



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 4

List View

General Information | [Contact](#) | [Default Values](#) | [Discount](#) | [Document Information](#) | [Clarification Request](#)

Procurement Folder: 1089736

Procurement Type: Central Master Agreement

Vendor ID: VS0000011255

Legal Name: CREATIVE BUS SALES INC

Alias/DBA:

Total Bid: \$0.00

Response Date: 10/12/2022

Response Time: 12:11

Responded By User ID: CreativeBus

First Name: Nick

Last Name: Corley

Email: biddepartment@creative1

Phone: 9094655528

SO Doc Code: CRFQ

SO Dept: 0810

SO Doc ID: DMT2300000004

Published Date: 9/21/22

Close Date: 10/12/22

Close Time: 13:30

Status: Closed

Solicitation Description: Mid Size, Medium Duty Cutaway Bus

Total of Header Attachments: 4

Total of All Attachments: 4



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder: 1089736
Solicitation Description: Mid Size, Medium Duty Cutaway Bus
Proc Type: Central Master Agreement

Solicitation Closes	Solicitation Response	Version
2022-10-12 13:30	SR 0810 ESR10122200000001858	1

VENDOR
VS0000011255
CREATIVE BUS SALES INC

Solicitation Number: CRFQ 0810 DMT2300000004
Total Bid: 0
Response Date: 2022-10-12
Response Time: 12:11:18
Comments: N/A

FOR INFORMATION CONTACT THE BUYER
David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	215018.000000	0.00

Comm Code	Manufacturer	Specification	Model #
25101502			

Commodity Line Comments: Our proposal includes pricing for all classes of vehicles.

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

CRFQ DMT23*04 - Exhibit A PRICING PAGE
Mid-Sized Medium Duty Transit Vehicles

VENDOR Creative Bus Sales

Manufac Glaval Legacy on 2023 Freightliner chassis'

Class	Item Description	Unit Price Per Vehicle	Estimated Quantity	Extended Price
A	Bus; Rear Air Suspension	\$216,802.00	8	\$1,734,416.00
B	Bus; Rear Air Suspension; Extended length +4	\$221,235.00	8	\$1,769,880.00
C	Bus; Rear Air Suspension; Extended length +8	\$226,833.00	8	\$1,814,664.00
D	Bus, Automatic Tire Chain Devices; full bus paint	\$215,018.00	5	\$1,075,090.00
E	Bus, Automatic Tire Chain Device; Extended length +4, full bus paint	\$224,854.00	5	\$1,124,270.00
F	Bus, Automatic Tire Chains Device; Extended length +8, full bus paint	\$231,087.00	5	\$1,155,435.00
G	Bus; Automatic Tire Chain Device: full bus paint;	\$215,018.00	5	\$1,075,090.00
			TOTAL	\$9,748,845.00

**Complete Form provided.*

**Please note these are only estimated quantities and do not reflect any guarantee of purchase.*

**The WV DPT may purchase more or less as needed.*



Table of Contents

State of West Virginia, Department of Administration – Purchasing Division
Solicitation Number CRFQ 0810 DMT2300000004
Mid-Size, Medium Duty Cutaway Bus:

1. Tab 1 – Letter of Transmittal
2. Tab 2 – Experience and Qualifications
3. Tab 3 – Required Documents
 - a. Bid Form 1 – Location of Technical Service Representative(s) and Parts Distribution Center(s)
 - b. Bid Form 2 – Certification for Air and Water Pollution
 - c. Bid Form 3 – Disadvantaged Business Enterprise, Vendors/Manufacturers Certification
 - d. Bid Form 4 – Buy America Certification, Rolling Stock
 - e. Bid Form 5 – Federal Motor Vehicle Safety Standards Certification
 - f. Bid Form 6 – U.S. Comptroller's Debarment List Certification
 - g. Bid Form 7 – Certification of Primary Participant Regarding Debarment, Suspension, and Other Responsibility Matters
 - h. Bid Form 8 – Vendor's Certification of Understanding and Acceptance
 - i. Bid Form 9 – Certification of Restrictions on Lobbying
 - j. Bid Form 10 – Required Bid Documentation Checklist
 - k. Contract Manager Form
 - l. Bid Forms and Certifications - Manufacturer
 - m. FMVSS Certification
 - n. Evidence of Insurance
 - o. Dealer License/ Business Registration
 - p. References
 - q. Training Letter of Understanding
 - r. Nearest Depot Location
 - s. Assembly/Conversion Location
 - t. Buy America Reports
 - u. Addendum 1
4. Tab 4 – Specifications
 - a. Body Construction
 - b. Floorplans
 - c. Weight Calculations
 - d. Altoona Test
 - e. Exceptions/Clarifications
5. Tab 5 – Supporting Documents



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

- a. Manufacturer Brochure
 - b. Chassis/Engine Brochure and Detail
 - c. Alternator Brochure and Detail
 - d. Seating Brochures
 - e. Driver's Seat Brochure
 - f. Wheelchair Lift Brochure
 - g. Wheelchair Securement Brochure
 - h. Wheelchair Securement Storage
 - i. Ambulatory/ADA Passenger Entrance/Exit Detail
 - j. Exterior Mirrors Brochure
 - k. HVAC Brochure
 - l. Flooring Brochure and Explanation
 - m. Water Test Process
 - n. Interlock Brochure
 - o. Undercoating Brochure
 - p. Corrosion Protection Brochure
 - q. Destination Sign
 - r. Farebox Location
 - s. PA System Brochure
 - t. Strobe Light Brochure
 - u. Security Camera Brochure
 - v. Back-up Camera Brochure
 - w. Back-up Alarm Brochure
 - x. Dual Purpose Safety Vent
 - y. Stepwell Heater
 - z. Transmission Description
 - aa. Tires Description
 - bb. AM/FM Radio/CD Brochure
 - cc. Paint and Graphic Examples
 - dd. CBS QA Program
 - ee. TVM, DBE Certification and Letter
 - ff. Authorized Signatory Letter
 - gg. Financial Stability Letter
6. Tab 6 – Warranty
- a. Warranty Information Document
 - b. Warranty Service Location Document
 - c. Manufacturer
 - d. Chassis/Engine
 - e. Transmission
 - f. Seating
 - g. Flooring



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

- h. Wheelchair Lift
- i. Wheelchair Securement
- j. Security Camera
- k. Back-Up Camera
- l. Exterior Mirrors
- m. Stepwell Heater
- n. Undercoating
- o. Dual Purpose Safety Vent
- p. Lighting
- q. CBS Warranty Process
- 7. Tab 7 – Price Proposal
 - a. Exhibit A Pricing Page
 - b. Centralized Request for Quote Pages



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Letter of Transmittal

Solicitation Number: CRFQ 0810 DMT2300000004

Bid Title: Mid Size, Medium Duty Cutaway Bus

Bid Due Date: Wednesday, October 12, 2022 @1:30pm EST

Mr. Pauline and the State of West Virginia Purchasing Division,

Thank you and the Department of Administration – Purchasing Division for the opportunity to submit a response to Solicitation # DMT2300000004.

Our understanding of the scope of work pertaining to this solicitation is to provide The State of West Virginia proposals for the manufacture and delivery of products in accordance with the terms and conditions set forth in this solicitation, meeting all specifications and FMVSS laws.

CBS's proposal may include manufacturer's brochures, standard warranty information, and additional technical information within our bid submittal. Information shown on these documents indicates our manufacturer's standard equipment or specifications and does not necessarily reflect the exact equipment to be utilized or included with the bid vehicle(s). Our vehicle is built to meet all bid specifications/amendments unless otherwise noted in our exceptions and clarification list. Our submittal takes no exceptions to the solicitation terms and conditions.

The resulting open-ended contract will be for an estimated forty-four (44) mid-size, medium duty cutaways buses with related necessary components, and selected options. The contract shall be a one (1) year contract with a one (1) year renewal allowable.

The information contained in our proposal contains our qualifications to perform the required work, detailed specifications, warranties, and descriptions of our facilities and staff.

Included are all the required documentation and general forms. If you need more information or clarification, please give us a call at 800.326.2877 with any inquiries.

Sincerely,

Nick Corley | Sales Operations Manager

Creative Bus Sales, Inc.

800-326-2877

ncorley@creativebussales.com



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Experience and Qualifications

Responder Information

Creative Bus Sales, Inc.
9365 Counselors Row, Suite 112
Indianapolis, Indiana, 46240

Mike Wilson | Director of Sales
Phone: 800.326.2877
Email: MikeW@CreativeBusSales.com

1. Background and Experience

Operating 23 full-service locations, Creative Bus Sales is the largest bus dealership in the United States representing over 20 major vehicle manufacturers. The Company's team of vehicle sales representatives possess over 560 years of cumulative vehicles sales experience, resulting in 5,000+ vehicles sold nationwide every year.

Creative Bus Sales is dedicated to servicing its customers at the highest possible level. Nationwide, the Company has in excess of 270 company operated service bays dedicated to pre-delivery inspections, warranty and service work. Green Alternative Systems (GAS), a division of Creative Bus Sales, has performed over 10,000 alternative fuel conversions (CNG, Propane, and Electric). Additionally, the Company is the only dealership in the nation to possess multiple Ford-certified, Qualified Vehicle Modifier (QVM) dealership locations.

Creative Bus Sales houses a dedicated customer service department to handle all pre- and post-sales needs of its customers. The Company has a team of 25+ dedicated outside and inside parts sales representatives responsible for handling all customer parts needs. Creative Bus Sales currently holds multiple State Purchasing Contracts, a partial listing of contracts is shown below.

Nationwide Transit Contract Experience (a partial listing of significant projects)

• Orange County Transit (OCTA)	Over 950 Paratransit Buses & Vans
• City of Los Angeles (LADOT)	Over 500 Paratransit Buses
• Caltrans/DGS	Over 5,000 Paratransit Buses & Vans
• RTC Las Vegas	Over 400 Paratransit & Transit Buses
• Access Services	Over 1,000 Paratransit Mini Vans
• Dallas DART	Over 400 Paratransit Buses
• Florida (FDOT)	Over 600 Paratransit Buses & Vans
• GSA	Over 350 Paratransit Buses
• Arizona Dept of Trans (ADOT)	Over 600 Paratransit Buses & Vans
• North Carolina (NCDOT)	Over 600 Paratransit Buses & Vans
• Texas (Multiple Contracts)	Over 1,200 Paratransit Buses & Vans
• Washington (WSDOT)	Over 650 Paratransit Buses & Vans
• Oregon (ODOT)	Over 300 Paratransit Buses & Vans
• Oklahoma (Multiple Contracts)	Over 400 Paratransit Buses & Vans
• New Mexico (NMDOT)	Over 450 Paratransit Buses & Vans



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Creative Bus Sales currently holds transit contracts and/or services customers in the following states: WA, OR, CA, NV, ID, MT, WY, UT, CO, AZ, NM, KS, OK, TX, IL, IN, AR, LA, MS, AL, GA, FL, NC, SC, PA, TN, MD, and MA.

Customer Service Capabilities

Creative Bus Sales' service locations are located within the contract requirements of all recipient's locations. The Creative Care and Technical team are available to assist immediately as needed. The Company has the authority to deploy internal and factory personnel from any discipline including engineering, manufacturing, parts, service and management in response to a customer's needs. No delay in problem resolution due to out of state factory personnel availability is experienced. Swift and accurate resolutions to issues and needs are achieved through factory personnel directly reviewing issues, "firsthand", as they are presented.

Creative Bus Sales has excellent relations with all major component manufacturers. The Company's Service Technicians and supervisory team are certified by John Deere, Cummins, A/C Carrier, MCC, Trans Air, Thermo King, Freedman Seating, Ricon, and Braun amongst many others. Service Technicians are graduates of the Automotive Technical College and many are Automotive Service Excellence (ASE) Master Technicians.

Creative Bus Sales' Parts and Service Department is dedicated solely to the service and support of commercial and transit buses and does not service any other type of equipment, school buses or trucks. Such focus ensures an unmatched level of competency in the industry. Technical assistance can be provided immediately during business hours by contacting Creative Bus Sales service technicians. Complete description of warranty policy and procedures can be provided upon award.

With over 5,000 units sold annually, Creative Bus Sales has the largest "fleet" of vehicles in service in the nation. This gives the Company the most vehicle performance data in the industry. The Company is exposed to issues with vehicles across the country in a variety of operating conditions. This data allows the Company to recognize issues well in advance of smaller dealers that do not service the volume of vehicles Creative Bus Sales does. This translates to quicker warranty approvals and repair execution for customers, as many times the Company has already seen the issue prior to receiving the call. Additionally, our technical support team has an information sharing process that communicates common issues and repairs, resulting in reduced troubleshooting times frames and quicker repairs. All of this allows the Company to get customer vehicles back up and running in the quickest manner possible, minimizing downtime for WVDOT.

List of Centers

One call to our dedicated Creative Care team will initiate immediate warranty service and technical response. Creative Bus Sales is an authorized repair facility for all products represented. The Company has the authority to make on the spot decisions regarding warranty repairs and approvals. In addition to the Company operated facilities, local warranty repair facilities will be authorized to perform the required repair on an as needed basis. Our intent is to make all warranty and service as



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

local as possible while providing the customer with the best possible service. Our team of certified technical advisors are available to assist with any necessary troubleshooting efforts. This ensures less downtime and a better overall experience to the end users.

Spare Parts and Inventory Levels

A critical part of the project is a quick response time to service assistance and parts supply. Creative Bus Sales operates dedicated parts warehousing operations with over 60,000 square feet of capacity and \$10,000,000 worth of inventory. The Company stocks significant parts supply at all its locations. In addition, the Company operates dedicated parts warehouses in Arizona, California, Florida, Indiana, Georgia, Pennsylvania, and Texas.

One call to our Parts Department will facilitate the end user's needs. With 25+ dedicated employees, Creative Bus Sales' Parts Department has over sixty years of cumulative experience in this field. Most parts can be shipped within twenty-four hours of order. Complete description of parts policy and procedures can be provided upon award.

Inspection procedures

Due to Creative Bus Sales' proximity to manufacturers locations, the Company has inspectors on site during vehicle builds. The Company has a team of inspectors located in Elkhart, Indiana that visits manufacturer facilities on an ongoing basis. This allows the Company to catch any potential issues during the build process, prior to customer receipt. Once completed at the manufacturer, vehicles are delivered to a Company location for additional inspection. In many cases these vehicles flow through Creative Bus Sales' Elkhart inspection facility immediately following completion. The Elkhart facility is over 50,000 square feet and processes deliveries of approximately 1,500 vehicles yearly. Any issues identified can be repaired in house or sent back to the manufacturer for repair. Next, vehicles are shipped to one of the Company's local facilities for final PDI (Pre-Delivery Inspection). This additional inspection allows the Company to catch any issues that may have occurred during the initial driving period of the vehicle. Any deficiency noted shall be repaired before delivery. All documents required under the contract shall be provided upon delivery or pickup. The Company inspection processes mentioned above are all in addition to any inspections performed by the manufacturer and/or line inspectors hired by the end user.

2. Key Personnel and Experience

Contract Management Team

- Tony Matijevich | President
- TJ Matijevich | Vice President Sales
- JR Sauder | Senior Vice President
- Mike Wilson | Director of Sales
- **Matt Mashuda | Sales Executive, Project Manager**
- Nick Corley | Sales Operations Manager
- Carl Henderson | Senior Director of Service
- Jamie Greenlaw | Fleet Warranty Administrator



3. Fiscal Responsibility

With a 40 year history, 23 locations nationwide, and 350+ employees, Creative Bus Sales has the necessary longevity and financial stability to service any contract of any size. Since 1980, the Company has grown to service customers in nearly every state in the U.S. More than 50% of the Company's facilities are owned facilities, not leased properties, with significant investment in renovations, equipment, and employees.

Creative Bus Sales has long standing relationships with vehicle floorplan providers and banking partners. Floorplan relationships go back 20+ years and the same goes for its banking relationships. The Company has achieved increased revenue, sales, and transaction growth year over year for the past 10+ years.

4. Delivery Performance

Creative Bus Sales prides itself on delivering vehicles on time with all specifications met. The Company has not paid liquidated damages on any transit contract in the past five (5) years.

5. Ownership History and Statement Regarding Judgements and Violations

Originally founded in 1980 as Creative Transportation Systems (CTS), the Company was later renamed Creative Bus Sales in 1990. The current owner, Tony Matijevich, purchased the Company in 1993 and it has been family-owned and operated since. Prior to purchasing Creative Bus Sales, Tony was the President of ElDorado National, the largest manufacturer of small and mid-size buses in the nation at the time. Under the current leadership and vision, Creative Bus Sales has become the largest-volume small, mid and large-size bus and van dealership in the United States. Over the past 40 years, the Company has expanded its scope through a combination of dealer acquisitions and organic growth.

Creative Bus Sales was incorporated in the State of California in 1993 under the current ownership. Creative Bus Sales has had no judgments, litigation, licensing violations or other violations outstanding or resolved against it within the past five (5) years.

6. Additional Information

Creative Bus Sales Nationwide Locations:

- | | |
|-------------------------|----------------------|
| 1. Chino, CA | 11. Rogers, AR |
| 2. Sacramento, CA | 12. Slidell, LA |
| 3. Canby, OR | 13. Jackson, MS |
| 4. Mukilteo, WA | 14. Elkhart, IN |
| 5. Phoenix, AZ | 15. Buffalo, NY |
| 6. Albuquerque, NM | 16. Canonsburg, PA |
| 7. Colorado Springs, CO | 17. Carlstadt, NJ |
| 8. Irving, TX | 18. Hudson, NH |
| 9. Lewisville, TX | 19. Jacksonville, FL |
| 10. Tyler, TX | 20. Davie, FL |



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

21. Orlando, FL
22. Charlotte, NC

23. College Park, GA

Notices should be sent c/o

Mike Wilson Creative Bus Sales, Inc. 9365 Counselors Row, Ste 112, Indianapolis, IN, 46240
Phone: 800.326.2877 Fax: 909-465-5529 Email: MikeW@CreativeBusSales.com

Preparer

Nick Corley, Sales Operations Manager for Creative Bus Sales, is the preparer of this proposal.

Flexible Scope

Creative Bus Sales is committed to flexibility in the products and services offered in the contract upon request by the State.

Independent Pricing

Creative Bus Sales certifies that in connection with this Contract the prices proposed have been arrived at without consultation, communication or agreement for the purpose of restricting competition.

Signer(s)

Each person signing this proposal and/or addenda is the person responsible for or authorized to make decisions as to the prices quoted in the cost proposal and has not participated and will not participate in any action contrary to those stated above.

Consent

If awarded a contract, Creative Bus Sales will not assign any part of its interest in the agreement without prior consent of the State.

Acceptance of Terms

Creative Bus Sales accepts the Contract Terms and Conditions.

Cutoff Dates

Creative Bus Sales agrees to comply with this section. Model year cutoffs are well communicated by the OEM's and chassis dealers alike. We generally receive 60 – 90 day notice and will notify the agency promptly.

Sincerely,

Nick Corley | Sales Operations Manager
Creative Bus Sales, Inc.

REQUEST FOR QUOTATION – CRFQ DMT23*04
Mid-Size – Medium Duty Cutaway Bus

BID FORM #1

Location(s) of the Technical Service Representative(s) and parts distribution center(s) closest or in the State of West Virginia.

Location(s) of the technical service representative(s).

Name: Matt Mashuda

Address: 9365 Counselors Row, Suite 112

Indianapolis, Indiana, 46240

Telephone: 463-234-94000

Name: _____

Address: _____

Telephone: _____

Location(s) of parts distribution center(s).

Name: Creative Bus Sales, Inc.

Address: 9365 Counselors Row, Suite 112

Indianapolis, Indiana, 46240

Telephone: 463-234-9400

Name: _____

Address: _____

Telephone: _____

BID FORM #2

CERTIFICATION FOR AIR & WATER POLLUTION


The Vendor certifies that the vehicles proposed:

ARE ✓ in compliance with the regulations in 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 600, Clean Water Act and the air/water pollution criteria established by the Environmental Protection Agency of the United States Government.

ARE NOT _____ in compliance with the regulations in 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 600, Clean Water Act and the air/water pollution criteria established by the Environmental Protection Agency of the United States Government.

10-10-2022

Date



- Nick Corley

Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

Company Name

BID FORM #3


**DISADVANTAGED BUSINESS ENTERPRISE
VENDORS/ MANUFACTURERS CERTIFICATION**

(Check appropriate statement)

_____ The Vendor, if a transit vehicle manufacturer, hereby certifies that it has complied with the requirements of 49 CFR Section 26.49 by submitting an annual DBE goal to the Federal Transit Administration (FTA). The goal has either been approved or not disapproved by FTA.

☒ The Vendor, if a non-manufacturing supplier, hereby certifies that the manufacturer of the transit vehicle to be supplied has complied with the above-referenced requirement of 49 CFR Section 26.49.

_____ 10-10-2022
Date

_____  - Nick Corley
Authorized Signature

_____ Sales Operations Manager
Title

_____ Creative Bus Sales, Inc.
Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*04
Mid-Size – Medium Duty Cutaway Bus

BID FORM #4

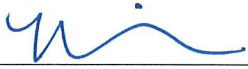
**BUY AMERICA CERTIFICATION
ROLLING STOCK**

Certificate of Compliance

The bidder or offeror hereby certifies that it will comply with the requirements of section 165(b) (3), of the Surface Transportation Assistance Act of 1982, as amended, and the applicable regulations of 49 CFR 661.11:

10-10-2022

Date



Authorized Signature

Creative Bus Sales, Inc.

Company Name

Nick Corley

Name

Sales Operations Manager

Title

Certificate for Non-Compliance

The bidder or offeror hereby certifies that it cannot comply with the requirements of section 165(b) (3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirement consistent with section 165(b) (2) or (b) (4) of the Surface Transportation Assistance Act, as amended, and the applicable regulations in 49 CFR 661.7.

Date

Authorized Signature

Company Name

Name

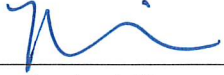
Title

BID FORM #5

**FEDERAL MOTOR VEHICLE
SAFETY STANDARDS CERTIFICATION**

The vendor hereby certifies that it shall submit, as required by Title 49 of the CFR, Part 663 - Subpart D, its self-certification information stating that the vehicle(s) will comply with the relevant Federal Motor Vehicle Safety Standards issued by the National Highway Traffic Safety Administration in Title 49 of the Code of Federal Regulations, Part 571.

10-10-2022
Date


Authorized Signature - Nick Corley

Sales Operations Manager
Title

Creative Bus Sales, Inc.
Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*04
Mid-Size – Medium Duty Cutaway Bus

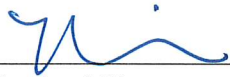
BID FORM #6
U.S. Comptroller's Debarment List Certification

____ Creative Bus Sales, Inc. _____ hereby certifies that it

____ **IS or**

☒ **IS NOT** (specify one) included on the U.S. GSA's debarment and suspension information available at <https://www.sam.gov>.

____ 10-10-2022 _____
Date

____  _____ - Nick Corley
Authorized Signature

____ Sales Operations Manager _____
Title

____ Creative Bus Sales, Inc. _____
Company Name

BID FORM #7

**CERTIFICATION OF PRIMARY PARTICIPANT REGARDING
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS**

The Primary Participant (applicant for an FTA grant or cooperative agreement, or potential contractor for a major third-party contract),

Creative Bus Sales, Inc. (COMPANY NAME) certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

If the primary participant (applicant for an FTA grant, or cooperative agreement, or potential third-party contractor) is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT (APPLICANT FOR AN FTA GRANT OR COOPERATIVE AGREEMENT, OR POTENTIAL CONTRACTOR FOR A MAJOR THIRD-PARTY CONTRACT),
Creative Bus Sales, Inc., CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.



- Nick Corley, Sales Operations Manager

Signature and Title of Authorized Official

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

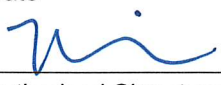
BID FORM #8

***VENDOR'S CERTIFICATION OF
UNDERSTANDING AND ACCEPTANCE***

The Vendor hereby certifies that all Technical Specifications and Contract Terms and Conditions have been carefully reviewed, are fully understood, and shall be adhered to in performance and completion of any contract resulting from this bid.

10-10-2022

Date

 - Nick Corley

Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

Company Name

SPECIFICATION COMPLIANCE

NOTE: Please check if what is offered is in exact compliance with specifications. **Any discrepancies required be listed as an attachment to the bid proposal. Exact dimensions and/or descriptions must be provided as a part of the Vendor's bid proposal when submitted.**

- ☒ * Bid proposal submitted meets and/or exceeds all specification requirements.
- ☐ Bid proposal submitted contains deviations from specification requirements. Detailed descriptions of these deviations have been provided with this bid proposal.

**All specification deviations have been approved per Addendum 1. Supporting documentation is included in our proposal.*

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

BID FORM #9

CERTIFICATION OF RESTRICTIONS ON LOBBYING

The undersigned (Vendor, Contractor) certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influence or attempt to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress regarding the award of a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, or the extension, continuation, renewal, amendment, or modification of any Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance.
2. If any funds other than Federal appropriated funds have been or will be paid to any person to influence or attempt to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or any employee of a Member of Congress in connection with any application for a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, the undersigned assures that it will complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," Rev. 7-97; and
3. The undersigned understands that the language of this certification shall be included in the award documents for all sub awards at all tiers (including subcontracts, sub grants, sub agreements, and contracts under grants, loans (including a line of credit), cooperative agreements, loan guarantees, and loan insurance.

Undersigned understands that this certification is a material representation of fact upon which reliance is placed by the Federal government and that submission of this certification is a prerequisite for providing a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance for a transaction covered by 31 U.S.C. 1352. The undersigned also understands that any person who fails to file a required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The (Vendor, Contractor) Creative Bus Sales, Inc., certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contractor) understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

10-10-2022
Date


- Nick Corley
Authorized Signature

Sales Operations Manager
Title

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

Documentation – to be submitted with bid:

Referenced

- ☒ 3.2 Engine: An ISB-10 Engine (6.7 liter) with EGR and Diesel Particulate Filter exhaust system – provide product description, warranty information and product literature.
- ☒ 3.2.8 High Idle System: provide product description, warranty information and product literature.
- ☒ 3.4 Transmission (separate cooling system): provide product description, warranty information and product literature.
- ☒ 3.5.4 Back Up Camera System: provide product description, warranty information and product literature.
- ☒ 3.10 Tires: provide product description, warranty information and product literature.
- ☒ 3.15.5 Alternator: provide product description, warranty information and product literature.
- ☒ 3.1.11 Water Testing: provide details of water testing procedures.
- ☒ 3.14 f. Exterior Vinyl Colors: provide samples/chart of available colors.
- ☒ 3.15 Undercoating and Rustproofing: provide product description, warranty information and literature.
- ☒ 3.16.2 Ambulatory Passenger Entrance/Exit: provide location, size, door operating details.
- ☒ 3.16.8 Stepwell Heater: provide product description, warranty information and product literature.
- ☒ 3.22 Floor Covering: provide samples of floor covering and colors to be provided.
- ☒ 3.27 Seating: provide product description, warranty information, product literature and color charts for all of the seating products to be utilized. **Proposed floor plans.**
- ☒ 3.27.11 Driver's Seat: provide description of product.
- ☒ 3.27.1 Exterior Mirrors: provide product description, warranty information and product literature.
- ☒ 3.19 Dual Purpose Safety Vent: provide product description, warranty information and product literature.
- ☒ 3.30 Wheelchair Securement System: provide product description, warranty information and product literature.
- ☒ 3.37 Strap/Buckle Storage: provide description and location of product.

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

- ☒ 3.31 Wheelchair Occupant Restraint System: provide product description, warranty information and product literature.
- ☒ 3.32 Wheelchair Lift: provide Make, Model #, product description, warranty information and product literature.
- ☒ 3.34 AM/FM Radio/CD: provide product description, warranty information and product literature.
- ☒ 3.39 Training: submit letter of understanding to the terms in this Section.
- ☒ 3.38.4 Fare box Provisions: provide description of proposed location.
- ☒ 3.38.1 Destination Signs: provide product description, warranty information and product literature.
- ☒ 3.38.5 PA System: provide product description and product literature.
- ☒ 3.21.15 Strobe Light: provide product description and product literature.
- ☒ 3.28.11 Security Cameras Only: provide product description, warranty information and product literature.
- ☒ 4.10 Security Camera System Including Playback: provide product description, warranty information and product literature.
- ☒ 4.15 Warranty on complete vehicle.
- ☒ 4.16 Warranty on Basic Vehicle Structure.
- ☒ 4.17.1 Warranty: warranties to be provided on subsystems and components.
- ☐ N/A 6.1.2 Complete two (2) bids in binder form – one (1) marked for DPT.
- ☒ 10.2 A. Complete mechanical description of vehicle, its construction and equipment including manufacturer's model name and /or number. Include description of front and rear air conditioning and heat systems.
- ☒ 21 Proposed interior floor plans, showing detailed dimensions including the location of the wheelchair securement system and stanchions.
- ☒ 10.2 C. Curb weight (empty weight) and gross vehicle weight rating (GVWR) of vehicle.
- ☒ 10.2 D. Samples or paint charts of available exterior paint colors and vinyl.
- ☒ 10.2 H. Identification of the conversion location of the van.

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

- ✓ 10.2 I. A list of five (5) users names, addresses, emails, and telephone numbers who have been provided similar equipment by the Vendor.
- ✓ No Debt Affidavit
- ✓ Addendum Acknowledgement

REQUEST FOR QUOTATION – CRFQ DMT23*04
Mid-Size – Medium Duty Cutaway Bus

- 17.1.3 Delivery Payment/Risk of Loss:** Standard order delivery shall be F.O.B. destination to the Agency's designated location. Vendor shall include the cost of standard order delivery charges in its bid pricing/discount and is not permitted to charge the Agency separately for such delivery.

18. VENDOR DEFAULT:

- 18.1** The Following shall be considered a vendor default under this Contract.
- 18.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.
 - 18.1.2 Failure to comply with other specifications and requirements contained herein.
 - 18.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.
 - 18.1.4 Failure to remedy deficient performance upon request.
- 18.2** The Following remedies shall be available to Agency upon default.
- 18.2.1 Immediate cancellation of the Contract.
 - 18.2.2 Immediate cancellation of one or more release orders issued under this Contract.
 - 18.2.3 Any other remedies available in law or equity.

20. MISCELLANEOUS:

- 19.1 No Substitutions:** Vendor shall supply only Vehicles as submitted in response to the Solicitation unless a contract modification is approved in accordance with the provisions contained in this Contract.
- 19.2 Vendor Supply:** Vendor must carry sufficient inventory of the Contract Items being offered to fulfill its obligations under this Contract. By signing its bid, Vendor certifies that it can supply the Contract Items contained in its bid response.
- 19.3 Contract Manager:** During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: Matt Mashuda
Telephone Number: 412-992-0184
Fax Number: 909-465-5529
Email Address: BidDepartment@CreativeBusSales.com

BID FORM #2

CERTIFICATION FOR AIR & WATER POLLUTION

The Vendor certifies that the vehicles proposed:

ARE ✓ in compliance with the regulations in 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 600, Clean Water Act and the air/water pollution criteria established by the Environmental Protection Agency of the United States Government.

ARE NOT _____ in compliance with the regulations in 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 600, Clean Water Act and the air/water pollution criteria established by the Environmental Protection Agency of the United States Government.

10/6/2022

Date



Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

BID FORM #3

**DISADVANTAGED BUSINESS ENTERPRISE
VENDORS/ MANUFACTURERS CERTIFICATION**

(Check appropriate statement)

☒ The Vendor, if a transit vehicle manufacturer, hereby certifies that it has complied with the requirements of 49 CFR Section 26.49 by submitting an annual DBE goal to the Federal Transit Administration (FTA). The goal has either been approved or not disapproved by FTA.

☐ The Vendor, if a non-manufacturing supplier, hereby certifies that the manufacturer of the transit vehicle to be supplied has complied with the above-referenced requirement of 49 CFR Section 26.49.

10/6/2022

Date



Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*04
Mid-Size – Medium Duty Cutaway Bus

BID FORM #4


**BUY AMERICA CERTIFICATION
ROLLING STOCK**

Certificate of Compliance

The bidder or offeror hereby certifies that it will comply with the requirements of section 165(b) (3), of the Surface Transportation Assistance Act of 1982, as amended, and the applicable regulations of 49 CFR 661.11:

10/6/2022

Date



Authorized Signature

Forest River Bus, LLC

Company Name

Scott Defrees

Name

Government Bid Team Manager

Title

Certificate for Non-Compliance

The bidder or offeror hereby certifies that it cannot comply with the requirements of section 165(b) (3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirement consistent with section 165(b) (2) or (b) (4) of the Surface Transportation Assistance Act, as amended, and the applicable regulations in 49 CFR 661.7.

Date

Authorized Signature

Company Name

Name

Title

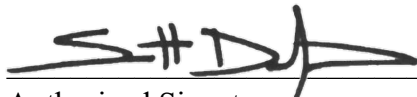
BID FORM #5

**FEDERAL MOTOR VEHICLE
SAFETY STANDARDS CERTIFICATION**

The vendor hereby certifies that it shall submit, as required by Title 49 of the CFR, Part 663 - Subpart D, its self-certification information stating that the vehicle(s) will comply with the relevant Federal Motor Vehicle Safety Standards issued by the National Highway Traffic Safety Administration in Title 49 of the Code of Federal Regulations, Part 571.

10/6/2022

Date

A handwritten signature in black ink, appearing to be 'S#D', written over a horizontal line.

Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

BID FORM #6
U.S. Comptroller's Debarment List Certification

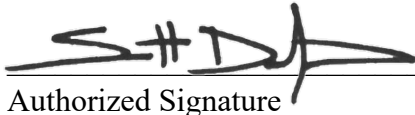
Forest River Bus, LLC _____ hereby certifies that it

_____ **IS or**

X **IS NOT** (specify one) included on the U.S. GSA's debarment and suspension information available at <https://www.sam.gov>.

10/6/2022

Date



Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

BID FORM #7

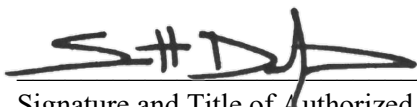
**CERTIFICATION OF PRIMARY PARTICIPANT REGARDING
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS**

The Primary Participant (applicant for an FTA grant or cooperative agreement, or potential contractor for a major third-party contract),
Forest River Bus, LLC _____ (COMPANY NAME) certifies to the best
of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

If the primary participant (applicant for an FTA grant, or cooperative agreement, or potential third-party contractor) is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT (APPLICANT FOR AN FTA GRANT OR COOPERATIVE AGREEMENT, OR POTENTIAL CONTRACTOR FOR A MAJOR THIRD-PARTY CONTRACT),
Scott Defrees, Forest River Bus, LLC _____, CERTIFIES OR AFFIRMS THE
TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED
ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31
U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.



Government Bid Team Manager

Signature and Title of Authorized Official

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

BID FORM #8

***VENDOR'S CERTIFICATION OF
UNDERSTANDING AND ACCEPTANCE***

The Vendor hereby certifies that all Technical Specifications and Contract Terms and Conditions have been carefully reviewed, are fully understood, and shall be adhered to in performance and completion of any contract resulting from this bid.

10/6/2022

Date



Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

SPECIFICATION COMPLIANCE

NOTE: Please check if what is offered is in exact compliance with specifications. **Any discrepancies required be listed as an attachment to the bid proposal. Exact dimensions and/or descriptions must be provided as a part of the Vendor's bid proposal when submitted.**

_____ Bid proposal submitted meets and/or exceeds all specification requirements.

X _____ Bid proposal submitted contains deviations from specification requirements. Detailed descriptions of these deviations have been provided with this bid proposal.

REQUEST FOR QUOTATION
Passenger Type Dual Rear Tire Van (Non-Raised Roof)

BID FORM #9

CERTIFICATION OF RESTRICTIONS ON LOBBYING

The undersigned (Vendor, Contractor) certifies, to the best of his or her knowledge and belief, that:


1. No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influence or attempt to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress regarding the award of a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, or the extension, continuation, renewal, amendment, or modification of any Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance.
2. If any funds other than Federal appropriated funds have been or will be paid to any person to influence or attempt to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or any employee of a Member of Congress in connection with any application for a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, the undersigned assures that it will complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," Rev. 7-97; and
3. The undersigned understands that the language of this certification shall be included in the award documents for all sub awards at all tiers (including subcontracts, sub grants, sub agreements, and contracts under grants, loans (including a line of credit), cooperative agreements, loan guarantees, and loan insurance.

Undersigned understands that this certification is a material representation of fact upon which reliance is placed by the Federal government and that submission of this certification is a prerequisite for providing a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance for a transaction covered by 31 U.S.C. 1352. The undersigned also understands that any person who fails to file a required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The (Vendor, Contractor) Forest River Bus, LLC, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contractor) understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

10/6/2022

Date


Authorized Signature

Government Bid Team Manager

Title



FOREST RIVER BUS

2367 CENTURY DRIVE · GOSHEN, INDIANA 46528 · 1.800.348.7440

FMVSS/CMVSS Compliance Summary 2022

**Starcraft Bus, StarTrans Bus, Glaval Bus, Eldorado Bus,
Champion Bus - Commercial Product Only**

This vehicle conforms to all applicable U.S Federal Motor Vehicle Safety Standards and Canadian Motor Vehicle Safety Standards in effect on the date of manufacture

C/FMVSS No.	Standard Description	Compliance Action
101	Control Location, Identification and Illumination	Forest River Bus does not alter the OEM controls or displays. Any aftermarket seats and/or controls or displays subject to the standard meet this standard. Test data on file.
102	Transmission Shift Lever Sequence, Starter Interlock & Transmission Braking Effect	Compliance is deferred to the chassis manufacturer.
103	Windshield Defrosting & Defogging Systems	Compliance is deferred to the chassis manufacturer.
104	Windshield Wiping & Washing Systems	Compliance is deferred to the chassis manufacturer.
105	Hydraulic Brake Systems	Test data kept on file for vehicles that have had the frame stretched, or have had other system modifications. For Non-stretched vehicles compliance is deferred to the chassis manufacturer.
106	Brake Hoses	Vehicles with stretched frames have additional lines installed by chassis modifiers using OEM components. Other vehicles that have had system modifications use OEM or OEM-approved components and are tested for compliance. For Non-stretched vehicles compliance is deferred to the chassis manufacturer.
108	Lamps, Reflective Devices & Associated Equipment	Forest River Bus does not alter OEM lighting. Additional lighting to include brake, turn, clearance and reverse lamps meet standard. Data on file.
108.1	Alternative Requirements for Headlamps	Forest River Bus does not alter OEM lighting. Compliance is deferred to the chassis manufacturer.
110	Tire Selection and Rim for Motor Vehicles with a GVWR of 4,536kg (10,000 lbs.) or Less	Forest River Bus does not manufacture vehicles with a GVWR of 4,536kg (10,000 lbs.) or Less.
111	Rear View Mirrors	All aftermarket mirrors installed by Forest River Bus meet this standard and DOT regulations. Data on file.
112	Headlamp Concealment Devices	Forest River Bus does not manufacture vehicles with headlamp concealment devices.
113	Hood latch systems	Compliance is deferred to the chassis manufacturer.
114	Theft Protection	Compliance is deferred to the chassis manufacturer.
115	Vehicle Identification Number	Compliance is deferred to the chassis manufacturer.
116	Hydraulic Brake Fluids	Forest River Bus does not alter brake systems. Vehicles with stretched frames have additional fluid added by chassis modifiers using OEM instruction and materials. All other system modifications utilize only OEM- approved fluid. For Non-stretched vehicles compliance is deferred to the chassis manufacturer.
118	Power Operated Window, Partition, and Roof Panel Systems	Compliance is deferred to the chassis manufacturer.
120	Tire Selection and Rim for Motor Vehicles with a GVWR of 4,536kg (10,000 lbs.) or More	Compliance is deferred to the chassis manufacturer.
121	Air Brake Systems	Vehicles with stretched frames have additional lines installed by chassis modifiers using OEM components. Other vehicles that have had system modifications use OEM or OEM-approved components and are tested for compliance. For Non-stretched vehicles compliance is deferred to the chassis manufacturer.
124	Accelerator Control Systems	Forest River Bus does not alter the OEM accelerator system, with the exception of the addition of aftermarket fast idle systems on some vehicles. These systems meet this standard when installed in accordance with instructions.
125	Warning Devices	All vehicles manufactured by Forest River Bus that are equipped with aftermarket (3) triangle kit meet this standard.
131	School Bus Pedestrian Safety Devices	All vehicles manufactured by Forest River Bus are not completed to be used as school buses.
135	Light Vehicle Brake System with a GVWR of 3,500kg (7,716lbs.) or Less	Forest River Bus does not manufacture vehicles with a GVWR of 3,500kg (7,716 lbs.) or Less.
201	Occupant Protection in Interior Impact	All vehicles applicable to the standard (under 10,000 lbs.) do not have alterations made that affect the compliance to this standard. Compliance is deferred to the chassis manufacturer.
202	Head Restraints	All vehicles applicable to the standard (under 10,000 lbs.) have seating installed that meets this standard. Compliance is deferred to the chassis manufacturer.

This vehicle conforms to all applicable U.S Federal Motor Vehicle Safety Standards and Canadian Motor Vehicle Safety Standards in effect on the date of manufacture

203	Impact Protection for the Driver from the Steering Control System	Compliance is deferred to the chassis manufacturer.
204	Steering Control Rearward Displacement	Compliance is deferred to the chassis manufacturer.
205	Glazing Materials	No modifications are made to the OEM Glazing materials. Additional glazing materials meet the standard. Data on file.
206	Door Locks and Door Retention Devices	All vehicles manufactured by Forest River Bus (non-buses) that are subject to this standard have no modifications made which affect compliance to the standard. Compliance is deferred to the chassis manufacturer.
207	Seating System	All seating installed by Forest River Bus meets this standard. Test data on file.
208	Occupant Crash Protection	No alterations are made to the OEM seat belts, air bag systems or associated hardware. Any seat belt systems added meet the standard. Test data on file.
209	Seat Belt Assemblies	No alterations are made to the OEM seat belts or associated hardware. Any seat belt systems added meet the standard. Test data on file.
210	Seat Belt Assembly Anchorage	No alterations are made to the OEM seat belts or associated hardware. Seat belt systems and their installation meet the standard. Test data on file.
210.1	User-ready Tether Anchorages for Restraint System	No alterations are made to the OEM seat belts or associated hardware. Seat belt systems and their installation meet the standard. Data on file.
210.2	Lower Universal Anchorage Systems for Restraint Systems and Booster Cushions	No alterations are made to the OEM seat belts or associated hardware. Seat belt systems and their installation meet the standard. Data on file.
212	Windshield Mounting	Compliance is deferred to the chassis manufacturer.
213	Child Restraint Systems	Vehicles manufactured by Forest River Bus that are subject to this standard (under 10,000 lbs.) have seating installed that meets this standard. Test data on file.
213.4	Built-in Child Restraint Systems and Built-in Booster Cushions	Vehicles manufactured by Forest River Bus that are subject to this standard (under 10,000 lbs.) have seating installed that meets this standard. Test data on file.
214	Side Impact Protection with a GVWR of 4,536kg (10,000 lbs.) or Less	Forest River Bus does not manufacture vehicles with a GVWR of 4,536kg (10,000 lbs.) or Less
216	Roof Crush Resistance	Forest River Bus does not manufacture vehicles that are subject to this standard.
217	Bus Window Retention and Release	No modifications are made to the OEM windows. Additional windows meet the standard. Test data on file.
219	Windshield Zone Intrusion	Compliance is deferred to the chassis manufacturer.
220	School Bus Rollover Testing	All vehicles manufactured by Forest River Bus are not completed to be used as school buses, however, Forest River Bus does test vehicles to meet standard.
221	School Bus Body Joint Strength	All vehicles manufactured by Forest River Bus are not completed to be used as school buses, however, Forest River Bus does test vehicles to meet standard.
222	School Bus Passenger Seating and Crash Protection	All vehicles manufactured by Forest River Bus are not completed to be used as school buses.
225	Child Restraint Anchorage Systems	Vehicles manufactured by Forest River Bus that are subject to this standard (under 10,000 lbs.) have seating installed that meets this standard.
301	Fuel System Integrity	Compliance is deferred to the chassis manufacturer.
301.1	LPG Fuel System Integrity	Compliance is deferred to the chassis manufacturer.
301.2	CNG Fuel System Integrity	Compliance is deferred to the chassis manufacturer.

This vehicle conforms to all applicable U.S Federal Motor Vehicle Safety Standards and Canadian Motor Vehicle Safety Standards in effect on the date of manufacture

302	Flammability of Interior Materials	Materials installed in the interior of Forest River Bus products meet the standard. Test data on file.
303	Fuel System Integrity of Compressed Natural Gas Systems	Forest River Bus does not typically produce vehicles with CNG systems. All vehicles equipped with CNG systems exceed the applicability (10,000 lbs. or less) of this standard.
304	Compressed Natural Gas Fuel Container Integrity	Forest River Bus does not typically produce vehicles with CNG systems. All vehicles equipped with CNG systems exceed the applicability (10,000 lbs. or less) of this standard.
305	Electrolyte Spillage and Electrical Shock Protection	Forest River Bus does not produce vehicles that use electricity as propulsion power.
403	Platform Lift System for Motor Vehicles	Forest River Bus does not alter the platform lift system. Forest River Bus install lift system in strict compliance with the manufacturers installation instructions. Forest River Bus meets strength requirements. Test data on file.
404	Platform Lift Installation on Motor Vehicles	Compliance is deferred to the lift manufacturer.
1106	Noise Emissions	Forest River Bus does not alter the OEM Chassis in the area which is stated in the incomplete vehicle documents. Data on file.

Signed: 

Date: 01/04/2022

Title: Compliance and Customer Service Manager



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

7/13/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION** IS **WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Woodruff-Sawyer & Co. 2 Park Plaza, Suite 500 Irvine CA 92614	CONTACT NAME: Audrey Curtis PHONE (A/C, No, Ext): 949-435-7345 E-MAIL ADDRESS: acurtis@woodruffssawyer.com	FAX (A/C, No):
INSURED Creative Bus Sales, Inc. 9365 Counselors Row # 200 Indianapolis, IN 42640	License#: 0329598 CREABUS-01	
INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A: Zurich American Insurance Company		16535
INSURER B: Landmark American Insurance Company		33138
INSURER C: Everest Indemnity Insurance Company		10851
INSURER D: Endurance American Insurance Company		10641
INSURER E:		
INSURER F:		

COVERAGES**CERTIFICATE NUMBER: 747623805****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input checked="" type="checkbox"/> LOC OTHER:			GLO038187407	7/1/2022	7/1/2023	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$1,000,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$4,000,000 \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			GP038180307	7/1/2022	7/1/2023	COMBINED SINGLE LIMIT (Ea accident) \$2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
B	<input type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$			LHA254101	7/1/2022	7/1/2023	EACH OCCURRENCE \$2,000,000 AGGREGATE \$2,000,000 \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input type="checkbox"/>	N/A	WC038095407	7/1/2022	7/1/2023	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
C	Excess Liability			XC1EX00558221	7/1/2022	7/1/2023	Occ/Agg \$3,000,000
D	Excess Liability			ELD30021915100	7/1/2022	7/1/2023	Occ/Agg \$4,000,000
A	Garagekeepers Legal			GP038180307	7/1/2022	7/1/2023	Limit: \$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Dealers Inventory
Policy Number: QT6305R702920TIL22
Carrier: Travelers Casualty Insurance Company of America NAIC: 19046
Effective: 7/1/2022 Expiration: 7/1/2023
Limit: \$84,050,000

CERTIFICATE HOLDER**CANCELLATION**

Evidence of Insurance

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**CREATIVE BUS SALES, INC.
14740 RAMONA AVE
CHINO, CA 91710-5747**

BUSINESS REGISTRATION ACCOUNT NUMBER: 2336-7201

This certificate is issued on: **12/5/2016**

*This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.



Creative Bus Sales

CRFQ 0810 DMT2200000004 Mid Size Medium Duty Vehicles

10.2.I References

Beacon College
Eric Johnston
352.638.9784
ejohnston@beaconcollege.edu

Friendship Circle
Rabbi Shuey Biston
954.796.7330
shueybiston@gmail.com

Matthews Specialty Vehicles
Dennis Hoag
877.905.4678
dhoag@msvehicles.com



Creative Bus Sales

TRAINING ACKNOWLEDGEMENT LETTER

Creative Bus Sales is hereby acknowledgement and understanding of the training responsibilities of a successful bidder outlined in the procurement specification in section 3.39

We look forward to working with the customers to maximize their success with the buses we provide to them by facilitating the training described.



Creative Bus Sales

CRFQ 0810 DMT2200000004 Mid Size Medium Duty Vehicles

10.2 F Nearest Depot Location

The nearest full service Creative Bus Sales depot is located at 57475 County Road 3 Elkhart Indiana. Activities to take place at this location are:

- Final vehicle clean
- Test Drive
- Component functionality review
- PDI for quality control
- Parts depot



Creative Bus Sales

CRFQ 0810 DMT2200000004 Mid Size Medium Duty Vehicles

10.2 H Conversion Location

The vehicles will be constructed at 2367 Century Drive Goshen Indiana.

Activities to take place at this location are:

- Chassis receipt and prep
- Body construction and component installation
- Receive customer factory tour if requested by customer
- Body Paint if necessary
- Water test
- Test Drive
- Component functionality review
- Factory PDI for quality control

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 30" 199"WB ON FREIGHTLINER S2C	Glaval Bus		<u>74.72%</u>	<u>25.28%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	53.07%	
Rear/Front Bumper	Romeo	U.S.	0.62%	
Exterior Mirrors	ROSCO	U.S.	0.32%	
A/C System	Trans Air	U.S.	5.91%	
Destination Sign(s)	Transign	U.S.	2.22%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.44%	
Wheelchair Lift	Braun	U.S.	2.76%	
Wheelchair Restraints	Q'Straint	U.S.	0.64%	
Seating	Freedman	U.S.	8.07%	
DVR/NVR	AngelTrax	U.S.	0.69%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.13%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids

TITLE

10/10/2022

DATE

Scott Defrees
PRINT NAME

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 32' 238"WB ON FREIGHTLINER S2C	Glaval Bus		<u>74.61%</u>	<u>25.39%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	52.24%	
Rear/Front Bumper	Romeo	U.S.	0.60%	
Exterior Mirrors	ROSCO	U.S.	0.31%	
A/C System	Trans Air	U.S.	5.78%	
Destination Sign(s)	Transign	U.S.	2.17%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.43%	
Wheelchair Lift	Braun	U.S.	2.70%	
Wheelchair Restraints	Q'Straint	U.S.	0.63%	
Seating	Freedman	U.S.	9.08%	
DVR/NVR	AngelTrax	U.S.	0.67%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.09%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids

TITLE

10/10/2022

DATE

Scott Defrees
PRINT NAME

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 36' 279"WB ON FREIGHTLINER S2C	Glaval Bus		<u>74.55%</u>	<u>25.45%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	51.41%	
Rear/Front Bumper	Romeo	U.S.	0.59%	
Exterior Mirrors	ROSCO	U.S.	0.31%	
A/C System	Trans Air	U.S.	5.68%	
Destination Sign(s)	Transign	U.S.	2.13%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.42%	
Wheelchair Lift	Braun	U.S.	2.65%	
Wheelchair Restraints	Q'Straint	U.S.	0.62%	
Seating	Freedman	U.S.	10.09%	
DVR/NVR	AngelTrax	U.S.	0.66%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.05%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids

TITLE

10/10/2022

DATE

Scott Defrees
PRINT NAME

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 30' 199"WB ON FREIGHTLINER S2C	Glaval Bus		<u>75.12%</u>	<u>24.88%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	52.39%	
Rear/Front Bumper	Romeo	U.S.	0.61%	
Exterior Mirrors	ROSCO	U.S.	0.31%	
A/C System	Trans Air	U.S.	5.81%	
Destination Sign(s)	Transign	U.S.	2.18%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.43%	
Wheelchair Lift	Braun	U.S.	2.71%	
Wheelchair Restraints	Q'Straint	U.S.	0.63%	
Seating	Freedman	U.S.	7.93%	
DVR/NVR	AngelTrax	U.S.	0.67%	
Tire Chains	OnSpot	U.S.	1.45%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.10%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids
TITLE

10/10/2022
DATE

Scott Defrees
PRINT NAME

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 32' 238"WB ON FREIGHTLINER S2C	Glaval Bus		<u>76.47%</u>	<u>23.53%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	52.69%	
Rear/Front Bumper	Romeo	U.S.	0.60%	
Exterior Mirrors	ROSCO	U.S.	0.31%	
A/C System	Trans Air	U.S.	5.77%	
Destination Sign(s)	Transign	U.S.	2.17%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.43%	
Wheelchair Lift	Braun	U.S.	2.69%	
Wheelchair Restraints	Q'Straint	U.S.	0.63%	
Seating	Freedman	U.S.	9.07%	
DVR/NVR	AngelTrax	U.S.	0.67%	
Tire Chains	OnSpot	U.S.	1.44%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.08%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids
TITLE

10/10/2022
DATE

Scott Defrees
PRINT NAME

Glaval Bus**Pre-Award BUY AMERICA CERTIFICATION**

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COMPONENT NAME	MANUFACTURER NAME		% U.S. CONTENT	%FOREIGN CONTENT
LEGACY 36' 279"WB ON FREIGHTLINER S2C	Glaval Bus		<u>74.91%</u>	<u>25.09%</u>
SUBCOMPONENT NAME	MANUFACTURER NAME	MFG LOCATION	% OF TOTAL	
Chassis	FREIGHTLINER	U.S.	50.69%	
Rear/Front Bumper	Romeo	U.S.	0.58%	
Exterior Mirrors	ROSCO	U.S.	0.30%	
A/C System	Trans Air	U.S.	5.60%	
Destination Sign(s)	Transign	U.S.	2.10%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.42%	
Wheelchair Lift	Braun	U.S.	2.61%	
Wheelchair Restraints	Q'Straint	U.S.	0.61%	
Seating	Freedman	U.S.	9.95%	
DVR/NVR	AngelTrax	U.S.	0.65%	
Tire Chains	OnSpot	U.S.	1.40%	

MAJOR ACTIVITIES UNDERTAKEN AT THE FINAL ASSEMBLY LOCATION

All purchasing of raw and assembled materials including the chassis, fabrication and welding of the frame, prime paint, installation of all wood, fabric, FRP, aluminum and/or other body panel and/or trim materials, installation of doors and windows, HVAC components and systems, electrical systems, installation of any required options such as wheel chair lifts, tie down kits, seats, radios and optional electronic items, if any, complete undercoat, exterior paint and/or graphics if ordered, full road test, rain booth test and all other final quality functions as needed to ensure compliance with the contract.

FINAL ASSEMBLY LOCATION: 2367 CENTURY DRIVE, GOSHEN, IN 46528

BODY V.I.N. OF UNITS DELIVERED UNDER POST DELIVERY BUY AMERICA:

TBD

FINAL ASSEMBLY % OF TOTAL COST NOT INCLUDED IN THE MATERIAL COSTS ABOVE:

2.02%

FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE

\$3,097.57


AUTHORIZED SIGNATURE

Government Bids
TITLE

10/10/2022
DATE

Scott Defrees
PRINT NAME



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote

Proc Folder: 1089736

Doc Description: Mid Size, Medium Duty Cutaway Bus

Reason for Modification:

Addendum No. 1

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2022-09-21	2022-10-12 13:30	CRFQ 0810 DMT2300000004	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: VS0000011255

Vendor Name : Creative Bus Sales, Inc.

Address : 9365 Counselors Row, Suite 112

Street :

City : Indianapolis

State : Indiana

Country : U.S.A.

Zip : 46240

Principal Contact : Matt Mashuda

Vendor Contact Phone: 412-992-0184

Extension:

FOR INFORMATION CONTACT THE BUYER

David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X

FEIN# 33-0388707

DATE 10-10-2022

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION

Addendum No. 1

To respond to vendor technical questions, see attached
To made changes to the specifications or modify specifications, see attached.
To move bid opening date to October 12, 2022, at 1:30 pm est.

No other changes.

****Federal Terms and Conditions Apply****

INVOICE TO

PUBLIC TRANSIT DIVISION
OF
BLDG 5 RM 663

1900 KANAWHA BLVD E
CHARLESTON WV
US

SHIP TO

PUBLIC TRANSIT DIVISION
OF
KANAWHA VALLEY
REGIONAL
TRANSPORTATION
AUTHORITY

1550 FOURTH AVE
CHARLESTON WV
US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA		

Comm Code**Manufacturer****Specification****Model #**

25101502

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

SCHEDULE OF EVENTS**Line****Event****Event Date**

1

Vendor Technical Questions Due 11:00 am est.

2022-09-20

	Document Phase	Document Description	Page 3
DMT2300000004	Draft	Mid Size, Medium Duty Cutaway Bus	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFQ DMT2300000004

Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as CRFQ DMT2200000004 to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☒ Modify bid opening date and time
- ☒ Modify specifications of product or service being sought
- ☒ To respond to technical questions
- ☐ Attachment of pre-bid sign-in sheet
- ☐ Correction of error
- ☐ Other

Additional Documentation:

1. To respond to vendor technical questions, see attached
2. To made changes to the specifications or modify specifications, see attached responses to questions which contain the specification changes.
3. To move bid opening date to October 12, 2022, at 1:30 pm est.
4. No other changes.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

CRFQ 0810 DMT 23-4

Vendor Questions / Agency Responses:

Question: Please require the use of Docket 90 for the vinyl upholstery and have the polyurethane foam completely encapsulated by the vinyl, also please approve the use of Docket 90 Vinyl for this sonication.

Answer: The Division is requiring the use of Docket 90 for all vinyl upholstery and have the polyurethane foam completely encapsulated.

Question: Will the Division allow the Solicitation Due date to be moved to October 12, 2022?

Answer: The Division will move the Solicitation Due date to October 12, 2022.

Question: Section 3.1.11 Water Test. Will the Division allow the use of our Rain Booth as approved equal for water leakage testing?

Answer: The Division will allow the use of the Rain Booth testing as equal.

Question: Section 3.2.8 will the Division accept the use of Intermotive Interlock as an approved equal?

Answer: The Division will accept Intermotive Interlock as approved equal.

Question: Section 3.8.8 Rear End Alignment, please accept that a rear end alignment is not available on a Freightliner Chassis.

Answer: It is understood that a Rear End Alignment isn't available on this type of vehicle.

Question: Section 3.11.6 please accept the OEM powder coated battery box and tray as an approved equal.

Answer: The Division will accept the power coated battery box and tray as equal.

Question: Section 3.11.6 will the Division accept one OEM master disconnect switch rather than 2 disconnect switches?

Answer: The Division will accept the one OEM disconnect switch as equal.

Question: Section 3.14.1 Body Construction please accept our Body Construction: Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral aluminized steel frame that is thoroughly coated in our primer paint shop, then mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

Answer: The Division will accept this method of body construction as equal.

Question: Section 3.14.3 please accept T-140 Aluminized Steel case as approved equal?

Answer: The Division will accept this request as equal.

Question: Section 3.14.3 please accept ZPG-9902S Anti-Corrosion as equal?

Answer: The Division will accept this request as equal.

Question: Section 3.14.4 will the Division accept that exterior materials will be zinc coated, nickel coated, or stainless steel in lieu of being painted to provide “additional corrosion protection?”

Answer: The Division will accept this request.

Question: Section 3.14.13 will the Division accept Gavaneal Steel as equal?

Answer: The Division will accept Gavaneal Steel as equal.

Question: Section 3.17.1 Undercoating will the Division accept Z Guard 9902 Star for the undercoating of each vehicle?

Answer: The Division will accept Z Guard 9902 for the undercoating.

Question: Section 3.19.6 is a rear door required?

Answer: A rear door isn't necessary.

Question: Section 3.20.5 will the Division accept Trans Air TA777132 Dual Super 10,15 CID Compressor Air Conditioning System as an approved equal?

Answer: The Division will accept Trans Air TA777132 Dual Super 10,15 CID Compressor Air Conditioning System as an approved equal?

Question: Section 3.24.4 Stepwells and walkways will the Division accept Gerfor Sirius Graphite Flooring and step nosing in a color to contrast?

Answer: The Division will accept this as approved equal.

Question: Section 3.25.5 is a stanchion pole required behind the rear most passenger seat?

Answer: The Division will remove Section 3.25.5

Question: Section 3.27.10 Please clarify that one double seat, with both seats being ICS capable is required?

Answer: The Division is only asking that there are 2 ICS installed on 2 seats, not on a double seat.

Question: Section 3.34.1 SYNC radio is specified, and this is a Ford radio, please specify what radio capabilities is required.

Answer: The Division is asking for an AM/FM radio that can be paired to a cell phone for hands free operation.

Question: Section 3.38.1 Please specify if Twin Vision or Transign is required?

Answer: The Division is asking for the front and side digital destination signs to have the characteristics outlined in Section 3.38.

Question: Section 4.1 being that this vehicle is a truck chassis, will the Division be flexible on the ground to first step measurements?

Answer: The Division will allow up to 2" difference in what is specified.

Question: Section 4.3 what is expected for Class D as the specs state that it should match Class A but also states Class C, should this read Class D?

Answer: This is a clerical error, it should be Class D.

Question: Section 4.6, it appears Class D and Class G have the same requirements?

Answer: It is a clerical error; they are the same requirements but both fields in Exhibit A **MUST BE FILLED OUT.**

Question: Section 3.24 Floor and Floor Covering please remove filled and replace with heat welded only.

Answer: The Division will accept either method of sealing the floors.

Question: Section 3.24.4 please remove RCA Transit Flooring the company went out of business in March of 2022.

Answer: The Division will remove RCA Transit Flooring for the specification.

Question: Section 3.24.6 refers to RCA flooring, please remove.

Answer: The Division will remove Section 3.24.6 from the Specifications.

Question: Section 3.24.7 please remove; it refers to RCA flooring.

Answer: The Division will remove Section 3.24.7 since it refers to RCA flooring.

Question: Section 3.24.4 Please accept Gerflor's Tarabus as equal.

Answer: The Division will accept Gerflor Tarabus flooring as equal.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DMT2300000004

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Creative Bus Sales, Inc.
Company

Authorized Signature

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote

Proc Folder: 1089736			Reason for Modification: Addendum No. 1
Doc Description: Mid Size, Medium Duty Cutaway Bus			
Proc Type: Central Master Agreement			
Date Issued	Solicitation Closes	Solicitation No	Version
2022-09-21	2022-10-12 13:30	CRFQ 0810 DMT2300000004	2

BID RECEIVING LOCATION

BID CLERK
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PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: VS0000011255
Vendor Name : Creative Bus Sales, Inc.
Address : 9365 Counselors Row, Suite 112
Street :
City : Indianapolis
State : Indiana **Country :** U.S.A. **Zip :** 46240
Principal Contact : Matt Mashuda
Vendor Contact Phone: 412-992-0184 **Extension:**

FOR INFORMATION CONTACT THE BUYER

David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X

FEIN# 33-0388707

DATE 10-10-2022

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ADDITIONAL INFORMATION

Addendum No. 1

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WV

SHIP TO

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 REGIONAL
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 AUTHORITY

1550 FOURTH AVE
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WV

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$216,802.00	\$216,802.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class A, 23+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$221,235.00	\$221,235.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class B, 27+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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WV

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$226,833.00	\$226,833.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class C, 31+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$215,018.00	\$215,018.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class D, 23+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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Proc Folder: 1089736

Doc Description: Mid Size, Medium Duty Cutaway Bus

Reason for Modification:

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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$224,854.00	\$224,854.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class E, 27+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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Doc Description: Mid Size, Medium Duty Cutaway Bus

Reason for Modification:

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1550 FOURTH AVE
 CHARLESTON WV
 US

WV

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$231,087.00	\$231,087.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class F, 31+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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State of West Virginia
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Proc Folder: 1089736

Doc Description: Mid Size, Medium Duty Cutaway Bus

Reason for Modification:

Addendum No. 1

Proc Type: Central Master Agreement

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1550 FOURTH AVE
 CHARLESTON WV
 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Mid Size, Medium Duty Cutaway Bus	0.00000	EA	\$215,018.00	\$215,018.00

Comm Code	Manufacturer	Specification	Model #
25101502	2023 Glaval Legacy	Class G, 23+2	Freightliner

Extended Description:

See Attached Exhibit A Pricing Page

To establish an open ended contract for Mid-Size, Medium Duty Cutaway Buses o provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

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LEGACY BODY FRAME CONSTRUCTION

The following information is submitted for all Glaval Bus products proposed for this IFB as supporting documentation of the structural soundness and impact resistance of the bodies manufactured. All vehicles are built using virtually the same materials with some minor differences in the height and width of cross members due to entry floor heights and/or body width variations.

A representative set of construction prints provided by engineering supplements this verbal accounting of our materials and assembly specifications.

If, in the reviewing of these written technical specifications and engineering frame prints submitted any questions arise, please contact us immediately for any clarification or help in interpretation and understanding.

3.0 Body Construction – General Frame Construction

Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral aluminized steel frame that is thoroughly coated in our primer paint shop, then mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

3.0.1 Floor frame construction and assembly –

- 3.0.1.1 Cross Members -- The floor cross members form the base structural support for the rest of the frame components. Our cross members are constructed of 11 gauge aluminized steel, formed to a capital “C” shape. Cross members over the fuel tank are made to provide the clearance needed to conform with FMVSS301, and include formed internal reinforcements welded in place for additional strength. All additional longitudinal and latitudinal structure is flush welded in place to form a one piece floor upon completion.
- 3.0.1.2 Aluminized steel “Hat Posts” – 1”x1”x4” run the length of the floor between cross members and are welded into place. This extremely strong form is used to weld our HSLA steel seat track in place.
- 3.0.1.3 Aluminized steel C Channel – 1”x1.5” C channel is welded in between cross members the full length of the floor in 5 places. Coupled with the Hat Posts this provides a one-piece strong “ladder” type frame for the flooring.
- 3.0.1.4 Seat Track – 12 gauge roll formed high strength/low alloy steel is wire welded in place for seat mounting down each side of the bus, with lengths predicated on the floor plan chosen. This is yet another stiffener in our extensive construction process.



- 3.0.1.5 Wheel Wells -- Constructed of 14 gauge aluminized steel, wheel wells are also welded in during the floor construction process. All seams in the wheel well are welded to create a one piece water resistant wheel housing structure. The wheel wells also provide additional strength to the body assembly, when welded in place.
- 3.0.1.6 Structural Aluminized steel Angle – 1/8” thick 1.5” x 2.5” structural aluminized steel angle is used the full perimeter length of each floor assembly, welded to the ends of all floor cross members. This provides not only a flat plane for joining the sidewall assembly, but also ties all cross members together and provides additional side impact resistance.
- 3.0.1.7 Additional structure – When adding vertical stanchions, wheel chair lifts and/or tie down options, additional structure is welded into the floor at locations specified by our engineering department on CAD drawings.

3.0.2 Sidewall Construction –

- 3.0.2.1 Sidewall vertical member – The heart of our sidewall is the vertical structure, a roll formed 18 gauge aluminized steel capital “C” channel with 8 bends that create extreme strength and rigidity. The vertical member is installed in full lengths and in shorter sections below window frames. Additional vertical structure is used at both ends of the sidewall enabling the structure to withstand the forces applied by the vehicle when in motion. Using the open C member also enables a thorough primer application.
- 3.0.2.2 Aluminized steel Tubing – 1”x1” lower and 1”x3” upper 16 gauge aluminized steel tubing is welded in horizontally between vertical members to frame in window openings. This adds front to rear reinforcement as well.
- 3.0.2.3 Seat Track – 11 gauge high strength low alloy roll formed aluminized steel track is welded down each sidewall below the window frame. While serving as a seat attaching device, it adds excellent structure to the sidewall and also adds excellent side impact resistance.
- 3.0.2.4 Wheelchair Options – Add another layer of metal. Depending on track locations, another structure of 11 gauge thick aluminized steel is welded in place between each vertical member for attaching a shoulder belt mount. Also, additional structure is added to accommodate wheelchair door frames – either 1”x1” or 1”x2” 16 gauge wall aluminized steel tubing..
- 3.0.2.5 Full length aluminized steel tubing – 1”x1” 16 gauge aluminized steel tubing is stitch welded to the sidewall bottom and top at each vertical member for attaching to the floor and roof sections, respectively.

3.0.3 Rear Wall Construction –

- 3.0.3.1 Rear wall vertical member – The vertical sidewall capital “C” channel with 8 bends is also used in the rear wall assembly. Full length structure is used at varying places, depending on choice of rear window, or rear door. Shorter cut pieces are used above windows and doors. Additional side windows used with the rear door also change the configuration.



- 3.0.3.2 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is welded horizontally between vertical members to provide a window frame in the standard product, and used as an upper door frame in the optional rear assembly.
- 3.0.3.3 Full length aluminized steel tubing – 1"x1" 16 gauge aluminized steel tubing is stitch welded to the rear wall top and bottom as in the sidewall assembly.

3.0.4 Roof Construction –

- 3.0.4.1 Roof Bows – Radius formed one-piece 16 gauge aluminized steel roof bows formed as a modified hat post design with eight bends for exceptional strength and located on 16" centers (the closest in the industry), including 4 bends in the web similar to our vertical sidewall aluminized steel provide a roof structure capable of taking severe loads. They are then capped with top flat pieces from flange to flange to provide abundant surface area for securing the exterior roof material.
- 3.0.4.2 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1" x 3" 16 gauge aluminized steel tubing to all upper window openings as required. A full perimeter is also welded on to mate the roof to the sidewall and rear wall, with short vertical pieces providing support on the front and rear ends. The 3" wide aluminized steel tube supplies a structural mounting surface for shoulder belt attachment and has been pull tested to federal standards.

3.0.5 Driver Compartment Overhead Halo –

- 3.0.5.1 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is cut and jig welded into an integrated one piece structure spanning from the front roof bow of the body to the newly cut roof line of the cab. Also created during the structure manufacture is the housing for mounting the electronic circuit board.
- 3.0.5.2 11 Gauge Aluminized steel – formed to make brackets used to mount to the chassis roof.

3.0.6 False Floor (Cab to body transition) –

- 3.0.6.1 Aluminized steel Tubing – 2" x2" (taller when needed) 16 gauge aluminized steel tubing is welded together forming a flat body floor transition from the step area back to the actual body area. An overhang on the curbside provides a secure attach point frontally for the entry door frame added later.
- 3.0.6.2 Structural aluminized steel angle – 11 gauge 1.5"x1.5" structural angle is added in short lengths five places to provide attachment points to the chassis floor.

3.0.7 Interior Vertical Transition Frames –

- 3.0.7.1 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is used vertically and a ladder type assembly is made welding the 1x 1 tube to .75"x.75" 11 gauge aluminized steel tube that is used horizontally in the assemblies. These pieces



transition from the body fronts on each side to the driver halo side assembly and the entry door frame assembly on the curbside.

3.0.8 Entry Door & Step Assembly Frame –

3.0.8.1 Aluminized steel Tubing – 1"x1" 16 gauge and .75"x.75" 11 gauge aluminized steel tube is cut to length and welded together in a ladder type construction forming a rigid frame for attaching the entry door/step assembly.

3.0.9 Entry Door/Step Assembly –

3.0.9.1 11 Gauge Aluminized steel – The step riser/tread piece is manufactured from one-piece 11 gauge aluminized steel and uses 90° bends at all risers and treads. The bottom tread also adds an additional 90° bend for additional strength and safety. Upper and lower side pieces are then attached and an 11 gauge flat plate with holes is used to bridge the lower and upper side pieces, then is stitch welded and plug welded to form a strong one piece assembly prior to inserting and welding to the entry step framing.

APPLICATION OF EXTERIOR SIDEWALL MATERIAL

GALVANIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

The exterior is .024" galvanized steel pre-painted white with an underlayment of 5/32" luan.

The interior is 5/32" luan covered with a light gray FRP or padded vinyl.

The foam filled aluminized steel cage is placed in the center and all layers are adhered using polyurethane hot melt adhesive. The entire assembly is then sent through a pressure application roller system to assure adhesion.

Composite FRP exterior sidewall panels are installed using the same method.

Should any further questions arise, please contact your Glaval Bus representative.

Technical drawing of the interior layout of a vehicle, showing seating, fuel access panel, ICS, farebox, and stanchion poles. Dimensions are provided in feet and inches.

Overall dimensions:

- Length: $234\frac{1}{2}$
- Width: 96
- Overall length including front section: $356\frac{3}{16}$
- Overall width including front section: $42\frac{3}{8}$

Seating and Component Dimensions:

- Top row seats: 28 , $30\frac{1}{2}$, $30\frac{1}{2}$, $30\frac{1}{2}$, $32\frac{1}{2}$, 34 , 34 , 11
- Bottom row seats: 28 , 42 , 42 , 42 , $13\frac{3}{8}$
- Fuel Access Panel: 42
- ICS (Individual Control System): 42
- Farebox: $47\frac{1}{2}$
- Stanchion Pole: 10
- Overall length of main section: 199

Labels:

- FUEL ACCESS PANEL
- ICS
- FAREBOX
- STANCHION POLE

DEALER APPROVAL

☐ APPROVED

CUSTOMER SIGNATURE

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REV.
L.F.T.

DESCRIPTION OF CHANGE

BY

CHK

DATE _____

ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

	+ 1/8"
--	--------

-10°
$+10^\circ$

OTHER

+ 1/16"

 $+ 1/2^\circ$

DATE: 06/02/21

NAME: LDH

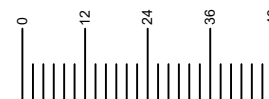
NAME:	
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GLAVAL BUS
Buses for the new millenium

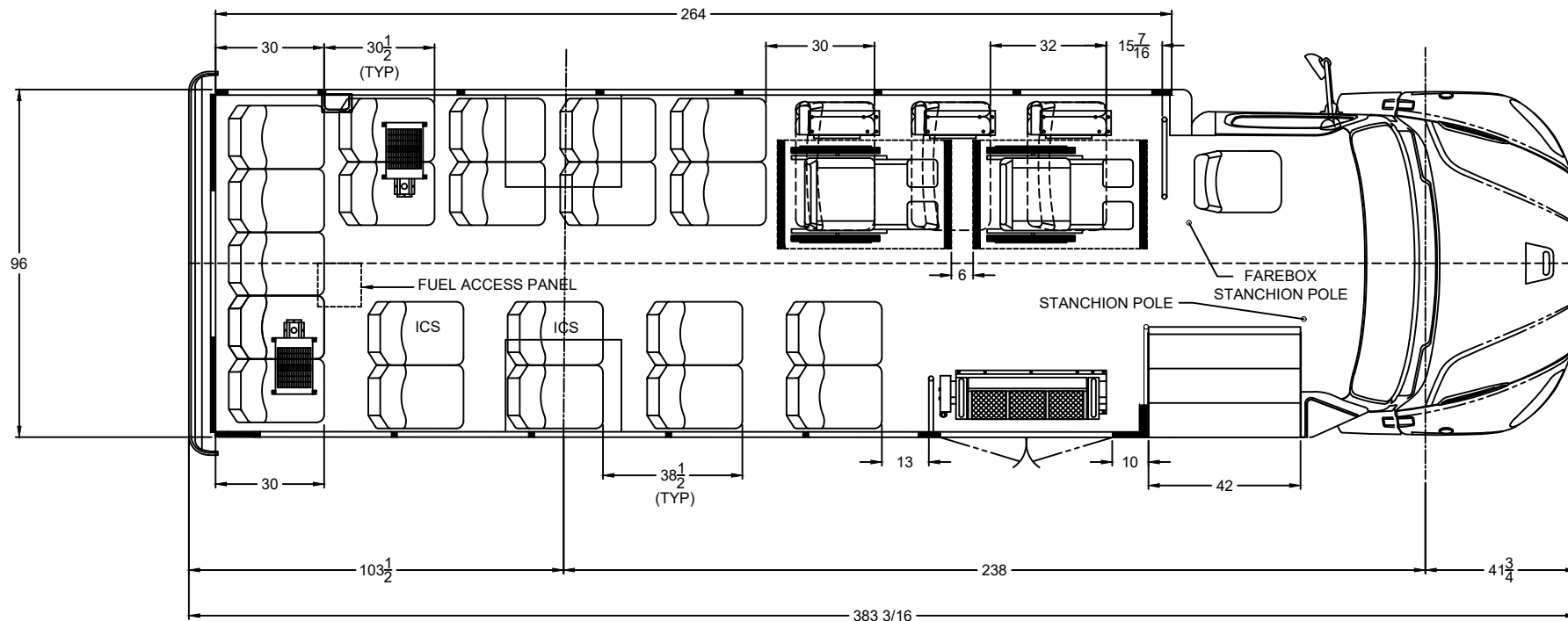
TITLE:	17/2 WC 199" WB 235" BDY MODEL 30
--------	--------------------------------------

NAME:	
DATE:	15 AUG 2001 10:10:00

SCALE
IN INCHES



CLASS B, E



NOTE: SHOWN WITH MID HI FREEDMAN SEATS
LEGACY 25,900 GVWR
THIS FLOOR PLAN IS FOR ILLUSTRATION PURPOSES ONLY.
A WEIGHT ANALYSIS HAS NOT YET BEEN PERFORMED.
FINAL APPROVAL WITH A WEIGHT ANALYSIS IS REQUIRED UPON RECEIPT OF A
COMPLETED ORDER WITH ALL OPTIONS SHOWN.
OPTIONAL EQUIPMENT MAY BE SHOWN.
THE SALES ORDER PLACED DICTATES ACTUAL OPTION CONTENT.

DEALER APPROVAL

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SCALE
IN INCHES



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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

± 1°

± 1/2°

DATE: 06/14/21

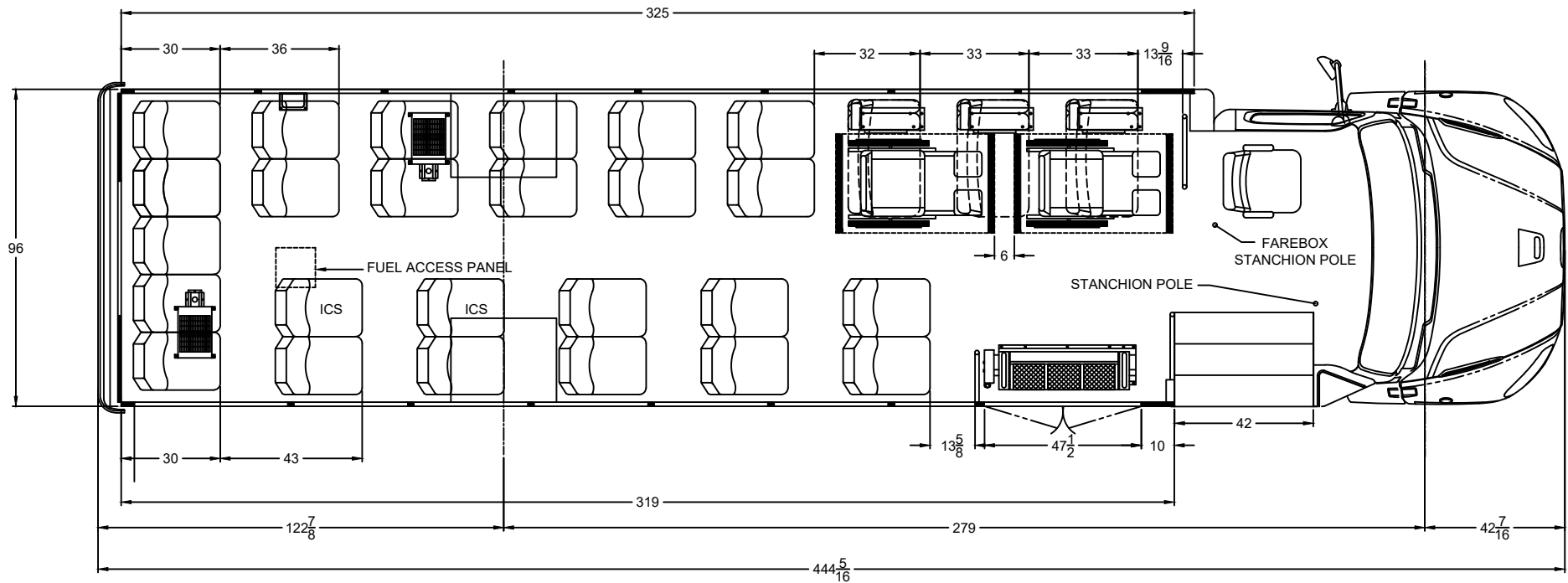
NAME: LDH

DWG. No. 21 2 WC 3 DBL FOLD 238 WB 264 BDY-3 USA

GLAVAL BUS
Buses for the new millennium

TITLE: 21 2 WC 238" WB 264" BDY
MODEL 32

CLASS C, F



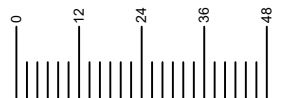
NOTE: SHOWN WITH MID HI FREEDMAN SEATS
LEGACY FREIGHTLINER CHASSIS 96" WIDE
25,900 GVWR
THIS FLOOR PLAN IS FOR ILLUSTRATION PURPOSES ONLY.
A WEIGHT ANALYSIS HAS NOT YET BEEN PERFORMED.
FINAL APPROVAL WITH A WEIGHT ANALYSIS IS REQUIRED UPON RECEIPT OF A
COMPLETED ORDER WITH ALL OPTIONS SHOWN.
OPTIONAL EQUIPMENT MAY BE SHOWN.
THE SALES ORDER PLACED DICTATES ACTUAL OPTION CONTENT.

DEALER APPROVAL

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SCALE
IN INCHES



GLAVAL BUS
Buses for the new millenium

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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

± 1°

± 1/2°

DATE: 06/14/21

NAME: LDH

DWG. No. 25 2 WC 3 DB FOLDS 279 325-1 USA

TITLE: 25/2 W/C 279" WB 325" BDY
MODEL 36

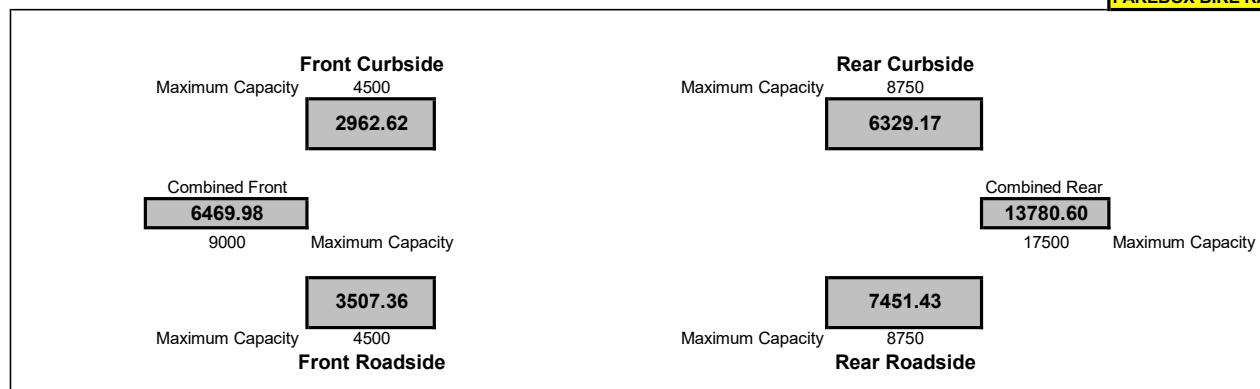
CLASS A, D, G

WEIGHT ANALYSIS

6/24/2021 17 2 WC 3 DB FOLDS 199 235 BDY-5 USA EST WA

INPUT AREAS=						FUEL LOAD ADJ. DATA (F.L.A.)					
VEHICLE DESCRIPTION:		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PER GAL.				
				FLINER	DIESEL	40	7.1				
WHEELBASE		PER IN. VALUE CALC.	AXLE WEIGHTS			FUEL AMT.	WGT OF FUEL	FUEL ADJ. AMT.			
199		0.50	LEFT FRONT	RIGHT FRONT		0.13	284	-36.92			
AXLE CAPACITIES			6688	3420	3268	FUEL TANK CENTER		DEALER			
FRONT	REAR	TOTAL		LEFT REAR	RIGHT REAR		261				
9000	17500	25850	9520	4878	4642						
LEFT (ROADSIDE)						RIGHT (CURBSIDE)					
	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	
DRIVER	40	150	20.10%	119.85	30.15	159	-55	79.90%	-11.06	-43.94	DB
DB FOLD	102	-85	51.26%	-41.43	-43.57	192	-55	96.48%	-1.93	-53.07	DB
DB FOLD	150	-85	75.38%	-20.93	-64.07	225	-55	113.07%	7.19	-62.19	DB
			0.00%	0.00	0.00	258	-55	129.65%	16.31	-71.31	DB
DB	197	-55	98.99%	-0.55	-54.45	291	-55	146.23%	25.43	-80.43	DB
DB	228	-55	114.57%	8.02	-63.02			0.00%	0.00	0.00	
DB	258	-55	129.65%	16.31	-71.31	145	-73	72.86%	-19.81	-53.19	1/2 FRT TC80
DB	289	-55	145.23%	24.87	-79.87	257	-73	129.15%	21.28	-94.28	1/2 REAR TC80
			0.00%	0.00	0.00			0.00%	0.00	0.00	
BIKE RACK	-40	-55	-20.10%	-66.06	11.06	163	355	81.91%	64.22	290.78	DB
ROMEO F	-40	20	-20.10%	24.02	-4.02	205	355	103.02%	-10.70	365.70	DB
ROMEO R	311	20	156.28%	-11.26	31.26	247	355	124.12%	-85.63	440.63	DB
28GA GALV BELLY	189	131.25	94.97%	6.60	124.65	289	357	145.23%	-161.46	518.46	HB DB
1/2 FRT TC80	145	-73	72.86%	-19.81	-53.19	289	91	145.23%	-41.16	132.16	1/2 SINGLE
1/2 REAR TC80	257	-73	129.15%	21.28	-94.28			0.00%	0.00	0.00	
2 3 FAN CONDS	128	89	64.32%	31.75	57.25	-40	-55	-20.10%	-66.06	11.06	BIKE RACK
DB FOLD	94	385	47.24%	203.14	181.86	-40	20	-20.10%	24.02	-4.02	ROMEO F
DB FOLD	128	385	64.32%	137.36	247.64	311	20	156.28%	-11.26	31.26	ROMEO R
DB FOLD	162	385	81.41%	71.58	313.42	189	131.25	94.97%	6.60	124.65	28GA GALV BELLY
DB	197	355	98.99%	3.57	351.43			0.00%	0.00	0.00	
DB	228	355	114.57%	-51.73	406.73	290	50	145.73%	-22.86	72.86	1/2 TA 77
DB	258	355	129.65%	-105.25	460.25			0.00%	0.00	0.00	
HB DB	289	357	145.23%	-161.46	518.46			0.00%	0.00	0.00	
1/2 SINGLE	289	91	145.23%	-41.16	132.16			0.00%	0.00	0.00	
1/2 TA 77	290	50	145.73%	-22.86	72.86			0.00%	0.00	0.00	
TOTAL PASSENGER LOAD				125.85	2411.40				-266.89	1525.14	3795.50
AXLE WEIGHTS				3420.00	4878.00				3268.00	4642.00	16208.00
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
			LEFT	3507.36	7451.43	10958.79	0.541				
			RIGHT	2962.62	6329.17	9291.79	0.459				
			FRT / REAR TOTALS	6469.98	13780.60	20250.58					
			AXLE CAPACITIES	9000	17500	25850					
			AVAILABLE CAPACITIES	2530.02	3719.40	5599.42					

101484PT (2) TC 80 RT AC SYSTEMS FAREBOX
FAREBOX BIKE RACK 3/4 MAR MID HI



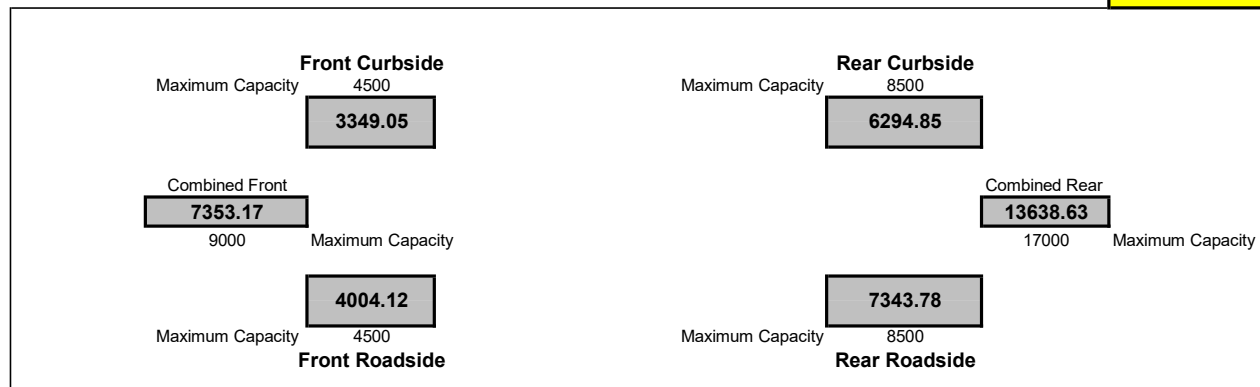
CLASS B, E

WEIGHT ANALYSIS

6/24/2021 21 2 WC 3 DBL FOLD 238 WB 264 BDY-3 USA EST WA

INPUT AREAS=							FUEL LOAD ADJ.	DATA (F.L.A.)			
VEHICLE DESCRIPTION:		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PER GAL.				
				FLINER	DIESEL	60	7.1				
WHEELBASE		PER IN. VALUE CALC.		AXLE WEIGHTS		FUEL AMT.	WGT OF FUEL	FUEL ADJ. AMT.			
238		0.42		LEFT FRONT	RIGHT FRONT	0.25	426	-106.50			
AXLE CAPACITIES			7105	3649	3456	FUEL TANK CENTER		DEALER			
FRONT	REAR	TOTAL		LEFT REAR	RIGHT REAR	300					
9000	17000	25850	9197	4785	4412						
LEFT (ROADSIDE)						RIGHT (CURBSIDE)					
	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	
DRIVER	40	150	16.81%	124.79	25.21	158	-55	66.39%	-18.49	-36.51	DB
DB FOLD	93	-85	39.08%	-51.79	-33.21	218	-55	91.60%	-4.62	-50.38	DB
DB FOLD	124	-85	52.10%	-40.71	-44.29	251	-55	105.46%	3.00	-58.00	DB
DB FOLD	155	-85	65.13%	-29.64	-55.36	284	-55	119.33%	10.63	-65.63	DB
DB	193	-55	81.09%	-10.40	-44.60	317	-55	133.19%	18.26	-73.26	DB
DB	224	-55	94.12%	-3.24	-51.76	317	-16	133.19%	5.31	-21.31	1/2 SINGLE
DB	255	-55	107.14%	3.93	-58.93			0.00%	0.00	0.00	
DB	286	-55	120.17%	11.09	-66.09			0.00%	0.00	0.00	
DB	317	-55	133.19%	18.26	-73.26	163	355	68.49%	111.87	243.13	DB
1/2 SINGLE	317	-16	133.19%	5.31	-21.31	202	355	84.87%	53.70	301.30	DB
DB FOLD	97	385	40.76%	228.09	156.91	240	355	100.84%	-2.98	357.98	DB
DB FOLD	130	385	54.62%	174.71	210.29	279	355	117.23%	-61.16	416.16	DB
DB FOLD	162	385	68.07%	122.94	262.06	317	357	133.19%	-118.50	475.50	DB
DB	195	355	81.93%	64.14	290.86	317	91.5	133.19%	-30.37	121.87	1/2 SINGLE
DB	226	355	94.96%	17.90	337.10	-41	-55	-17.23%	-64.47	9.47	BIKE RACK
DB	256	355	107.56%	-26.85	381.85	238	-62.5	100.00%	0.00	-62.50	MORRYDE
DB	287	355	120.59%	-73.09	428.09	202	33.35	84.87%	5.04	28.31	5/8M TO 3/4 M
DB	317	357	133.19%	-118.50	475.50	290	-24	121.85%	5.24	-29.24	R-60
1/2 SINGLE	317	91.5	133.19%	-30.37	121.87	202	146.8	84.87%	22.21	124.59	GALV BELLY METAL
BIKE RACK	-41	-55	-17.23%	-64.47	9.47			0.00%	0.00	0.00	
MORRYDE	238	-62.5	100.00%	0.00	-62.50			0.00%	0.00	0.00	
5/8M TO 3/4 M	202	33.35	84.87%	5.04	28.31			0.00%	0.00	0.00	
R-60	290	-24	121.85%	5.24	-29.24			0.00%	0.00	0.00	
2 3 FAN COND	124	88	52.10%	42.15	45.85			0.00%	0.00	0.00	
GALV BELLY METAL	202	146.8	84.87%	22.21	124.59			0.00%	0.00	0.00	
TOTAL PASSENGER LOAD				396.73	2357.42				-65.33	1681.48	4370.30
AXLE WEIGHTS				3649.00	4785.00				3456.00	4412.00	16302.00
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
			LEFT	4004.12	7343.78	11347.90	0.541				
			RIGHT	3349.05	6294.85	9643.90	0.459				
			FRT / REAR TOTALS	7353.17	13638.63	20991.80					
			AXLE CAPACITIES	9000	17000	25850					
			AVAILABLE CAPACITIES	1646.83	3361.37	4858.20					

102184PT 5/8 MAR ROMEO REAR MID HI SEATS

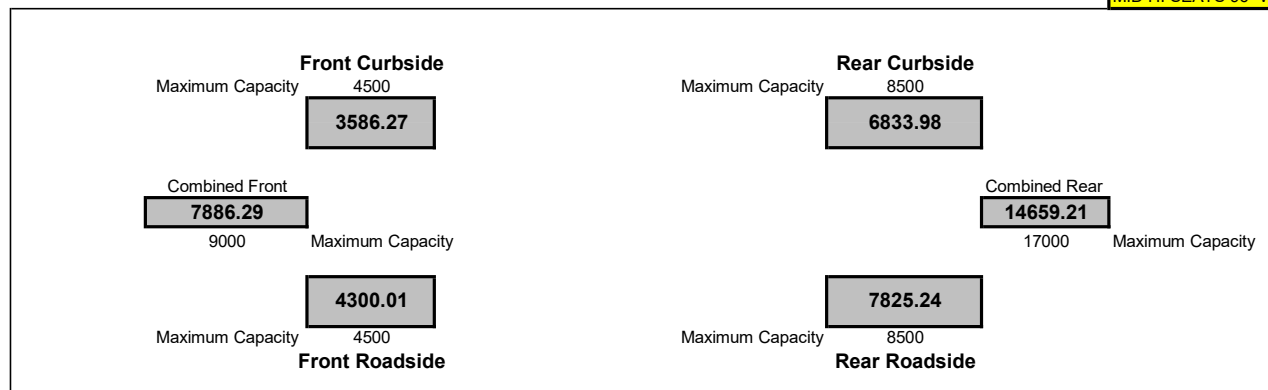


WEIGHT ANALYSIS

6/24/2021 25 2 WC 3 DB FOLDS 279 325-1 USA EST WA

INPUT AREAS=						FUEL LOAD ADJ. DATA (F.L.A.)					
VEHICLE DESCRIPTION:		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PER GAL.				
				FLINER	DIESEL	60	7.1				
WHEELBASE		PER IN. VALUE CALC.	AXLE WEIGHTS			FUEL AMT.	WGT OF FUEL	FUEL ADJ. AMT.			
279		0.36	LEFT FRONT	RIGHT FRONT		0.25	426	-106.50			
AXLE CAPACITIES			7410	3783	3627	FUEL TANK CENTER		DEALER			
FRONT	REAR	TOTAL		LEFT REAR	RIGHT REAR		341				
9000	17000	25850	9570	4937	4633						
LEFT (ROADSIDE)						RIGHT (CURBSIDE)					
	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	
DRIVER	40	150	14.34%	128.49	21.51	165	-55	59.14%	-22.47	-32.53	DB
DB FOLD	118	-85	42.29%	-49.05	-35.95	201	-55	72.04%	-15.38	-39.62	DB
DB FOLD	158	-85	56.63%	-36.86	-48.14	237	-55	84.95%	-8.28	-46.72	DB
DB	225	-55	80.65%	-10.65	-44.35	273	-55	97.85%	-1.18	-53.82	DB
DB	264	-55	94.62%	-2.96	-52.04	309	-55	110.75%	5.91	-60.91	DB
DB	303	-55	108.60%	4.73	-59.73	345	-55	123.66%	13.01	-68.01	DB
DB	342	-55	122.58%	12.42	-67.42	381	-55	136.56%	20.11	-75.11	DB
DB	381	-55	136.56%	20.11	-75.11			0.00%	0.00	0.00	
			0.00%	0.00	0.00	163	355	58.42%	147.60	207.40	DB
DB FOLD	97	385	34.77%	251.15	133.85	206	355	73.84%	92.89	262.11	DB
DB FOLD	130	385	46.59%	205.61	179.39	249	355	89.25%	38.17	316.83	DB
DB FOLD	163	385	58.42%	160.07	224.93	292	355	104.66%	-16.54	371.54	DB
DB	198	355	70.97%	103.06	251.94	335	355	120.07%	-71.25	426.25	DB
DB	234	355	83.87%	57.26	297.74	378	357	135.48%	-126.68	483.68	HB DBL
DB	270	355	96.77%	11.45	343.55	378	91.5	135.48%	-32.47	123.97	1/2 HB SINGLE
DB	306	355	109.68%	-34.35	389.35			0.00%	0.00	0.00	
DB	342	355	122.58%	-80.16	435.16	235	40	84.23%	6.31	33.69	5/8M TO 3/4 M
HB DBL	378	357	135.48%	-126.68	483.68	235	177	84.23%	27.91	149.09	28GA BELLY METAL
1/2 HB SINGLE	378	91.5	135.48%	-32.47	123.97	-40	-55	-14.34%	-62.89	7.89	BIKE RACK
5/8M TO 3/4 M	235	40	84.23%	6.31	33.69			0.00%	0.00	0.00	
28GA BELLY METAL	235	177	84.23%	27.91	149.09			0.00%	0.00	0.00	
BIKE RACK	-40	-55	-14.34%	-62.89	7.89			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
TOTAL PASSENGER LOAD				552.51	2692.99				-5.23	2005.73	5246.00
AXLE WEIGHTS				3783.00	4937.00				3627.00	4633.00	16980.00
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
			LEFT	4300.01	7825.24	12125.25	0.538				
			RIGHT	3586.27	6833.98	10420.25	0.462				
			FRT / REAR TOTALS	7886.29	14659.21	22545.50					
			AXLE CAPACITIES	9000	17000	25850					
			AVAILABLE CAPACITIES	1113.71	2340.79	3304.50					

99388G 5/8 MAR BIKE RACK ROMEO REAR
MID HI SEATS 96" WIDE BUS



STURAA TEST
10 YEAR
350,000 MILE BUS
from
GLAVAL BUS,
a division of
FOREST RIVER, INC.
MODEL LEGACY

APRIL 2012

PTI-BT-R1110

PENNSTATE



The Thomas D. Larson
Pennsylvania Transportation Institute
Vehicle Systems and Safety Program

201 Transportation Research Building (814) 865-1891
The Pennsylvania State University
University Park, PA 16802

Bus Testing and Research Center

2237 Old Route 220 N. (814) 695-3404
Duncansville, PA 16635



MECHANICAL TESTING
CERTIFICATE 3172.01

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	3
ABBREVIATIONS	5
BUS CHECK-IN	6
1. MAINTAINABILITY	
1.1 ACCESSIBILITY OF COMPONENTS AND SUBSYSTEMS	19
1.2 SERVICING, PREVENTATIVE MAINTENANCE, AND REPAIR AND MAINTENANCE DURING TESTING	22
1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS	27
2. RELIABILITY - DOCUMENTATION OF BREAKDOWN AND REPAIR TIMES DURING TESTING	31
3. SAFETY - A DOUBLE-LANE CHANGE (OBSTACLE AVOIDANCE TEST)	34
4. PERFORMANCE TESTS	
4.1 PERFORMANCE - AN ACCELERATION, GRADEABILITY, AND TOP SPEED TEST	37
4.2 PERFORMANCE – BUS BRAKING PERFORMANCE TEST.....	41
5. STRUCTURAL INTEGRITY	
5.1 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL SHAKEDOWN TEST	46
5.2 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION	50
5.3 STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC TOWING TEST	62
5.4 STRUCTURAL STRENGTH AND DISTORTION TESTS - DYNAMIC TOWING TEST	66
5.5 STRUCTURAL STRENGTH AND DISTORTION TESTS - JACKING TEST	69
5.6 STRUCTURAL STRENGTH AND DISTORTION TESTS - HOISTING TEST	71
5.7 STRUCTURAL DURABILITY TEST	73
6. FUEL ECONOMY TEST - A FUEL CONSUMPTION TEST USING AN APPROPRIATE OPERATING CYCLE	84
7. NOISE	
7.1 INTERIOR NOISE AND VIBRATION TESTS	99
7.2 EXTERIOR NOISE TESTS	104
8. EMISSIONS	110

EXECUTIVE SUMMARY

Glaval Bus, a division of Forest River, inc. submitted a model Legacy, diesel-powered 45 seat (including the driver) 39-foot bus, for a 10 yr/350,000 mile STURAA test. The odometer reading at the time of delivery was 535 miles. Testing started on June 14, 2011 and was completed on April 6, 2012. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on July 26, 2011 and was completed on March 9, 2012.

The interior of the bus is configured with seating for 45 passengers including the driver. Free floor space will accommodate 23 standing passengers resulting in a potential load of 68 persons. At 150 lbs per person, this load results in a Measured Gross Vehicle Weight (GVW) of 27,300 lbs. **Note: at Gross Vehicle Load (GVL) the weight of the rear axle is 1,530 lbs over the rear GAWR and 1,300 lbs over the GVWR.** The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 27,300 lbs. The middle segment was performed at a seated load weight of 24,070 lbs and the final segment was performed at a curb weight of 16,280 lbs. Durability driving resulted in unscheduled maintenance and failures that involved a variety of subsystems. A description of failures, and a complete and detailed listing of scheduled and unscheduled maintenance is provided in the Maintainability section of this report.

Effective January 1, 2010 the Federal Transit Administration determined that the total number of simulated passengers used for loading all test vehicles will be based on the full complement of seats and free-floor space available for standing passengers (150 lbs per passenger). The passenger loading used for dynamic testing will not be reduced in order to comply with Gross Axle Weight Ratings (GAWR's) or the Gross Vehicle Weight Ratings (GVWR's) declared by the manufacturer. Cases where the loading exceeds the GAWR and/or the GVWR will be noted accordingly. During the testing program, all test vehicles transported or operated over public roadways will be loaded to comply with the GAWR and GVWR specified by the manufacturer.

Accessibility, in general, was adequate, components covered in Section 1.3 (Repair and/or Replacement of Selected Subsystems) along with all other components encountered during testing, were found to be readily accessible and no restrictions were noted.

The Reliability section compiles failures that occurred during Structural Durability Testing. Breakdowns are classified according to subsystems. The data in this section are arranged so that those subsystems with more frequent problems are apparent. The problems are also listed by class as defined in Section 2. The test bus encountered no Class 1 or Class 2 failures. Of the six reported failures, three were Class 3 and three were Class 4.

The Safety Test, (a double-lane change, obstacle avoidance test) was safely performed in both right-hand and left-hand directions up to a maximum test speed of 45 mph. The performance of the bus is illustrated by a speed vs. time plot. Acceleration and gradeability test data are provided in Section 4, Performance. The average time to obtain 50 mph was 25.39 seconds. The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 28.91' at 20 mph, 57.10' at 30 mph, 90.35' at 40 mph and 116.07' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 37.12'. There was no deviation from the test lane during the performance of the Stopping Distance phase. During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane but did experience pull to the left during both approaches to the Split Friction Road surface. The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

The Shakedown Test produced a maximum final loaded deflection of 0.444 inches with a permanent set ranging between -0.005 to 0.006 inches under a distributed static load of 25,500 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. Water leakage was observed throughout the test across the top of the windshield.

The Static Towing Test was performed using a target load (towing force) of 20,184 lbs. All four front pulls were completed to the full test load with no damage or deformation observed. The Dynamic Towing Test was performed by means of a front-lift tow. The towing interface was accomplished using a hydraulic under-lift wrecker. The bus was towed without incident and no damage resulted from the test. The manufacturer does not recommend towing the bus from the rear, therefore, a rear test was not performed. The Jacking and Hoisting Tests were also performed without incident. The bus was found to be stable on the jack stands, and the minimum jacking clearance observed with a tire deflated was 4.6 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 4.59 mpg, 5.37 mpg, and 10.32 mpg respectively; with an overall average of 5.74 mpg.

A series of Interior and Exterior Noise Tests was performed. These data are listed in Section 7.1 and 7.2 respectively.

The Emissions Test was performed. These results are available in Section 8 of this report.

ABBREVIATIONS

ABTC	- Altoona Bus Test Center
A/C	- air conditioner
ADB	- advance design bus
ATA-MC	- The Maintenance Council of the American Trucking Association
CBD	- central business district
CW	- curb weight (bus weight including maximum fuel, oil, and coolant; but without passengers or driver)
dB(A)	- decibels with reference to 0.0002 microbar as measured on the "A" scale
DIR	- test director
DR	- bus driver
EPA	- Environmental Protection Agency
FFS	- free floor space (floor area available to standees, excluding ingress/egress areas, area under seats, area occupied by feet of seated passengers, and the vestibule area)
GVL	- gross vehicle load (150 lb for every designed passenger seating position, for the driver, and for each 1.5 sq ft of free floor space)
GVW	- gross vehicle weight (curb weight plus gross vehicle load)
GVWR	- gross vehicle weight rating
MECH	- bus mechanic
mpg	- miles per gallon
mph	- miles per hour
PM	- Preventive maintenance
PSBRTF	- Penn State Bus Research and Testing Facility
PTI	- Pennsylvania Transportation Institute
rpm	- revolutions per minute
SAE	- Society of Automotive Engineers
SCH	- test scheduler
SEC	- secretary
SLW	- seated load weight (curb weight plus 150 lb for every designed passenger seating position and for the driver)
STURAA	- Surface Transportation and Uniform Relocation Assistance Act
TD	- test driver
TECH	- test technician
TM	- track manager
TP	- test personnel

TEST BUS CHECK-IN

I. OBJECTIVE

The objective of this task is to log in the test bus, assign a bus number, complete the vehicle data form, and perform a safety check.

II. TEST DESCRIPTION

The test consists of assigning a bus test number to the bus, cleaning the bus, completing the vehicle data form, obtaining any special information and tools from the manufacturer, determining a testing schedule, performing an initial safety check, and performing the manufacturer's recommended preventive maintenance. The bus manufacturer must certify that the bus meets all Federal regulations.

III. DISCUSSION

The check-in procedure is used to identify in detail the major components and configuration of the bus.

The test bus consists of a Glaval Bus, model Legacy. The bus has an OEM driver's door and front passenger door rear of the front axle and a rear cargo/handicap entrance centered at the rear of the bus. Note; this test bus was not equipped with any type of handicap lift or ramp. Power is provided by a diesel-fueled, Cummins model IBS 6.7 L 240 HP engine coupled to an Allison model 2200 PTS transmission.

The measured curb weight is 6,530 lbs for the front axle and 10,290 lbs for the rear axle. These combined weights provide a total measured curb weight of 16,820 lbs. There are 45 seats including the driver and room for 23 standing passengers bringing the total passenger capacity to 68. Gross load is $150 \text{ lb} \times 68 = 10,200 \text{ lbs}$. At full capacity, the measured gross vehicle weight is 27,300 lbs. **Note: at GVL the load is 1,530 lbs over the rear GAWR and 1,300 lbs over the GVWR.**

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

VEHICLE DATA FORM

Bus Number: 1110	Arrival Date: 6-14-11
Bus Manufacturer: Glaval	Vehicle Identification Number (VIN): 5NHBGY524BF012294
Model Number: Legacy	Date: 6-14-11
Personnel: E.D., E.L. & T.S.	Chassis: Freightliner / Type Bus/Autobus

WEIGHT:

Individual Wheel Reactions:

Weights (lb)	Front Axle		Middle Axle		Rear Axle	
	Right	Left	Right	Left	Right	Left
CW	3,260	3,270	N/A	N/A	4,700	5,590
SLW	3,570	3,590	N/A	N/A	8,280	8,630
GVW	4,030	4,100	N/A	N/A	9,350	9,820

Total Weight Details:

Weight (lb)	CW	SLW	GVW	GAWR
Front Axle	6,530	7,160	8,130	9,350
Middle Axle	N/A	N/A	N/A	N/A
Rear Axle	10,290	16,910	19,170	17,640
Total	16,820	24,070	27,300	GVWR: 26,000

Dimensions:

Length (ft/in)	39 / 7.25
Width (in)	97.00
Height (in)	127.25
Front Overhang (in)	40.50
Rear Overhang (in)	154.50
Wheel Base (in)	280.25
Wheel Track (in)	Front: 82.30
	Rear: 72.50

Bus Number: 1110	Date: 6-14-11
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CLEARANCES:

Lowest Point Outside Front Axle	Location: Radiator hose	Clearance(in): 16.2
Lowest Point Outside Rear Axle	Location: Fuel tank mounts	Clearance(in): 16.4
Lowest Point between Axles	Location: Driveshaft guard	Clearance(in): 7.9
Ground Clearance at the center (in)	14.1	
Front Approach Angle (deg)	21.8	
Rear Approach Angle (deg)	6.1	
Ramp Clearance Angle (deg)	3.2	
Aisle Width (in)	15.8	
Inside Standing Height at Center Aisle (in)	79	

BODY DETAILS:

Body Structural Type	Integral		
Frame Material	Steel		
Body Material	Composite		
Floor Material	Plywood		
Roof Material	Composite		
Windows Type	<input type="checkbox"/> Fixed	<input checked="" type="checkbox"/> Movable	
Window Mfg./Model No.	KTG / DOT620 ANSI 297.1-1984 16 CFR 1201		
Number of Doors	<u> 1 </u> Driver	<u> 1 </u> Passenger	<u> 1 </u> Rear
Mfr. / Model No.	Driver's – Freightliner / OEM Passenger – A&M Systems Inc. Rear – Glaval Bus		
Dimension of Each Door (in)	52.3 x 29.3	87.6 x 30.3	63.6 x 34.1
Passenger Seat Type	<input type="checkbox"/> Cantilever	<input checked="" type="checkbox"/> Pedestal	<input type="checkbox"/> Other (explain)
Mfr. / Model No.	Freedman Seating Co. / Featherweight		
Driver Seat Type	<input checked="" type="checkbox"/> Air	<input type="checkbox"/> Spring	<input type="checkbox"/> Other (explain)
Mfr. / Model No.	Bostrom Seating / Talladega 910 High Back Air-Suspension		
Number of Seats (including Driver)	45		

Bus Number: 1110	Date: 6-14-11
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BODY DETAILS (Contd..)

Free Floor Space (ft ²)	35.8																		
Height of Each Step at Normal Position (in)	<table border="1"> <tr> <td>Front</td> <td>1. 10.6</td> <td>2. 9.1</td> <td>3. 9.1</td> <td>4. 9.1</td> <td>5. 8.5</td> </tr> <tr> <td>Middle</td> <td>1. N/A</td> <td>2. N/A</td> <td>3. N/A</td> <td>4. N/A</td> <td></td> </tr> <tr> <td>Rear</td> <td>1. N/A</td> <td>2. N/A</td> <td>3. N/A</td> <td>4. N/A</td> <td></td> </tr> </table>	Front	1. 10.6	2. 9.1	3. 9.1	4. 9.1	5. 8.5	Middle	1. N/A	2. N/A	3. N/A	4. N/A		Rear	1. N/A	2. N/A	3. N/A	4. N/A	
Front	1. 10.6	2. 9.1	3. 9.1	4. 9.1	5. 8.5														
Middle	1. N/A	2. N/A	3. N/A	4. N/A															
Rear	1. N/A	2. N/A	3. N/A	4. N/A															
Step Elevation Change - Kneeling (in)	N/A																		

ENGINE

Type	<input checked="" type="checkbox"/> C.I. <input type="checkbox"/> S.I.	<input type="checkbox"/> Alternate Fuel <input type="checkbox"/> Other (explain)	
Mfr. / Model No.	Cummins / ISB 6.7 L 240 Hp		
Location	<input checked="" type="checkbox"/> Front <input type="checkbox"/> Diesel	<input type="checkbox"/> Rear <input type="checkbox"/> LNG	<input type="checkbox"/> Other (explain) <input type="checkbox"/> Methanol <input type="checkbox"/> Other (explain)
Fuel Type			
Fuel Tank Capacity (indicate units)	100 gals		
Fuel Induction Type	<input checked="" type="checkbox"/> Injected <input type="checkbox"/> Carburetion		
Fuel Injector Mfr. / Model No.	Cummins / ISB 6.7 L 240 Hp		
Carburetor Mfr. / Model No.	N/A		
Fuel Pump Mfr. / Model No.	Cummins / ISB 6.7 L 240 Hp		
Alternator (Generator) Mfr. / Model No.	Prestolite / 4944PA Leece Neville / A0014944PA		
Maximum Rated Output (Volts / Amps)	14 / 270		
Air Compressor Mfr. / Model No.	Cummins / 107-032		
Maximum Capacity (ft ³ / min)	18.7		
Starter Type	<input checked="" type="checkbox"/> Electrical <input type="checkbox"/> Pneumatic	<input type="checkbox"/> Other (explain)	
Starter Mfr. / Model No.	Denso / 428000-5230		

Bus Number: 1110

Date: 6-14-11

TRANSMISSION

Transmission Type	<input type="checkbox"/> Manual	<input checked="" type="checkbox"/> Automatic	
Mfr. / Model No.	Allison / 2200 PTS		
Control Type	<input checked="" type="checkbox"/> Mechanical	<input type="checkbox"/> Electrical	<input type="checkbox"/> Other
Torque Converter Mfr. / Model No.	Allison / 2200 PTS		
Integral Retarder Mfr. / Model No.	N/A		

SUSPENSION

Number of Axles	2		
Front Axle Type	<input type="checkbox"/> Independent	<input checked="" type="checkbox"/> Beam Axle	
Mfr. / Model No.	Axle Alliance Co. / F10-3N		
Axle Ratio (if driven)	N/A		
Suspension Type	<input type="checkbox"/> Air	<input checked="" type="checkbox"/> Spring	<input type="checkbox"/> Other (explain)
No. of Shock Absorbers	2		
Mfr. / Model No.	Sachs / 47 1700 000 449		
Middle Axle Type	<input type="checkbox"/> Independent	<input type="checkbox"/> Beam Axle	
Mfr. / Model No.	N/A		
Axle Ratio (if driven)	N/A		
Suspension Type	<input type="checkbox"/> Air	<input type="checkbox"/> Spring	<input type="checkbox"/> Other (explain)
No. of Shock Absorbers	N/A		
Mfr. / Model No.	N/A		
Rear Axle Type	<input type="checkbox"/> Independent	<input checked="" type="checkbox"/> Beam Axle	
Mfr. / Model No.	Axle Alliance Co. / R18-2N		
Axle Ratio (if driven)	5.125		
Suspension Type	<input checked="" type="checkbox"/> Air	<input type="checkbox"/> Spring	<input type="checkbox"/> Other (explain)
No. of Shock Absorbers	2		
Mfr. / Model No.	Sachs / 47 1700 131 777		

Bus Number: 1110	Date: 6-14-11
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WHEELS & TIRES

Front	Wheel Mfr./ Model No.	Accuride / 22.5 x 7.5
	Tire Mfr./ Model No.	Michelin / 235/80R 22.5
Rear	Wheel Mfr./ Model No.	Accuride / 22.5 x 7.5
	Tire Mfr./ Model No.	Michelin / 235/80R 22.5

BRAKES

Front Axle Brakes Type	<input type="checkbox"/> Cam	<input checked="" type="checkbox"/> Disc	<input type="checkbox"/> Other (explain)
Mfr. / Model No.	Bosch / 73 mm		
Middle Axle Brakes Type	<input type="checkbox"/> Cam	<input type="checkbox"/> Disc	<input type="checkbox"/> Other (explain)
Mfr. / Model No.	N/A		
Rear Axle Brakes Type	<input type="checkbox"/> Cam	<input checked="" type="checkbox"/> Disc	<input type="checkbox"/> Other (explain)
Mfr. / Model No.	Bosch / 73 mm		
Retarder Type	N/A		
Mfr. / Model No.	N/A		

HVAC

Heating System Type	<input type="checkbox"/> Air	<input checked="" type="checkbox"/> Water	<input type="checkbox"/> Other
Capacity (Btu/hr)	130,000		
Mfr. / Model No.	Pro-Air / (2) 65K Floor Heaters		
Air Conditioner	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Location	Rear		
Capacity (Btu/hr)	120,000		
A/C Compressor Mfr. / Model No.	Seltec / Dual TM-21		

STEERING

Steering Gear Box Type	Hydraulic gear
Mfr. / Model No.	TRW / THP-60
Steering Wheel Diameter	17.7
Number of turns (lock to lock)	4.25

Bus Number: 1110	Date: 6-14-11
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OTHERS

Wheel Chair Ramps	Location: N/A	Type: N/A
Wheel Chair Lifts	Location: N/A	Type: N/A
Mfr. / Model No.	N/A	
Emergency Exit	Location: Door Windows Roof hatch	Number: 2 6 1

CAPACITIES

Fuel Tank Capacity (units)	100 gals.
Engine Crankcase Capacity (gallons)	4.4
Transmission Capacity (gallons)	Initial fill 3.7 Refill 2.6
Differential Capacity (gallons)	Unknown.
Cooling System Capacity (quarts)	Unknown. Fill to line.
Power Steering Fluid Capacity (quarts)	Unknown.

VEHICLE DATA FORM

Bus Number: 1110	Date: 6-14-11
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List all spare parts, tools and manuals delivered with the bus.

Part Number	Description	Qty.
NA	Tires & rims	6
47 1700 131 777	Shocks	2
47 1700 000 449	Shocks	2
01-32241-065	Belt	1
LF 3970	Oil filter	2
29539579	Transmission filter	2
P607955 Donaldson	Air filter	2

COMPONENT/SUBSYSTEM INSPECTION FORM

Bus Number: 1110	Date: 6/14/11
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Subsystem	Checked	Comments
Air Conditioning Heating and Ventilation	✓	
Body and Sheet Metal	✓	
Frame	✓	
Steering	✓	
Suspension	✓	
Interior/Seating	✓	
Axles	✓	
Brakes	✓	
Tires/Wheels	✓	
Exhaust	✓	
Fuel System	✓	
Power Plant	✓	
Accessories	✓	
Lift System	✓	
Interior Fasteners	✓	
Batteries	✓	

CHECK - IN



GLAVAL BUS MODEL LEGACY



CHECK - IN CONT.



OPERATOR'S AREA

MANUFACTURED BY / FABRIQUE PAR: **FOREST RIVER, Inc** DATE: **3/29/2011**

VIN/VIN: **5NHBGYS24BF012294 4UZADRDXBCBB1757 S2R0840**

GVWR/PNBV: **11794 KG (26000 LB)** TYPE/TYF: **BUS/AUTOBUS**

DESIG. SEAT CAP./NOMBRE D'ESIGNE' DE PLACES ASSISES: **40x600kg=3060 kg or 45X150lbs=6750 lb**

GAWR/PNEU	TRES/PNEU	RIMS/QUANTE	COLD INFL. PRESS/PRESS DE CONFL. A FROID
FRONT/AVANT 4241 KG 9350 LB	235/80R22.5 (G)	22.5X7.5	759 KP SINGLE DUAL 110 PSILP <input checked="" type="checkbox"/> <input type="checkbox"/>
MID/MID 0 KG 0 LB			0 KP SINGLE DUAL 0 PSILP <input checked="" type="checkbox"/> <input type="checkbox"/>
REAR/ARRIERE 8002 KG 17640 LB	235/80R22.5 (G)	22.5X7.5	759 KP SINGLE DUAL 110 PSILP <input type="checkbox"/> <input checked="" type="checkbox"/>

VIN TAG

CHECK - IN CONT.



INTERIOR VIEW FROM FRONT



INTERIOR VIEW FROM REAR

CHECK - IN CONT.



UNDERCARRIAGE REAR



UNDERCARRIAGE FORWARD

1. MAINTAINABILITY

1.1 ACCESSIBILITY OF COMPONENTS AND SUBSYSTEMS

1.1-I. TEST OBJECTIVE

The objective of this test is to check the accessibility of components and subsystems.

1.1-II. TEST DESCRIPTION

Accessibility of components and subsystems is checked, and where accessibility is restricted the subsystem is noted along with the reason for the restriction.

1.1-III. DISCUSSION

Accessibility, in general, was adequate. Components covered in Section 1.3 (repair and/or replacement of selected subsystems), along with all other components encountered during testing, were found to be readily accessible and no restrictions were noted.

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

ACCESSIBILITY DATA FORM

Bus Number: 1110	Date: 10-20-11
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Component	Checked	Comments
ENGINE :		
Oil Dipstick	E.D.	
Oil Filler Hole	E.D.	
Oil Drain Plug	E.D.	
Oil Filter	E.D.	
Fuel Filter	E.D.	
Air Filter	E.D.	
Belts	E.D.	
Coolant Level	E.D.	
Coolant Filler Hole	E.D.	
Coolant Drain	E.D.	
Spark / Glow Plugs	E.D.	
Alternator	E.D.	
Diagnostic Interface Connector	E.D.	
TRANSMISSION :		
Fluid Dip-Stick	E.L.	
Filler Hole	E.L.	
Drain Plug	E.L.	
SUSPENSION :		
Bushings	E.L.	
Shock Absorbers	E.L.	
Air Springs	E.L.	
Leveling Valves	E.L.	
Grease Fittings	E.L.	

ACCESSIBILITY DATA FORM

Bus Number: 1110	Date: 10-20-11
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Component	Checked	Comments
HVAC :		
A/C Compressor	E.D.	
Filters	E.D.	
Fans	E.D.	
ELECTRICAL SYSTEM :		
Fuses	E.D.	
Batteries	E.D.	
Voltage regulator	E.D.	
Voltage Converters	E.D.	N/A
Lighting	E.D.	
MISCELLANEOUS :		
Brakes	E.D.	
Handicap Lifts/Ramps	E.D.	
Instruments	E.D.	
Axles	E.D.	
Exhaust	E.D.	
Fuel System	E.D.	
OTHERS :		

1.2 SERVICING, PREVENTIVE MAINTENANCE, AND REPAIR AND MAINTENANCE DURING TESTING

1.2-I. TEST OBJECTIVE

The objective of this test is to collect maintenance data about the servicing, preventive maintenance, and repair.

1.2.-II. TEST DESCRIPTION

The test will be conducted by operating the NBM and collecting the following data on work order forms and a driver log.

1. Unscheduled Maintenance
 - a. Bus number
 - b. Date
 - c. Mileage
 - d. Description of malfunction
 - e. Location of malfunction (e.g., in service or undergoing inspection)
 - f. Repair action and parts used
 - g. Man-hours required
2. Scheduled Maintenance
 - a. Bus number
 - b. Date
 - c. Mileage
 - d. Engine running time (if available)
 - e. Results of scheduled inspections
 - f. Description of malfunction (if any)
 - g. Repair action and parts used (if any)
 - h. Man-hours required

The buses will be operated in accelerated durability service. While typical items are given below, the specific service schedule will be that specified by the manufacturer.

- A. Service
 1. Fueling
 2. Consumable checks
 3. Interior cleaning
- B. Preventive Maintenance
 4. Brake adjustments
 5. Lubrication
 6. 3,000 mi (or equivalent) inspection

7. Oil and filter change inspection
8. Major inspection
9. Tune-up

C. Periodic Repairs

1. Brake reline
2. Transmission change
3. Engine change
4. Windshield wiper motor change
5. Stoplight bulb change
6. Towing operations
7. Hoisting operations

1.2-III. DISCUSSION

Servicing and preventive maintenance were performed at manufacturer-specified intervals. The following Scheduled Maintenance Form lists the mileage, items serviced, the service interval, and amount of time required to perform the maintenance. Table 1 is a list of the lubricating products used in servicing. Finally, the Unscheduled Maintenance List along with Unscheduled Maintenance-related photographs is included in Section 5.7, Structural Durability. This list supplies information related to failures that occurred during the durability portion of testing. The Unscheduled Maintenance List includes the date and mileage at which the malfunction occurred, a description of the malfunction and repair, and the time required to perform the repair.

(Page 1 of 2)
SCHEDULED MAINTENANCE
 Glaval Bus #1110

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
08-24-11	597	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
08-30-11	1,352	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
09-08-11	2,426	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
10-31-11	3,722	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-17-12	4,600	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-25-12	5,837	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
02-03-12	7,092	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
02-07-12	7,556	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00

(Page 2 of 2)
SCHEDULED MAINTENANCE
 Glaval Bus #1110

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
02-14-12	8,628	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
02-20-12	9,852	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
02-27-12	10,829	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
03-21-12	11,257	P.M. / Inspection Fuel Economy Prep	Linkage, tie rods, universals/u-joints all lubed. Oil changed. Oil, fuel, and air filters changed. Transmission oil and filter changed.	8.00	8.00

Table 1. STANDARD LUBRICANTS

The following is a list of Texaco lubricant products used in bus testing conducted by the Penn State University Altoona Bus Testing Center:

<u>ITEM</u>	<u>PRODUCT CODE</u>	<u>TEXACO DESCRIPTION</u>
Engine oil	#2112	URSA Super Plus SAE 30
Transmission oil	#1866	Automatic Trans Fluid Mercon/Dexron II Multipurpose
Gear oil	#2316	Multigear Lubricant EP SAE 80W90
Wheel bearing & Chassis grease	#1935	Starplex II

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS

1.3-I. TEST OBJECTIVE

The objective of this test is to establish the time required to replace and/or repair selected subsystems.

1.3-II. TEST DESCRIPTION

The test will involve components that may be expected to fail or require replacement during the service life of the bus. In addition, any component that fails during the NBM testing is added to this list. Components to be included are:

1. Transmission
2. Alternator
3. Starter
4. Batteries
5. Windshield wiper motor

1.3-III. DISCUSSION

During the test, several additional components were removed for repair or replacement. Following is a list of components and total repair/replacement time.

MAN HOURS

All 6 tires.

4.5

At the end of the test, the remaining items on the list were removed and replaced. The transmission assembly took 8.00 man-hours (two men 4.00 hrs) to remove and replace. The time required for repair/replacement of the four remaining components is given on the following Repair and/or Replacement Form.

REPLACEMENT AND/OR REPAIR FORM

Subsystem	Replacement Time
Transmission	8.00 man hours
Wiper Motor	0.50 man hours
Starter	0.75 man hours
Alternator	0.50 man hours
Batteries	0.50 man hours

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS



**TRANSMISSION REMOVAL AND REPLACEMENT
(8.00 MAN HOURS)**



**WIPER MOTOR REMOVAL AND REPLACEMENT
(0.50 MAN HOURS)**

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS CONT.



**STARTER REMOVAL AND REPLACEMENT
(0.75 MAN HOURS)**



**ALTERNATOR REMOVAL AND REPLACEMENT
(0.50 MAN HOURS)**

2. RELIABILITY - DOCUMENTATION OF BREAKDOWN AND REPAIR TIMES DURING TESTING

2-I. TEST OBJECTIVE

The objective of this test is to document unscheduled breakdowns, repairs, down time, and repair time that occur during testing.

2-II. TEST DESCRIPTION

Using the driver log and unscheduled work order forms, all significant breakdowns, repairs, man-hours to repair, and hours out of service are recorded on the Reliability Data Form.

CLASS OF FAILURES

Classes of failures are described below:

- (a) Class 1: Physical Safety. A failure that could lead directly to passenger or driver injury and represents a severe crash situation.
- (b) Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.
- (c) Class 3: Bus Change. A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point with a replacement bus.
- (d) Class 4: Bad Order. A failure that does not require removal of the bus from service during its assignments but does degrade coach operation. The failure shall be reported by driver, inspector, or hostler.

2-III. DISCUSSION

A listing of breakdowns and unscheduled repairs is accumulated during the Structural Durability Test. The following Reliability Data Form lists all unscheduled repairs under classes as defined above. These classifications are somewhat subjective as the test is performed on a test track with careful inspections every two hours. However, even on the road, there is considerable latitude on deciding how to handle many failures.

The Unscheduled Repair List is also attached to provide a reference for the repairs that are included in the Reliability Data Forms.

The classification of repairs according to subsystem is intended to emphasize those systems which had persistent minor or more serious problems. There were no Class 1 or 2 failures. Of the three Class 3 failures, one each occurred with the body/frame, air conditioning and cooling system. These, and the remaining three Class 4 failures are available for review in the Unscheduled Maintenance List, located in Section 5.7 Structural Durability.

Page 1 of 1

Bus Number: 1110	Date: 03-09-12
Personnel: Bob Reifsteck	

[illegible]

3. SAFETY - A DOUBLE-LANE CHANGE (OBSTACLE AVOIDANCE)

3-I. TEST OBJECTIVE

The objective of this test is to determine handling and stability of the bus by measuring speed through a double lane change test.

3-II. TEST DESCRIPTION

The Safety Test is a vehicle handling and stability test. The bus will be operated at SLW on a smooth and level test track. The bus will be driven through a double lane change course at increasing speed until the test is considered unsafe or a speed of 45 mph is reached. The lane change course will be set up using pylons to mark off two 12 foot center to center lanes with two 100 foot lane change areas 100 feet apart. The bus will begin in one lane, change to the other lane in a 100 foot span, travel 100 feet, and return to the original lane in another 100 foot span. This procedure will be repeated, starting first in the right-hand and then in the left-hand lane.

3-III. DISCUSSION

The double-lane change was performed in both right-hand and left-hand directions. The bus was able to safely negotiate the test course in both the right-hand and left-hand directions up to the maximum test speed of 45 mph.

SAFETY DATA FORM

Bus Number: 1110	Date: 3/19/12
Personnel: G.C., T.S. & J.P.	

Temperature (°F): 68°	Humidity (%): 56
Wind Direction: Calm	Wind Speed (mph): Calm
Barometric Pressure (in.Hg): 30.16	

SAFETY TEST: DOUBLE LANE CHANGE	
Maximum safe speed tested for double-lane change to left	45 mph
Maximum safe speed tested for double-lane change to right	45 mph
Comments of the position of the bus during the lane change: A safe profile was maintained through all portions of testing.	
Comments of the tire/ground contact patch: Tire/ground contact was maintained through all portions of testing.	

3. SAFETY



RIGHT - HAND APPROACH



LEFT - HAND APPROACH

4.0 PERFORMANCE

4.1 PERFORMANCE - AN ACCELERATION, GRADEABILITY, AND TOP SPEED TEST

4.1-I. TEST OBJECTIVE

The objective of this test is to determine the acceleration, gradeability, and top speed capabilities of the bus.

4.1-II. TEST DESCRIPTION

In this test, the bus will be operated at SLW on the skid pad at the PSBRTF. The bus will be accelerated at full throttle from a standstill to a maximum "geared" or "safe" speed as determined by the test driver. The vehicle speed is measured using a Correvit non-contacting speed sensor. The times to reach speed between ten mile per hour increments are measured and recorded using a stopwatch with a lap timer. The time to speed data will be recorded on the Performance Data Form and later used to generate a speed vs. time plot and gradeability calculations.

4.1-III. DISCUSSION

This test consists of three runs in both the clockwise and counterclockwise directions on the Test Track. Velocity versus time data is obtained for each run and results are averaged together to minimize any test variability which might be introduced by wind or other external factors. The test was performed up to a maximum speed of 50 mph. The fitted curve of velocity vs. time is attached, followed by the calculated gradeability results. The average time to obtain 50 mph was 25.39 seconds.

PERFORMANCE DATA FORM

Bus Number: 1110		Date: 3-19-12	
Personnel: G.C., T.S. & J.P			
Temperature (°F): 68°		Humidity (%): 56	
Wind Direction: Calm		Wind Speed (mph): Calm	
Barometric Pressure (in.Hg): 30.16			
Air Conditioning compressor-OFF		✓Checked	
Ventilation fans-ON HIGH		✓Checked	
Heater pump motor-Off		✓Checked	
Defroster-OFF		✓ Checked	
Exterior and interior lights-ON		✓ Checked	
Windows and doors-CLOSED		✓ Checked	
ACCELERATION, GRADEABILITY, TOP SPEED			
Counter Clockwise Recorded Interval Times			
Speed	Run 1	Run 2	Run 3
10 mph	3.58	3.42	3.82
20 mph	6.98	6.92	6.82
30 mph	11.48	11.20	11.11
40 mph	18.04	18.10	17.67
Top Test Speed(mph) 50	26.63	26.44	26.28
Clockwise Recorded Interval Times			
Speed	Run 1	Run 2	Run 3
10 mph	3.35	3.42	3.42
20 mph	6.35	6.70	6.55
30 mph	10.63	10.29	10.48
40 mph	16.63	16.57	16.61
Top Test Speed(mph) 50	24.03	24.28	24.69

1110.ACC

PERFORMANCE SUMMARY SHEET

BUS MANUFACTURER :GlaVal
BUS MODEL :Mod Legacy

BUS NUMBER :1110
TEST DATE :3/19/12

TEST CONDITIONS :

TEMPERATURE (DEG F) : 68.0
WIND DIRECTION : Calm
WIND SPEED (MPH) : .0
HUMIDITY (%) : 56
BAROMETRIC PRESSURE (IN. HG) : 30.2

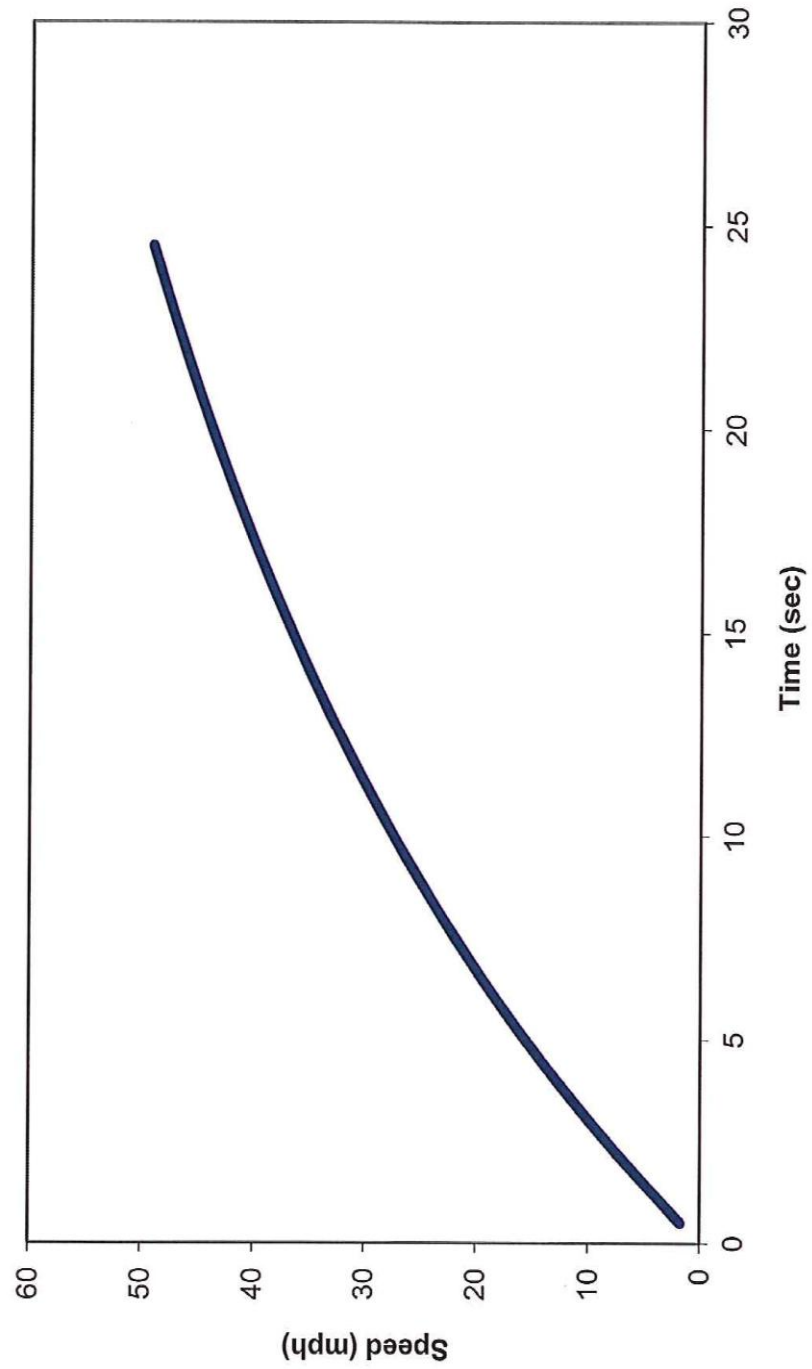
VEHICLE SPEED (MPH)	AVERAGE TIME (SEC)		
	CCW DIRECTION	CW DIRECTION	TOTAL
10.0	3.61	3.40	3.50
20.0	6.91	6.53	6.72
30.0	11.26	10.47	10.87
40.0	17.94	16.60	17.27
50.0	26.45	24.33	25.39

TEST SUMMARY :

VEHICLE SPEED (MPH)	TIME (SEC)	ACCELERATION (FT/SEC^2)	MAX. GRADE (%)
1.0	.28	5.2	16.3
5.0	1.45	4.8	15.2
10.0	3.03	4.4	13.9
15.0	4.77	4.0	12.5
20.0	6.70	3.6	11.3
25.0	8.86	3.2	10.0
30.0	11.28	2.8	8.9
35.0	14.04	2.5	7.7
40.0	17.22	2.1	6.7
45.0	20.92	1.8	5.7
50.0	25.30	1.5	4.8

NOTE : Gradeability results were calculated from performance
----- test data. Actual sustained gradeability performance
for vehicles equipped with auto transmission may be
lower than the values indicated here.

**Velocity vs. Time
Glaval Bus # 1110**



4.0 PERFORMANCE

4.2 Performance - Bus Braking

4.2 I. TEST OBJECTIVE

The objective of this test is to provide, for comparison purposes, braking performance data on transit buses produced by different manufacturers.

4.2 II. TEST DESCRIPTION

The testing will be conducted at the PTI Test Track skid pad area. Brake tests will be conducted after completion of the GVW portion of the vehicle durability test. At this point in testing the brakes have been subjected to a large number of braking snubs and will be considered well burnished. Testing will be performed when the bus is fully loaded at its GVW. All tires on each bus must be representative of the tires on the production model vehicle

The brake testing procedure comprises three phases:

1. Stopping distance tests
 - i. Dry surface (high-friction, Skid Number within the range of 70-76)
 - ii. Wet surface (low-friction, Skid Number within the range of 30-36)
2. Stability tests
3. Parking brake test

Stopping Distance Tests

The stopping distance phase will evaluate service brake stops. All stopping distance tests on dry surface will be performed in a straight line and at the speeds of 20, 30, 40 and 45 mph. All stopping distance tests on wet surface will be performed in straight line at speed of 20 mph.

The tests will be conducted as follows:

1. **Uniform High Friction Tests:** Four maximum deceleration straight-line brake applications each at 20, 30, 40 and 45 mph, to a full stop on a uniform high-friction surface in a 3.66-m (12-ft) wide lane.
2. **Uniform Low Friction Tests:** Four maximum deceleration straight-line brake applications from 20 mph on a uniform low friction surface in a 3.66-m (12-ft) wide lane.

When performing service brake stops for both cases, the test vehicle is accelerated on the bus test lane to the speed specified in the test procedure and this speed is maintained into the skid pad area. Upon entry of the appropriate lane of the skid pad area, the vehicle's service brake is applied to stop the vehicle as quickly as

possible. The stopping distance is measured and recorded for both cases on the test data form. Stopping distance results on dry and wet surfaces will be recorded and the average of the four measured stopping distances will be considered as the measured stopping distance. Any deviation from the test lane will be recorded.

Stability Tests

This test will be conducted in both directions on the test track. The test consists of four maximum deceleration, straight-line brake applications on a surface with split coefficients of friction (i.e., the wheels on one side run on high-friction SN 70-76 or more and the other side on low-friction [where the lower coefficient of friction should be less than half of the high one] at initial speed of 30 mph).

(I) The performance of the vehicle will be evaluated to determine if it is possible to keep the vehicle within a 3.66m (12 ft) wide lane, with the dividing line between the two surfaces in the lane's center. The steering wheel input angle required to keep the vehicle in the lane during the maneuver will be reported.

Parking Brake Test

The parking brake phase utilizes the brake slope, which has a 20% grade. The test vehicle, at its GVW, is driven onto the brake slope and stopped. With the transmission in neutral, the parking brake is applied and the service brake is released. The test vehicle is required to remain stationary for five minutes. The parking brake test is performed with the vehicle facing uphill and downhill.

4.2-III. DISCUSSION

The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 28.91' at 20 mph, 57.10' at 30 mph, 90.35' at 40 mph and 116.07' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 37.12'. There was no deviation from the test lane during the performance of the Stopping Distance phase.

During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane but did experience pull to the left during both approaches to the Split Friction Road surface.

The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

Table 4.2-6. Braking Test Data Forms

Bus Number: 1110	Date:10-17-11
Personnel: G.C., T.S. & S.C.	
Amb. Temperature (°F): 53	Wind Speed (mph): 10 - 12
Wind Direction: NW	Pavement Temp (°F) Start: 52 End: 57

TIRE INFLATION PRESSURE (psi):				
Tire Type: Front: Michelin XZE 235/80R 22.5			Rear: Michelin XZE 235/80R 22.5	
	Left Tire(s)		Right Tire(s)	
Front	110		110	
	Inner	Outer	Inner	Outer
Rear	110	110	110	110
Rear	N/A	N/A	N/A	N/A

AXLE LOADS (lb)		
	Left	Right
Front	4,100	4,030
Rear	9,820	9,350

FINAL INSPECTION	
Bus Number: 1110	Date: 10-17-11
Personnel: S.C.	

Table 4.2-7. Record of All Braking System Faults/Repairs.

Date	Personnel	Fault/Repair	Description
10/17/11	G.C., T.S. & S.C.	None noted.	

Table 4.2-8.1. Stopping Distance Test Results Form

Stopping Distance (ft)					
Vehicle Direction	CW	CW	CCW	CCW	
Speed (mph)	Stop 1	Stop 2	Stop 3	Stop 4	Average
20 (dry)	27.82	29.75	28.96	29.08	28.91
30 (dry)	56.88	56.20	58.33	56.96	57.10
40 (dry)	96.21	92.19	85.15	87.85	90.35
45 (dry)	118.57	115.45	114.64	115.60	116.07
20 (wet)	33.87	32.89	42.22	39.50	37.12

Table 4.2-8.2. Stability Test Results Form

Stability Test Results (Split Friction Road surface)		
Vehicle Direction	Attempt	Did test bus stay in 12' lane? (yes/no)
CW	1	Yes
	2	Yes
CCW	1	Yes
	2	Yes

Table 4.2-8.3. Parking Brake Test Form

PARKING BRAKE (Fully Loaded) - GRADE HOLDING						
Vehicle Direction	Attempt	Hold Time (min)	Slide (in)	Roll (in)	Did Hold	No Hold
Front up	1	5 min			X	
	2					
	3					
Front down	1	5 min			X	
	2					
	3					

5. STRUCTURAL INTEGRITY

5.1 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL SHAKEDOWN TEST

5.1-I. DISCUSSION

The objective of this test is to determine certain static characteristics (e.g., bus floor deflection, permanent structural deformation, etc.) under static loading conditions.

5.1-II. TEST DESCRIPTION

In this test, the bus will be isolated from the suspension by blocking the vehicle under the suspension points. The bus will then be loaded and unloaded up to a maximum of three times with a distributed load equal to 2.5 times gross load. Gross load is 150 lb for every designed passenger seating position, for the driver, and for each 1.5 sq ft of free floor space. For a distributed load equal to 2.5 times gross load, place a 375-lb load on each seat and on every 1.5 sq ft of free floor space. The first loading and unloading sequence will "settle" the structure. Bus deflection will be measured at several locations during the loading sequences.

5.1-III. DISCUSSION

This test was performed based on a maximum passenger capacity of 68 people including the driver. The resulting test load is $(68 \times 375 \text{ lb}) = 25,500 \text{ lb}$. The load is distributed evenly over the passenger space. Deflection data before and after each loading and unloading sequence is provided on the Structural Shakedown Data Form.

The unloaded height after each test becomes the original height for the next test. Some initial settling is expected due to undercoat compression, etc. After each loading cycle, the deflection of each reference point is determined. The bus is then unloaded and the residual (permanent) deflection is recorded. On the final test, the maximum loaded deflection was 0.444 inches at reference point 3. The maximum permanent deflection after the final loading sequence ranged from -0.005 inches at reference points 2, 6 and 10 to 0.005 inches at reference point 10.

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

STRUCTURAL SHAKEDOWN DATA FORM

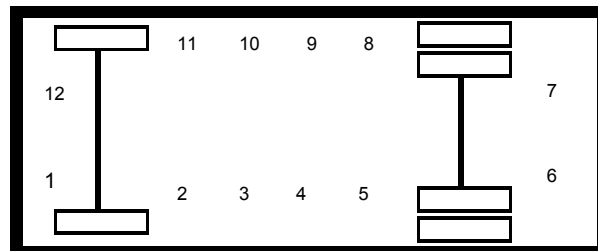
Bus Number: 1110	Date: 7-6-11
Personnel: T.S., B.L., E.L., E.D. & P.D.	Temperature (°F): 88
Loading Sequence: <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 (check one) Test Load (lbs): 25,500 (45 seated & 23 standees)	

Indicate Approximate Location of Each Reference Point

Right

Front
of
Bus

Left



Top View

Reference Point No.	A (in) Original Height	B (in) Loaded Height	B-A (in) Loaded Deflection	C (in) Unloaded Height	C-A (in) Permanent Deflection
1	0	-.223	-.233	-.003	-.003
2	0	.201	.201	.024	.024
3	0	.357	.357	.040	.040
4	0	.370	.370	.041	.041
5	0	.352	.352	.033	.033
6	0	.245	.245	.038	.038
7	0	.229	.229	.030	.030
8	0	.250	.250	.029	.029
9	0	.348	.348	.029	.029
10	0	.350	.350	.025	.025
11	0	.210	.210	.012	.012
12	0	-.227	-.227	-.007	-.007

STRUCTURAL SHAKEDOWN DATA FORM

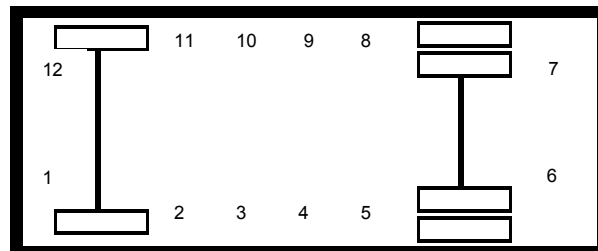
Bus Number: 1110	Date: 7-6-11
Personnel: T.S., B.L., E.L., E.D. & P.D.	Temperature (°F): 88
Loading Sequence: <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 (check one) Test Load (lbs): 25,500 (45 seated & 23 standees)	

Indicate Approximate Location of Each Reference Point

Right

Front
of
Bus

Left



Top View

Reference Point No.	A (in) Original Height	B (in) Loaded Height	B-A (in) Loaded Deflection	C (in) Unloaded Height	C-A (in) Permanent Deflection
1	-.003	-.242	-.239	-.005	-.002
2	.024	.215	.191	.019	-.005
3	.040	.484	.444	.036	-.004
4	.041	.398	.357	.039	-.002
5	.033	.277	.244	.035	.002
6	.038	.210	.172	.033	-.005
7	.030	.198	.168	.028	-.002
8	.029	.272	.243	.035	.006
9	.029	.382	.353	.027	-.002
10	.025	.382	.357	.030	.005
11	.012	.230	.218	.014	.002
12	-.007	-.244	-.237	-.007	.000

5.1 STRUCTURAL SHAKEDOWN TEST



DIAL INDICATORS IN POSITION



**BUS LOADED TO 2.5 TIMES GVL
(25,500 LBS)**

5.2 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION

5.2-I. TEST OBJECTIVE

The objective of this test is to observe the operation of the bus subsystems when the bus is placed in a longitudinal twist simulating operation over a curb or through a pothole.

5.2-II. TEST DESCRIPTION

With the bus loaded to GVWR, each wheel of the bus will be raised (one at a time) to simulate operation over a curb and the following will be inspected:

1. Body
2. Windows
3. Doors
4. Roof vents
5. Special seating
6. Undercarriage
7. Engine
8. Service doors
9. Escape hatches
10. Steering mechanism

Each wheel will then be lowered (one at a time) to simulate operation through a pothole and the same items inspected.

5.2-III. DISCUSSION

The test sequence was repeated ten times. The first and last test is with all wheels level. The other eight tests are with each wheel 6 inches higher and 6 inches lower than the other three wheels.

All doors, windows, escape mechanisms, engine, steering and handicapped devices operated normally throughout the test. The undercarriage and body indicated no deficiencies. Water leakage was observed throughout the test across the top of the windshield. The results of this test are indicated on the following data forms.

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input checked="" type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
<input checked="" type="checkbox"/> Windows	The windshield is leaking across the top.
<input checked="" type="checkbox"/> Front Doors	No deficiencies.
<input checked="" type="checkbox"/> Rear Doors	No deficiencies.
<input checked="" type="checkbox"/> Escape Mechanisms/ Roof Vents	No deficiencies.
<input checked="" type="checkbox"/> Engine	No deficiencies.
<input checked="" type="checkbox"/> Handicapped Device/ Special Seating	No deficiencies.
<input checked="" type="checkbox"/> Undercarriage	No deficiencies.
<input checked="" type="checkbox"/> Service Doors	No deficiencies.
<input checked="" type="checkbox"/> Body	No deficiencies.
<input checked="" type="checkbox"/> Windows/ Body Leakage	No deficiencies.
<input checked="" type="checkbox"/> Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input checked="" type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input checked="" type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input checked="" type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input checked="" type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input checked="" type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input checked="" type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	No deficiencies.
■ Front Doors	The windshield is leaking across the top.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input checked="" type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input checked="" type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
■ Windows	The windshield is leaking across the top.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

DISTORTION TEST INSPECTION FORM
(Note: Ten copies of this data sheet are required)

Bus Number: 1110	Date: 7-12-11
Personnel: T.S., B.L., P.D., E.D., E.L. & S.C.	Temperature(°F): 78

Wheel Position : (check one)		
All wheels level	<input type="checkbox"/> before	<input checked="" type="checkbox"/> after
Left front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right front	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Right rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower
Left rear	<input type="checkbox"/> 6 in higher	<input type="checkbox"/> 6 in lower

	Comments
<input checked="" type="checkbox"/> Windows	The windshield is leaking across the top.
<input checked="" type="checkbox"/> Front Doors	No deficiencies.
<input checked="" type="checkbox"/> Rear Doors	No deficiencies.
<input checked="" type="checkbox"/> Escape Mechanisms/ Roof Vents	No deficiencies.
<input checked="" type="checkbox"/> Engine	No deficiencies.
<input checked="" type="checkbox"/> Handicapped Device/ Special Seating	No deficiencies.
<input checked="" type="checkbox"/> Undercarriage	No deficiencies.
<input checked="" type="checkbox"/> Service Doors	No deficiencies.
<input checked="" type="checkbox"/> Body	No deficiencies.
<input checked="" type="checkbox"/> Windows/ Body Leakage	No deficiencies.
<input checked="" type="checkbox"/> Steering Mechanism	No deficiencies.

5.2 STRUCTURAL DISTORTION TEST



RIGHT FRONT WHEEL SIX INCHES HIGHER



LEFT REAR WHEEL SIX INCHES LOWER

5.3 STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC TOWING TEST

5.3-I. TEST OBJECTIVE

The objective of this test is to determine the characteristics of the bus towing mechanisms under static loading conditions.

5.3-II. TEST DESCRIPTION

Utilizing a load-distributing yoke, a hydraulic cylinder is used to apply a static tension load equal to 1.2 times the bus curb weight. The load will be applied to both the front and rear, if applicable, towing fixtures at an angle of 20 degrees with the longitudinal axis of the bus, first to one side then the other in the horizontal plane, and then upward and downward in the vertical plane. Any permanent deformation or damage to the tow eyes or adjoining structure will be recorded.

5.3-III. DISCUSSION

The load-distributing yoke was incorporated as the interface between the Static Tow apparatus and the test bus tow hook/eyes. The test was performed to the full target test weight of 20,184 lbs (1.2 x 16,820 lbs CW). No damage or deformation was observed during all four pulls of the test. The manufacturer does not recommend rear towing therefore a rear test was not performed.

STATIC TOWING TEST DATA FORM

Bus Number: 1110	Date: 3-1-12
Personnel: B.L., P.D., J.P. & S.C.	Temperature (°F): 43

Inspect right front tow eye and adjoining structure.
Comments: No damage or deformation was observed.
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: All torques and structure inspected.
Inspect left tow eye and adjoining structure.
Comments: No damage or deformation was observed.
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: All torques and structure inspected.
Inspect right rear tow eye and adjoining structure.
Comments: N/A
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: N/A
Inspect left rear tow eye and adjoining structure.
Comments: N/A
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: N/A
General comments of any other structure deformation or failure: All four front
pulls were completed to the full target test load of 20,184 lbs. (1.2 x 16,820 lbs CW)
No damage or deformation was observed. The manufacturer does not recommend
rear towing therefore a rear test was not performed.

5.3 STATIC TOWING TEST



FRONT 20° UPWARD PULL



FRONT 20° DOWN PULL

5.3 STATIC TOWING TEST CONT.



FRONT 20° LEFT PULL



FRONT 20° RIGHT PULL

5.4 STRUCTURAL STRENGTH AND DISTORTION TESTS - DYNAMIC TOWING TEST

5.4-I. TEST OBJECTIVE

The objective of this test is to verify the integrity of the towing fixtures and determine the feasibility of towing the bus under manufacturer specified procedures.

5.4-II. TEST DESCRIPTION

This test requires the bus be towed at curb weight using the specified equipment and instructions provided by the manufacturer and a heavy-duty wrecker. The bus will be towed for 5 miles at a speed of 20 mph for each recommended towing configuration. After releasing the bus from the wrecker, the bus will be visually inspected for any structural damage or permanent deformation. All doors, windows and passenger escape mechanisms will be inspected for proper operation.

5.4-III. DISCUSSION

The bus was towed using a heavy-duty wrecker. The towing interface was accomplished by incorporating a hydraulic under lift. A front lift tow was performed. Rear towing is not recommended. No problems, deformation, or damage was noted during testing.

DYNAMIC TOWING TEST DATA FORM

Bus Number: 1110	Date: 4-6-12
Personnel: B.L. & K.D.	

Temperature (°F): 41	Humidity (%): 45
Wind Direction: NE	Wind Speed (mph): 6
Barometric Pressure (in.Hg): 30.07	

Inspect tow equipment-bus interface.
Comments: A safe and adequate connection was made between the tow equipment and the bus.
Inspect tow equipment-wrecker interface.
Comments: A safe and adequate connection was made between the tow equipment and the wrecker.
Towing Comments: A front lift tow was performed incorporating a hydraulic under lift wrecker.
Description and location of any structural damage: No damage or deformation observed.
General Comments: No problems with the tow or towing interface were encountered.

5.4 DYNAMIC TOWING TEST



TOWING INTERFACE



TEST BUS IN TOW

5.5 STRUCTURAL STRENGTH AND DISTORTION TESTS – JACKING TEST

5.5-I. TEST OBJECTIVE

The objective of this test is to inspect for damage due to the deflated tire, and determine the feasibility of jacking the bus with a portable hydraulic jack to a height sufficient to replace a deflated tire.

5.5-II. TEST DESCRIPTION

With the bus at curb weight, the tire(s) at one corner of the bus are replaced with deflated tire(s) of the appropriate type. A portable hydraulic floor jack is then positioned in a manner and location specified by the manufacturer and used to raise the bus to a height sufficient to provide 3-in clearance between the floor and an inflated tire. The deflated tire(s) are replaced with the original tire(s) and the hack is lowered. Any structural damage or permanent deformation is recorded on the test data sheet. This procedure is repeated for each corner of the bus.

5.5-III. DISCUSSION

The jack used for this test has a minimum height of 8.75 inches. During the deflated portion of the test, the jacking point clearances ranged from 4.6 inches to 18.6 inches. No deformation or damage was observed during testing. A complete listing of jacking point clearances is provided in the Jacking Test Data Form.

JACKING CLEARANCE SUMMARY

Condition	Frame Point Clearance
Front axle – one tire flat	11.1"
Rear axle – one tire flat	18.5"
Rear axle – two tires flat	15.5"

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

JACKING TEST DATA FORM

Bus Number: 1110	Date: 6-21-11
Personnel: E.D. & E.L.	Temperature (°F): 75

Record any permanent deformation or damage to bus as well as any difficulty encountered during jacking procedure.

Deflated Tire	Jacking Pad Clearance Body/Frame (in)	Jacking Pad Clearance Axle/Suspension (in)	Comments
Right front	13.6 " I 11.3 " D	9.5 " I 6.3 " D	
Left front	13.3 " I 11.1 " D	9.4 " I 6.3 " D	
Right rear—outside	20.1 " I 18.6 " D	7.0 " I 6.8 " D	
Right rear—both	20.1 " I 15.6 " D	7.0 " I 4.6 " D	
Left rear—outside	19.1 " I 18.5 " D	7.1 " I 6.7 " D	
Left rear—both	19.1 " I 15.5 " D	7.1 " I 4.6 " D	
Right middle or tag—outside	NA	NA	
Right middle or tag—both	NA	NA	
Left middle or tag—outside	NA	NA	
Left middle or tag—both	NA	NA	
Additional comments of any deformation or difficulty during jacking:			
None noted.			

5.6 STRUCTURAL STRENGTH AND DISTORTION TESTS - HOISTING TEST

5.6-I. TEST OBJECTIVE

The objective of this test is to determine possible damage or deformation caused by the jack/stands.

5.6-II. TEST DESCRIPTION

With the bus at curb weight, the front end of the bus is raised to a height sufficient to allow manufacturer-specified placement of jack stands under the axles or jacking pads independent of the hoist system. The bus will be checked for stability on the jack stands and for any damage to the jacking pads or bulkheads. The procedure is repeated for the rear end of the bus. The procedure is then repeated for the front and rear simultaneously.

5.6-III. DISCUSSION

The test was conducted using four posts of a six-post electric lift and standard 19 inch jack stands. The bus was hoisted from the front wheel, rear wheel, and then the front and rear wheels simultaneously and placed on jack stands.

The bus easily accommodated the placement of the vehicle lifts and jack stands and the procedure was performed without any instability noted.

These test results were obtained prior to the accreditation of the lab on November 8, 2011; therefore, are not considered to be accredited in accordance with A2LA policy.

HOISTING TEST DATA FORM

Bus Number: 1110	Date: 6-21-11
Personnel: E.D. & E.L.	Temperature (°F): 78

Comments of any structural damage to the jacking pads or axles while both the front wheels are supported by the jack stands:
None noted.
Comments of any structural damage to the jacking pads or axles while both the rear wheels are supported by the jack stands:
None noted.
Comments of any structural damage to the jacking pads or axles while both the front and rear wheels are supported by the jack stands:
None noted.

5.7 STRUCTURAL DURABILITY TEST

5.7-I. TEST OBJECTIVE

The objective of this test is to perform an accelerated durability test that approximates up to 25 percent of the service life of the vehicle.

5.7-II. TEST DESCRIPTION

The test vehicle is driven a total of 11,250 miles; approximately 8,750 miles on the PSBRTF Durability Test Track and approximately 2,500 miscellaneous other miles. The test will be conducted with the bus operated under three different loading conditions. The first segment will consist of approximately 4,625 miles with the bus operated at GVW. The second segment will consist of approximately 2,000 miles with the bus operated at SLW. The remainder of the test, approximately 4,625 miles, will be conducted with the bus loaded to CW. If GVW exceeds the axle design weights, then the load will be adjusted to the axle design weights and the change will be recorded. All subsystems are run during these tests in their normal operating modes. All recommended manufacturers servicing is to be followed and noted on the vehicle maintainability log. Servicing items accelerated by the durability tests will be compressed by 10:1; all others will be done on a 1:1 mi/mi basis. Unscheduled breakdowns and repairs are recorded on the same log as are any unusual occurrences as noted by the driver. Once a week the test vehicle shall be washed down and thoroughly inspected for any signs of failure.

5.7-III. DISCUSSION

The Structural Durability Test was started on July 26, 2011 and was conducted until March 9, 2012. The first 4,625 miles were performed at a GVW of 27,300 lbs. and completed on January 17, 2012. **Note; at GVL the load is 1,530 lbs over the rear GAWR and 1,300 lbs over the GVWR.** The next 2,000 mile SLW segment was performed at 24,070 lbs and completed on January 31, 2012, and the final 4,625 mile segment was performed at a CW of 16,820 lbs and completed on March 9, 2012.

The following mileage summary presents the accumulation of miles during the Structural Durability Test. The driving schedule is included, showing the operating duty cycle. A detailed plan view of the Test Track Facility and Durability Test Track are attached for reference. Also, a durability element profile detail shows all the measurements of the different conditions. Finally, photographs illustrating some of the failures that were encountered during the Structural Durability Test are included.

Glaval - TEST BUS #1110

MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
07/25/11 TO 07/31/11	0.00	30.00	30.00
08/01/11 TO 08/07/11	0.00	0.00	0.00
08/08/11 TO 08/14/11	0.00	0.00	0.00
08/15/11 TO 08/21/11	75.00	35.00	110.00
08/22/11 TO 08/28/11	865.00	71.00	936.00
08/29/11 TO 09/04/11	731.00	36.00	767.00
09/05/11 TO 09/11/11	781.00	114.00	895.00
09/12/11 TO 09/18/11	247.00	12.00	259.00
09/19/11 TO 09/25/11	0.00	0.00	0.00
09/26/11 TO 10/02/11	24.00	1.00	25.00
10/03/11 TO 10/09/11	221.00	10.00	231.00
10/10/11 TO 10/16/11	681.00	326.00	1007.00
10/17/11 TO 10/23/11	0.00	340.00	340.00
10/24/11 TO 10/30/11	0.00	0.00	0.00

Glaval - TEST BUS #1110
MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
10/31/11 TO 11/06/11	0.00	0.00	0.00
11/07/11 TO 11/13/11	0.00	0.00	0.00
11/14/11 TO 11/20/11	0.00	0.00	0.00
11/21/11 TO 11/27/11	0.00	0.00	0.00
11/28/11 TO 12/04/11	0.00	0.00	0.00
12/05/11 TO 12/11/11	0.00	0.00	0.00
12/12/11 TO 12/18/11	0.00	0.00	0.00
12/19/11 TO 12/25/11	0.00	0.00	0.00
12/26/11 TO 01/01/12	0.00	0.00	0.00
1/2/12 TO 01/08/12	0.00	0.00	0.00
1/9/12 TO 01/15/12	0.00	0.00	0.00
1/16/12 TO 01/22/12	433.00	220.00	653.00
01/23/12 TO 01/29/12	1067.00	88.00	1155.00

Glaval - TEST BUS #1110
MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
01/30/12 TO 02/05/12	489.00	289.00	778.00
02/06/12 TO 02/12/12	1056.00	79.00	1135.00
02/13/12 TO 02/19/12	1305.00	132.00	1437.00
02/20/12 TO 02/26/12	775.00	296.00	1071.00
02/27/12 TO 03/04/12	0.00	288.00	288.00
03/05/12 TO 03/11/12	0.00	67.00	67.00
03/12/12 TO 03/18/12	0.00	0.00	0.00
03/19/12 TO 03/25/12	0.00	73.00	73.00
TOTAL	8750.00	2507.00	11257.00

Table 4. Driving Schedule for Bus Operation on the Durability Test Track.

STANDARD OPERATING SCHEDULE

Monday through Friday		
	HOUR	ACTION
Shift 1	midnight	D
	1:40 am	C
	1:50 am	B
	2:00 am	D
	3:35 am	C
	3:45 am	B
	4:05 am	D
	5:40 am	C
	5:50 am	B
	6:00 am	D
	7:40 am	C
	7:50 am	F
Shift 2	8:00 am	D
	9:40 am	C
	9:50 am	B
	10:00 am	D
	11:35 am	C
	11:45 am	B
	12:05 pm	D
	1:40 pm	C
	1:50 pm	B
	2:00 pm	D
	3:40 pm	C
	3:50 pm	F
Shift 3	4:00 pm	D
	5:40 pm	C
	5:50 pm	B
	6:00 pm	D
	7:40 pm	C
	7:50 pm	B
	8:05 pm	D
	9:40 pm	C
	9:50 pm	B
	10:00 pm	D
	11:40 pm	C
	11:50 pm	F

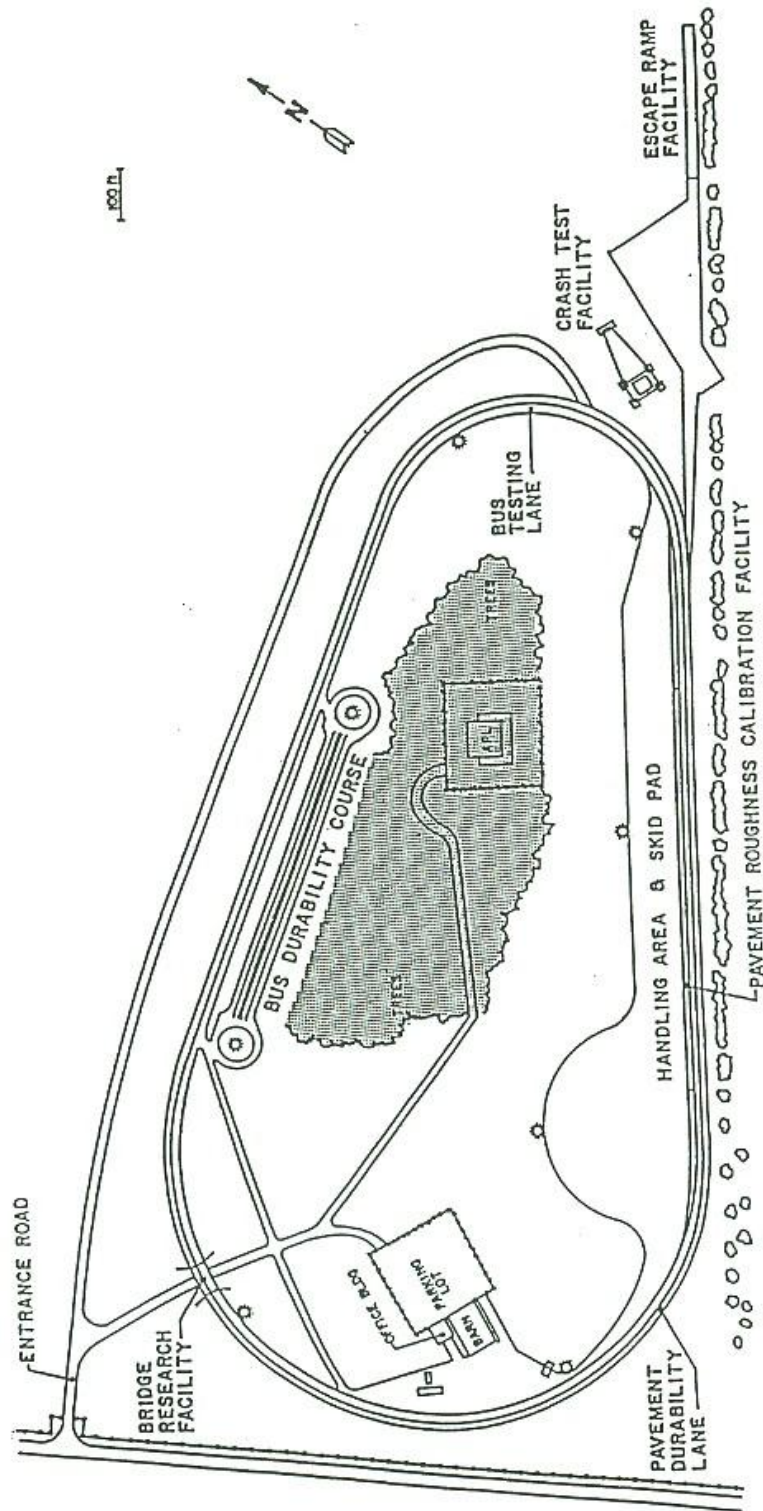
B—Break

C—Cycle all systems five times, visual inspection, driver's log entries

D—Drive bus as specified by procedure

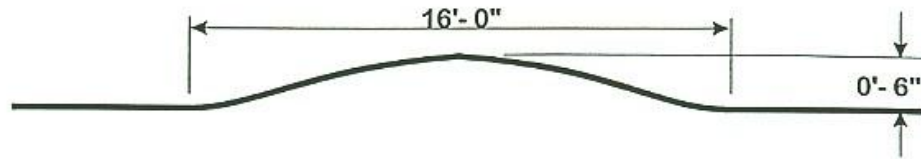
F—Fuel bus, complete driver's log shift entries

“PLAN VIEW OF PENN STATE BUS TESTING AND RESEARCH FACILITY”

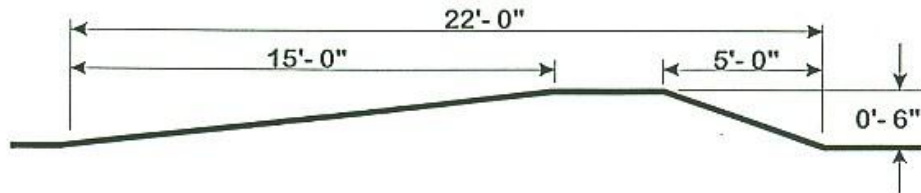


**BUS TESTING AND RESEARCH TEST TRACK
UNIVERSITY PARK, PA**

Staggered
Bumps
(10 mph)



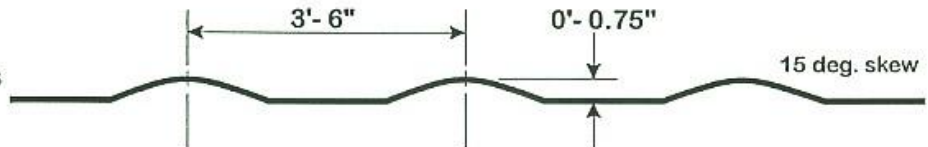
Railroad
Crossing
(8 mph)



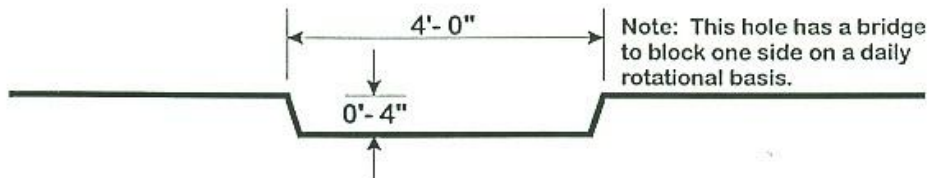
1" Random
Chuck Holes
(20 mph)



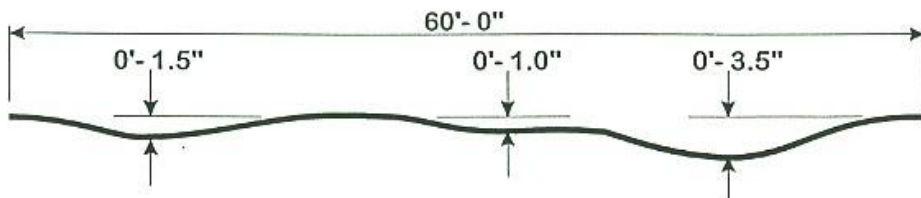
Chatter Bumps
(20 mph)



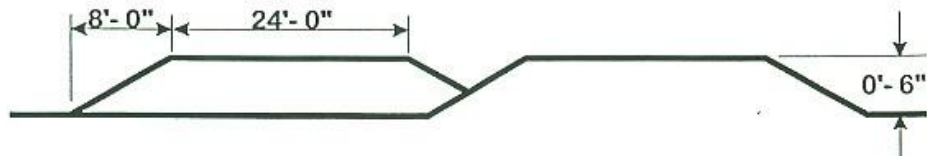
4" Chuck Hole
(5 mph)



High Crown
Intersection
(20 mph)



Frame Twist
(10 mph)



Durability Element Profiles

The Pennsylvania Transportation Institute
Penn State

(Page 1 of 1)
UNSCHEDULED MAINTENANCE
 Glaval Bus #1110

DATE	TEST MILES	SERVICE	ACTIVITY	MAN HOURS	DOWN TIME
08-30-11	1,352	Four mounting bolts and grommets are out of the grill causing it to fall off.	Grill and mounting bolts and grommets replaced.	2.00	1.00
08-30-11	1,352	The brass quarter turn coolant valve located by the right front shock is leaking.	Brass quarter turn valve tightened.	2.00	4.00
09-07-11	2,184	The roof is leaking in the area of the antenna.	Leak around antenna sealed.	1.50	1.50
10-05-11	3,022	The A/C line through the firewall to the evaporator is leaking refrigerant.	Warranty dealer repaired leaking A/C line and added support brackets at the firewall.	4.00	296.00
01-17-12	4,600	All 6 tires are worn.	All 6 tires replaced.	4.50	1.50
02-10-12	8,207	Numerous floor cross member welds are broken or cracked.	8 Right side and 8 left side floor cross members welded/repaired.	4.00	4.00

UNSCHEDULED MAINTENANCE



**NUMEROUS BROKEN FLOOR CROSSMEMBER WELDS
(8,207 TEST MILES)**



UNSCHEDULED MAINTENANCE CONT.



**NUMEROUS BROKEN FLOOR CROSSMEMBER WELDS
(8,207 TEST MILES)**



6. FUEL ECONOMY TEST - A FUEL CONSUMPTION TEST USING AN APPROPRIATE OPERATING CYCLE

6-I. TEST OBJECTIVE

The objective of this test is to provide accurate comparable fuel consumption data on transit buses produced by different manufacturers. This fuel economy test bears no relation to the calculations done by the Environmental Protection Agency (EPA) to determine levels for the Corporate Average Fuel Economy Program. EPA's calculations are based on tests conducted under laboratory conditions intended to simulate city and highway driving. This fuel economy test, as designated here, is a measurement of the fuel expended by a vehicle traveling a specified test loop under specified operating conditions. The results of this test will not represent actual mileage but will provide data that can be used by recipients to compare buses tested by this procedure.

6-II. TEST DESCRIPTION

This test requires operation of the bus over a course based on the Transit Coach Operating Duty Cycle (ADB Cycle) at seated load weight using a procedure based on the Fuel Economy Measurement Test (Engineering Type) For Trucks and Buses: SAE 1376 July 82. The procedure has been modified by elimination of the control vehicle and by modifications as described below. The inherent uncertainty and expense of utilizing a control vehicle over the operating life of the facility is impractical.

The fuel economy test will be performed as soon as possible (weather permitting) after the completion of the GVW portion of the structural durability test. It will be conducted on the bus test lane at the Penn State Test Facility. Signs are erected at carefully measured points which delineate the test course. A test run will comprise 3 CBD phases, 2 Arterial phases, and 1 Commuter phase. An electronic fuel measuring system will indicate the amount of fuel consumed during each phase of the test. The test runs will be repeated until there are at least two runs in both the clockwise and counterclockwise directions in which the fuel consumed for each run is within ± 4 percent of the average total fuel used over the 4 runs. A 20-minute idle consumption test is performed just prior to and immediately after the driven portion of the fuel economy test. The amount of fuel consumed while operating at normal/low idle is recorded on the Fuel Economy Data Form. This set of four valid runs along with idle consumption data comprise a valid test.

The test procedure is the ADB cycle with the following four modifications:

1. The ADB cycle is structured as a set number of miles in a fixed time in the following order: CBD, Arterial, CBD, Arterial, CBD, and Commuter. A separate idle fuel consumption measurement is performed at the beginning and end of the fuel economy test. This phase sequence permits the reporting of fuel consumption for each of these phases separately, making the data more useful to bus manufacturers and transit properties.
2. The operating profile for testing purposes shall consist of simulated transit type service at seated load weight. The three test phases (figure 6-1) are: a central business district (CBD) phase of 2 miles with 7 stops per mile and a top speed of 20 mph; an arterial phase of 2 miles with 2 stops per mile and a top speed of 40 mph; and a commuter phase of 4 miles with 1 stop and a maximum speed of 40 mph. At each designated stop the bus will remain stationary for seven seconds. During this time, the passenger doors shall be opened and closed.
3. The individual ADB phases remain unaltered with the exception that 1 mile has been changed to 1 lap on the Penn State Test Track. One lap is equal to 5,042 feet. This change is accommodated by adjusting the cruise distance and time.
4. The acceleration profile, for practical purposes and to achieve better repeatability, has been changed to "full throttle acceleration to cruise speed".

Several changes were made to the Fuel Economy Measurement Test (Engineering Type) For Trucks and Buses: SAE 1376 July 82:

1. Sections 1.1, and 1.2 only apply to diesel, gasoline, methanol, and any other fuel in the liquid state (excluding cryogenic fuels).

1.1 SAE 1376 July 82 requires the use of at least a 16-gal fuel tank. Such a fuel tank when full would weigh approximately 160 lb. It is judged that a 12-gal tank weighing approximately 120 lb will be sufficient for this test and much easier for the technician and test personnel to handle.

1.2 SAE 1376 July 82 mentions the use of a mechanical scale or a flowmeter system. This test procedure uses a load cell readout combination that provides an accuracy of 0.5 percent in weight and permits on-board weighing of the gravimetric tanks at the end of each phase. This modification permits the determination of a fuel economy value for each phase as well as the overall cycle.

2. Section 2.1 applies to compressed natural gas (CNG), liquefied natural gas (LNG), cryogenic fuels, and other fuels in the vapor state.

2.1 A laminar type flowmeter will be used to determine the fuel consumption. The pressure and temperature across the flow element will be monitored by the flow computer. The flow computer will use this data to calculate the gas flow rate. The flow computer will also display the flow rate (scfm) as well as the total fuel used (scf). The total fuel used (scf) for each phase will be recorded on the Fuel Economy Data Form.

3. Use both Sections 1 and 2 for dual fuel systems.

FUEL ECONOMY CALCULATION PROCEDURE

A. For diesel, gasoline, methanol and fuels in the liquid state.

The reported fuel economy is based on the following: measured test quantities-- distance traveled (miles) and fuel consumed (pounds); standard reference values-- density of water at 60EF (8.3373 lbs/gal) and volumetric heating value of standard fuel; and test fuel specific gravity (unitless) and volumetric heating value (BTU/gal). These combine to give a fuel economy in miles per gallon (mpg) which is corrected to a standard gallon of fuel referenced to water at 60EF. This eliminates fluctuations in fuel economy due to fluctuations in fuel quality. This calculation has been programmed into a computer and the data processing is performed automatically.

The fuel economy correction consists of three steps:

- 1.) Divide the number of miles of the phase by the number of pounds of fuel consumed

phase	miles per phase	total miles per run
CBD	1.9097	5.7291
ART	1.9097	3.8193
COM	3.8193	3.8193

$$FE_{o_{mi/lb}} = \text{Observed fuel economy} = \frac{\text{miles}}{\text{lb of fuel}}$$

- 2.) Convert the observed fuel economy to miles per gallon [mpg] by multiplying by the specific gravity of the test fuel G_s (referred to water) at 60°F and multiply by the density of water at 60°F

$$FE_{o_{mpg}} = FE_{c_{mi/lb}} \times G_s \times G_w$$

where G_s = Specific gravity of test fuel at 60°F (referred to water)
 G_w = 8.3373 lb/gal

- 3.) Correct to a standard gallon of fuel by dividing by the volumetric heating value of the test fuel (H) and multiplying by the volumetric heating value of standard reference fuel (Q). Both heating values must have the same units.

$$FE_c = FE_{o_{mpg}} \times \frac{Q}{H}$$

where

H = Volumetric heating value of test fuel [BTU/gal]
 Q = Volumetric heating value of standard reference fuel

Combining steps 1-3 yields

$$\Rightarrow FE_c = \frac{\text{miles}}{\text{lbs}} \times (G_s \times G_w) \times \frac{Q}{H}$$

- 4.) Covert the fuel economy from mpg to an energy equivalent of miles per BTU. Since the number would be extremely small in magnitude, the energy equivalent will be represented as miles/BTUx10⁶.

Eq = Energy equivalent of converting mpg to mile/BTUx10⁶.

$$Eq = ((mpg)/(H)) \times 10^6$$

B. CNG, LNG, cryogenic and other fuels in the vapor state.

The reported fuel economy is based on the following: measured test quantities-- distance traveled (miles) and fuel consumed (scf); density of test fuel, and volumetric heating value (BTU/lb) of test fuel at standard conditions ($P=14.73$ psia and $T=60^\circ\text{F}$). These combine to give a fuel economy in miles per lb. The energy equivalent

(mile/BTUx10⁶) will also be provided so that the results can be compared to buses that use other fuels.

- 1.) Divide the number of miles of the phase by the number of standard cubic feet (scf) of fuel consumed.

phase	miles per phase	total miles per run
CBD	1.9097	5.7291
ART	1.9097	3.8193
COM	3.8193	3.8193

$$\text{FEo}_{\text{mi/scf}} = \text{Observed fuel economy} = \frac{\text{miles}}{\text{scf of fuel}}$$

- 2.) Convert the observed fuel economy to miles per lb by dividing FEO by the density of the test fuel at standard conditions (Lb/ft³).

Note: The density of test fuel must be determined at standard conditions as described above. If the density is not defined at the above standard conditions, then a correction will be needed before the fuel economy can be calculated.

$$\text{FEo}_{\text{mi/lb}} = \text{FEo} / \text{Gm}$$

where Gm = Density of test fuel at standard conditions

- 3.) Convert the observed fuel economy (FEomi/lb) to an energy equivalent of (miles/BTUx10⁶) by dividing the observed fuel economy (FEomi/lb) by the heating value of the test fuel at standard conditions.

$$\text{Eq} = ((\text{FEomi/lb})/\text{H}) \times 10^6$$

where

Eq = Energy equivalent of miles/lb to mile/BTUx10⁶

H = Volumetric heating value of test fuel at standard conditions

6-III. DISCUSSION

This is a comparative test of fuel economy using diesel fuel with a heating value of 19,860 btu/lb. The driving cycle consists of Central Business District (CBD), Arterial (ART), and Commuter (COM) phases as described in 6-II. The fuel consumption for each driving cycle and for idle is measured separately. The results are corrected to a reference fuel with a volumetric heating value of 126,700.0 btu/gal.

An extensive pretest maintenance check is made including the replacement of all lubrication fluids. The details of the pretest maintenance are given in the first three Pretest Maintenance Forms. The fourth sheet shows the Pretest Inspection. The next sheet shows the correction calculation for the test fuel. The next four Fuel Economy Forms provide the data from the four test runs. Finally, the summary sheet provides the average fuel consumption. The overall average is based on total fuel and total mileage for each phase. The overall average fuel consumption values were; CBD – 4.59 mpg, ART – 5.37 mpg, and COM – 10.32 mpg. Average fuel consumption at idle was 0.64 gph.

FUEL ECONOMY PRE-TEST MAINTENANCE FORM

Bus Number: 1110	Date: 3-14-12	SLW (lbs): 24,070
Personnel: T.S & P.D.		

FUEL SYSTEM	OK	Date	Initials
Install fuel measurement system	✓	3/14/12	T.S.
Replace fuel filter	✓	3/14/12	T.S.
Check for fuel leaks	✓	3/14/12	T.S.
Specify fuel type (refer to fuel analysis)	Diesel		
Remarks: None noted.			
BRAKES/TIRES	OK	Date	Initials
Inspect hoses	✓	3/14/12	P.D.
Inspect brakes	✓	3/14/12	P.D.
Relube wheel bearings	✓	3/14/12	P.D.
Check tire inflation pressures (mfg. specs.)	✓	3/14/12	P.D.
Remarks: None noted.			
COOLING SYSTEM	OK	Date	Initials
Check hoses and connections	✓	3/14/12	T.S.
Check system for coolant leaks	✓	3/14/12	T.S.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 1110	Date: 3-14-12		
Personnel: T.S. & P.D.			
ELECTRICAL SYSTEMS	OK	Date	Initials
Check battery	✓	3/14/12	T.S.
Inspect wiring	✓	3/14/12	T.S.
Inspect terminals	✓	3/14/12	T.S.
Check lighting	✓	3/14/12	T.S.
Remarks: None noted.			
DRIVE SYSTEM	OK	Date	Initials
Drain transmission fluid	✓	3/14/12	P.D.
Replace filter/gasket	✓	3/14/12	P.D.
Check hoses and connections	✓	3/14/12	P.D.
Replace transmission fluid	✓	3/14/12	P.D.
Check for fluid leaks	✓	3/14/12	P.D.
Remarks: None noted.			
LUBRICATION	OK	Date	Initials
Drain crankcase oil	✓	3/14/12	T.S.
Replace filters	✓	3/14/12	T.S.
Replace crankcase oil	✓	3/14/12	T.S.
Check for oil leaks	✓	3/14/12	P.D.
Check oil level	✓	3/14/12	P.D.
Lube all chassis grease fittings	✓	3/14/12	T.S.
Lube universal joints	✓	3/14/12	T.S.
Replace differential lube including axles	✓	3/14/12	P.D.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 3)

Bus Number: 1110	Date: 3-14-12		
Personnel: T.S. & P.D.			
EXHAUST/EMISSION SYSTEM	OK	Date	Initials
Check for exhaust leaks	✓	3/14/12	P.D.
Remarks: None noted.			
ENGINE	OK	Date	Initials
Replace air filter	✓	3/14/12	P.D.
Inspect air compressor and air system	✓	3/14/12	P.D.
Inspect vacuum system, if applicable	✓	3/14/12	P.D.
Check and adjust all drive belts	✓	3/14/12	T.S.
Check cold start assist, if applicable	✓	3/14/12	T.S.
Remarks: None noted.			
STEERING SYSTEM	OK	Date	Initials
Check power steering hoses and connectors	✓	3/14/12	T.S.
Service fluid level	✓	3/14/12	T.S.
Check power steering operation	✓	3/14/12	T.S.
Remarks: None noted.			
	OK	Date	Initials
Ballast bus to seated load weight	✓	3/14/12	T.S.
TEST DRIVE	OK	Date	Initials
Check brake operation	✓	3/14/12	P.D.
Check transmission operation	✓	3/14/12	P.D.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST INSPECTION FORM

Bus Number: 1110	Date: 3-2-12
Personnel: T.M., T.S. & E.D.	
PRE WARM-UP	If OK, Initial
Fuel Economy Pre-Test Maintenance Form is complete	T.S.
Cold tire pressure (psi): Front <u>110</u> Middle <u>N/A</u> Rear <u>110</u>	T.S.
Tire wear:	T.S.
Engine oil level	T.S.
Engine coolant level	T.S.
Interior and exterior lights on, evaporator fan on	T.S.
Fuel economy instrumentation installed and working properly.	T.S.
Fuel line -- no leaks or kinks	T.S.
Speed measuring system installed on bus. Speed indicator installed in front of bus and accessible to TECH and Driver.	E.D.
Bus is loaded to SLW	T.S. & E.D.
WARM-UP	If OK, Initial
Bus driven for at least one hour warm-up	T.M.
No extensive or black smoke from exhaust	T.S.
POST WARM-UP	If OK, Initial
Warm tire pressure (psi): Front <u>110</u> Middle <u>N/A</u> Rear <u>110</u>	T.S.
Environmental conditions Average wind speed <12 mph and maximum gusts <15 mph Ambient temperature between 30°F(-1C°) and 90°F(32°C) Track surface is dry Track is free of extraneous material and clear of interfering traffic	T.S.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1110	Manufacturer: Glaval		Date: 3-21-12
Run Number: 1	Personnel: T.M., T.S. & E.D.		
Test Direction: <input type="checkbox"/> CW or <input checked="" type="checkbox"/> CCW	Temperature (°F): 54	Humidity (%): 71	
SLW (lbs): 24,070	Wind Speed (mph) & Direction: Calm	Barometric Pressure (in.Hg): 30.32	

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish			Start	Finish	
CBD #1	0	9:01	9:01	30.5	0	.379	.379
ART #1	0	4:04	4:04	30.9	0	.329	.329
CBD #2	0	8:57	8:57	31.4	0	.387	.387
ART #2	0	4:03	4:03	31.5	0	.336	.336
CBD #3	0	9:01	9:01	36.5	0	.386	.386
COMMUTER	0	6:07	6:07	34.3	0	.343	.343
Total Fuel = 2.160 gals							

20 minute idle : Total Fuel Used = 0.189 gals
Heating Value = 19,860 BTU/LB
Comments: None noted.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1110	Manufacturer: Glaval		Date: 3-21-12
Run Number: 2	Personnel: T.M., T.S. & E.D.		
Test Direction: <input checked="" type="checkbox"/> CW or <input type="checkbox"/> CCW	Temperature (°F): 61°	Humidity (%): 71	
SLW (lbs): 24,070	Wind Speed (mph) & Direction: Calm	Barometric Pressure (in.Hg): 30.32	

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish			Start	Finish	
CBD #1	0	8:57	8:57	36.7	0	.382	.382
ART #1	0	4:07	4:07	35.1	0	.321	.321
CBD #2	0	8:55	8:55	37.9	0	.392	.392
ART #2	0	4:06	4:06	36.6	0	.329	.329
CBD #3	0	8:50	8:50	39.8	0	.389	.389
COMMUTER	0	6:04	6:04	38.7	0	.343	.343
Total Fuel = 2.156 gals							

20 minute idle : Total Fuel Used = N/A gals
Heating Value = 19,860 BTU/LB
Comments: None noted.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1110		Manufacturer: Glaval		Date: 3-21-12			
Run Number: 3		Personnel: T.M., T.S. & E.D.					
Test Direction: <input type="checkbox"/> CW or <input checked="" type="checkbox"/> CCW		Temperature (°F): 63		Humidity (%): 73			
SLW (lbs): 24,070		Wind Speed (mph) & Direction: Calm		Barometric Pressure (in.Hg): Calm			
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish			Start	Finish	
CBD #1	0	8:42	8:42	40.3	0	.375	.375
ART #1	0	4:01	4:01	38.1	0	.329	.329
CBD #2	0	8:52	8:52	41.0	0	.385	.385
ART #2	0	4:04	4:04	40.4	0	.332	.332
CBD #3	0	9:01	9:01	41.4	0	.391	.391
COMMUTER	0	6:06	6:06	39.1	0	.347	.347
Total Fuel = 2.159 gals							
20 minute idle : Total Fuel Used = N/A gals							
Heating Value = 19,860 BTU/LB							
Comments: None noted.							

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1110		Manufacturer: Glaval		Date: 3-21-12			
Run Number: 4		Personnel: T.M., T.S. & E.D.					
Test Direction: <input checked="" type="checkbox"/> CW or <input type="checkbox"/> CCW		Temperature (°F): 63		Humidity (%): 73			
SLW (lbs): 24,070		Wind Speed (mph) & Direction: 5 / SE		Barometric Pressure (in. Hg): 30.31			
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish			Start	Finish	
CBD #1	0	8:53	8:53	39.1	0	.378	.378
ART #1	0	4:08	4:08	38.8	0	.322	.322
CBD #2	0	8:53	8:53	39.1	0	.385	.385
ART #2	0	4:07	4:07	37.7	0	.326	.326
CBD #3	0	8:50	8:50	40.5	0	.372	.372
COMMUTER	0	6:03	6:03	39.3	0	.331	.331
Total Fuel = 2.114 gals							
20 minute idle : Total Fuel Used = 0.207 gals							
Heating Value = 19,860 BTU/LB							
Comments: None noted.							

FUEL ECONOMY SUMMARY SHEET

BUS MANUFACTURER : **Glaval Bus** BUS NUMBER : **1110**
 BUS MODEL : **Legacy** TEST DATE : **03/21/12**

FUEL TYPE : DIESEL
 SP. GRAVITY : .8400
 HEATING VALUE : 19860.00 BTU/Lb
 FUEL TEMPERATURE : 37.30 deg F
 Standard Conditions : 60 deg F and 14.7 psi
 Density of Water : 8.3373 lb/gallon at 60 deg F

CYCLE	TOTAL FUEL USED (GAL)	TOTAL MILES	FUEL ECONOMY MPG (Measured)	FUEL ECONOMY MPG (Corrected)
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Run # :1, CCW				
CBD	1.152	5.73	4.974	4.58
ART	.665	3.82	5.744	5.29
COM	.343	3.82	11.137	10.26
TOTAL	2.160	13.37	6.190	5.70

Run # :2, CW				
CBD	1.163	5.73	4.927	4.54
ART	.650	3.82	5.877	5.41
COM	.343	3.82	11.137	10.26
TOTAL	2.156	13.37	6.201	5.71

Run # :3, CCW				
CBD	1.151	5.73	4.978	4.59
ART	.661	3.82	5.779	5.32
COM	.347	3.82	11.009	10.14
TOTAL	2.159	13.37	6.193	5.71

Run # :4, CW				
CBD	1.135	5.73	5.048	4.65
ART	.648	3.82	5.895	5.43
COM	.331	3.82	11.541	10.63
TOTAL	2.114	13.37	6.325	5.83

IDLE CONSUMPTION (MEASURED)

First 20 Minutes Data : .19GAL Last 20 Minutes Data : .21GAL
 Average Idle Consumption : .59GAL/Hr

RUN CONSISTENCY: % Difference from overall average of total fuel used

Run 1 : -.6 Run 2 : -.4 Run 3 : -.5 Run 4 : 1.5

SUMMARY (CORRECTED VALUES)

Average Idle Consumption : .64 G/Hr
 Average CBD Phase Consumption : 4.59 MPG
 Average Arterial Phase Consumption : 5.37 MPG
 Average Commuter Phase Consumption : 10.32 MPG
 Overall Average Fuel Consumption : 5.74 MPG
 Overall Average Fuel Consumption : 41.25 Miles/ Million BTU

7. NOISE

7.1 INTERIOR NOISE AND VIBRATION TESTS

7.1-I. TEST OBJECTIVE

The objective of these tests is to measure and record interior noise levels and check for audible vibration under various operating conditions.

7.1-II. TEST DESCRIPTION

During this series of tests, the interior noise level will be measured at several locations with the bus operating under the following three conditions:

1. With the bus stationary, a white noise generating system shall provide a uniform sound pressure level equal to 80 dB(A) on the left, exterior side of the bus. The engine and all accessories will be switched off and all openings including doors and windows will be closed. This test will be performed at the ABTC.
2. The bus accelerating at full throttle from a standing start to 35 mph on a level pavement. All openings will be closed and all accessories will be operating during the test. This test will be performed on the track at the Test Track Facility.
3. The bus will be operated at various speeds from 0 to 55 mph with and without the air conditioning and accessories on. Any audible vibration or rattles will be noted. This test will be performed on the test segment between the Test Track and the Bus Testing Center.

All tests will be performed in an area free from extraneous sound-making sources or reflecting surfaces. The ambient sound level as well as the surrounding weather conditions will be recorded in the test data.

7.1-III. DISCUSSION

This test is performed in three parts. The first part exposes the exterior of the vehicle to 80.0 dB(A) on the left side of the bus and the noise transmitted to the interior is measured. The overall average of the six measurements was 50.1 dB(A); ranging from 49.4 dB(A) at the rear passenger seats to 51.1 dB(A) in line with the middle speaker. The interior ambient noise level for this test was < 34.0 dB(A).

The second test measures interior noise during acceleration from 0 to 35 mph. This noise level ranged from 65.9 dB(A) at the rear passenger seats to 73.5 dB(A) at the driver's seat. The overall average was 69.2 dB(A). The interior ambient noise level for this test was 23.3 dB(A).

The third part of the test is to listen for resonant vibrations, rattles, and other noise sources while operating over the road. No vibrations or rattles were noted.

INTERIOR NOISE TEST DATA FORM
Test Condition 1: 80 dB(A) Stationary White Noise

Bus Number: 1110	Date: 6-15-11
Personnel: E.D. & T.S.	
Temperature (°F): 75	Humidity (%): 41
Wind Speed (mph): 3	Wind Direction: Variable
Barometric Pressure (in.Hg): 30.01	
Initial Sound Level Meter Calibration: ■ checked by: E.D.	
Interior Ambient Noise Level dB(A): < 34.0	Exterior Ambient Noise Level dB(A): 44.2
Microphone Height During Testing (in): 29" above seat cushion.	

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	49.6
Front Passenger Seats	50.9
In Line with Front Speaker	49.5
In Line with Middle Speaker	51.1
In Line with Rear Speaker	50.6
Rear Passenger Seats	49.4

Final Sound Level Meter Calibration: ■ checked by: E.D.

Comments: All readings taken in the center aisle.

INTERIOR NOISE TEST DATA FORM
Test Condition 2: 0 to 35 mph Acceleration Test

Bus Number: 1110	Date: 3/19/12
Personnel: G.C., T.S. & J.P.	
Temperature (°F): 68	Humidity (%): 56
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.17	
Initial Sound Level Meter Calibration: ■ checked by: T.S.	
Interior Ambient Noise Level dB(A): 23.3	Exterior Ambient Noise Level dB(A): 44.8
Microphone Height During Testing (in): 48"	

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	73.1
Front Passenger Seats	71.0
Middle Passenger Seats	66.3
Rear Passenger Seats	65.9

Final Sound Level Meter Calibration: ■ checked by: T.S.

Comments: All readings taken in the center aisle.

INTERIOR NOISE TEST DATA FORM
Test Condition 3: Audible Vibration Test

Bus Number: 1110	Date: 3/19/12
Personnel: G.C., T.S. & J.P.	
Temperature (°F): 68	Humidity (%): 56
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.17	

Describe the following possible sources of noise and give the relative location on the bus.

Source of Noise	Location
Engine and Accessories	None noted.
Windows and Doors	None noted.
Seats and Wheel Chair lifts	None noted.

Comment on any other vibration or noise source which may have occurred that is not described above: None noted.

7.1 INTERIOR NOISE TEST



**TEST BUS SET-UP FOR 80 dB(A)
INTERIOR NOISE TEST**

7.2 EXTERIOR NOISE TESTS

7.2-I. TEST OBJECTIVE

The objective of this test is to record exterior noise levels when a bus is operated under various conditions.

7.2-II. TEST DESCRIPTION

In the exterior noise tests, the bus will be operated at a SLW in three different conditions using a smooth, straight and level roadway:

1. Accelerating at full throttle from a constant speed at or below 35 mph and just prior to transmission up shift.
2. Accelerating at full throttle from standstill.
3. Stationary, with the engine at low idle, high idle, and wide open throttle.

In addition, the buses will be tested with and without the air conditioning and all accessories operating. The exterior noise levels will be recorded.

The test site is at the PSBRTF and the test procedures will be in accordance with SAE Standards SAE J366b, Exterior Sound Level for Heavy Trucks and Buses. The test site is an open space free of large reflecting surfaces. A noise meter placed at a specified location outside the bus will measure the noise level.

During the test, special attention should be paid to:

1. The test site characteristics regarding parked vehicles, signboards, buildings, or other sound-reflecting surfaces
2. Proper usage of all test equipment including set-up and calibration
3. The ambient sound level

7.2-III. DISCUSSION

The Exterior Noise Test determines the noise level generated by the vehicle under different driving conditions and at stationary low and high idle, with and without air conditioning and accessories operating. The test site is a large, level, bituminous paved area with no reflecting surfaces nearby.

With an exterior ambient noise level of 35.9 dB(A), the average test result obtained while accelerating from a constant speed was 69.7 dB(A) on the right side and 71.4 dB(A) on the left side.

When accelerating from a standstill with an exterior ambient noise level of 35.9 dB(A), the average of the results obtained were 67.5 dB(A) on the right side and 69.9 dB(A) on the left side.

With the vehicle stationary and the engine, accessories, and air conditioning on, the measurements averaged 57.7 dB(A) at low idle, 61.4 dB(A) at high idle, and 70.7 dB(A) at wide open throttle. With the accessories and air conditioning off, the readings averaged 1.6 dB(A) lower at low idle, 0.4 dB(A) lower at high idle, and 0.6 dB(A) higher at wide open throttle. The exterior ambient noise level measured during this test was 35.9 dB(A).

EXTERIOR NOISE TEST DATA FORM **Accelerating from Constant Speed**

Bus Number: 1110	Date: 3/19/12
Personnel: G.C., T.S. & J.P.	
Temperature (°F): 68	Humidity (%): 56
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.16	
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.	
Initial Sound Level Meter Calibration: ■ checked by: T.S.	
Exterior Ambient Noise Level dB(A): 35.9	

Accelerating from Constant Speed Curb (Right) Side		Accelerating from Constant Speed Street (Left) Side	
Run #	Measured Noise Level dB(A)	Run #	Measured Noise Level dB(A)
1	69.9	1	71.2
2	68.4	2	71.3
3	69.2	3	70.5
4	69.5	4	71.3
5	69.5	5	71.5
Average of two highest actual noise levels = 69.7 dB(A)		Average of two highest actual noise levels = 71.4 dB(A)	
Final Sound Level Meter Calibration Check: ■ checked by: T.S.			
Comments: None noted.			

EXTERIOR NOISE TEST DATA FORM

Accelerating from Standstill

Bus Number: 1110	Date: 3/19/12
Personnel: G.C., T.S. & J.P.	
Temperature (°F): 68	Humidity (%): 56
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.16	
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.	
Initial Sound Level Meter Calibration: ■ checked by: T.S.	
Exterior Ambient Noise Level dB(A): 35.9	

Accelerating from Standstill Curb (Right) Side		Accelerating from Standstill Street (Left) Side	
Run #	Measured Noise Level dB(A)	Run #	Measured Noise Level dB(A)
1	66.5	1	69.5
2	67.2	2	69.6
3	66.8	3	70.0
4	67.7	4	69.7
5	67.3	5	69.6
Average of two highest actual noise levels = 67.5 dB(A)		Average of two highest actual noise levels = 69.9 dB(A)	

Final Sound Level Meter Calibration Check: ■ checked by: T.S.
Comments: None noted.

EXTERIOR NOISE TEST DATA FORM

Stationary

Bus Number: 1110		Date: 3/19/12	
Personnel: G.C., T.S. & J.P.			
Temperature (°F): 68		Humidity (%): 56	
Wind Speed (mph): Calm		Wind Direction: Calm	
Barometric Pressure (in.Hg): 30.16			
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.			
Initial Sound Level Meter Calibration: ■ checked by: T.S.			
Exterior Ambient Noise Level dB(A): 35.9			
Accessories and Air Conditioning ON			
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)
		Measured	Measured
Low Idle	775	56.5	58.9
High Idle	995	60.1	62.6
Wide Open Throttle	2,750	69.7	71.7
Accessories and Air Conditioning OFF			
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)
		Measured	Measured
Low Idle	775	56.2	56.0
High Idle	995	59.9	62.1
Wide Open Throttle	2,750	70.1	72.5
Final Sound Level Meter Calibration Check: ■ checked by: T.S.			
Comments: None noted.			

7.2 EXTERIOR NOISE TESTS



**TEST BUS UNDERGOING
EXTERIOR NOISE TEST**



8. EMISSIONS TEST – DYNAMOMETER-BASED EMISSIONS TEST USING TRANSIT DRIVING CYCLES

8-I. TEST OBJECTIVE

The objective of this test is to provide comparable emissions data on transit buses produced by different manufacturers. This chassis-based emissions test bears no relation to engine certification testing performed for compliance with the Environmental Protection Agency (EPA) regulation. EPA's certification tests are performed using an engine dynamometer operating under the Federal Test Protocol. This emissions test is a measurement of the gaseous engine emissions CO, CO₂, NO_x, HC and particulates (diesel vehicles) produced by a vehicle operating on a large-roll chassis dynamometer. The test is performed for three differed driving cycles intended to simulate a range of transit operating environments. The cycles consist of Manhattan Cycle, the Orange County Bus driving cycle, and the Urban Dynamometer Driving Cycle (UDDS) and. The test is performed under laboratory conditions in compliance with EPA 1065 and SAE J2711. The results of this test may not represent actual in-service vehicle emissions but will provide data that can be used by recipients to compare buses tested under different operating conditions.

8-II. TEST DESCRIPTION

This test is performed in the emissions bay of the LTI Vehicle Testing Laboratory. The Laboratory is equipped with a Schenk Pegasus 300 HP, large-roll (72 inch diameter) chassis dynamometer suitable for heavy-vehicle emissions testing. The dynamometer is located in the end test bay and is adjacent to the control room and emissions analysis area. The emissions laboratory provides capability for testing heavy-duty diesel and alternative-fueled buses for a variety of tailpipe emissions including particulate matter, oxides of nitrogen, carbon monoxide, carbon dioxide, and hydrocarbons. It is equipped with a Horiba full-scale CVS dilution tunnel and emissions sampling system. The system includes Horiba Mexa 7400 Series gas analyzers and a Horiba HF47 Particulate Sampling System. Test operation is automated using Horiba CDTCS software. The computer controlled dynamometer is capable of simulating over-the-road operation for a variety of vehicles and driving cycles.

The emissions test will be performed as soon as permissible after the completion of the GVW portion of the structural durability test. The driving cycles are the Manhattan cycle, a low average speed, highly transient urban cycle (Figure 1), the Orange County Bus Cycle which consists of urban and highway driving segments (Figure 2), and the EPA UDDS Cycle (Figure 3). An emissions test will comprise of two runs for the three different driving cycles, and the average value will be reported. Test results reported will include the average grams per mile value for each of the gaseous emissions for

gasoline buses, for all the three driving cycles. In addition, the particulate matter emissions are included for diesel buses, and non-methane hydrocarbon emissions (NMHC) are included for CNG buses. Testing is performed in accordance with EPA CFR49, Part 1065 and SAE J2711 as practically determined by the FTA Emissions Testing Protocol developed by West Virginia University and Penn State University.

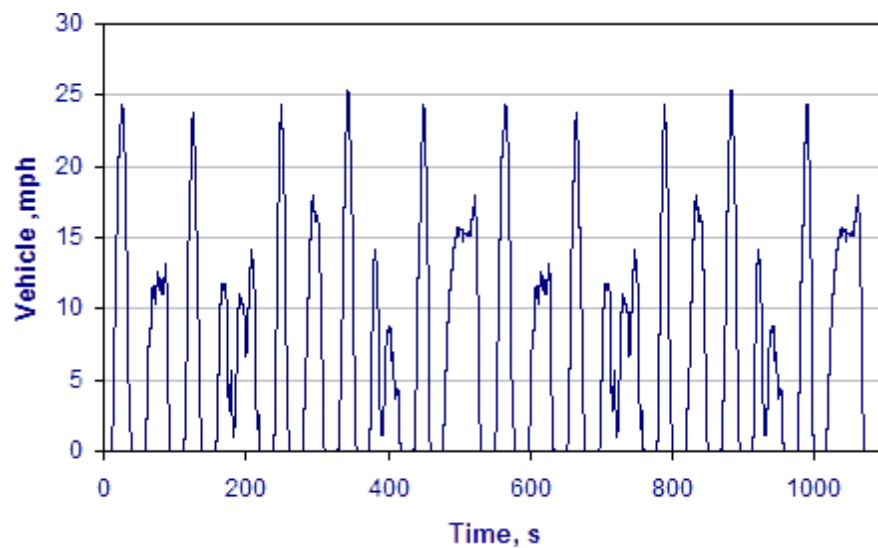


Figure 1. *Manhattan Driving Cycle (duration 1089 sec, Maximum speed 25.4mph, average speed 6.8mph)*

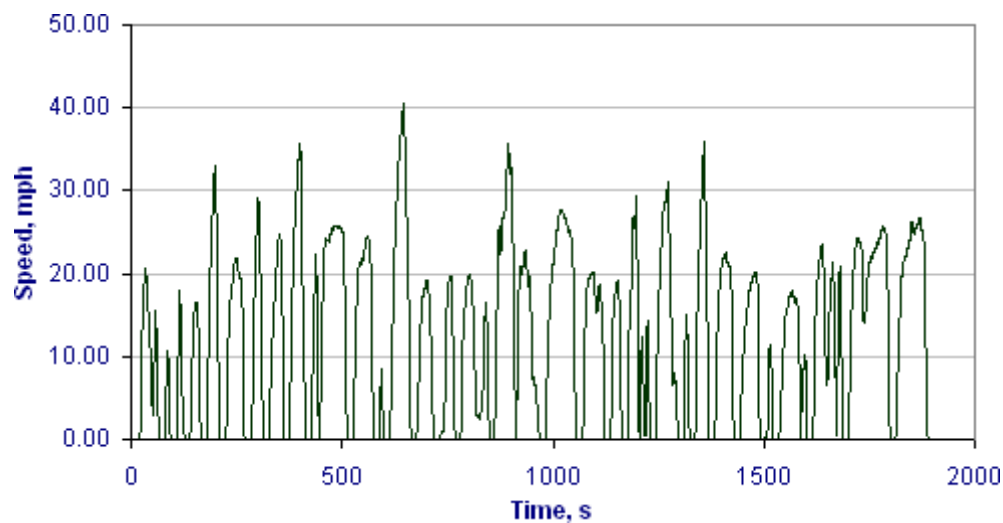


Figure 2. *Orange County Bus Cycle (Duration 1909 Sec, Maximum Speed 41mph, Average Speed 12mph)*

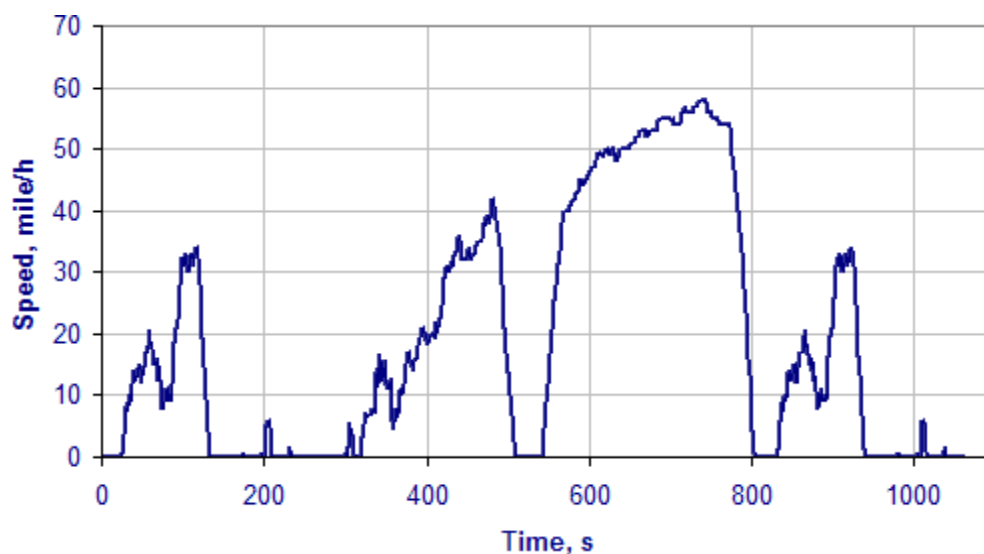


Figure 3. HD-UDDS Cycle (duration 1060seconds, Maximum Speed 58mph, Average Speed 18.86mph)

8-III. TEST ARTICLE

The test article is a Glaval Bus model Legacy transit bus equipped with diesel fueled, Cummins model ISB 6.7L 240 HP engine. The bus was tested on April 3, 2012.

8-IV. TEST EQUIPMENT

Testing is performed in the LTI Vehicle Testing Laboratory emissions testing bay. The test bay is equipped with a Schenk Pegasus 72-inch, large-roll chassis dynamometer. The dynamometer is electronically controlled to account for vehicle road-load characteristics and for simulating the inertia characteristics of the vehicle. Power to the roller is supplied and absorbed through an electronically controlled 3-phase ac motor. Absorbed power is dumped back onto the electrical grid.

Vehicle exhaust is collected by a Horiba CVS, full-flow dilution tunnel. The system has separate tunnels for diesel and gasoline/natural gas fueled vehicles. In the case of diesel vehicles, particulate emissions are measured gravimetrically using 47mm Teflon filters. These filters are housed in a Horiba HF47 particulate sampler, per EPA 1065 test procedures.. Heated gaseous emissions of hydrocarbons and NOx are sampled by Horiba heated oven analyzers. Gaseous emissions for CO, CO2 and cold NOx are measured using a Horiba Mexa 7400 series gas analyzer. System operation, including the operation of the chassis dynamometer,

and all calculations are controlled by a Dell workstation running Horiba CDCTS test control software. Particulate Filters are weighed in a glove box using a Sartorius microbalance accurate to 1 microgram.

8-V. TEST PREPARATION AND PROCEDURES

All vehicles are prepared for emissions testing in accordance with the Fuel Economy Pre-Test Maintenance Form. (In the event that fuel economy test was performed immediately prior to emissions testing this step does not have to be repeated) This is done to ensure that the bus is tested in optimum operating condition. The manufacturer-specified preventive maintenance shall be performed before this test. The ABS system and when applicable, the regenerative braking system are disabled for operation on the chassis dynamometer. Any manufacturer-recommended changes to the pre-test maintenance procedure must be noted on the revision sheet. The Fuel Economy Pre-Test Inspection Form will also be completed before performing. Both the Fuel Economy Pre-Test Maintenance Form and the Fuel Economy Pre-Test Inspection Form are found on the following pages.

Prior to performing the emissions test, each bus is evaluated to determine its road-load characteristics using coast-down techniques in accordance with SAE J1263. This data is used to program the chassis dynamometer to accurately simulate over-the-road operation of the bus.

Warm-up consists of driving the bus for 20 minutes at approximately 40 mph on the chassis dynamometer. The test driver follows the prescribed driving cycle watching the speed trace and instructions on the Horiba Drivers-Aid monitor which is placed in front of the windshield. The CDCTS computer monitors driver performance and reports any errors that could potentially invalidate the test.

All buses are tested at half seated load weight. The base line emissions data are obtained at the following conditions:

1. Air conditioning off
2. Evaporator fan or ventilation fan on
3. One Half Seated load weight
4. Appropriate test fuel with energy content (BTU/LB) noted in CDTCS software
5. Exterior and interior lights on
6. Heater Pump Motor off
7. Defroster off
8. Windows and Doors closed

The test tanks or the bus fuel tank(s) will be filled prior to the fuel economy test with the appropriate grade of test fuel.

8-VI DISCUSSION

The following Table 1 provides the emissions testing results on a grams per mile basis for each of the exhaust constituents measured and for each driving cycle performed.

TABLE 1 Emissions Test Results

Driving Cycle	Manhattan	Orange County Bus	UDDS
CO₂, gm/mi	2,217	1,585	1,124
CO, gm/mi	0.29	0.25	0.17
THC, gm/mi	0.02	0.03	0.01
NMHC, gm/mi	NA	NA	NA
NO_x, gm/mi	2.25	0.80	0.52
Particulates. gm/mi	0.002	0.002	0.002
Fuel consumption mpg	4.59	6.42	9.05

FUEL ECONOMY/EMISSIONS PRE-TEST MAINTENANCE FORM

Bus Number: 1110	Date: 3-14-12	SLW (lbs): 24,070
Personnel: T.S & P.D.		

FUEL SYSTEM	OK	Date	Initials
Install fuel measurement system	✓	3/14/12	T.S.
Replace fuel filter	✓	3/14/12	T.S.
Check for fuel leaks	✓	3/14/12	T.S.
Specify fuel type (refer to fuel analysis)	Diesel		
Remarks: None noted.			
BRAKES/TIRES	OK	Date	Initials
Inspect hoses	✓	3/14/12	P.D.
Inspect brakes	✓	3/14/12	P.D.
Relube wheel bearings	✓	3/14/12	P.D.
Check tire inflation pressures (mfg. specs.)	✓	3/14/12	P.D.
Remarks: None noted.			
COOLING SYSTEM	OK	Date	Initials
Check hoses and connections	✓	3/14/12	T.S.
Check system for coolant leaks	✓	3/14/12	T.S.
Remarks: None noted.			

FUEL ECONOMY/EMISSIONS PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 1110	Date: 3-14-12		
Personnel: T.S. & P.D.			
ELECTRICAL SYSTEMS	OK	Date	Initials
Check battery	✓	3/14/12	T.S.
Inspect wiring	✓	3/14/12	T.S.
Inspect terminals	✓	3/14/12	T.S.
Check lighting	✓	3/14/12	T.S.
Remarks: None noted.			
DRIVE SYSTEM	OK	Date	Initials
Drain transmission fluid	✓	3/14/12	P.D.
Replace filter/gasket	✓	3/14/12	P.D.
Check hoses and connections	✓	3/14/12	P.D.
Replace transmission fluid	✓	3/14/12	P.D.
Check for fluid leaks	✓	3/14/12	P.D.
Remarks: None noted.			
LUBRICATION	OK	Date	Initials
Drain crankcase oil	✓	3/14/12	T.S.
Replace filters	✓	3/14/12	T.S.
Replace crankcase oil	✓	3/14/12	T.S.
Check for oil leaks	✓	3/14/12	P.D.
Check oil level	✓	3/14/12	P.D.
Lube all chassis grease fittings	✓	3/14/12	T.S.
Lube universal joints	✓	3/14/12	T.S.
Replace differential lube including axles	✓	3/14/12	P.D.
Remarks: None noted.			

FUEL ECONOMY/EMISSIONS PRE-TEST MAINTENANCE FORM (page 3)

Bus Number: 1110	Date: 3-14-12		
Personnel: T.S. & P.D.			
EXHAUST/EMISSION SYSTEM	OK	Date	Initials
Check for exhaust leaks	✓	3/14/12	P.D.
Remarks: None noted.			
ENGINE	OK	Date	Initials
Replace air filter	✓	3/14/12	P.D.
Inspect air compressor and air system	✓	3/14/12	P.D.
Inspect vacuum system, if applicable	✓	3/14/12	P.D.
Check and adjust all drive belts	✓	3/14/12	T.S.
Check cold start assist, if applicable	✓	3/14/12	T.S.
Remarks: None noted.			
STEERING SYSTEM	OK	Date	Initials
Check power steering hoses and connectors	✓	3/14/12	T.S.
Service fluid level	✓	3/14/12	T.S.
Check power steering operation	✓	3/14/12	T.S.
Remarks: None noted.			
	OK	Date	Initials
Ballast bus to seated load weight	✓	3/14/12	T.S.
TEST DRIVE	OK	Date	Initials
Check brake operation	✓	3/14/12	P.D.
Check transmission operation	✓	3/14/12	P.D.
Remarks: None noted.			

FUEL ECONOMY/EMISSIONS PRE-TEST INSPECTION FORM

Bus Number: 1110	Date: 4-3-12
Personnel: T.M., T.S. & E.D.	
PRE WARM-UP	If OK, Initial
Fuel Economy Pre-Test Maintenance Form is complete	T.S.
Cold tire pressure (psi): Front <u>110</u> Middle <u>N/A</u> Rear <u>110</u>	T.S.
Tire wear:	T.S.
Engine oil level	T.S.
Engine coolant level	T.S.
Interior and exterior lights on, evaporator fan on	T.S.
Fuel economy instrumentation installed and working properly.	T.S.
Fuel line -- no leaks or kinks	T.S.
Speed measuring system installed on bus. Speed indicator installed in front of bus and accessible to TECH and Driver.	E.D.
Bus is loaded to SLW	T.S. & E.D.
WARM-UP	If OK, Initial
Bus driven for at least one hour warm-up	T.M.
No extensive or black smoke from exhaust	T.S.
POST WARM-UP	If OK, Initial
Warm tire pressure (psi): Front <u>110</u> Middle <u>N/A</u> Rear <u>110</u>	T.S.
Environmental conditions Average wind speed <12 mph and maximum gusts <15 mph Ambient temperature between 30°F(-1C°) and 90°F(32°C) Track surface is dry Track is free of extraneous material and clear of interfering traffic	T.S.



Creative Bus Sales

CRFQ 0810 DMT2200000004 Mid Size Medium Duty

Cutaway Vehicles

LIST OF EXCEPTIONS:

1. Section 3.8.4: The parking brake will not automatically engage when the vehicle is placed in park. This is not available.
2. Section 3.19.4-Glass in entry door panels will be AS-2 not AS-3.
3. Section 3.27.7-Passenger seats will be 17.5"W. Freedman no longer offers 18" wide seats
4. 3.27.11 Driver seat will be OEM black cloth, so they will not match the passengers seats in color due to the inclusion of the Docket 90 specification in Addendum 1.
5. 3.27.11 Driver seat belt extension is not available.
6. 3.32.1 Lift will be NCL model, not NVL model as it is not available in a 1000 pound capacity.
7. Section 4-Please refer to the floor plans provided for overall length of each Class offering.

GLAVAL LEGACY

QUALITY, STYLE AND DURABILITY

The all new Glaval Legacy is sure to impress with its updated stylish standards, comfortable ride and rugged durability. Built on the heavy-duty Freightliner S2C diesel chassis, the Legacy offers the comfort, sophistication and room to move your most elite clientele while keeping affordability in mind. Standard 5/8" marine grade plywood flooring,

stainless steel exterior screws and a fully undercoated chassis protects the bus from the most extreme conditions. Redesigned straight sidewalls and solid one-piece front and rear caps gives a fresh new look to this dependable classic. With an abundance of options and layouts, the new Legacy will exceed your customer's expectations.



 **Glaval Bus**
A Division Of Forest River, Inc.

GLAVAL LEGACY

Standard Exterior Feature Highlights

- Fully welded corrosion-preventative coated aluminized steel cage construction with laminated sidewall structure meeting all applicable FMVSS requirements
- "Starview" drivers visibility window in front of entry door
- Electric actuated passenger entry door with full length glass
- 36" wide x 36" high upper double T-Slider tempered safety glass windows with climate control tint
- Black powder coated steel rear bumper
- Rear mud flaps
- Molded wheel flares
- Pre-painted white galvanized steel sidewalls and skirts
- Fiberglass front and rear caps
- One-piece seamless FRP (fiberglass reinforced plastic) roof
- Breakaway rearview mirrors with built-in convex
- Sealed LED stop, tail, and turn signal lights with reverse lights
- Exterior LED front and rear marker lights

Standard Interior Feature Highlights

- 93" and 99" interior width
- 96" and 102" exterior width
- 81" interior floor to ceiling height with standard floor
- Floor and wall seat track for flexible seating
- Black slip resistant Gerflor floor covering
- 5/8" marine tech plywood flooring
- Coved flooring to bottom of seat track
- Gray padded vinyl or cloth interior
- White step nosing at passenger door
- 1.25" left hand vertical passenger assist rail at entry door
- LED entry door step well lights
- LED driver and passenger area lighting
- FlexTech Electrical System
- Backup camera system with 7" monitor/rearview mirror combo
- Non-retractable seat belts

Popular Option Highlights

- Stainless steel wheel inserts
- Luggage storage areas (overhead luggage racks with reading lights, interior luggage racks, rear storage area)
- Rear emergency door with window(s)
- Passenger area rear heat and air conditioning
- Passenger grab rails
- Audio and video systems
- Mid back or high back seating
- ADA and FMVSS compliant wheelchair lifts and securement systems
- Fiberglass side walls and skirts



28 Passenger 2 Wheelchair
2 Passenger Foldaway and 4 Passenger Flip Seats
Plus Driver



29 Passenger with Rear Luggage Plus Driver



36 Passenger 2 Wheelchair
2 Passenger Foldaway and 4 Passenger Flip Seats
Plus Driver



37 Passenger Plus Driver



41 Passenger with Rear Luggage Plus Driver



45 Passenger Plus Driver



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DEALER INFO

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Freightliner Custom Chassis Corporation

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A proposal for
GLAVAL BUS SALES: DEALER COPY

Prepared by
Freightliner Custom Chassis
April Newton

Jun 18, 2021

Freightliner Custom Chassis Corp S2C

B6.7-240hp / 2200PTS / HYD Disc Brakes with Air Provision / ADA / 19.5" Michelins / Steel Wheels

Detroit Rear Axle / Air Susp / Spare wheel/tire

Chrome Bumper / Steel Battery Box Parts / Davco F/W Sep

199" wb @ 26,000# GVWR (Axle Limited)

(F-GAWR: 9,000# / R-GAWR: 17,000#)

VERIFY SPECIFICATIONS and PRICING ARE ACCURATE BEFORE PLACING AN ORDER



Components shown may not reflect all spec'd options and are not to scale

Application Version 11.6.302
Data Version PRL-8H6.020
Glaval S2C 22MY WV 199wb Air Susp
@ 2590...



06/18/2021 3:37 PM

Page 1 of 12

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S P E C I F I C A T I O N P R O P O S A L

Data Code	Description
Price Level	
PRL-8H6	FCCC SHUTTLE BUS 2022 DATABOOK (EFF: 02/01/21)
Data Version	
DRL-020	SPECPRO21 DATA RELEASE VER 020
Vehicle Configuration	
001-342	S2C 106 CONVENTIONAL CAB AND CHASSIS
002-004	SET BACK AXLE - TRUCK
003-001	LH PRIMARY STEERING LOCATION
General Service	
A66-99D	EXPECTED FRONT AXLE(S) LOAD : 9000.0 lbs
A68-99D	EXPECTED REAR DRIVE AXLE(S) LOAD : 17000.0 lbs
ADJ-99D	GROSS VEHICLE WEIGHT ADJUSTMENT +/- : - 100.0 lbs
A63-99D	EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 25900.0 lbs
AA1-005	CHASSIS CONFIGURATION
A85-032	SHUTTLE BUS
AA3-045	CHARTER/SHUTTLE/TRANSIT BUS/MOTOR COACH
A84-1BU	BUS TRANSPORTATION BUSINESS SEGMENT
AA4-014	PASSENGERS COMMODITY
AA6-001	DOMICILED, USA 50 STATES (INCLUDING CALIFORNIA AND CARB OPT-IN STATES)
AA5-002	TERRAIN/DUTY: 100% (ALL) OF THE TIME, IN TRANSIT, IS SPENT ON PAVED ROADS
AB1-008	MAXIMUM 8% EXPECTED GRADE
AB5-001	SMOOTH CONCRETE OR ASPHALT PAVEMENT - MOST SEVERE IN-TRANSIT (BETWEEN SITES) ROAD SURFACE
AF3-2GA	STARTRANS BUS
Engine	
101-21T	CUM B6.7 240 HP @ 2400 RPM, 2600 GOV, 560 LB/FT @ 1600 RPM



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Data Code	Description
Engine Controls & Parameters	
162-002	IGNITION SWITCH CONTROLLED ENGINE STOP
99D-008	2008 CARB EMISSION CERTIFICATION WITH IDLE SHUTDOWN DISABLED - EXEMPTED
79A-075	75 MPH ROAD SPEED LIMIT
79B-004	CRUISE CONTROL SPEED LIMIT 1 MPH LOWER THAN ROAD SPEED LIMIT
79G-998	NO IDLE SHUTDOWN CONFIGURATION
79K-017	PTO MODE ENGINE RPM LIMIT - 2300 RPM
79M-001	PTO MODE BRAKE OVERRIDE - SERVICE BRAKE ONLY ENABLED
79P-009	PTO RPM W/CRUISE SET SW - 1200 RPM
79Q-005	PTO RPM WITH CRUISE RESUME SWITCH - 1000 RPM
79S-009	PTO MODE CANCEL VEHICLE SPEED - 0 MPH
79U-006	PTO GOVERNOR RAMP RATE - 200 RPM PER SECOND
79W-001	ONE REMOTE PTO SPEED
79X-009	REMOTE PTO SPEED 1 SETTING - 1200 RPM
80G-002	PTO MINIMUM RPM - 700
80J-004	REGEN INHIBIT SPEED THRESHOLD - 1 MPH
80M-002	ALTERNATE SWITCH SPEED 950 RPM
80N-002	MAXIMUM ENGINE RPM = 2500 ON VSS FAILURE
80L-004	ENABLE DPF REGEN STAY WARM

Engine Equipment	
266-100	700 SQ-IN ALUMINUM RADIATOR
105-001	ENGINE MOUNTED OIL CHECK AND FILL
111-001	15W-40 WT ENGINE OIL
190-001	DONALDSON 1-STAGE AIR CLEANER
188-050	AIR INTAKE THROUGH LH SIDE OF HOOD
189-001	AIR INTAKE PIPING - CLNR TO ENGINE
192-004	AIR CLEANER MOUNTED ON FIREWALL
124-1CC	LN 12V 270 AMP 4949PA PAD MOUNT ALTERNATOR WITH AC TAPS
292-1D7	(3) ALLIANCE MODEL 1131, GROUP 31, 12V MAINTENANCE FREE 2775 CCA THREADED STUD BATTERIES
290-108	BATTERY BOX FRAME MOUNTED, STAINLESS STEEL
282-045	SINGLE BATTERY BOX FRAME MOUNTED LH SIDE UNDER CAB 62" (1575MM) AFT OF STD



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Data Code	Description
291-001	FRAME GROUND RETURN FOR BATTERY CABLES
289-006	PLASTIC BATTERY BOX COVER
293-998	NO BATTERY SHUTOFF SWITCH
107-032	CUMMINS 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY VALVE
108-002	STD MECH AIR COMP GOV
131-012	STEEL AIR COMPRESSOR DISCHARGE LINE
152-049	ELECTRONIC ENGINE INTEGRAL WARNING & DERATE PROTECTION SYSTEM WITH SEPERATE LOW COOLANT LVL LIGHT & BUZZER
128-076	CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH
28F-002	ENGINE AFTERTREATMENT DEVICE, AUTOMATIC OVER THE ROAD REGENERATION AND DASH MOUNTED REGENERATION REQUEST SWITCH
234-025	HORIZONTAL DIESEL PARTICULATE FILTER AFTERTREATMENT DEVICE
235-076	RH IB FRAME MTD HZ ATD
23U-009	10 GALLON DEF TANK LH FRAME MTD
35W-001	EXHAUST MITIGATION DEVICE FTL 4" ID SLIP-FIT
237-072	HORIZONTAL TAILPIPE, EXIT LH REAR OF CHASSIS
273-004	BORG WARNER VISCOUS FAN DRIVE
110-003	CUMMINS SPIN ON FUEL FILTER
118-001	FULL FLOW OIL FILTER
267-001	REMOTE MOUNTED SURGE TANK
103-039	ANTIFREEZE TO -34F, OAT (NITRITE & SILICATE FREE) EXTENDED LIFE COOLANT
171-007	GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT
172-016	CONSTANT TORQUE BREEZE CLAMPS ON 1" IN DIA AND GREATER, SS CLAMPS LESS THAN 1"
261-001	STANDARD CHARGE AIR COOLER PLUMBING
270-998	NO OPTIONAL RADIATOR PLUMBING
168-002	LOWER RADIATOR GUARD
138-010	PHILLIPS-TEMRO 750 WATT/115 VOLT BLOCK HEATER
140-010	CHROME ENGINE HEATER RECEPTACLE TEMPORARILY MOUNTED TO ENGINE



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Data Code	Description
134-001	ALUMINUM FLYWHEEL HOUSING
155-023	DENSO 12V STARTER WITH COPPER CONTACTS

Transmission

342-1MH **ALLISON 2200 PTS AUTOMATIC TRANSMISSION
WITH PARK PAWL WITHOUT PTO PROVISION**

Transmission Controls & Parameters

345-093	T-HANDLE CABLE SHIFT CONTROL WITH PARK POSITION AND PARK INTERLOCK SOLENOID
353-032	VEHICLE INTERFACE WIRING WITH ADA INTERLOCKS
343-301	PKG 354 - 1K/2K RDS/EVS/HS/MH/PTS/SPS - 5TH GEN
97F-002	ALLISON TRANS - SEM/LRTP REQ
97G-001	TRANS PROG-ENABLED
84C-003	5, 3, 2, 1 - D, 3, 2, L -1K/2K PRIMARY GEARS
85B-011	RANGE INDICATION,PARK,NEUT
84U-001	SECONDARY MODE INPUT - MODE SWITCH,FOR 1000/2000 PRODUCT FAMILIES ONLY
84W-004	AUX RNG INHIBIT,DUAL

Transmission Equipment

370-015	WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK
346-001	TRANSMISSION OIL CHECK AND FILL
35T-001	SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle & Equipment

400-1A5	DA-F-10.0-3 10,000# FF1 71.5 KPI/3.74DROP SINGLE FRONT AXLE
403-002	NON-ASBESTOS FRONT BRAKE LINING
402-054	BOSCH HYDRAULIC PIN-SLIDE DISC FRONT BRAKES
419-004	FRONT DISC BRAKE ROTORS
418-030	CONMET IRON FRONT HUBS
409-002	SKF SCOTSEAL CLASSIC FRONT OIL SEALS
408-001	VENTED FRONT HUB CAPS W/WINDOW, CENTER AND SIDE PLUGS - OIL
40T-001	ORGANIC SAE 80/90 FRONT AXLE LUBE
416-022	STANDARD SPINDLE NUTS FOR ALL AXLES
618-002	STANDARD CUPS AND CONES (WHEEL BEARINGS) FRONT AND REAR



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Data Code	Description
536-050	TRW THP-60 POWER STEERING
539-003	POWER STEERING PUMP
534-015	2 QUART SEE THROUGH POWER STEERING RESERVOIR

Front Suspension

620-019	9,000# TAPERLEAF FRONT SUSPENSION
619-005	MAINTENANCE FREE RUBBER BUSHINGS - FRONT SUSPENSION
629-998	NO FRONT SWAYBAR
410-017	SACHS FRONT SHOCK ABSORBERS

Rear Axle & Equipment

420-279	DA-RS-17.0-4 17,000# L-SERIES SINGLE REAR AXLE
421-430	4.30 REAR AXLE RATIO
424-001	IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING
386-055	SPL100 DANA SPICER MAIN DRIVELINE WITH HALF ROUND YOKES
41T-001	ORGANIC SAE 80/90 REAR AXLE LUBE
393-001	DRIVELINE GUARD
423-054	BOSCH HYDRAULIC PIN-SLIDE DISC REAR BRAKES
433-002	NON-ASBESTOS REAR BRAKE LINING
451-005	REAR DISC BRAKE ROTORS
440-001	SKF SCOTSEAL CLASSIC REAR OIL SEALS
435-009	REAR AXLE MOUNTED AIR OPERATED DRUM PARK BRAKE

Rear Suspension

622-216	23,000# AIRLINER REAR SUSPENSION WITH CHAIN CLEARANCE
621-007	AIRLINER HIGH POSITION RIDE HEIGHT
888-002	MANUAL DUMP VALVE FOR AIR SUSPENSION W/INDICATOR LIGHT, W/O GAUGE
910-004	DUAL AIR REAR SUSPENSION LEVELING VALVES
87D-001	REAR AIR SUSPENSION DUMP VALVE AUTOFILL W/IGNITION OFF OR >5 MPH W/IND LIGHT
630-001	REAR SWAYBAR
439-017	SACHS REAR SHOCK ABSORBERS

Tag Axle & Equipment

443-998	NO TAG AXLE
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Data Code	Description
Brake System	
018-003	HYDRAULIC BRAKE PACKAGE W/OPTIONAL AIR SUPPLY
490-1AR	WABCO NG HYDRAULIC 4S/4M ABS W/O TRACTION CONTROL
871-033	NYCLAD HYDRAULIC TUBING WITH NYLON AND FABRIC/WIRE BRAID CHASSIS AIR LINES
901-006	HYDRAULIC HOSE/LINE FRONT SERVICE BRAKES
902-006	HYDRAULIC HOSE/LINE REAR SERVICE BRAKES
46D-002	STANDARD AIR SYSTEM PRESSURE PROTECTION
46E-001	STANDARD AIR MANAGEMENT UNIT
480-083	WABCO SS-1200 PLUS AIR DRYER W/INTEGRAL AIR GOVERNOR AND HEATER
479-003	AIR DRYER MOUNTED INBOARD ON LH RAIL
483-004	WABCO OIL COALESCING FILTER FOR AIR DRYER
460-077	ONE STEEL AIR BRAKE RESERVOIR MTD INSIDE RAIL
477-042	PETCOCK DRAIN VALVES ON ALL AIR TANKS CENTRALLY LOCATED TO FRAME MOUNTED BRACKETS
Wheelbase & Frame	
545-505	5050MM (199 INCH) WHEELBASE
546-080	5/16X3.00X10-1/8 INCH STEEL FRAME (7.94MMX257.2MM/0.312X10.13 INCH) 80KSI
552-117	3175MM (125 INCH) REAR FRAME OVERHANG
553-001	SQUARE END OF FRAME
550-001	FRONT CLOSING CROSSMEMBER
559-001	STANDARD WEIGHT ENGINE CROSSMEMBER
562-001	STANDARD MIDSHIP #1 CROSSMEMBER(S)
565-001	STANDARD SUSPENSION CROSSMEMBER
Chassis Equipment	
556-1AR	THREE-PIECE 14 INCH CHROMED STEEL BUMPER WITH COLLAPSIBLE ENDS
558-001	FRONT TOW HOOKS - FRAME MOUNTED
574-001	BUMPER MOUNTING FOR SINGLE LICENSE PLATE
586-024	FENDER & FRONT OF HOOD MOUNTED FRONT MUDFLAPS



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Data Code	Description
551-006	ZINC PLATED HEX HEADED FRAME FASTENERS
54L-998	NO BODY BUILDER CLIP/CLAMPING AFT
99U-018	"BUY AMERICA ORDER"

Fuel Tanks

230-001	60 GALLON/227 LITER RECTANGULAR STEEL FUEL TANK - BETWEEN RAILS
5A3-003	PETROLEUM DIESEL FUEL
205-009	LH SIDEFILL FUEL TANK CAP
20J-002	FUEL FILLER NECK WITH STRAIGHT FLANGE
122-1H8	DAVCO 245 FUEL/WATER SEPARATOR W/12V HEAT & WIF

Tires

093-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL FRONT TIRES
094-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL REAR TIRES
510-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL SPARE TIRE

Hubs

450-002	GUNITE IRON REAR AXLE HUBS
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Wheels

502-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 5.12 INSET 4-HAND STEEL DISC FRONT WHEELS
505-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 4-HAND STEEL DISC REAR WHEELS
511-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 4-HAND STEEL DISC SPARE WHEEL
498-049	FREIGHTLINER VALVE STEMS

Cab Exterior

829-071	106" BBC FLAT ROOF ALUMINUM CONVENTIONAL CAB
651-004	LH CAB DOOR(S) WITH 70 DEGREE DOOR STOP
653-997	OMIT STANDARD RH DOOR ASSEMBLY
655-025	LH CAB DOOR LATCHES WITH MANUAL DOOR LOCKS, NO RH DOOR LOCK
682-085	OPENING IN BACK OF CAB W/TEMPORARY STRUCTURE
650-009	RUBBER CAB MOUNTS
664-001	PLAIN STEP FINISH
644-004	FIBERGLASS HOOD



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Data Code	Description
690-007	HOOD LINER INSULATION WITH SINGLE FIREWALL INSULATION
646-023	HOOD MOUNTED CHROMED PLASTIC GRILLE
65X-003	CHROMED HOOD MOUNTED AIR INTAKE GRILLE
726-002	DUAL ELECTRIC HORNS
657-001	DOOR LOCKS AND IGNITION SWITCH KEYED THE SAME
312-038	INTEGRAL HEADLIGHT/MARKER ASSEMBLY WITH CHROME BEZEL
311-015	DAYTIME RUNNING LIGHTS ON FRONT TURN LAMPS WITH ENGINE RUNNING
294-027	WIRING ONLY WITH SEPARATE STOP AND TURN LIGHT CIRCUITS TO END OF FRAME FOR CUSTOMER FURNISHED LAMPS
300-015	STANDARD FRONT TURN SIGNAL LAMPS
744-997	OMIT STANDARD PRIMARY MIRROR ASSEMBLY DOES NOT COMPLY W/ C/FMVSS 111 OR ADR14
729-001	STANDARD SIDE/REAR REFLECTORS
677-058	DUAL LEVEL ENTRY STEPS LH ONLY
768-997	OMIT REAR WINDOW(S)
661-020	TINTED DOOR GLASS LH WITH TINTED LH NON-OPERATING WING WINDOWS, NO RH WINDOW
654-024	LH MANUAL WINDOW REGULATOR, NO RH REGULATOR
663-019	1-PIECE TINTED ROPED-IN WINDSHIELD
659-003	1 GALLON WINDSHIELD WASHER RESERVOIR
335-004	UPGRADED CHASSIS MULTIPLEXING UNIT
969-103	FCCC INSTALLED EMBLEMS ON HOOD

Cab Interior

707-1AK	OPAL GRAY VINYL INTERIOR
772-006	BLACK MATS WITH SINGLE INSULATION
785-004	DASH MOUNTED ASH TRAY(S) WITHOUT LIGHTER
691-997	OMIT STANDARD FORWARD OVERHEAD CONSOLE
694-010	IN DASH STORAGE BIN
742-007	(2) CUP HOLDERS LH AND RH DASH
680-006	GRAY/CHARCOAL FLAT DASH
130-003	SANDEN COMPACT AIR CONDITIONER COMPRESSOR



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Data Code	Description
685-118	FCCC COMPLETED DASH A/C ONLY, NO OTHERFCCC SUPPLIED AC COMPONENTS
700-002	HEATER, DEFROSTER AND AIR CONDITIONER
703-005	MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH
698-001	RADIATOR MOUNTED AIR CONDITIONER CONDENSER
702-002	BINARY CONTROL, R-134A
170-041	ADDITIONAL AUXILIARY LINES WITH MANIFOLD PLUMBING AND COMBINED SHUTOFF TO DASH AND AUXILIARY HEATER
739-034	PREMIUM INSULATION
285-020	SOLID-STATE CIRCUIT PROTECTION, PDMS W/FUSES & BRKRS, PDC W/FUSES & BRKR
324-074	LH/RH DOOR ACTIVATED DOME LT W/3-WAY SW & COURTESY LIGHTS MOUNTED ON ALL DOORS
32H-013	STEPWELL LAMP ON WITH DOOR(S) OPEN
284-023	(1) 12 VOLT POWER SUPPLY IN DASH
756-1D9	PREM HB AIR SUSP ST W/3 CHMBR AIR LMBR, INT CUSH EXT,FWD&RR TILT, ADJ SHK
760-997	OMIT STANDARD FRONT PASSENGER SEAT
757-998	NO SEAT SKIRT(S)
759-009	INBOARD DRIVER SEAT ARMREST, NO PASSENGER SEAT ARMREST
711-006	LH INTEGRAL DOOR PANEL ARMREST, NO RH ARMREST
758-022	BLACK MORDURA CLOTH DRIVER SEAT COVER
763-031	3 POINT FIXED D-RING RETRACTOR DRIVER SEAT BELT; NO PASSENGER BELT
706-013	MOLDED PLASTIC DOOR PANEL
532-002	ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN
540-015	4-SPOKE 18 INCH (450MM) STEERING WHEEL
765-002	DRIVER AND PASSENGER INTERIOR SUN VISORS

Instruments & Controls

732-004	GRAY DRIVER INSTRUMENT PANEL
734-004	GRAY CENTER INSTRUMENT PANEL
870-001	BLACK GAUGE BEZELS



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Data Code	Description
811-039	DRIVER MESSAGE CENTER W/LCD DISPLAY,24 WARNING LAMPS, DATA LINKED, AMI
810-027	ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE, WITHOUT ODOMETER
812-022	ELECTRONIC 3500 RPM TACHOMETER
840-007	SINGLE AIR PRESSURE GAUGE FOR HYDRAULIC BRAKES WITH AIR PROVISION
852-002	ELECTRIC ENGINE OIL PRESSURE GAUGE
856-001	ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE
836-015	DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY
844-001	2 INCH ELECTRIC FUEL GAUGE
864-022	DIGITAL TRANS OIL TEMP INDRIVER DISPLAY
486-001	LOW AIR PRESSURE LIGHT AND BUZZER
830-017	ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY
198-002	INTAKE MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS
149-013	ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL
160-025	DIAGNOSTIC INTERFACE CONNECTOR, 9 PIN, SAE J1939, LOCATED BELOW DASH
148-079	PROG RPM CTRL WITH A/C OR 12.75V LOW VOLTAGE AUTO HIGH IDLE
746-019	CUSTOMER FURNISHED DIN RADIO PACKAGE
747-001	DASH MOUNTED RADIO
750-055	2)RADIO SPEAKERS IN CAB & WRG ONLY FOR (2)BODYBUILDER INTERFACE SPKRS
753-039	AM/FM ANTENNA PROVISION W/LHDASH EXIT, TEMP MTD
329-102	PROV FOR TWELVE BODY BUILDER SUPPLIED SWITCHES
660-008	SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY
304-001	MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH
882-050	ONE VALVE PARKING BRAKE SYSTEM W/WARNING INDICATOR AND CUSTOMER CONTROLLED PARK BRAKE RELEASE SOLENOID
299-013	SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE



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Data Code	Description
298-039	INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS
Design	
065-196	PAINT: ONE SOLID COLOR; BASE/CLEARCOAT
Color	
980-5F7	CAB COLOR A: L0007EY WHITE ELITE EY
98A-998	NO GRILLE PAINT
986-019	CHASSIS PAINT: VENDOR BLACK
962-972	POWDER WHITE (N0006EA) FRT WHEELS/RIMS(PKWHT21, TKWHT21, W, TW)
966-972	POWDER WHITE (N0006EA) REAR WHEELS/RIMS(PKWHT21, TKWHT21, W, TW)
96F-972	POWDER WHITE (N0006EA) SPARE WHEEL/RIM(PKWHT21, TKWHT21, W, TW)
Certification / Compliance	
996-001	U.S. FMVSS CERTIFICATION
Special Narrative Instructions	
999-998	NO SPECIAL NARRATIVE

(***) All cost increases for major components (Engines, Transmissions, Axles, Front and Rear Tires) and government mandated requirements, tariffs, and raw material surcharges will be passed through and added to factory invoices.





S2C Cutaway Commercial Bus Chassis



Features & Benefits

- 1** Chassis is equipped with ADA (Americans with Disabilities Act) wiring which offers body builder interface connections, eliminating the need for OEMs to splice into chassis wiring.
- 2** Between-the-rails fuel tank offers superior protection from impact and clean frame rail sides for bus body needs.
- 3** Tuned suspensions and match-marked tires offer a superior ride compared to a traditional truck suspension.
- 4** S2C offers a 20% larger windshield for better visibility compared to the competition.
- 5** Offers 30% to 50% better driver's line of sight compared to the competition, reducing blind spots and potential hazards.
- 6** Low-effort, easy-tilt hood minimizes stress on the driver during inspections. Hood also offers a dampening device that minimizes rapid closure, reducing hood damage or potential injury to maintenance personnel.
- 7** 55-degree wheel cut offers improved maneuverability compared to the traditional truck cab configuration.
- 8** Cab offers floor- and firewall-mounted noise and heat abatement package for improved driver and passenger comfort.
- 9** S2C exceeds the "Buy America" requirements, giving you the confidence that your vehicle was made in America.
- 10** Standard frame-mounted, rollout battery tray with cover. Easier accessibility than a traditional under-step configuration.
- 11** Available dual TM-21 A/C compressors and large single alternator to handle bus needs.

STANDARD FEATURES AND OPTIONS: S2C

When it comes to making the most out of its time on the road, nothing compares to our all-new S2C.

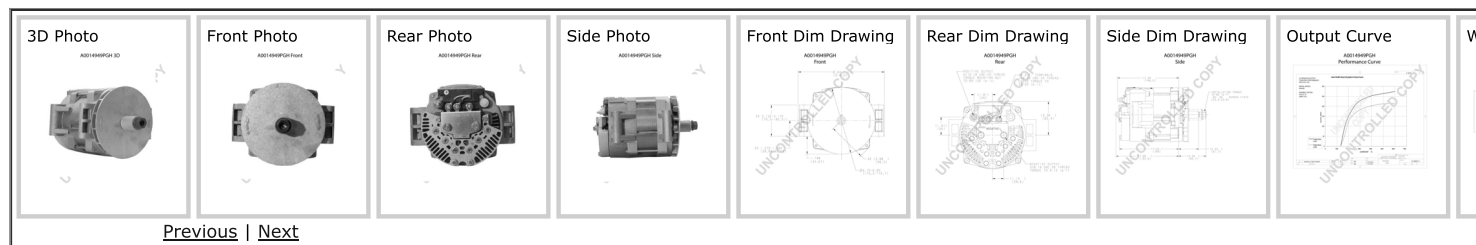
S2C CUTAWAY CHASSIS

Engine	Cummins® ISB 6.7-200 200 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm
Optional engines	Cummins ISB 6.7-220 220 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm Cummins ISB 6.7-240 240 hp @ 2,300 rpm, 2,600 GOV, 560 lb./ft. @ 1,600 rpm Cummins ISB 6.7-250 250 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm Cummins ISB 6.7-260 260 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm Cummins ISB 6.7-300 300 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm
Transmission	Allison® 1000 PTS with park pawl
Optional transmission	Allison 2100 PTS, 2200 PTS, 2500 PTS, 3000 PTS, B210, B220, B300
GVWR	19,500 lbs. to 33,000 lbs.
Alternator	Delco Remy® 160 amp, 28-SI
Optional alternator	Leece-Neville® 170 amp, 185 amp, 200 amp, 270 amp and 320 amp
Air conditioning	OEM dash A/C with Sanden SD-7 compact A/C compressor std; Dual Seltec TM-21 A/C compressors optional
Axles	
Front	Detroit DA-F-08.0-2, 8,000 lbs. FCI
Optional front axle	Detroit DA-F-10.0-3, 10,000 lbs.; DA-F-12.0-3, 12,000 lbs.
Rear	Detroit DA-RS 15-2, 15,000 lbs.
Optional rear axle	DA-RS-17.5, 17,500 lbs.; DA-RS-19.0-2, 19,000 lbs.; DA-RS-21, 21,000 lbs.
Suspension	
Front	Taper-leaf spring, 7,000 lbs.
Optional front suspension	Taper-leaf spring, 9,000 lbs., 10,000 lbs. and 12,000 lbs. ratings
Rear	52" Variable-rate multi-leaf spring, 12,500 lbs.
Optional rear suspension	52" variable-rate multi-leaf spring rear suspension with helper; 16,000 lbs., 19,000 lbs., 21,000 lbs. and 23,000 lbs. ratings; 23,000 lbs. AirLiner® air suspension with tuned Sachs® shocks with rear sway bar
Steering	TRW® tilt/telescoping steering column; TRW THP-45 or THP-60 steering gear; 55-degree wheel cut
Brakes	Bosch® hydraulic pin-slide disc brakes, front and rear WABCO® hydraulic ABS (4) channel
Optional air brakes	Bendix® air disc (front 22.5" wheel only); Meritor™ drum (front and rear)
Frame	5/16" x 3" x 10 1/8" 50 kpsi; 80 kpsi with rear air suspension
Wheelbase	179", 199", 219", 238", 259", 279", 300"
Fuel tank	60-gal. between the rails
Optional fuel tanks	100-gal. mounted between the rails; 65-gal. mounted right-hand side available
Tires	Goodyear® G647 RSS 245/70R 19.5" 14-ply
Optional tires	Goodyear or Michelin® 19.5" OR 22.5"
Dash	New automotive-styled, ergonomically designed dash; odometer/trip, hour/diagnostic/voltage display; LED backlights on switches and gauges offer solid-state design and longer life; integral driver cup holders
Wiring	Fully multiplexed electrical system with body-builder-ready electrical drop for ADA wiring
Hood	Torsion-bar-assisted for easy opening with minimal effort; composite headlamps with brighter beam pattern and integral turn signals
Bumper	Three-piece steel bumper; chrome option available
Battery box	Frame-mounted battery box with sliding tray; capable of holding dual 8 D batteries; optional available temporarily mounted
Select standards	- Daylight running lights - Standard cruise control and programmable high idle
Select options	- Center switch panel with cutouts for body-builder switches - Chrome grille and headlight bezels - T-handle shift lever with interlock

Call Freightliner Custom Chassis Corporation at (800) 545-8831, or visit us on the Web at freightlinerchassis.com.

9/14, FCC/MC-S-371. Specifications are subject to change without notice. Freightliner Custom Chassis Corporation is registered to ISO 9001:2008 and ISO 14001:2004.
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A0014949PGH - High Output Alternator



Product Specifications

Spec	Value
Item number	A0014949PGH
Sales number	4949PGH
Series number	4800-4900
Special Note	Conditions Of Usage
Warning: Prestolite Products are not approved for Aviation applications!	
Notes	GENERIC HEX SHAFT.
System voltage	12
Output	270
Mounting style	PAD
Dimensions in	INCHES
Rotation	CLOCKWISE
Housing coating	RAW
UL Approved	No
Mounting bolt size	F .417-.427 R .489-.479
Positive stud size	5/16-18 UNC
Negative stud size	3/8-16 UNC
Rectifier location	INTERNAL
Shaft diameter	7/8 INCH
Excitation type	
Regulator location	Integral
Regulator number	R240105747
Diode trio	No
Pulley required	No
Lamp driver	No
Adjustable regulator	No
Remote sense	No
Smart check	No
Batteryless	No

Similar Product

We have another model that is equivalent to A0014949PGH	
A0014949PAH	

Availability

Region	Priority / Status
USA / Canada	Medium (B)

Product status

Status	Number
Equivalent to	A0014949PAH

Technical Bulletins

Title / Link	Description
4000 Series Maintenance Manual	Service manual for the 4000 series alternators with internal regulators and rectifiers TSM1001_4000_Series_Int_Reg_and_Rectifier_Service-Manual.pdf (5.8 mb)
4000 Series Maintenance Manual - French Language Version	French version of the 4000 Series internal regulator and rectified alternators service manual. TSM1001_FR_4000_Series_Int_Reg_and_Rectifier_Service-Manual.pdf (5.9 mb)
4000 Series Pad Mount Alternators Hardware	Hardware kit for the 4000 Series Pad Mount alternators. TSB-3005_4000PAD-hardware.pdf (1.6 mb)
4900 Series Rear Housing Configurations	Through-bolt changes on the 4900 series alternator rear housing configurations. TSB-1047_4900_T-bolt.pdf (467 kb)
Brush Inspection and Replacement Procedure	Brush inspection and replacement procedure for 2500, 2800, 4800 and 4900 series alternators TSB-1061_Brush_Insection_and_Replacement.pdf (668 kb)
Pad Type Mounting Recommendations	Recommended mounting and bracket design for pad mount alternators. TSB-1049_Pad_Type_Mounting_Recommendations.pdf (608 kb)
Wire Identification Chart For R240 Regulators	Wire Identification chart for R240 Regulators for 4800-4900 series alternators TSB-1134_R240_Regulator_Wire_ID_Chart.pdf (76 kb)

Parts Breakdown

Title / Link	Description
4000 Series Pad Mount Service Parts List	Service parts list for the 4000 series alternator pad mount models. SP1009-4000-Pad-parts-list-web.pdf (2.3 mb)

Literature

Title / Link	Description
4000 Series High Amp Alternators	4000 Series High Amp alternators for all applications. FL1165_4000_Series_Alternator_Flyer.pdf (645 kb)
4000 Series High Amp Fire Truck Alts	4000 Series high amp alternators for fire truck applications FL1162_4000_Series_FireTruck_Alternator_Flyer.pdf (1.7 mb)
School Bus Informational Flyer	Severe Duty Alternators and Starters that apply to the school bus applications School_Bus_Application_FL1212.pdf (N/A)

Numbers Our Customers Use

Company	Part number
BBB INDUSTRIES	90-04-7097
DAIMLER TRUCKS NORTH AMERICA	LN 4949PGH
MACK TRUCKS INC 2742	22899067
MACK TRUCKS INC 2742	5034-4949PGH
PACCAR PARTS	LN4949PGH
PETERBILT	4949PGH
PIERCE MANUFACTURING INC	3760504
TRUCK PRO	PD-4949PGH
VOLVO NORTH AMERICAN CORP.	LN 4949PGH

Cross Reference Numbers

Company	Part number	Comment
OSHKOSH TRUCK	3760504	

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Questions regarding this information should be directed to the customer service division nearest you. Contact information can be found at our website at http://www.prestolite.com/pgs_contact/contact_0.php.

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A proposal for
GLAVAL BUS SALES: DEALER COPY

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Jun 18, 2021

Freightliner Custom Chassis Corp S2C

B6.7-240hp / 2200PTS / HYD Disc Brakes with Air Provision / ADA / 19.5" Michelins / Steel Wheels

Detroit Rear Axle / Air Susp / Spare wheel/tire

Chrome Bumper / Steel Battery Box Parts / Davco F/W Sep

199" wb @ 26,000# GVWR (Axle Limited)

(F-GAWR: 9,000# / R-GAWR: 17,000#)

VERIFY SPECIFICATIONS and PRICING ARE ACCURATE BEFORE PLACING AN ORDER



Components shown may not reflect all spec'd options and are not to scale

Application Version 11.6.302
Data Version PRL-8H6.020
Glaval S2C 22MY WV 199wb Air Susp
@ 2590...



06/18/2021 3:37 PM

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 Phone:

S P E C I F I C A T I O N P R O P O S A L

Data Code	Description
Price Level	
PRL-8H6	FCCC SHUTTLE BUS 2022 DATABOOK (EFF: 02/01/21)
Data Version	
DRL-020	SPECPRO21 DATA RELEASE VER 020
Vehicle Configuration	
001-342	S2C 106 CONVENTIONAL CAB AND CHASSIS
002-004	SET BACK AXLE - TRUCK
003-001	LH PRIMARY STEERING LOCATION
General Service	
A66-99D	EXPECTED FRONT AXLE(S) LOAD : 9000.0 lbs
A68-99D	EXPECTED REAR DRIVE AXLE(S) LOAD : 17000.0 lbs
ADJ-99D	GROSS VEHICLE WEIGHT ADJUSTMENT +/- : - 100.0 lbs
A63-99D	EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 25900.0 lbs
AA1-005	CHASSIS CONFIGURATION
A85-032	SHUTTLE BUS
AA3-045	CHARTER/SHUTTLE/TRANSIT BUS/MOTOR COACH
A84-1BU	BUS TRANSPORTATION BUSINESS SEGMENT
AA4-014	PASSENGERS COMMODITY
AA6-001	DOMICILED, USA 50 STATES (INCLUDING CALIFORNIA AND CARB OPT-IN STATES)
AA5-002	TERRAIN/DUTY: 100% (ALL) OF THE TIME, IN TRANSIT, IS SPENT ON PAVED ROADS
AB1-008	MAXIMUM 8% EXPECTED GRADE
AB5-001	SMOOTH CONCRETE OR ASPHALT PAVEMENT - MOST SEVERE IN-TRANSIT (BETWEEN SITES) ROAD SURFACE
AF3-2GA	STARTRANS BUS
Engine	
101-21T	CUM B6.7 240 HP @ 2400 RPM, 2600 GOV, 560 LB/FT @ 1600 RPM



Prepared for:
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 GLAVAL BUS SALES (BB)
 2367 CENTURY DR
 GOSHEN, IN 46528
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Freightliner Custom Chassis Corporation

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Data Code	Description
Engine Controls & Parameters	
162-002	IGNITION SWITCH CONTROLLED ENGINE STOP
99D-008	2008 CARB EMISSION CERTIFICATION WITH IDLE SHUTDOWN DISABLED - EXEMPTED
79A-075	75 MPH ROAD SPEED LIMIT
79B-004	CRUISE CONTROL SPEED LIMIT 1 MPH LOWER THAN ROAD SPEED LIMIT
79G-998	NO IDLE SHUTDOWN CONFIGURATION
79K-017	PTO MODE ENGINE RPM LIMIT - 2300 RPM
79M-001	PTO MODE BRAKE OVERRIDE - SERVICE BRAKE ONLY ENABLED
79P-009	PTO RPM W/CRUISE SET SW - 1200 RPM
79Q-005	PTO RPM WITH CRUISE RESUME SWITCH - 1000 RPM
79S-009	PTO MODE CANCEL VEHICLE SPEED - 0 MPH
79U-006	PTO GOVERNOR RAMP RATE - 200 RPM PER SECOND
79W-001	ONE REMOTE PTO SPEED
79X-009	REMOTE PTO SPEED 1 SETTING - 1200 RPM
80G-002	PTO MINIMUM RPM - 700
80J-004	REGEN INHIBIT SPEED THRESHOLD - 1 MPH
80M-002	ALTERNATE SWITCH SPEED 950 RPM
80N-002	MAXIMUM ENGINE RPM = 2500 ON VSS FAILURE
80L-004	ENABLE DPF REGEN STAY WARM
Engine Equipment	
266-100	700 SQ-IN ALUMINUM RADIATOR
105-001	ENGINE MOUNTED OIL CHECK AND FILL
111-001	15W-40 WT ENGINE OIL
190-001	DONALDSON 1-STAGE AIR CLEANER
188-050	AIR INTAKE THROUGH LH SIDE OF HOOD
189-001	AIR INTAKE PIPING - CLNR TO ENGINE
192-004	AIR CLEANER MOUNTED ON FIREWALL
124-1CC	LN 12V 270 AMP 4949PA PAD MOUNT ALTERNATOR WITH AC TAPS
292-1D7	(3) ALLIANCE MODEL 1131, GROUP 31, 12V MAINTENANCE FREE 2775 CCA THREADED STUD BATTERIES
290-108	BATTERY BOX FRAME MOUNTED, STAINLESS STEEL
282-045	SINGLE BATTERY BOX FRAME MOUNTED LH SIDE UNDER CAB 62" (1575MM) AFT OF STD



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291-001	FRAME GROUND RETURN FOR BATTERY CABLES
289-006	PLASTIC BATTERY BOX COVER
293-998	NO BATTERY SHUTOFF SWITCH
107-032	CUMMINS 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY VALVE
108-002	STD MECH AIR COMP GOV
131-012	STEEL AIR COMPRESSOR DISCHARGE LINE
152-049	ELECTRONIC ENGINE INTEGRAL WARNING & DERATE PROTECTION SYSTEM WITH SEPERATE LOW COOLANT LVL LIGHT & BUZZER
128-076	CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH
28F-002	ENGINE AFTERTREATMENT DEVICE, AUTOMATIC OVER THE ROAD REGENERATION AND DASH MOUNTED REGENERATION REQUEST SWITCH
234-025	HORIZONTAL DIESEL PARTICULATE FILTER AFTERTREATMENT DEVICE
235-076	RH IB FRAME MTD HZ ATD
23U-009	10 GALLON DEF TANK LH FRAME MTD
35W-001	EXHAUST MITIGATION DEVICE FTL 4" ID SLIP-FIT
237-072	HORIZONTAL TAILPIPE, EXIT LH REAR OF CHASSIS
273-004	BORG WARNER VISCOUS FAN DRIVE
110-003	CUMMINS SPIN ON FUEL FILTER
118-001	FULL FLOW OIL FILTER
267-001	REMOTE MOUNTED SURGE TANK
103-039	ANTIFREEZE TO -34F, OAT (NITRITE & SILICATE FREE) EXTENDED LIFE COOLANT
171-007	GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT
172-016	CONSTANT TORQUE BREEZE CLAMPS ON 1" IN DIA AND GREATER, SS CLAMPS LESS THAN 1"
261-001	STANDARD CHARGE AIR COOLER PLUMBING
270-998	NO OPTIONAL RADIATOR PLUMBING
168-002	LOWER RADIATOR GUARD
138-010	PHILLIPS-TEMRO 750 WATT/115 VOLT BLOCK HEATER
140-010	CHROME ENGINE HEATER RECEPTACLE TEMPORARILY MOUNTED TO ENGINE



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Data Code	Description
134-001	ALUMINUM FLYWHEEL HOUSING
155-023	DENSO 12V STARTER WITH COPPER CONTACTS

Transmission

342-1MH **ALLISON 2200 PTS AUTOMATIC TRANSMISSION
WITH PARK PAWL WITHOUT PTO PROVISION**

Transmission Controls & Parameters

345-093	T-HANDLE CABLE SHIFT CONTROL WITH PARK POSITION AND PARK INTERLOCK SOLENOID
353-032	VEHICLE INTERFACE WIRING WITH ADA INTERLOCKS
343-301	PKG 354 - 1K/2K RDS/EVS/HS/MH/PTS/SPS - 5TH GEN
97F-002	ALLISON TRANS - SEM/LRTP REQ
97G-001	TRANS PROG-ENABLED
84C-003	5, 3, 2, 1 - D, 3, 2, L -1K/2K PRIMARY GEARS
85B-011	RANGE INDICATION,PARK,NEUT
84U-001	SECONDARY MODE INPUT - MODE SWITCH,FOR 1000/2000 PRODUCT FAMILIES ONLY
84W-004	AUX RNG INHIBIT,DUAL

Transmission Equipment

370-015	WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK
346-001	TRANSMISSION OIL CHECK AND FILL
35T-001	SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle & Equipment

400-1A5	DA-F-10.0-3 10,000# FF1 71.5 KPI/3.74DROP SINGLE FRONT AXLE
403-002	NON-ASBESTOS FRONT BRAKE LINING
402-054	BOSCH HYDRAULIC PIN-SLIDE DISC FRONT BRAKES
419-004	FRONT DISC BRAKE ROTORS
418-030	CONMET IRON FRONT HUBS
409-002	SKF SCOTSEAL CLASSIC FRONT OIL SEALS
408-001	VENTED FRONT HUB CAPS W/WINDOW, CENTER AND SIDE PLUGS - OIL
40T-001	ORGANIC SAE 80/90 FRONT AXLE LUBE
416-022	STANDARD SPINDLE NUTS FOR ALL AXLES
618-002	STANDARD CUPS AND CONES (WHEEL BEARINGS) FRONT AND REAR



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Data Code	Description
536-050	TRW THP-60 POWER STEERING
539-003	POWER STEERING PUMP
534-015	2 QUART SEE THROUGH POWER STEERING RESERVOIR

Front Suspension

620-019	9,000# TAPERLEAF FRONT SUSPENSION
619-005	MAINTENANCE FREE RUBBER BUSHINGS - FRONT SUSPENSION
629-998	NO FRONT SWAYBAR
410-017	SACHS FRONT SHOCK ABSORBERS

Rear Axle & Equipment

420-279	DA-RS-17.0-4 17,000# L-SERIES SINGLE REAR AXLE
421-430	4.30 REAR AXLE RATIO
424-001	IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING
386-055	SPL100 DANA SPICER MAIN DRIVELINE WITH HALF ROUND YOKES
41T-001	ORGANIC SAE 80/90 REAR AXLE LUBE
393-001	DRIVELINE GUARD
423-054	BOSCH HYDRAULIC PIN-SLIDE DISC REAR BRAKES
433-002	NON-ASBESTOS REAR BRAKE LINING
451-005	REAR DISC BRAKE ROTORS
440-001	SKF SCOTSEAL CLASSIC REAR OIL SEALS
435-009	REAR AXLE MOUNTED AIR OPERATED DRUM PARK BRAKE

Rear Suspension

622-216	23,000# AIRLINER REAR SUSPENSION WITH CHAIN CLEARANCE
621-007	AIRLINER HIGH POSITION RIDE HEIGHT
888-002	MANUAL DUMP VALVE FOR AIR SUSPENSION W/INDICATOR LIGHT, W/O GAUGE
910-004	DUAL AIR REAR SUSPENSION LEVELING VALVES
87D-001	REAR AIR SUSPENSION DUMP VALVE AUTOFILL W/IGNITION OFF OR >5 MPH W/IND LIGHT
630-001	REAR SWAYBAR
439-017	SACHS REAR SHOCK ABSORBERS

Tag Axle & Equipment

443-998	NO TAG AXLE
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Data Code	Description
Brake System	
018-003	HYDRAULIC BRAKE PACKAGE W/OPTIONAL AIR SUPPLY
490-1AR	WABCO NG HYDRAULIC 4S/4M ABS W/O TRACTION CONTROL
871-033	NYCLAD HYDRAULIC TUBING WITH NYLON AND FABRIC/WIRE BRAID CHASSIS AIR LINES
901-006	HYDRAULIC HOSE/LINE FRONT SERVICE BRAKES
902-006	HYDRAULIC HOSE/LINE REAR SERVICE BRAKES
46D-002	STANDARD AIR SYSTEM PRESSURE PROTECTION
46E-001	STANDARD AIR MANAGEMENT UNIT
480-083	WABCO SS-1200 PLUS AIR DRYER W/INTEGRAL AIR GOVERNOR AND HEATER
479-003	AIR DRYER MOUNTED INBOARD ON LH RAIL
483-004	WABCO OIL COALESCING FILTER FOR AIR DRYER
460-077	ONE STEEL AIR BRAKE RESERVOIR MTD INSIDE RAIL
477-042	PETCOCK DRAIN VALVES ON ALL AIR TANKS CENTRALLY LOCATED TO FRAME MOUNTED BRACKETS
Wheelbase & Frame	
545-505	5050MM (199 INCH) WHEELBASE
546-080	5/16X3.00X10-1/8 INCH STEEL FRAME (7.94MMX257.2MM/0.312X10.13 INCH) 80KSI
552-117	3175MM (125 INCH) REAR FRAME OVERHANG
553-001	SQUARE END OF FRAME
550-001	FRONT CLOSING CROSSMEMBER
559-001	STANDARD WEIGHT ENGINE CROSSMEMBER
562-001	STANDARD MIDSHIP #1 CROSSMEMBER(S)
565-001	STANDARD SUSPENSION CROSSMEMBER
Chassis Equipment	
556-1AR	THREE-PIECE 14 INCH CHROMED STEEL BUMPER WITH COLLAPSIBLE ENDS
558-001	FRONT TOW HOOKS - FRAME MOUNTED
574-001	BUMPER MOUNTING FOR SINGLE LICENSE PLATE
586-024	FENDER & FRONT OF HOOD MOUNTED FRONT MUDFLAPS



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Data Code	Description
551-006	ZINC PLATED HEX HEADED FRAME FASTENERS
54L-998	NO BODY BUILDER CLIP/CLAMPING AFT
99U-018	"BUY AMERICA ORDER"

Fuel Tanks

230-001	60 GALLON/227 LITER RECTANGULAR STEEL FUEL TANK - BETWEEN RAILS
5A3-003	PETROLEUM DIESEL FUEL
205-009	LH SIDEFILL FUEL TANK CAP
20J-002	FUEL FILLER NECK WITH STRAIGHT FLANGE
122-1H8	DAVCO 245 FUEL/WATER SEPARATOR W/12V HEAT & WIF

Tires

093-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL FRONT TIRES
094-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL REAR TIRES
510-0E5	MICHELIN XZE 245/70R19.5 16 PLY RADIAL SPARE TIRE

Hubs

450-002	GUNITE IRON REAR AXLE HUBS
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Wheels

502-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 5.12 INSET 4-HAND STEEL DISC FRONT WHEELS
505-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 4-HAND STEEL DISC REAR WHEELS
511-1EB	ACCURIDE 50180 19.5X6.75 8-HUB PILOT 4-HAND STEEL DISC SPARE WHEEL
498-049	FREIGHTLINER VALVE STEMS

Cab Exterior

829-071	106" BBC FLAT ROOF ALUMINUM CONVENTIONAL CAB
651-004	LH CAB DOOR(S) WITH 70 DEGREE DOOR STOP
653-997	OMIT STANDARD RH DOOR ASSEMBLY
655-025	LH CAB DOOR LATCHES WITH MANUAL DOOR LOCKS, NO RH DOOR LOCK
682-085	OPENING IN BACK OF CAB W/TEMPORARY STRUCTURE
650-009	RUBBER CAB MOUNTS
664-001	PLAIN STEP FINISH
644-004	FIBERGLASS HOOD



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Data Code	Description
690-007	HOOD LINER INSULATION WITH SINGLE FIREWALL INSULATION
646-023	HOOD MOUNTED CHROMED PLASTIC GRILLE
65X-003	CHROMED HOOD MOUNTED AIR INTAKE GRILLE
726-002	DUAL ELECTRIC HORNS
657-001	DOOR LOCKS AND IGNITION SWITCH KEYED THE SAME
312-038	INTEGRAL HEADLIGHT/MARKER ASSEMBLY WITH CHROME BEZEL
311-015	DAYTIME RUNNING LIGHTS ON FRONT TURN LAMPS WITH ENGINE RUNNING
294-027	WIRING ONLY WITH SEPARATE STOP AND TURN LIGHT CIRCUITS TO END OF FRAME FOR CUSTOMER FURNISHED LAMPS
300-015	STANDARD FRONT TURN SIGNAL LAMPS
744-997	OMIT STANDARD PRIMARY MIRROR ASSEMBLY DOES NOT COMPLY W/ C/FMVSS 111 OR ADR14
729-001	STANDARD SIDE/REAR REFLECTORS
677-058	DUAL LEVEL ENTRY STEPS LH ONLY
768-997	OMIT REAR WINDOW(S)
661-020	TINTED DOOR GLASS LH WITH TINTED LH NON-OPERATING WING WINDOWS, NO RH WINDOW
654-024	LH MANUAL WINDOW REGULATOR, NO RH REGULATOR
663-019	1-PIECE TINTED ROPED-IN WINDSHIELD
659-003	1 GALLON WINDSHIELD WASHER RESERVOIR
335-004	UPGRADED CHASSIS MULTIPLEXING UNIT
969-103	FCCC INSTALLED EMBLEMS ON HOOD

Cab Interior

707-1AK	OPAL GRAY VINYL INTERIOR
772-006	BLACK MATS WITH SINGLE INSULATION
785-004	DASH MOUNTED ASH TRAY(S) WITHOUT LIGHTER
691-997	OMIT STANDARD FORWARD OVERHEAD CONSOLE
694-010	IN DASH STORAGE BIN
742-007	(2) CUP HOLDERS LH AND RH DASH
680-006	GRAY/CHARCOAL FLAT DASH
130-003	SANDEN COMPACT AIR CONDITIONER COMPRESSOR



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Data Code	Description
685-118	FCCC COMPLETED DASH A/C ONLY, NO OTHERFCCC SUPPLIED AC COMPONENTS
700-002	HEATER, DEFROSTER AND AIR CONDITIONER
703-005	MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH
698-001	RADIATOR MOUNTED AIR CONDITIONER CONDENSER
702-002	BINARY CONTROL, R-134A
170-041	ADDITIONAL AUXILIARY LINES WITH MANIFOLD PLUMBING AND COMBINED SHUTOFF TO DASH AND AUXILIARY HEATER
739-034	PREMIUM INSULATION
285-020	SOLID-STATE CIRCUIT PROTECTION, PDMS W/FUSES & BRKRS, PDC W/FUSES & BRKR
324-074	LH/RH DOOR ACTIVATED DOME LT W/3-WAY SW & COURTESY LIGHTS MOUNTED ON ALL DOORS
32H-013	STEPWELL LAMP ON WITH DOOR(S) OPEN
284-023	(1) 12 VOLT POWER SUPPLY IN DASH
756-1D9	PREM HB AIR SUSP ST W/3 CHMBR AIR LMBR, INT CUSH EXT,FWD&RR TILT, ADJ SHK
760-997	OMIT STANDARD FRONT PASSENGER SEAT
757-998	NO SEAT SKIRT(S)
759-009	INBOARD DRIVER SEAT ARMREST, NO PASSENGER SEAT ARMREST
711-006	LH INTEGRAL DOOR PANEL ARMREST, NO RH ARMREST
758-022	BLACK MORDURA CLOTH DRIVER SEAT COVER
763-031	3 POINT FIXED D-RING RETRACTOR DRIVER SEAT BELT; NO PASSENGER BELT
706-013	MOLDED PLASTIC DOOR PANEL
532-002	ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN
540-015	4-SPOKE 18 INCH (450MM) STEERING WHEEL
765-002	DRIVER AND PASSENGER INTERIOR SUN VISORS

Instruments & Controls

732-004	GRAY DRIVER INSTRUMENT PANEL
734-004	GRAY CENTER INSTRUMENT PANEL
870-001	BLACK GAUGE BEZELS



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Data Code	Description
811-039	DRIVER MESSAGE CENTER W/LCD DISPLAY,24 WARNING LAMPS, DATA LINKED, AMI
810-027	ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE, WITHOUT ODOMETER
812-022	ELECTRONIC 3500 RPM TACHOMETER
840-007	SINGLE AIR PRESSURE GAUGE FOR HYDRAULIC BRAKES WITH AIR PROVISION
852-002	ELECTRIC ENGINE OIL PRESSURE GAUGE
856-001	ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE
836-015	DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY
844-001	2 INCH ELECTRIC FUEL GAUGE
864-022	DIGITAL TRANS OIL TEMP INDRIVER DISPLAY
486-001	LOW AIR PRESSURE LIGHT AND BUZZER
830-017	ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY
198-002	INTAKE MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS
149-013	ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL
160-025	DIAGNOSTIC INTERFACE CONNECTOR, 9 PIN, SAE J1939, LOCATED BELOW DASH
148-079	PROG RPM CTRL WITH A/C OR 12.75V LOW VOLTAGE AUTO HIGH IDLE
746-019	CUSTOMER FURNISHED DIN RADIO PACKAGE
747-001	DASH MOUNTED RADIO
750-055	2)RADIO SPEAKERS IN CAB & WRG ONLY FOR (2)BODYBUILDER INTERFACE SPKRS
753-039	AM/FM ANTENNA PROVISION W/LHDASH EXIT, TEMP MTD
329-102	PROV FOR TWELVE BODY BUILDER SUPPLIED SWITCHES
660-008	SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY
304-001	MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH
882-050	ONE VALVE PARKING BRAKE SYSTEM W/WARNING INDICATOR AND CUSTOMER CONTROLLED PARK BRAKE RELEASE SOLENOID
299-013	SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE



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Data Code	Description
298-039	INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS
Design	
065-196	PAINT: ONE SOLID COLOR; BASE/CLEARCOAT
Color	
980-5F7	CAB COLOR A: L0007EY WHITE ELITE EY
98A-998	NO GRILLE PAINT
986-019	CHASSIS PAINT: VENDOR BLACK
962-972	POWDER WHITE (N0006EA) FRT WHEELS/RIMS(PKWHT21, TKWHT21, W, TW)
966-972	POWDER WHITE (N0006EA) REAR WHEELS/RIMS(PKWHT21, TKWHT21, W, TW)
96F-972	POWDER WHITE (N0006EA) SPARE WHEEL/RIM(PKWHT21, TKWHT21, W, TW)
Certification / Compliance	
996-001	U.S. FMVSS CERTIFICATION
Special Narrative Instructions	
999-998	NO SPECIAL NARRATIVE

(***) All cost increases for major components (Engines, Transmissions, Axles, Front and Rear Tires) and government mandated requirements, tariffs, and raw material surcharges will be passed through and added to factory invoices.



FEATHER WEIGHT

**MID-HI SEAT
"ROCK SOLID"**



Sustainable Seating Solutions

Freedman Seating Company's Feather Weight seats are designed to be like feathers on a bird: light and airy to satisfy weight restrictions and ensure a smooth ride, yet durable for years of service and low maintenance.

Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts).

Less weight means one thing to bus builders and operators: they can get more passengers per bus.

And when we say more passengers, ***we mean more happy passengers.***



Not Just Seats



Seating Solutions™

THE FEATHER WEIGHT SERIES BY

FREEDMAN
SEATING COMPANY

an ISO 9001:2000 certified company

FEATHER WEIGHT

MID-HI SEAT "ROCK SOLID"



Sustainable Seating Solutions

Whether your bus is for tour/charter, para-transit, or shuttle, Feather Weight Mid-Hi works for you. Optional adjustable headrests and reclining back-rests give you luxuries for long journeys, while grab rails and ABS plastic backs provide the function and safety required for shorter trips. The ultra-thin backrest gives outstanding support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight Mid-Hi features include:

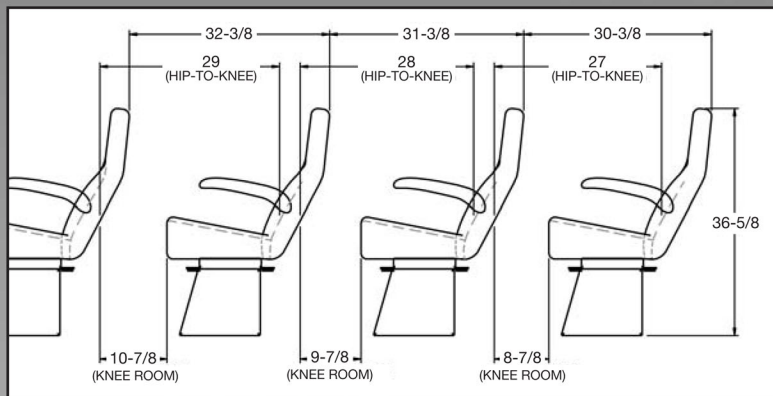
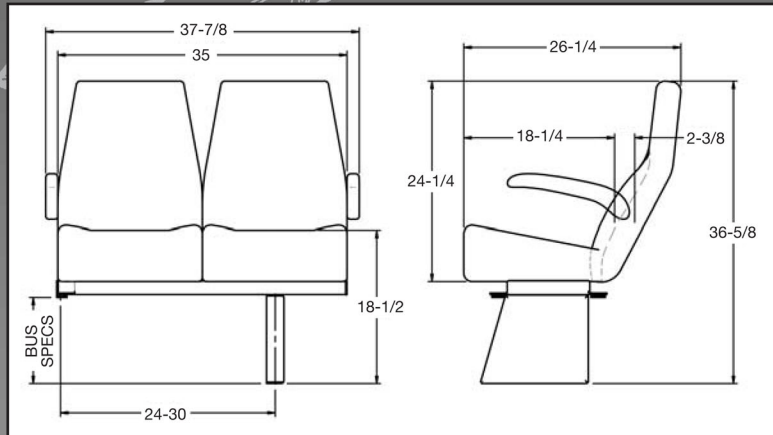
- An ultra-thin *Knee-Saver* type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17½" wide seat cushions
- 22½" back height off the seat cushion, 37" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance—all *Feather Weight* seats are seat belt ready
- Transit style—rigid backrests (starting weight without options—43 lbs.)
- Touring style—reclining backrests (starting weight without options—47 lbs.)
- Covers that can be removed and replaced easily and without the use of special tools

Feather Weight Mid-Hi options include:

- Black molded *U.S. Arms* or upholstered flip-up armrests
- Adjustable headrests
- Black or yellow corner AV grab rails
- Black or yellow top AV grab rails
- ABS plastic backs
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Rear row quick disconnect
- Side sliders
- 16", 18" or 19" wide seats available
- Rigid or reclining backrests
- Seat belts
 - Non-retracting seat belts
 - Retracting seat belts
 - USR (Under Seat Retractors)
- S3 Bio-Cushions (Made with vegetable oil)
- A wide variety of cloths and vinyls
- S3 cloths (Made with recycled yarn)

We are constantly updating and improving our seats; therefore we reserve the right to change or modify specifications or materials without notice. All Freedman Seating Company seats meet or exceed FMVS standards.

ISO 9001:2000 registered



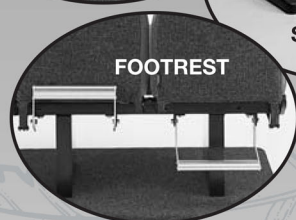
OPTIONS



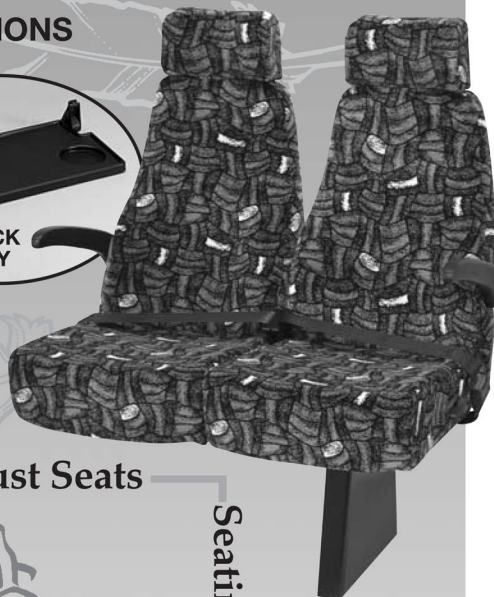
PILLOW SEAT



SNACK TRAY



FOOTREST



Not Just Seats



Seating Solutions™

FREEDMAN
SEATING COMPANY

an ISO 9001:2000 certified company

4545 W. Augusta Blvd., Chicago, IL 60651
(773) 524-2440 (800) 443-4540 Fax (773) 252-7450
e-mail: sales@freedmanseat.com
WWW.FREEDMANSEATING.COM

FEATHER WEIGHT

FOLDAWAY BV & AM STYLES

Freedman Seating gives you the largest selection of Foldaways in the industry. Whether you need space for luggage or wheel chairs, we have the right seat. Easy to install and easier to operate, our Foldaways will provide you with miles and miles of happy riders and drivers. Maybe we should say, "smiles and smiles". Freedman Seating, "Not just seats — seating solutions."



Notch-Back, standard Bench-Back and High-Back are shown.

Not Just Seats



THE FEATHER WEIGHT SERIES BY

FREEDMAN

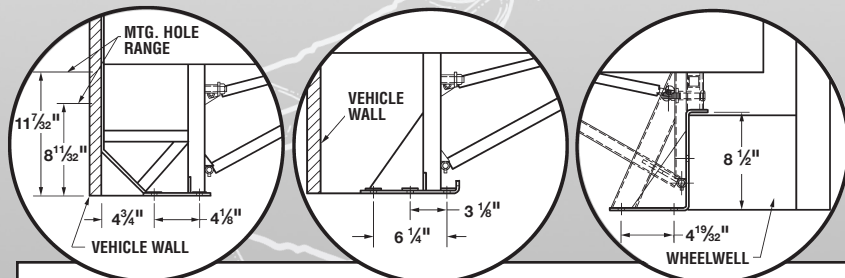
SEATING COMPANY

an ISO 9001:2000 certified company

Seating Solutions™

FEATHER

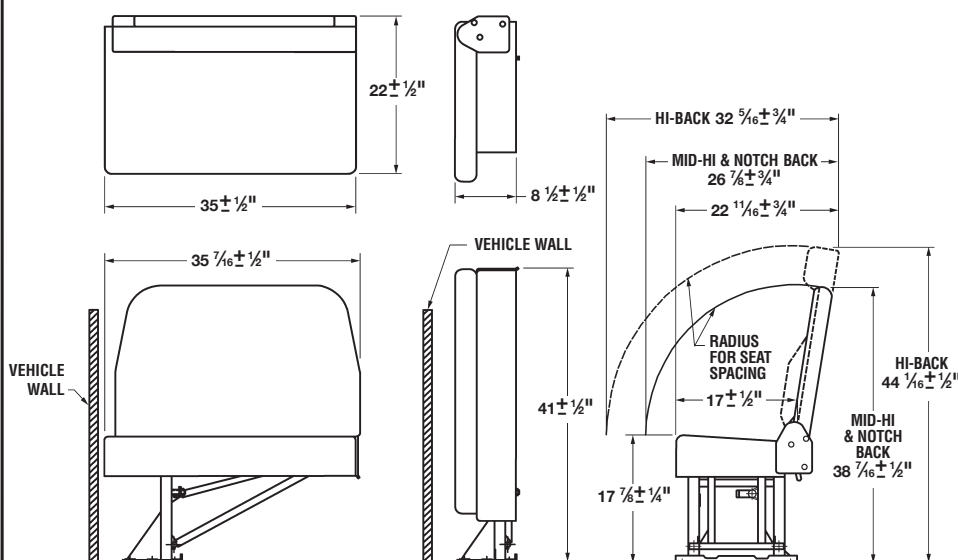
Foldaway BV & AM STYLES



AM2 Floor/Wall Mount

BV Floor Mount

BVWW3 Floor Mount



Corner Grabs

TDSS with belts

TDSS without belts



Belts not included.

Standard Features:

- BV Foldaways mount to the vehicle with four bolts to the floor (no wall mount)
- AM Foldaways mount to the vehicle with four bolts to the floor and two to the wall mount
- Seat belt ready (FMVSS 210 compliant with no leg or tether)
- Ultra-thin backrest for added hip-to-knee room and lumbar support
- High quality molded polyurethane seat and back cushions

- Folds up to less than 10" thick when in the stowed position
- Cantilever design provides reduced installation time; no floor cutting for aisle leg and easy vehicle clean up
- Wire mesh grid seat springs for even support
- 2 locking mechanisms to hold seat in stowed position

Options:

- Single or double seats
- Bench back, notch back or high back
- Wheel well seats
- Wide variety of vinyl's or cloths
- Molded U.S. arms or upholstered arms
- Black or yellow top grabs (not on high backs)
- Black or yellow corner grabs (black side only on high back)
- Vertical stitching
- FTA foam
- ABS backs (Notchback only)
- Adjustable headrests (Single and Notchback only)
- Shrouds to cover the Foldaway when stowed
- USR seat belts (Under Seat Retractors)
- CRS-225 hooks and tethers
- TDSS (Tie Down Storage System)

Not Just Seats



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Seating Solutions™

FREEDMAN

SEATING ICS

(Integrated Child Seat)

KIDS & SAFETY

**WHAT COULD
BE MORE
IMPORTANT?**

Also available
the ICS-10,
for children
up to 10 years old.



Not Just Seats

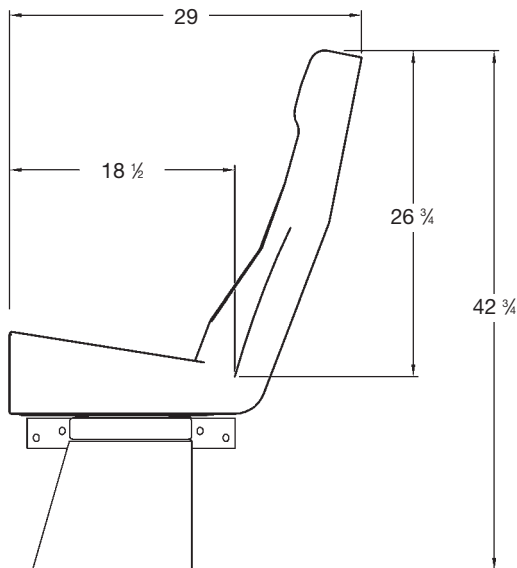
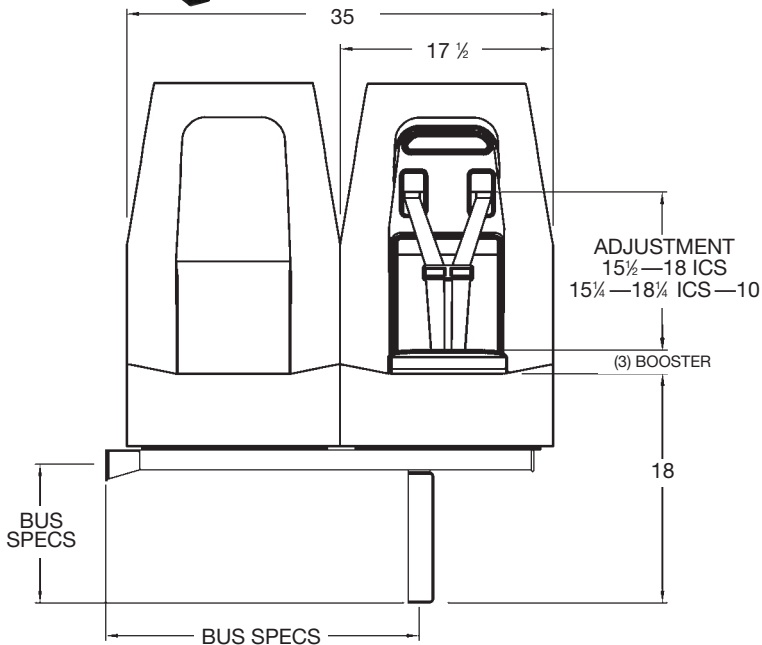


THE FEATHER WEIGHT SERIES BY

FREEDMAN
SEATING COMPANY

Seating Solutions™

FREEDMAN



SEATING ICS

(Integrated Child Seat)

Kids and safety, what could be more important? Nothing!

That's the underlying principle behind the Freedman ICS (Integrated Child Seat) and ICS-10.

The ICS is designed for children from 22–51 lbs. and the ICS-10 can accommodate children up to 10 years old, 22–78 lbs. Both ICS seats are comfortable for adults and safe for children.

A tapered back provides unrestricted viewing for drivers, and best of all, the shoulder belts can be adjusted in seconds without taking the seat apart or clumsy operations.

Standard Features:

- Accommodates children 22–51 lbs. (22–78 lbs for the ICS-10)
- Matching companion seat available
- Fold down tongue can be folded to act as a booster seat
- Easily adjustable shoulder straps
- Standard with FMVSS 213 and 210 seat belt anchorage compliance
- Retrofittable; Fits on most Feather Weight frames!

Options:

- Available in a wide variety of vinyls and cloths
- Upholstered or US Arms
- Adjustable footrests
- Freedman USR (Under Seat Retractor)
- Available as a single or double
- Grab rails

Not Just Seats



Seating Solutions™

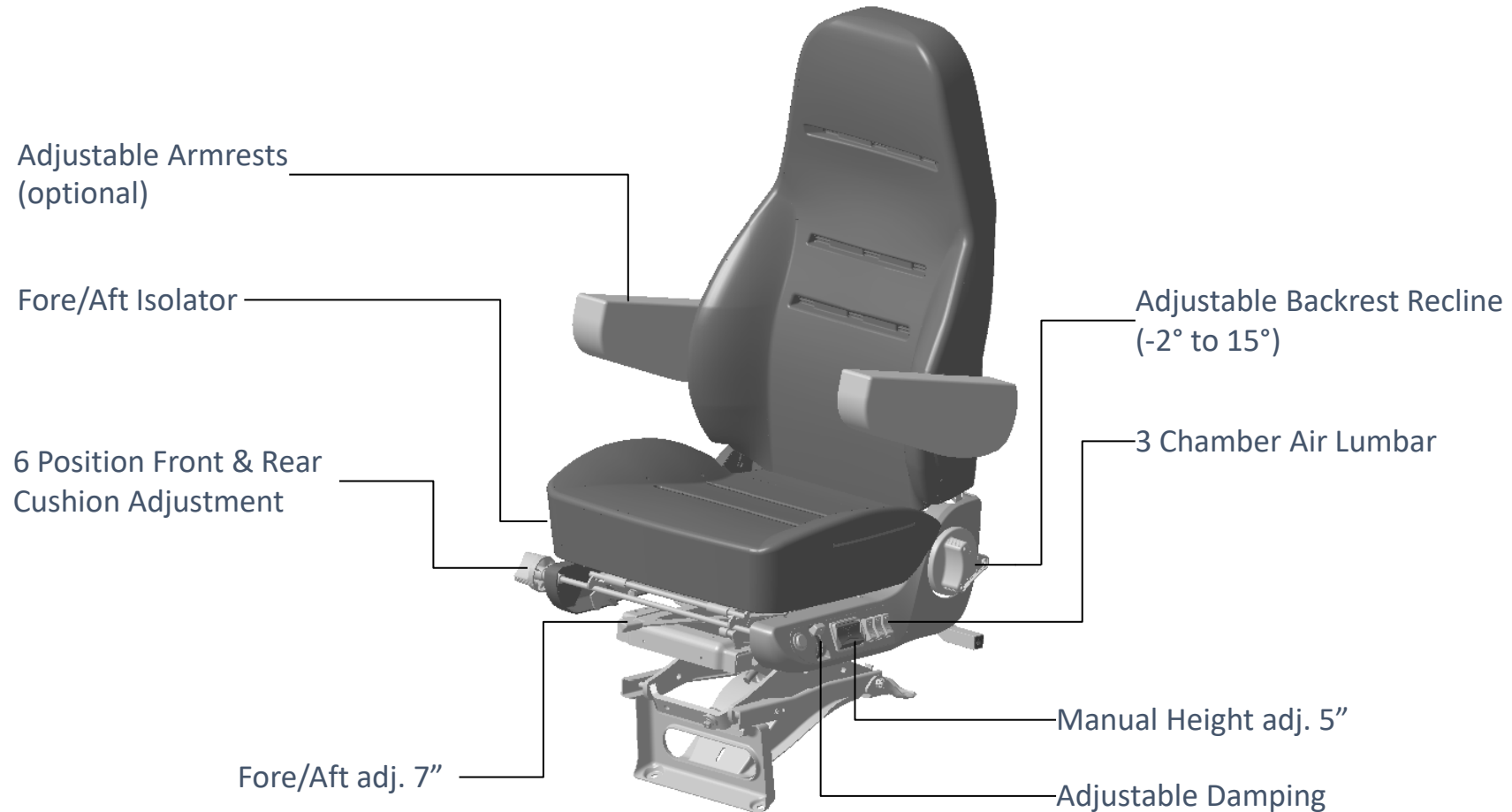
THE FEATHER WEIGHT SERIES BY

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DTNA Proprietary Premium Seat





2018 Product Application Guide • 3-7-18

Using NCL 1000 3454HB-2
model for WV DOT



NCL1000-2 CENTURY SERIES™

NCL1000-2 Century Series™ Features

- Fully automatic NHTSA compliant lift, operated by an attendant
- Loading position - either direction
- Interfaces with OEM interlocks
- Lift mounted lights - platform illuminated as it deploys
- Hand control with illuminated functions
- Locking mechanical Inboard Barrier (IB), powder coated yellow for safety and high visibility, prevents movement if occupied
- Pump design prevents platform folding when occupied, quiet operation and low current draw
- Durable redesigned baseplate reduces lift weight and allows for quicker and easier service of hose/wiring
- Easily installed, step-by-step installation instructions, no peripheral hardware required
- Visual and audible warning provides notification of unsafe conditions
- Spring-loaded outer barrier that will transition to the fully up position as the platform leaves the ground, has durable rubber nose guard and is powder coated yellow for safety and high visibility
- Parallel arms lift with hydraulic cylinders
- Side or rear door application
- Several platform widths and lengths
- Dual handrails for security and convenience
- Bridging feature permits the wheelchair user to board the lift from sidewalks or inclines
- Floor to ground travel is 48"
- Lifting capacity is 1000 lbs
- Integrated back-up pump
- Equipped with an adjustable anti-rattle feature to avoid unpleasant noise in the vehicle during transit
- Durable high-gloss powder coated finish
- Lift-Tite system stows the lift platform securely while the vehicle is in transit
- Pump module with removable cover offers easy access to all components

NCL1000-2 Century Series™ Models

NCL1000IB3351-2

NHTSA Compliant Usable Platform: 33" x 51"

NCL1000IB3451-2

NHTSA Compliant Usable Platform: 34" x 51"

NCL1000IB3451HB-2

NHTSA Compliant Usable Platform: 34" x 51"

NCL1000IB3454-2

NHTSA Compliant Usable Platform: 34" x 54"

NCL1000IB3454HB-2

NHTSA Compliant Usable Platform: 34" x 54"

NCL1000IB3751HB-2

NHTSA Compliant Usable Platform: 37" x 51"

NCL1000IB3754HB-2

NHTSA Compliant Usable Platform: 37" x 54"

For a front-mounted pump assembly, add "F" to the model number when ordering (example: NCL1000FIB3351-2).

IB = Inboard Barrier HB = Handrail Belt

General Function: Electrohydraulic, power up/gravity down operation

Operation: Hydraulic pump with two lifting cylinders

Control: hand-held control box

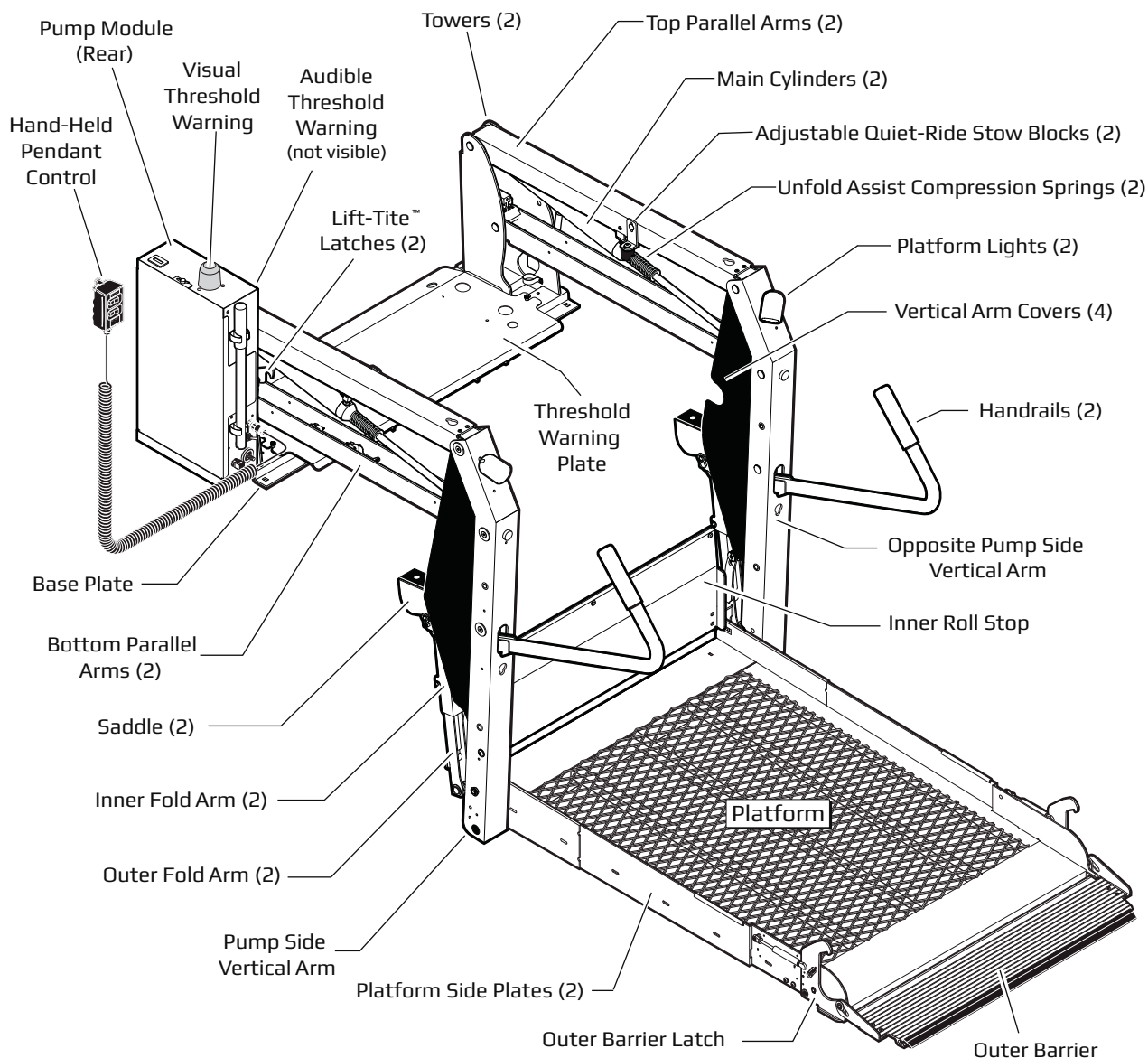
Hydraulic: Pressure Max. 2,495 psi, Fluid is Univis HVI 26, oil reservoir is .33 gal

Construction: Steel structure with powder coat finish

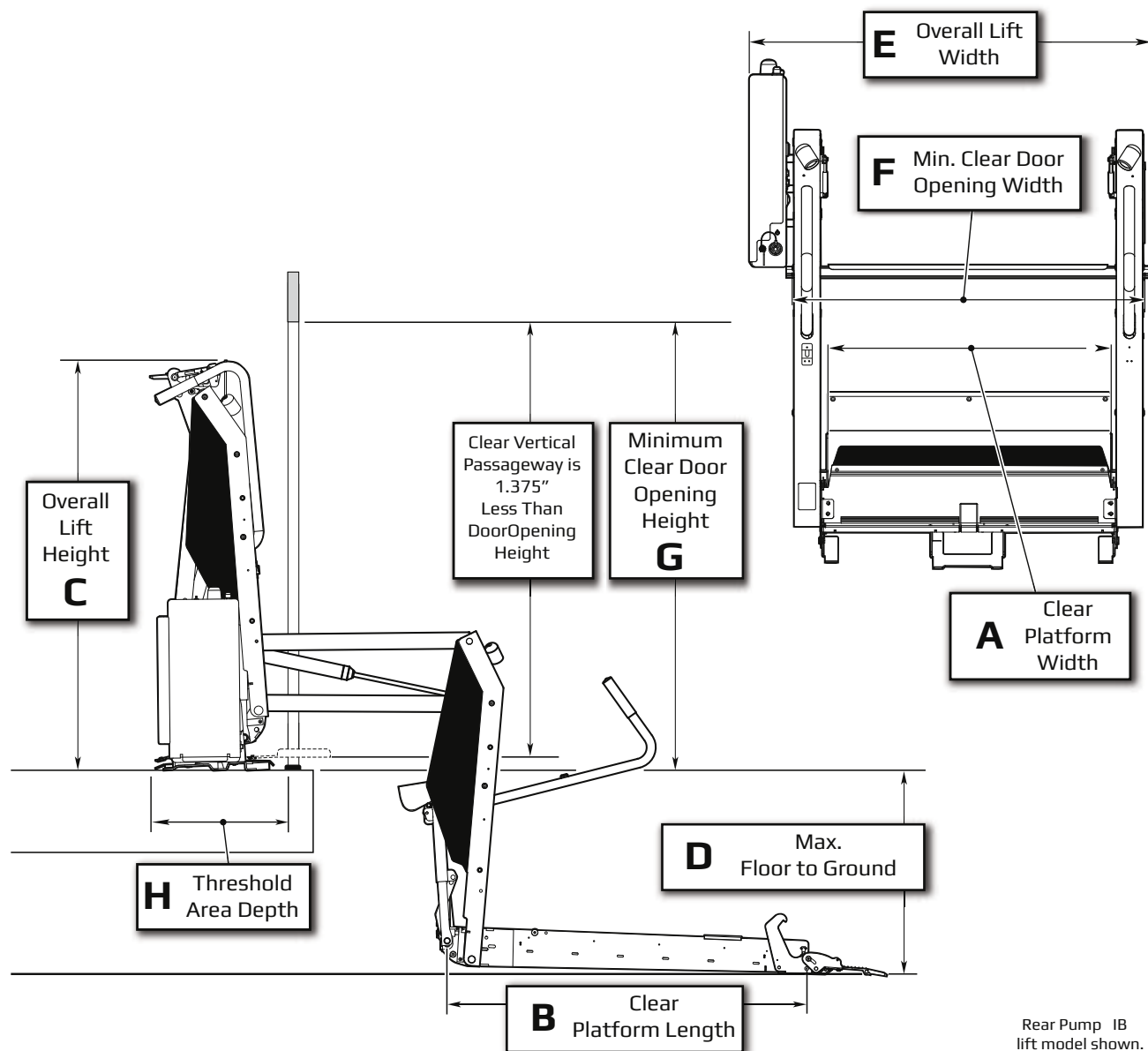
Operating Temperature: 0°F to 140°F

Power Supply: 12VDC

Current Consumption: Max. 70A (12V)



NCL1000-2 Century Series™ Dimensions



Rear Pump 1B
lift model shown.

All dimensions are for reference only.

NCL1000-2 Century Series™			A	B	C	D	E	F	G	H
Lift Model Number	Lift Weight lbs	Lifting Capacity lbs	Clear Platform Width	Clear Platform Length	Overall Lift Height	Max. Floor to Ground	Overall Lift Width	Min. Clear Door Opening Width	Min. Clear Door Opening Height	Threshold Area Depth
NCL1000IB3351-2	358	1000	33"	51"	56.25"	48"	46"	42"	57.375"	18"
NCL1000IB3451-2	358	1000	34"	51"	56.25"	48"	47"	43"	57.375"	18"
NCL1000IB3451HB-2	358	1000	34"	51"	61.25"	48"	47"	43"	62.375"	18"
NCL1000IB3454-2	358	1000	34"	54"	59.25"	48"	47"	43"	60.375"	18"
NCL1000IB3454HB-2	358	1000	34"	54"	66.25"	48"	47"	43"	67.375"	18"
NCL1000IB3751HB-2	380	1000	37"	51"	61.25"	48"	50"	46"	62.375"	18"
NCL1000IB3754HB-2	385	1000	37"	54"	66.25"	48"	50"	46"	67.375"	18"

NCL1000-2 Century Series™

NHTSA Installation Kits

	Std. Length Rear Door	Ext. Length Rear Door
Ford Transit (2015)	400774KS	400773KS
Ford Transit Template (2015)	400778KS	400778KS
Sprinter (2014 & up)		401174KS
Sprinter Template (2014 & up)		401177KS

Van Mounting Kits contain floor reinforcements for 403/404 compliance.

NCL1000-2 Century Series™

Accessories



◀ **31579KS**
Handrail Restraint
Retractable -
for 51" Platforms

35533KS
Handrail Restraint
Retractable -
for 54" Platforms

35331KS
Handrail Restraint
Non-Retractable



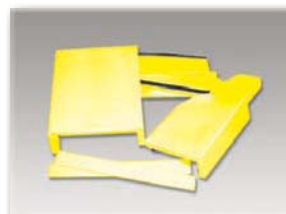
◀ **35295K**
Upper Tower Support Kit



◀ **33659KS**
Replacement
Hand-Held
Control



◀ **23708A913**
"Full Curtain"
Lift Cover
(NCL917-2)



◀ **402605KS**
Padding Kit
NCL2 Series

NCL1000-2 Century Series™ Specifications

COMMERCIAL WHEELCHAIR LIFT SPECIFICATIONS - IN COMPLIANCE WITH United States Department of Transportation Rules and Regulations 49CFR, Part 38. FROM THE AMERICANS WITH DISABILITIES ACT OF 1990 and NHTSA Rule 403 (2004) “Provided to make your spec writing easier.”

The wheelchair lift is compliant with Federal Motor Vehicle Safety Standard 403 for platform lift systems for motor vehicles. The lift shall have been tested to a minimum static load of 2400#. The lift shall have 1000# rated lifting capacity. The base plate shall be a corrugated designed member to provide rigidity to minimize lift deflection when placed under load.

The power supply shall be a 12 volt electro-hydraulic system operating two single-acting cylinders. The hydraulic power pack system shall be of modular design allowing for easy removal and field replacement, if needed. The operation of the unit shall provide a smooth, jerk-free ride in both up and down directions. The power operation of the hydraulic cylinders shall be of a pull-type design for smooth lifting operation and improved synchronous arm movement. The pivot pins in the trunnion (knuckle) of the pivot arms shall be of stationary design. The hydraulic system shall be regulated by two separate relief valves, one of which is designed to prevent accidental stowing when occupied.

The hand control for lift operation shall be of a one-hand operation design made of durable plastic. The hand control will provide user with illuminated functions. The hand control cable shall be coiled with quick-change connections for ease of maintenance or field change.

A manual back-up system shall be provided to ensure operation of the lift in case of electrical failure. The back-up system shall provide a reliable means of manually raising and lowering the lift while occupied. The back-up system shall fold and unfold the platform. The back-up pump shall be integrated with the hydraulic power pack system such that no hydraulic lines or fittings are required.

The platform shall be of steel construction and the surface shall be of see-through grating allowing for improved visibility and safer use in inclement weather. The platform shall have a minimum usable wheelchair passageway width of 33 inches and a minimum usable length of 51 inches requiring a 57 inch vertical clear door opening. The sides of the platform shall be a minimum of 2.5 inches high.

The platform shall be automatically folded and unfolded and fully automatic in operation. The platform shall allow both inboard and outboard facing of wheelchair and mobility aid users. The platform entrance ramp shall be extruded aluminum for weight savings, have a rubber leading edge and raised ribs for traction. The outer barrier must not raise if occupied with 25 lbs. The outer barrier shall be the sole outboard wheelchair retention device and shall be interlocked and comply with the FMVSS 403 requirements. Dual handrails shall be provided to add security and convenience. These handrails shall be 1.25 inch minimum diameter, minimum 30 inches in height, minimum of 8 inches in length, and withstand a 100# force in any direction (including vertical) without permanent deformation. The lift must have a fail safe system to prevent stowing if solenoid welds. The platform shall have “built in” lighting to meet 404 platform lighting requirements with no auxiliary lighting.

All lift components shall be finished with a baked-on powder coating, which will meet a salt spray test of 1000 hours, to provide corrosion resistance and a long service life. BraunAbility Century Series to include but not limited to the following model numbers:

- NCL1000IB3351-2, NCL1000FIB3351-2, NCL1000IB3451-2, NCL1000FIB3451-2, NCL1000IB3451HB-2, NCL1000FIB3451HB-2, NCL1000IB3454-2, NCL1000FIB3454-2, NCL1000IB3454HB-2, NCL1000FIB3454HB-2, NCL1000IB3751HB-2, NCL1000FIB3751HB-2, NCL1000IB3754HB-2, NCL1000FIB3754HB-2



braunability.com

800.THE.LIFT

ISO 9001:2008

631 West 11th Street, Winamac, IN 46996, USA

QRT[®]-1 SERIES



MAX / DELUXE / STANDARD
4-POINT SECUREMENT
WHEELCHAIR RETRACTORS



QRT[®]-1 SERIES

The Securement System That Changed Everything

The original 4-point wheelchair securement system, QRT-1 Series retractors defined the way passenger safety devices are designed and tested.

With a range of 3 different options to fit every need and every budget, the QRT-1 Series of retractors offer easy to use, effective 4-Point securement of wheelchairs for virtually any vehicle application.



QRT MAX

FULLY AUTOMATIC, premium knobless retractor that allows for one-handed operation.

More than 30 years ago, Q'STRAIT introduced the world's first fully integrated 4-Point wheelchair passenger securement system, now an industry standard the world over.

The QRT line of retractors are the linchpin of that system.



Every QRT retractor is fully ADA compliant, and meets or exceeds all standards and regulations, including:

- SAE J2249, ISO 10542,
- FMVSS 209, 302, 210, 222
- CMVSS 209
- CSA Z605
- and 30mph/20g crash testing

Anchorage Options

All QRT-1 Series Retractors are compatible with L-Track, L-Pockets and Slide 'N Click anchorages, or may be directly mounted to vehicle floors, seat legs or barriers.



L-TRACK / L-POCKETS

For kits that use L-Track or L-Pocket anchorages, QRT Series retractors feature our patented Positive Lock Indicator (PLI) that clearly indicates when the fitting is locked in the anchorage.

SLIDE 'N CLICK

For kits that include Slide 'N Click anchorages, QRT Series retractors feature a single-bolt SNC assembly and plunger that allows a full 360° rotation, eliminating anchorage alignment guesswork.

QRT-1 SERIES FEATURES COMPARISON

	MAX	DLX	STD	
Knobless, One-Handed Operation. No knobs to interfere with wheels and footrests.	●			
Dual Tensioning Knobs. Provides additional tensioning if needed.		●		
Single Tensioning Knob. Provides additional tensioning if needed.			●	
Automatic, Self-Locking. Allows easy, one-handed hook-up.	●	●		
Self-Tensioning. Retractors automatically take up 'slack'.	●	●		
Positive Lock Indicator. Patented feature clearly indicates when fitting is locked in anchorage.	●	●	●	
Interchangeable. Eliminates confusion: no right, left, front or rear locations.	●	●	●	
Low Profile & Compact. Elimination of mounting bracket allows retractors to fit under most footrests.	●	●	●	
Accommodates Larger Wheelchairs. Reduced overall length leaves more room for wheelchairs.	●	●		
Ultra-Durable. Hardened steel and coated zinc for maximum corrosion resistance.	●	●	●	
Universal Design. Accommodates virtually all wheelchair designs, including scooters.	●	●	●	
J-Hook. Reduces twisting of belts and ensures proper securement for all wheelchair designs.	●	●	●	
Foot Release Lever. Easy release eliminates the stress of bending down.	●	●	●	



WWW.QSTRAINT.COM/QRT-1-SERIES

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Rocklea, Australia, QLD. 4106
Tel: +61 7 3892 2311
Fax: +61 7 3892 1819
Email: info@tramanco.com.au

QS00073

Description

Heavy-Duty Storage Pouch provides storage for a complete securement system when not in use. Meets FMVSS 302.

Product Associations

General Accessories


Includes:

- (1) Heavy-Duty Storage Pouch (QS00073)





Stainless
Steel
Rivets

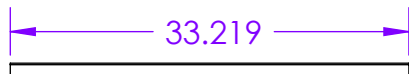


14 ga.
Stainless
Steel

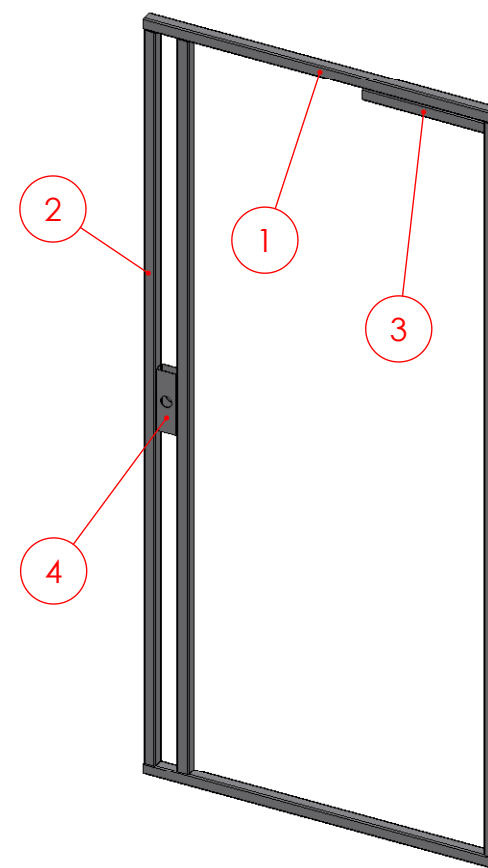
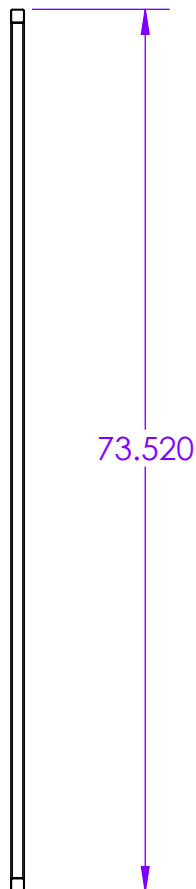
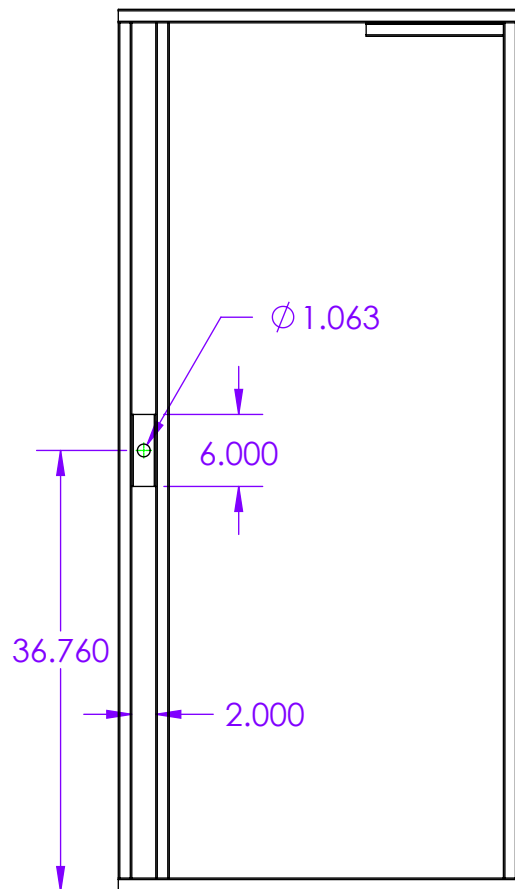
The image shows a close-up of a metal hinge assembly, likely on a vehicle door. Three black arrows originate from a single point at the bottom of the hinge pin and point upwards towards the top of the hinge pin. The metal surface is covered in water droplets. The text '14 ga. Stainless Steel' is overlaid on the left side of the image.








DET	LENGTH	DESCRIPTION	QTY
1	33.219	TUBE, SQUARE 1.13 X 1.13 X .06	2
2	71.27	TUBE, SQUARE 1.13 X 1.13 X .06	3
3	11.438	TUBE, SQUARE 1.13 X 1.13 X .06	1
4	6	TUBE, RECTANGULAR 1.00 X 2.000 X .06	1

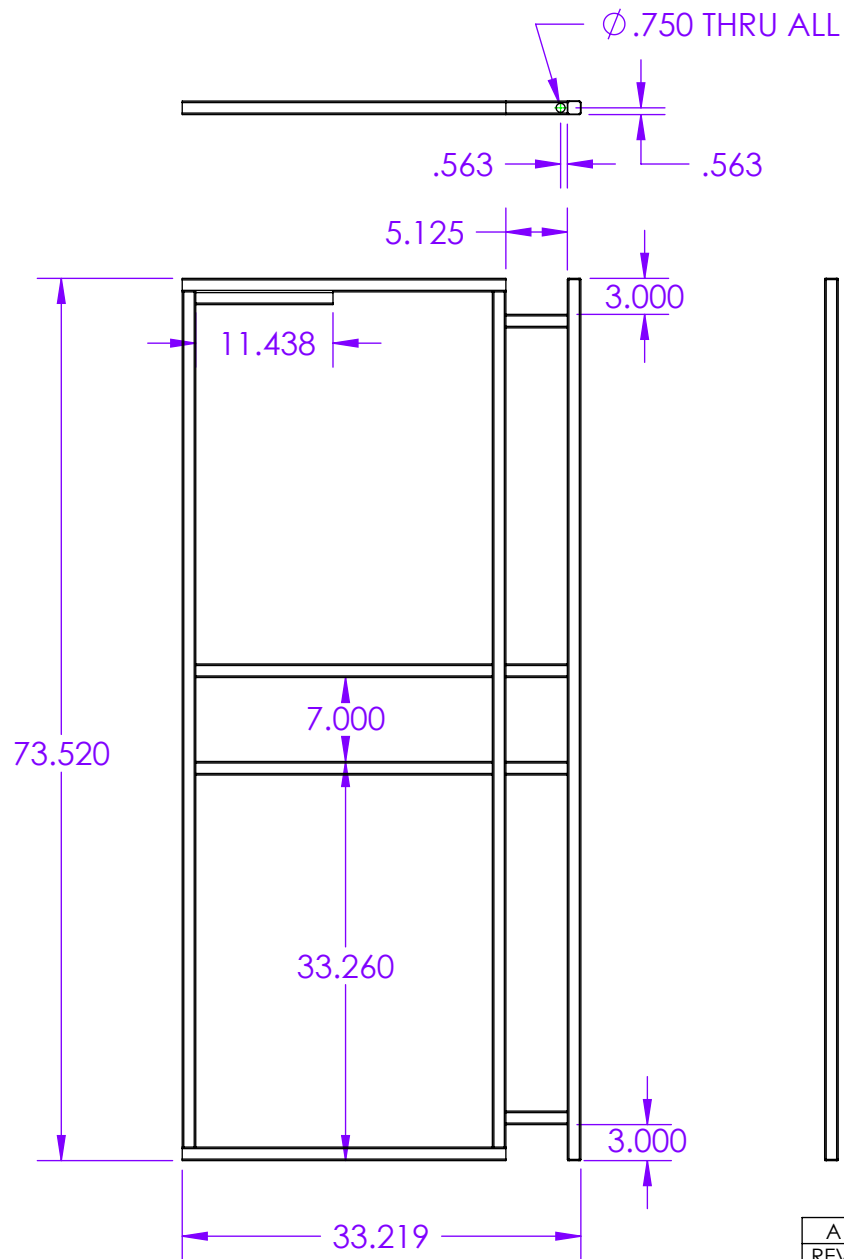


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E-MAIL: refave@challengerdor.com

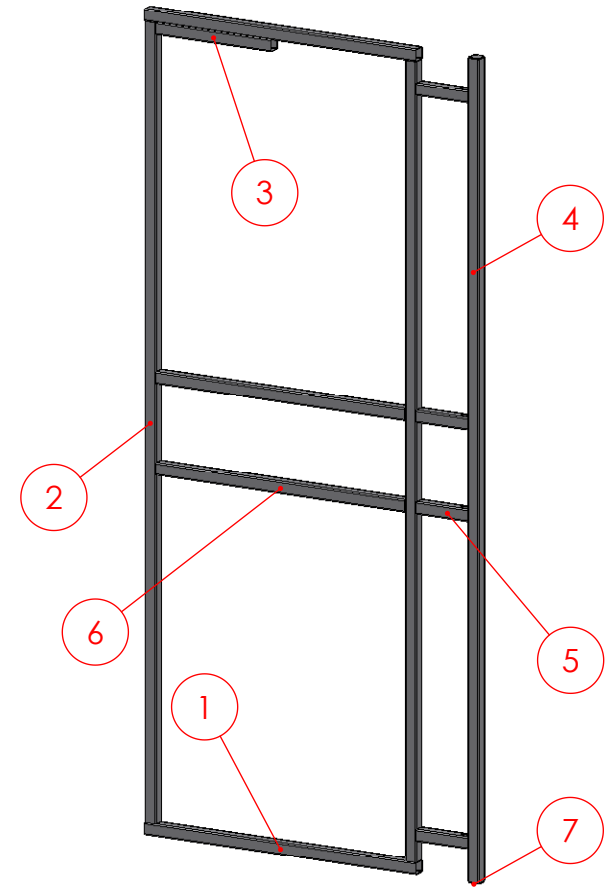
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ANGULAR: MACH ± 1.0		CHECKED	.	
TWO PLACE DECIMAL ± .03		AREA	.	
THREE PLACE DECIMAL ± .015		PERIMETER	.	
Material	N/A	COMMENTS:	CHALLENGER DOOR 24785 US & E PO Box 67 Nappanee IN 46550	
FINISH	N/A			
DO NOT SCALE DRAWING				



DESCRIPTION		
70.000 X 75.000 LH DOOR TUBE		
SIZE A	DWG. NO. 160041	REV. A
SCALE: 1:16	WEIGHT: 7.18 FT/LB	SHEET 1 OF 2



DET	LENGTH	DESCRIPTION	QTY
1	26.969	TUBE, SQUARE 1.13 X 1.13 X .06	2
2	71.27	TUBE, SQUARE 1.13 X 1.13 X .06	2
3	11.438	TUBE, SQUARE 1.13 X 1.13 X .06	1
4	73.32	TUBE, SQUARE 1.13 X 1.13 X .06	1
5	5.125	TUBE, SQUARE 1.13 X 1.13 X .06	4
6	24.719	TUBE, SQUARE 1.13 X 1.13 X .06	2
7	N/A	.100 END CAP	2



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 E-MAIL: rlefave@challengerdor.com

A	PRODUCTION RELEASE	08/05/11	RLL	-
REV.	DESCRIPTION	DATE	DRW	CHK
	DIMENSIONS ARE IN INCHES			
	TOLERANCES:			
	ANGULAR: MACH ± 1.0			
	TWO PLACE DECIMAL ± .03			
	THREE PLACE DECIMAL ± .015			
	Material	N/A		
	FINISH	N/A		
	DO NOT SCALE DRAWING			
	DRAWN	RLL	08/05/11	
	CHECKED	.	.	
	AREA	.		
	PERIMETER	.		
	COMMENTS:			

DESCRIPTION

70.00 X 75.00 DOUBLE LATCH DOOR TUBE

SIZE **A**

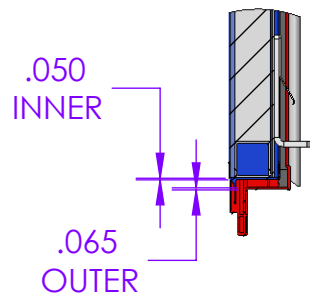
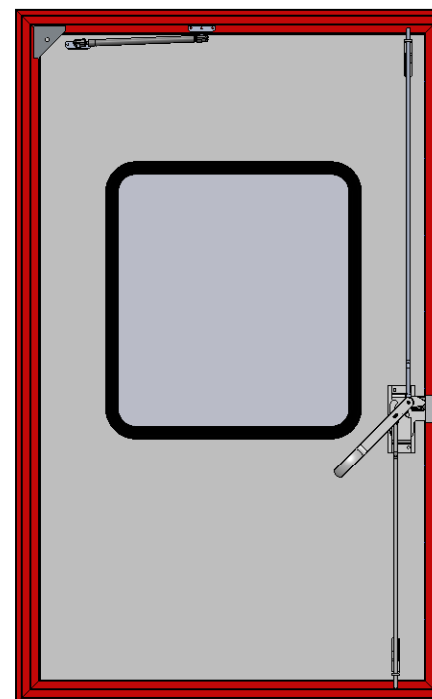
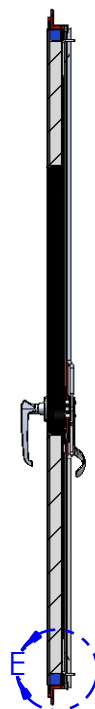
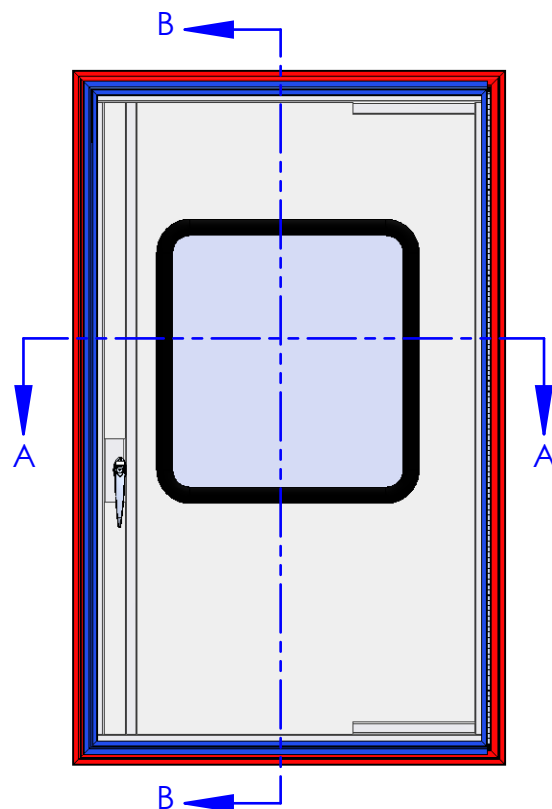
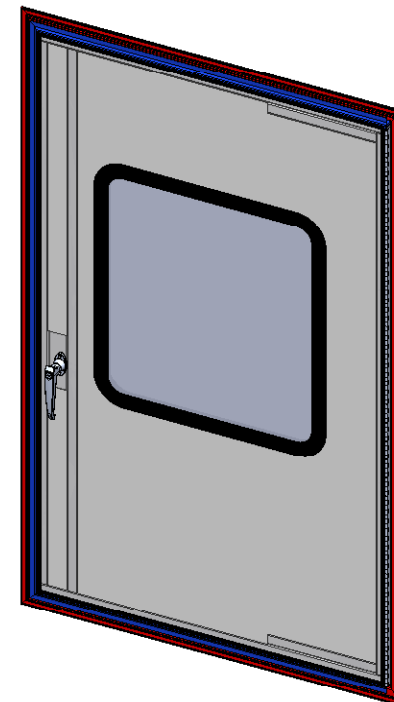
DWG. NO. **160041**

REV. **A**

SCALE: 1:16

WEIGHT: **8.35 FT/LB**

SHEET 2 OF 2



DETAIL E
SCALE 1 : 6

SECTION B-B

PROPRIETARY AND CONFIDENTIAL

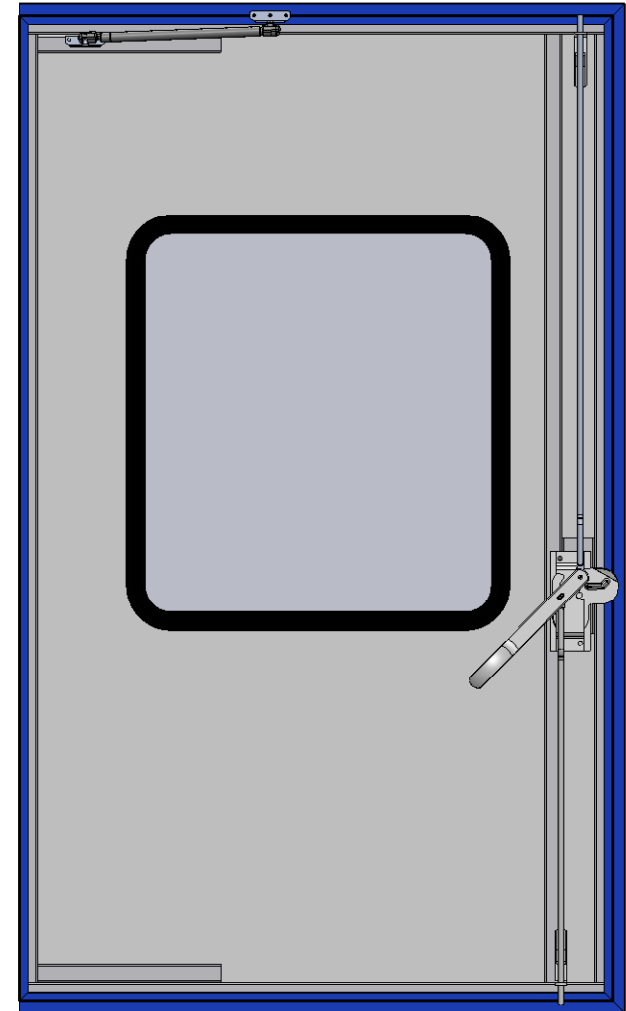
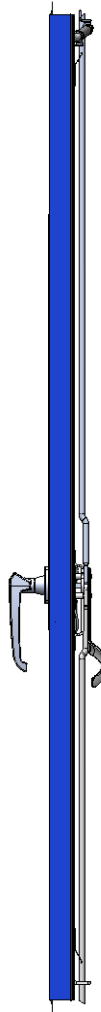
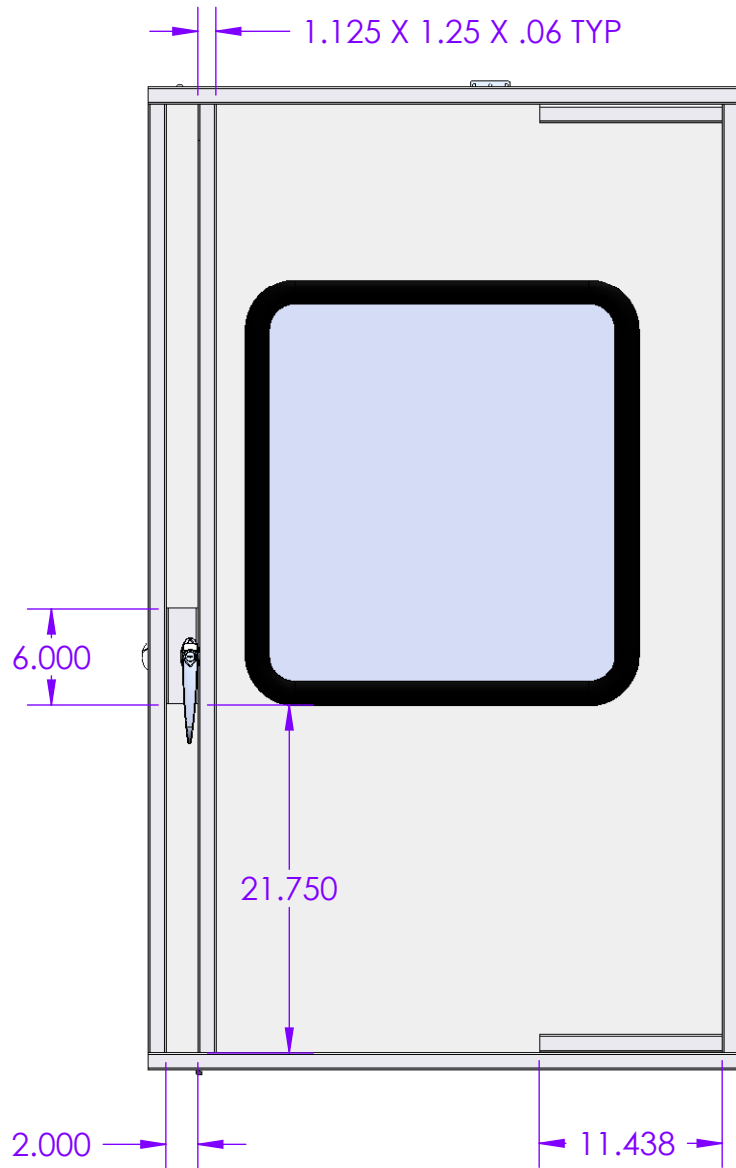
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E-MAIL rlfave@challengerdoor.com

REV.	DESCRIPTION	DATE	DRW	CHK
DIMENSIONS ARE IN INCHES TOLERANCES: ANGULAR: MACH \pm 1.0 TWO PLACE DECIMAL \pm .03 THREE PLACE DECIMAL \pm .015		NAME	DATE	
DRAWN		RLL	12/15/09	
CHECKED		.	.	
AREA		.		
Material N/A		PERIMETER	CHALLENGER DOO 24785 US 6 E PO Box 67 Nappanee IN 46550	
FINISH N/A		COMMENTS:		
DO NOT SCALE DRAWING				



DESCRIPTION	QTY	UNIT	PRICE	TOTAL
805 - SINGLE BUS DOOR ASSY	1	EA	100.00	100.00

SIZE A	DWG. NO. 850016	REV. A
SCALE: 1:18	WEIGHT: 98.302 FT/LB	SHEET 1 OF 2



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DIMENSIONS ARE IN INCHES
 TOLERANCES:
 ANGULAR: MACH ± 1.0
 TWO PLACE DECIMAL $\pm .03$
 THREE PLACE DECIMAL $\pm .015$

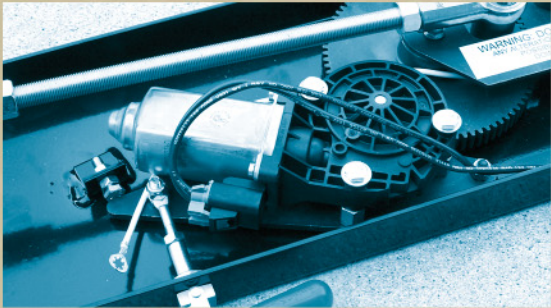
Material	N/A
FINISH	N/A
DO NOT SCALE DRAWING	

	NAME	DATE
DRAWN	RLL	12/15/09
CHECKED	.	.
AREA	.	.
PERIMETER	.	.
COMMENTS:	CHALLENGER DOOR 24785 US & E PO Box 67 Nappanee IN 46550	

DESCRIPTION		
805 - SINGLE BUS DOOR ASSY		
SIZE	DWG. NO.	REV.
A	850016	A
SCALE: 1:18	WEIGHT: 98.302 FT/LB	SHEET 2 OF 2

Quality in Design

Looking past the simplicity in design, you'll see a quality product—from powdercoated base plates to plated rods, from zinc plating to tempered glass. Indeed, "reliability" is a descriptor that applies to the entire product. With confidence, we offer a comprehensive one-year warranty. Beyond the warranty period however, you can expect years of trouble-free operation. In the unlikely event that service is ever required, the design also facilitates unparalleled ease of access.



Custom Design

While we do offer specific product families to address the needs of most manufacturers, A&M Systems specializes in designing to your specifications. Pin to pin lengths can vary between 26 and 46 inches. Header width can range from 7 to 11.5 inches. Our ability to manufacture to specification has lead top manufacturers to abandon their own production and design efforts and to choose the A&M Systems product.

In addition, those operating in the after-market have found that our actuators can be used as drop-in, direct replacement for older, less reliable door headers.

About A&M Systems

For years we've specialized in designing and manufacturing problem-free door actuators. In more recent times, we took our expertise to the door leaves as well.

We are a service-oriented company with keen insight into the industry. We offer agile manufacturing, short lead times, and just-in-time production. Our cost-conscious approach pleases the purchasing agent. Ease-of-installation pleases production personnel. Ease-of-operation pleases the end user. And the quality and reliability of our products pleases everyone.

We are committed to quality in design, quality in production, and quality in service.

Contact Information

A&M Systems, Inc.
1845 Fieldhouse
Elkhart, IN 46517
Phone: 574.522.5000
Fax: 574.522.9099

Email: sales@anmsystems.com

www.anmsystems.com



Transit Bus Doors & Actuators

Simple is Better

One look at our product line reveals our design approach: simple is better. We carefully engineer bus doors and actuators (headers) to operate smoothly and reliably while eliminating the problem-prone and complex design elements that plague our competitors' products. The result is a product line which has become the number one choice for manufacturers of small and medium-size buses.

Simplicity in design leads to simplicity in installation and simplicity in operation. It also means that we can offer a superior product at the best possible pricing to you.

Simplicity in design does not mean shortcuts in our production, however. We've put years of engineering effort into perfecting the design of our manual and electric door actuators and door leaves. Operational testing is conducted 24/7. Life-cycle testing has produced in excess of a quarter million trouble-free cycles.

Innovation is not lost in our efforts to maintain simplicity. For example, the variable ratio closing on our manual actuator is a patent-pending design. Consider also the re-engagement of our electric actuator following emergency opening. This scenario resulted in extremely complex approaches in competitive products. Our actuator easily and automatically recycles when the motor is reengaged.

In operation, our products are unsurpassed, achieving perpendicular door openings with either electric and manual models as well as secure closings—even at highway speeds.

Product Line Overview

The A&M product line consists of door leaves (often called “flops”) and manual and electric door actuators (often referred to as “headers”). In working together, these products create an attractive, functional, efficient, and robust entry system for small and medium-size buses in the transit industry.

In this system you will find a harmony of movement that speaks to design and manufacturing excellence. Every A&M door system produces completely perpendicular door openings—every time. In the A&M system, the forward door opens first and closes last—always. In the A&M system there is not a reliance on troublesome components (such as spring-loaded push-pull rods)—ever.

You can rely on A&M Systems to provide a distinctive entry system that opens smoothly and closes securely. Likewise, we will provide a business relationship guaranteed to help you succeed.



Manual Actuators Features

- ◆ Low-profile design
- ◆ Powder-coated base plate
- ◆ Plated push rods
- ◆ Permanently lubricated pivot points
- ◆ 1-year warranty



Electric Actuators Features

- ◆ Low-profile design
- ◆ Powder-coated base plate
- ◆ Plated push rods
- ◆ Permanently lubricated pivot points
- ◆ Motor control PC board
- ◆ Proprietary, heavy-duty motor
- ◆ Available wireless remote
- ◆ 1-year warranty

New! Wireless Remote Option

Now enjoy the benefits of remote door operation through a wireless key fob. This option adds to the convenience of an electronic A&M door system. It offers plug-n-play installation and it's retrofitable!



Door Features

- ◆ Key-lock joint (extremely rigid, no-weld design)
- ◆ Corrosion resistance aluminum and stainless steel
- ◆ Torque arm on upper hinge (unique and zinc plated)
- ◆ Tempered glass
- ◆ Tough, clear coat, anodized finish (204 R1 rated)
- ◆ Radius edge for clean mating to seal
- ◆ Leaves are ambidextrous! (Use in either forward or aft position)
- ◆ 1-year warranty



AccuStyle® 815 Series

Features and Benefits

- Lightweight, vibration reducing design.
- Certified by OEMs to meet FMVSS-111 requirements.
- Same model can be mounted as upright, overhang or two point mount.
- Reduces inventory of replacement parts.
- Aerodynamic, wind tunnel tested profile has lower drag coefficient for increased fuel economy.
- Available motorized or hand adjustable.
- Available with heated and LED turn signal options
- Each motorized mirror lens is four way adjustable.
- Hidden wire and connectors.
- Black or chrome finish is available.
- Full height rear entry cap allows for simple installation and ease of maintenance, including access to all wires and harnesses.



Model 815U
Shown with E-Z Bracket
combination assembly

AccuStyle® 815 series 8"x15" Dual Mirrors

PART NO.	DESCRIPTION
815	8" x 15" dual mirror, two point mount, motorized, 12 volt
815ELU / 815ERU	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right external signal LEDs
815OG	8" x 15" dual mirror, overhang mount, motorized, 12 volt
815SL / 815SR	8" x 15" dual mirror, two point mount, motorized 12 volt with left or right mirror lens signal LEDs
815ELU / 815SRU	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right mirror lens signal LEDs
815SELOG / 815SEOG	8" x 15" dual mirror, overhang mount, motorized 12 volt with left or right mirror lens signal LEDs
815U	8" x 15" dual mirror, upright mount, motorized, 12 volt
CEL815U	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right integrated camera
CER815U	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right integrated camera
M815	8" x 15" dual mirror, two point mount, hand adjustable
M815OG	8" x 15" dual mirror, overhang mount, hand adjustable
M815U	8" x 15" dual mirror, upright mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/"
or Add "H" in Front of the "/" When Present.

Custom Wire Harnessing

- Harnesses can have custom lengths.
- Conductors available in various gauges.
- Durable connection systems for superior harnessing between mirror, arm and switch.
- Weather proof connectors are available and grommets pre-installed on harnesses.
- Connectors from various companies, including: Tyco/AMP, ITT Canon, Delphi Packard and Deutsch, as well as others.
- In house high speed termination equipment provides fast turnaround.
- UL certified wire.
- Miniature connectors allow smaller holes in vehicle body.
- Multi-conductor cabling available in 2-lead for heating only, 4-lead for single motor control and 8-lead for dual motor control and heating.

Harness Types

1. Arm Harness- Concealed inside arm. Can be made very short to plug into a flush mount connector on the exterior of the vehicle or to pass just inside the vehicle skin. Can be made longer to be run all the way to the control switch.
2. Intermediate Harness- Joins the arm harness to the switch harness. Advantageous because it can be run before installation of the arm on the vehicle assembly line. Also allows arm to be removed from bus by disconnecting a connector instead of cutting a longer wire. More commonly used on passenger side.
3. Switch Harness- Attached to control switch. Often integrates heater control switch. Has leads for power and mirror heater circuits. Usually very short in length.

Mirror Systems Testing For Compliance to FMVSS-111

Our AccuStyle® and EuroStyle® rearview mirror systems and front cross view mirror systems (Eye-Max® LP, HD, Hawk-Eye®), have been certified for compliance to FMVSS-111 by all the major school bus body builders. Companies including IC Corporation, Thomas Built Buses, Blue-Bird, Collins and Girardin, have shown time and again that Rosco mirrors not only meet, but exceed the requirements of FMVSS-111. However, we continue to test and improve our mirrors to make sure that they cover areas around the bus, beyond the requirements of FMVSS-111. We can not rest in this regard, because we know that the safety of our children depends on it.



Proper School Bus Mirror Adjustment

You know your buses are being manufactured with FMVSS-111 compliant mirrors, but how do you know that your mirrors are being properly adjusted? Can you be sure that your drivers are seeing the blind areas around the bus? Are there blind areas around the bus beyond the FMVSS-111 mandated coverage? If these questions are bothering you, then you need to see "Field of Vision", the first video which teaches you how to keep your mirrors properly adjusted at all times. This free video guideline is a perfect addition to your driver training program. It not only shows how to keep your mirrors adjusted in compliance with FMVSS-111, but also how to see blind areas beyond FMVSS-111 regulations. Email us for your free copy: info@roscomirrors.com



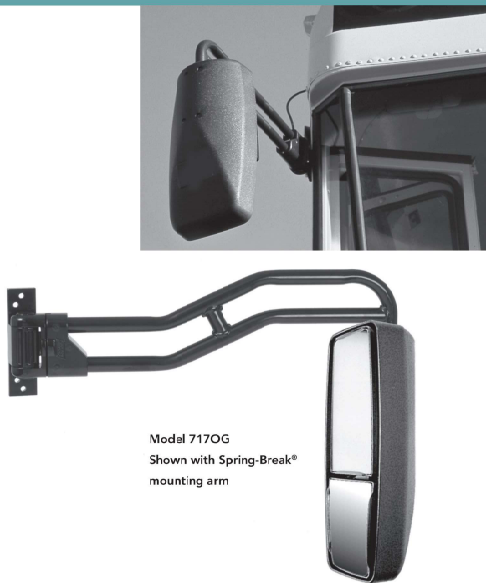
FIELD OF VISION
A video guide to proper school bus
mirror adjustment in accordance with
FMVSS-111

Info@Roscomirrors.com

EuroStyle® 717 Series

Features and Benefits

- Certified by OEMs to meet FMVSS-111 requirements.
- Oversized 8" x 17" housing provides additional mirror surface.
- Available in upright and overhang configurations.
- Used on all large school and commercial bus types, including conventional and transit style platforms.
- Available motorized or hand adjustable.
- Available heated and with LED turn signal options.
- Hidden wiring and connectors.
- 4 - way adjustable motors.
- Available in black textured finish to help conceal surface blemishes such as scratches and road grime.



EuroStyle® 717 series 8"x17" Dual Mirrors

PART NO.	DESCRIPTION
717OG	8" x 17" dual mirror, overhang mount, 12 volt motorized
717IOG	8" x 17" dual mirror, overhang mount, 12 volt motorized, wired for International switch
717U	8" x 17" dual mirror, upright mount, 12 volt motorized
717SLU / 717SRU	8" x 17" dual mirror, upright mount, motorized 12 volt with left or right signal LEDs
717SLOG / 717SROG	8" x 17" dual mirror, overhang mount, motorized 12 volt with left or right signal LEDs
M717OG	8" x 17" dual mirror, overhang mount, hand adjustable
M717U	8" x 17" dual mirror, upright mount, hand adjustable

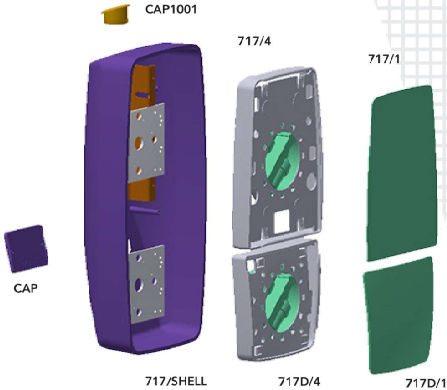
For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/"
or Add "H" in Front of the "/" When Present.

Rearview Mirror System

Replacement Parts

PART NO.	DESCRIPTION
717/1	7" x 9.5" flat mirror glass
717D/1	7" x 6" convex mirror glass
717/4	7" x 9.5" flat mirror carrier and motor assembly
717D/4	7" x 6" convex mirror carrier and motor assembly
717SL/1	7" x 9.5" flat mirror glass with left signal LEDs
717SR/1	7" x 9.5" flat mirror glass with right signal LEDs
M717/4	7" x 9.5" flat mirror carrier and hand swivel assembly
M717D/4	7" x 6" convex mirror carrier and hand swivel assembly
CAP	Connector access panel available with various company logos
CAP1001	Rubber grommet for 715 & 717 series mirrors
717/SHELL	Shell for 717 mirrors

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/"
or Add "H" in Front of the "/" When Present.



TA77 Evaporator

Industry
exclusive 2
year, unlimited
mileage, limited
warranty

**A rear mounted
freeblow
evaporator that
can be used as
a tie-in with OEM
components
or as part of a
complete
Trans/Air system**



Durable ABS cover with unique drain pan that promotes proper condensate removal (available in white, gray, and spring white)



Enhanced tube
& fin design provides
highest
capacity



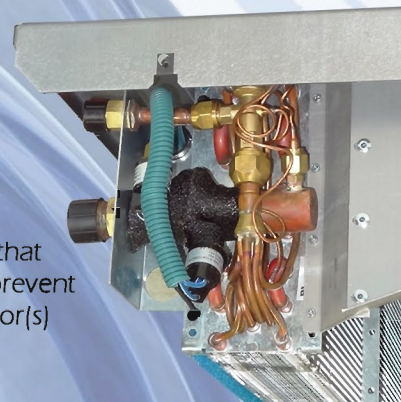
Blower assemblies come equipped
with larger blower wheels for maximum
air flow and motors utilize custom
wound armatures for lower current
draw and greater efficiency



Heavy Duty galvanized
steel enclosure for reduced
air leakage and maximum
durability



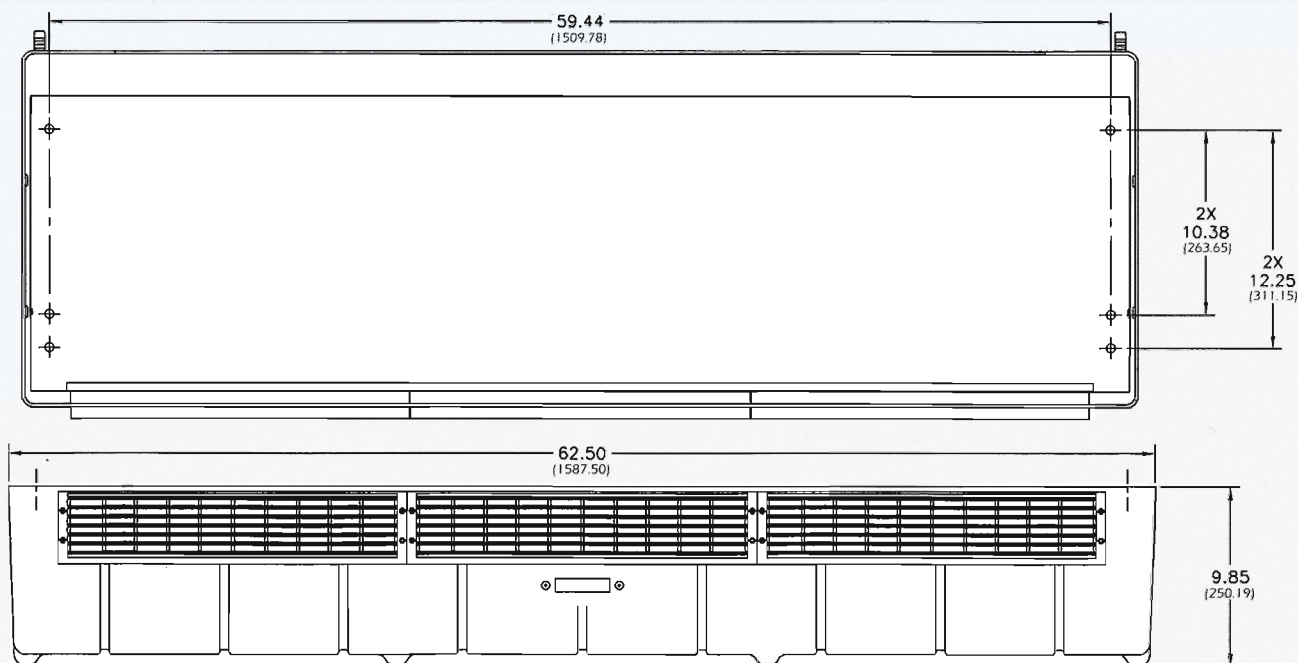
4 Ton externally equalized,
thermostatic expansion valves that
precisely control refrigerant and prevent
liquid slugging to the compressor(s)
or starved evaporator(s)



School & Commercial Bus Climate Control Design | Manufacture | Install | Service

Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing world class climate control products and services to the bus and commercial vehicle markets.

TA77 Evaporator



General

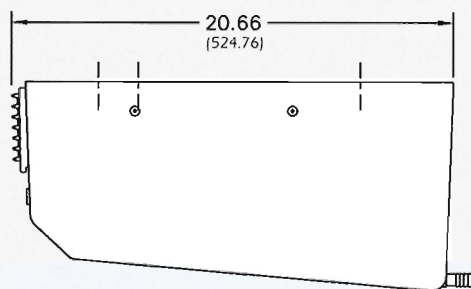
- Freeblow air distribution
- Weight lb (kg): 100 (45)
- Box Size in (mm): 66 x 20 x 16 (1676 x 508 x 406)
- Cube ft³ (m³): 12.22 (.34)

Cooling Capacity

- BTU/hr: 57,458 (SAE) to 96,826 (IMACA) *

Heating Capacity

- BTU/hr: 67,374 (Actual capacity varies based on engine operating temperature and hot water flow rate)



Cover

- ABS cover
- Integral drain pan
- (3) Multi-directional louvers
- Washable / reusable filter
- (2) 5/8 in ID drain hoses

Blower Assemblies

- (6) 4.5 in diameter blower wheels
- Amperage draw: 20.0 Amps @ 13.5 Vdc (10.0 Amps @ 27 Vdc)
- Total air flow 2220 ft³/min (3772 m³/hr) @ 0 static
- (3) Double shafted, single speed, permanent magnet motors

Evaporator Coil

- (2) Coils
- Each coil face area in² (cm²): 204 (1316)
- 3/8 in enhanced copper tubing
- Fins: 0.006 in raised lance, 10 FPI
- (3) Row

Electrical

- Color coded in fire retardant loom
- Low and high pressure switches

Expansion Valve

- (2) 4 Ton externally equalized thermostatic type

Available Options

- Metal cover for use with OEM installation
- Heat coil used with positive isolator valve. Isolator valve and heater hose not included.
- Coil corrosion protection

Warranty

- 2 year unlimited mileage limited warranty within the continental U.S. and Canada. Terms of Trans/Air's domestic and export warranty policies are available upon request.

* Actual BTU/hr is dependent on system combination and rating conditions used

- Specifications subject to change without notice
- All measurements in standard (metric)
- Contact Trans/Air for more information

A dual Trans/Air system consisting of: (1) TA71 Evaporator (front), (1) TA77 Evaporator(rear), (1) SMC3L Skirt Condensers, (1)SMC2S, and two add-on 10 and 15CID(*15CID Compressor requires #16 hose and fittings) compressors. The dual system is installed separately from the OEM chassis compressor and dash air evaporator. Each TransAir system is controlled with Basic II controls which are independent of each other and the OEM dash air controls. The (2) add-on compressors are installed with a Trans/Air supplied mount kit.

Quality System: Trans/Air Manufacturing is registered to SO 9001:2015 by an accredited auditor.

Evaporator:

TA77

Capacity: 64,246 (SAE) to 105,507 (IMACA) Btu/hr
Cooling Coil: (2) coils with advanced aluminum fins on 3/8" internally enhanced copper tubing
Expansion Valve: (2) externally equalized thermostatic type
Blower Assembly: (3) blowers with double wheels and dual inlets
Total Blower Air Flow: 2310 ft³/min @ 0 Static (3925 m³/hr @ 0 Static)
Motors: High performance double shaft, permanent magnet
Amperage: 34.0 A @ 13.5 Vdc
Housing: Galvannealed steel with ABS cover
Specification: All interior components shall meet FMVSS 302 for fire retardant specifications.

Evaporator:

TA71

Capacity: 28,352 (SAE) to 46,953 (IMACA) Btu/hr
Cooling Coil: Advanced aluminum fins on 3/8" internally enhanced copper tubing
Expansion Valve: Externally equalized thermostatic type
Blower Assembly: (1) blower with double wheels and dual inlets
Total Blower Air Flow: 740 ft³/min @ 0 Static (1257 m³/hr @ 0 Static)
Motors: High performance double shaft, permanent magnet
Amperage: 9.2 A @ 13.5 Vdc / 4.6 A @ 27 Vdc
Housing: Galvannealed steel with aluminum or ABS cover
Specification: All interior components shall meet FMVSS 302 for fire retardant specifications.

Condenser:

SMC3L Microchannel (Skirt Mount)

Capacity: 71,325 (SAE) to 87,175 (IMACA) Btu/hr
Condenser Coil: Aluminum microchannel (488 in² face area)
Fan Assembly: (3) low profile, surface mounted 10 in diameter fans
Motor Type: Closed, permanent magnet w/ball bearings
Amperage: 31.0 A @ 13.5 Vdc / 15.5 A @ 27 Vdc
Total Fan Air Flow: 2745 ft³/min @ 0 static (4664 m³/hr @ 0 Static)
Filter Drier: 16 in³, R-134A compatible
Sight Glass: At back of coil
Cond Housing: Powder-coated galvannealed steel

Condenser:

SMC2S Microchannel (Skirt Mount)

Capacity: 48,364 (SAE) to 59,112 (IMACA) Btu/hr
Condenser Coil: Aluminum microchannel (332 in² face area)
Fan Assembly: (2) low profile, surface mounted 10 in diameter fans
Motor Type: Closed, permanent magnet w/ball bearings
Amperage: 21.3 A @ 13.5 Vdc / 10.7 A @ 27 Vdc
Total Fan Air Flow: 1830 ft³/min @ 0 static (3109 m³/hr @ 0 Static)
Filter Drier: 16 in³, R-134A compatible
Sight Glass: At back of coil
Cond Housing: Powder-coated galvannealed steel



TA777033 Dual Super 10,15* CID Compressors

Total System General including OEM dash air contribution BTU/hr: 135K

A/C system capacity for rear only BTU/hr: 120K

A dual Trans/Air system consisting of: (1) TA70 Evaporator (front), (1) TA77 Evaporator(rear), (2) SMC3L Skirt Condensers and two add-on 10 and 15CID(*Requires #16 hose and fittings) compressors. The dual system is installed separately from the OEM chassis compressor and dash air evaporator. Each TransAir system is controlled with Basic II controls which are independent of each other and the OEM dash air controls. The (2) add-on compressors are installed with a Trans/Air supplied mount kit.

Electrical Controls: **Basic II**

Fan Controls: 3 speed rotary switch @ driver
Temp Controls: Rotary manual switch @ driver
Protection: Fused main power distribution with individually fused motor.
Wiring: Color coded in fire retardant loom
Specification: All wiring and electrical controls shall meet SAE J1292 electrical specifications.

Hose/Fittings: **Trans/Air SAE J2064:**

Fittings: Steel with corrosion resistive coating, (2) grooves, and stainless steel clips.
Hose: Type C with Butyl cover, Poly-amide barrier, rubber lining.
Specification: Exceeds SAE J2064 hose fitting integrity specification.

Quality System: Trans/Air Manufacturing is registered to ISO 9001:2015 by an accredited auditor.

Compressor: **15 CID**

Protection: High/low pressure switches.
Specification: Mounts shall meet SAE J637 belt alignment specifications.

Quality System: Trans/Air Manufacturing is registered to ISO 9001:2015 by an accredited auditor.

Compressor: **10 CID**

Protection: High/low pressure switches.
Specification: Mounts shall meet SAE J637 belt alignment specifications.

Warranty: **3 years**

Mileage: Unlimited
Inception: Date of in-service
Dealer demo: 6 month, 6000 miles
Coverage: All components and installation if installation is provided by Trans/Air.

SMC Condensers

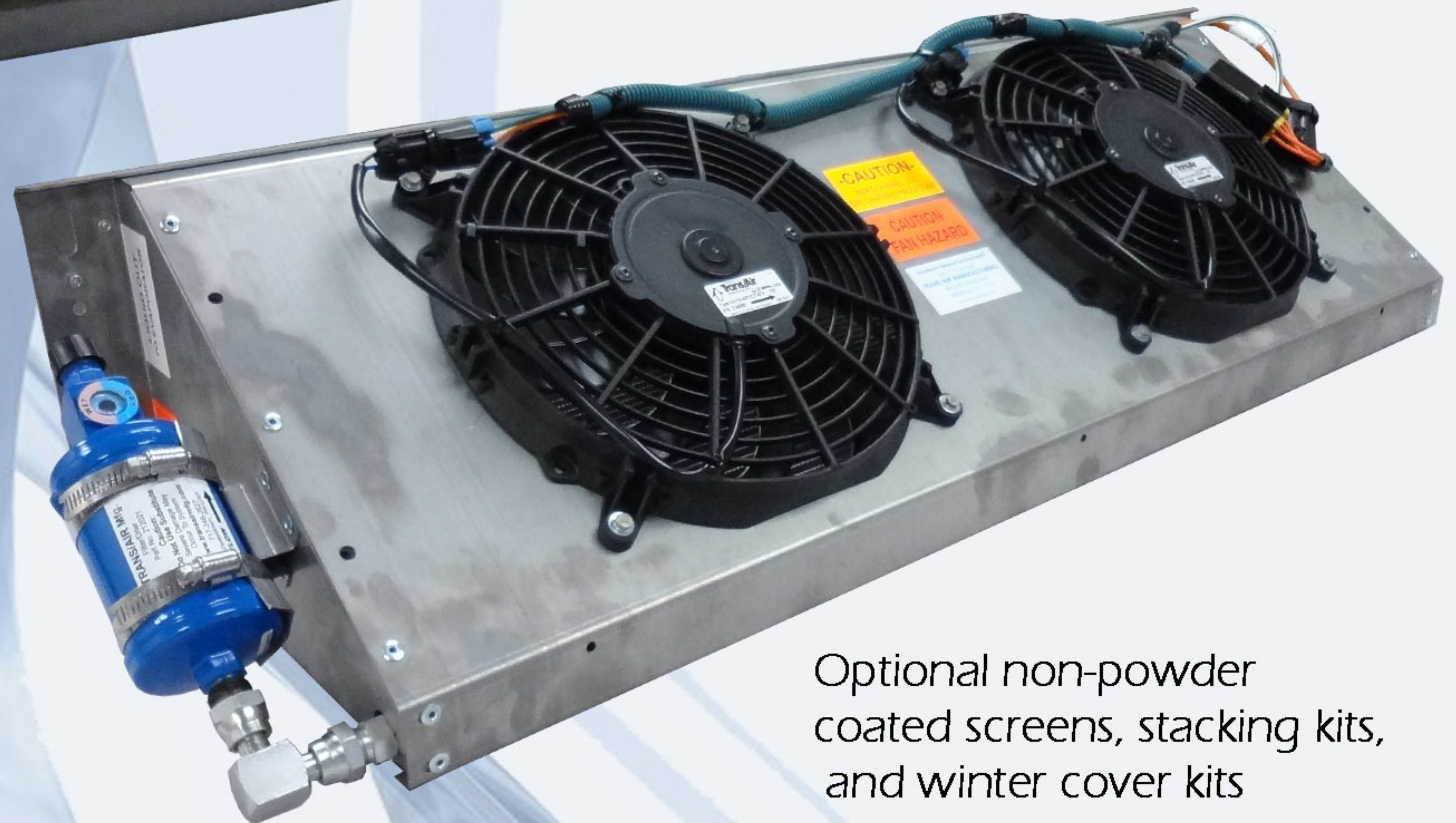
SMC3L & SMC2S microchannel skirt mounted condensers that can be used with almost every standard Trans/Air evaporator / compressor combination to complete an optimal climate control system.



Flexible mounting pattern (optional channels available to attach condenser to vehicle stringer in lieu of standard floor mounting)

Constructed of corrosion-resistant powder-coated galvanized steel

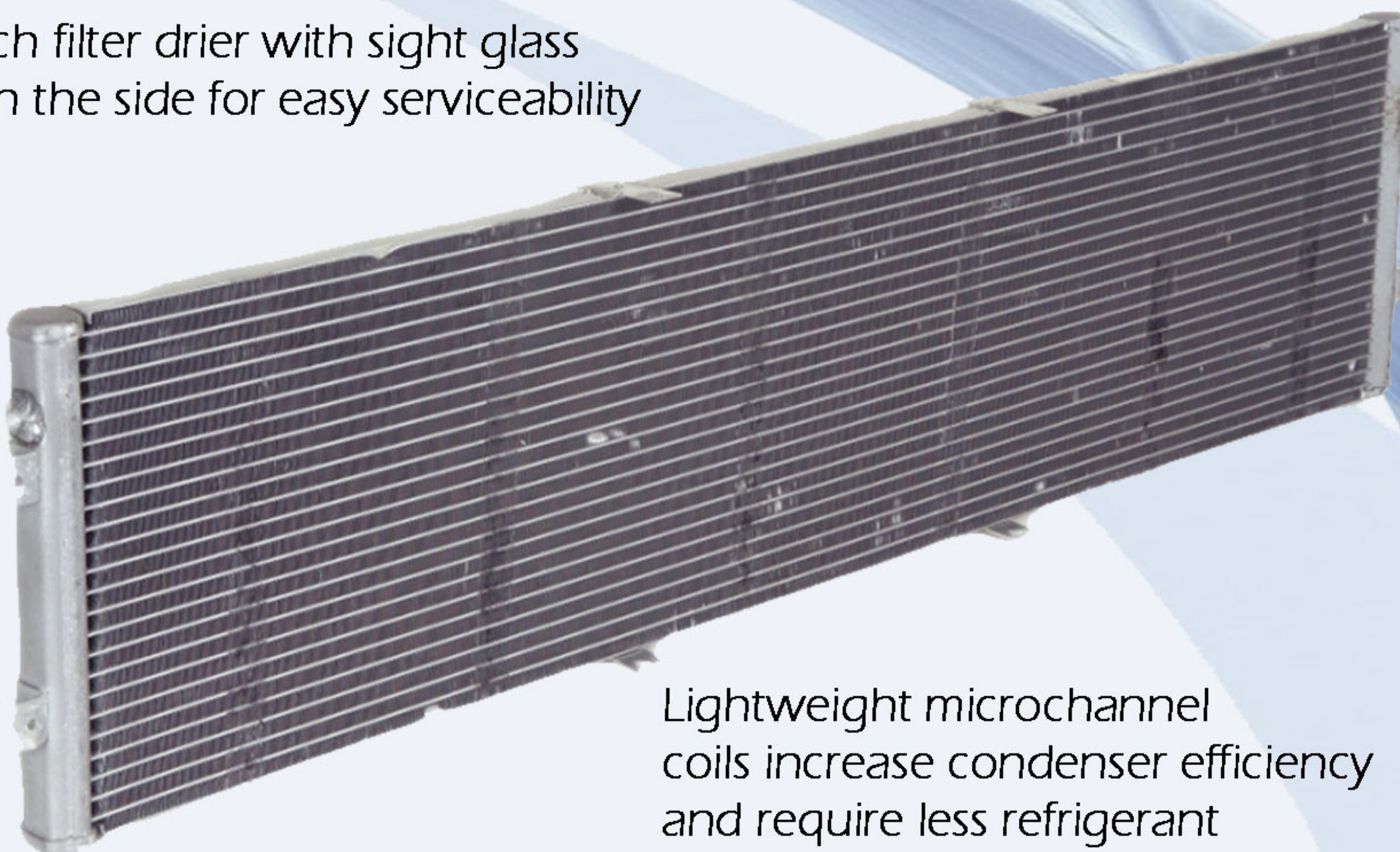
Stainless steel housing option is also available (Stainless Steel SMC2S pictured below)



Optional non-powder coated screens, stacking kits, and winter cover kits



16 cubic inch filter drier with sight glass mounted on the side for easy serviceability



Lightweight microchannel coils increase condenser efficiency and require less refrigerant



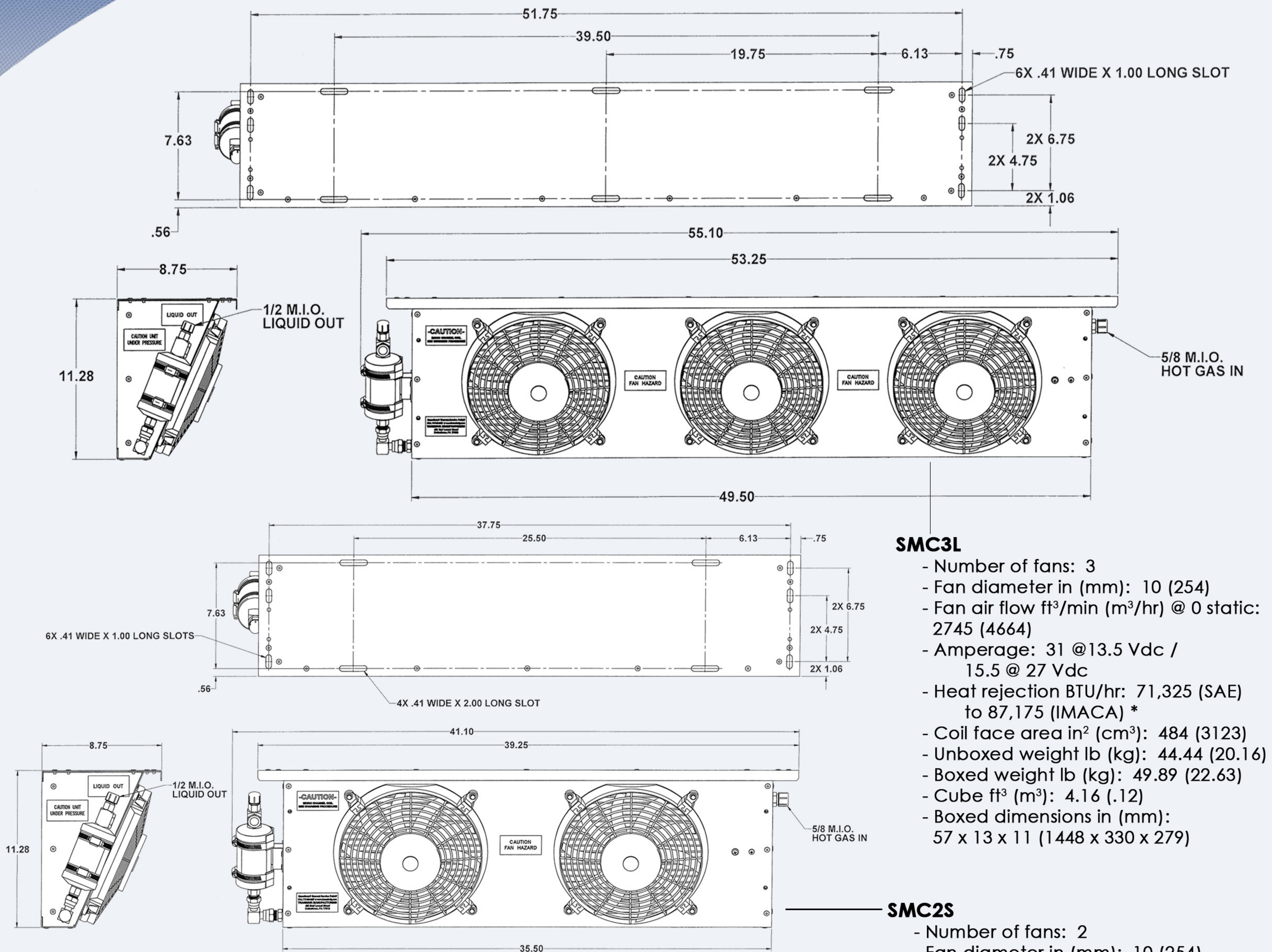
10" weather-proof condenser fans provide maximum air flow

School & Commercial Bus Climate Control Design | Manufacture | Install | Service

Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing world class climate control products and services to the bus and commercial vehicle markets.



SMC Condensers



SMC3L

- Number of fans: 3
- Fan diameter in (mm): 10 (254)
- Fan air flow ft³/min (m³/hr) @ 0 static: 2745 (4664)
- Amperage: 31 @13.5 Vdc / 15.5 @ 27 Vdc
- Heat rejection BTU/hr: 71,325 (SAE) to 87,175 (IMACA) *
- Coil face area in² (cm²): 484 (3123)
- Unboxed weight lb (kg): 44.44 (20.16)
- Boxed weight lb (kg): 49.89 (22.63)
- Cube ft³ (m³): 4.16 (.12)
- Boxed dimensions in (mm): 57 x 13 x 11 (1448 x 330 x 279)

SMC2S

- Number of fans: 2
- Fan diameter in (mm): 10 (254)
- Fan air flow ft³/min (m³/hr) @ 0 static: 1830 (3109)
- Amperage: 21.3 @13.5 Vdc / 10.7 @ 27 Vdc
- Heat rejection BTU/hr: 48,364 (SAE) to 59,112 (IMACA) *
- Coil face area in² (cm²): 363 (2342)
- Unboxed weight lb (kg): 33.82 (15.33)
- Boxed weight lb (kg): 38.58 (17.50)
- Cube ft³ (m³): 3.09 (.09)
- Boxed dimensions in (mm): 43 x 13 x 11 (1092 x 330 x 279)

General (SMC2S & SMC3L)

- Skirt mounted
- Housing: powder-coated galvanealed steel (stainless steel optional)
- 92% flow-through aluminum grill
- Coil fins: 0.008 in thick
- Filter drier: 16 in³

Fan Motor Assembly (SMC2S & SMC3L)

- Low profile surface mount
- Closed permanent magnet motor with ball bearings

Sight Glass (SMC2S & SMC3L)

- Moisture indicator
- Visible from outside of vehicle

Warranty

- 2 year unlimited mileage limited warranty within the continental U.S. and Canada. Terms of Trans/Air's domestic and export warranty policies are available upon request.

*** Actual BTU/hr is dependant on system combination and rating conditions used**

- Specifications subject to change without notice
- All measurements in standard
- Contact Trans/Air for more information

TA71 Evaporator

Industry
exclusive 2
year, unlimited
mileage, limited
warranty

**A rear or front
mounted freeblow
evaporator that
can be used as
a tie-in with
OEM components
or as part of a
complete
Trans/Air system**

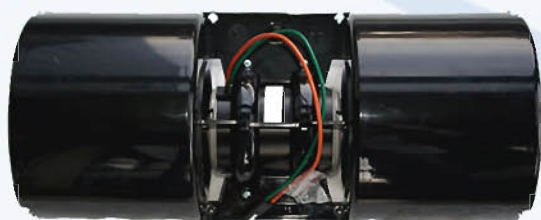
Durable ABS cover with
unique drain pan that promotes
proper condensate removal
(available in white, gray, and spring white)



Enhanced tube & fin design
provides highest capacity



Heavy Duty galvanized
steel enclosure for reduced
air leakage and maximum
durability



Blower assemblies come equipped
with larger blower wheels for maximum
air flow and motors utilize custom
wound armatures for lower current
draw and greater efficiency



4 Ton externally equalized, thermostatic expansion
valve that precisely controls refrigerant and prevents liquid
slugging to the compressor or starved evaporator



School & Commercial Bus Climate Control Design | Manufacture | Install | Service

Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing
world class climate control products and services to the bus and commercial vehicle markets.

TA71 Evaporator

General

- Freeblow air distribution
- Weight lb (kg): 46 (21)
- Box Size in (mm): 45 x 22 x 14 (1140 x 560 x 360)
- Cube ft³ (m³): 8 (.23)

Cooling Capacity

- BTU/hr: 25,031 (SAE) to 45,000 (IMACA) *

Heating Capacity

- BTU/hr: 28,489 (Actual capacity varies based on engine operating temperature and hot water flow rate)

Cover

- ABS cover
- Separate drain pan with sump
- (1) Multi-directional louvers
- Washable / reusable filter
- (2) 5/8 in ID drain hoses

Blower Assemblies

- (2) 4.5 in diameter blower wheels
- Amperage draw: 9.2 Amps @ 13.5 Vdc (4.6 Amps @ 27 Vdc)
- Total air flow 740 ft³/min (1257 m³/hr) @ 0 static
- (1) Double shafted, single speed, permanent magnet motors

Evaporator Coil

- (1) Coil
- Face area in² (cm²): 204 (1316)
- 3/8 in enhanced copper tubing
- Fins: 0.006 in raised lance, 10 FPI
- (3) Row

Electrical

- Color coded in fire retardant loom
- Low and high pressure switches

Expansion Valve

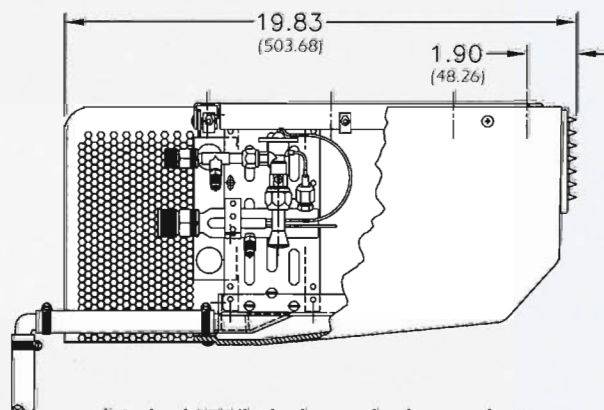
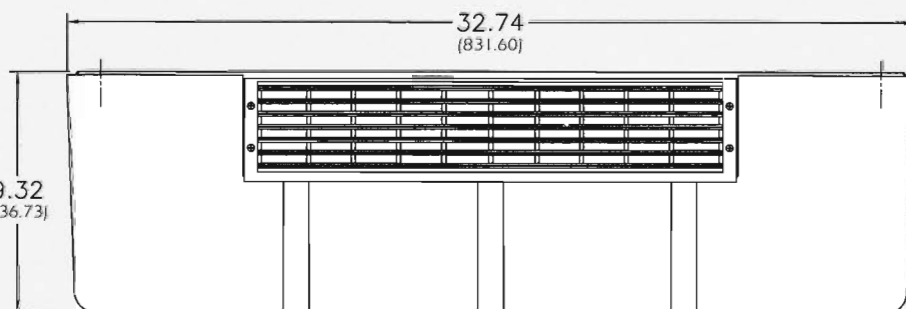
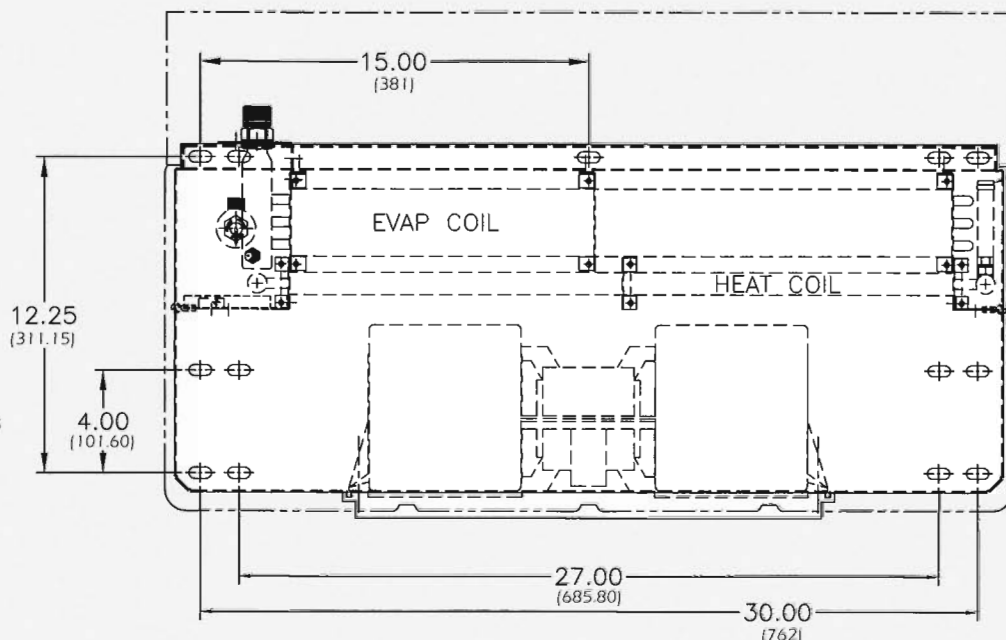
- (1) 4 Ton externally equalized thermostatic type

Available Options

- Metal cover for use with OEM installation
- Heat coil used with positive isolator valve. Isolator valve and heater hose not included.
- Coil corrosion protection

Warranty

- 2 year unlimited mileage limited warranty within the continental U.S. and Canada. Terms of Trans/Air's domestic and export warranty policies are available upon request.

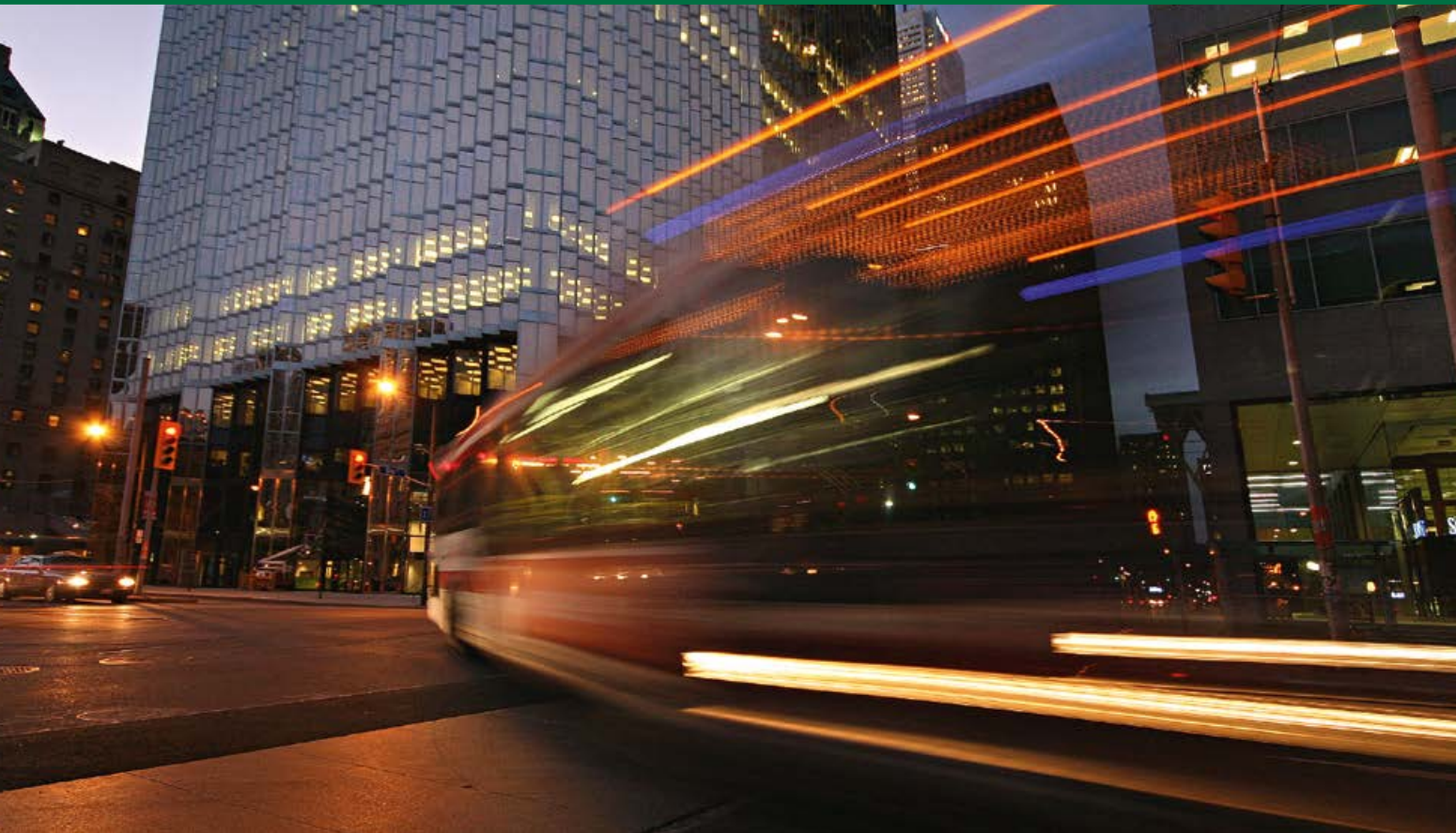


* Actual BTU/hr is dependant on system combination and rating conditions used

- Specifications subject to change without notice
- All measurements in standard (metric)
- Contact Trans/Air for more information

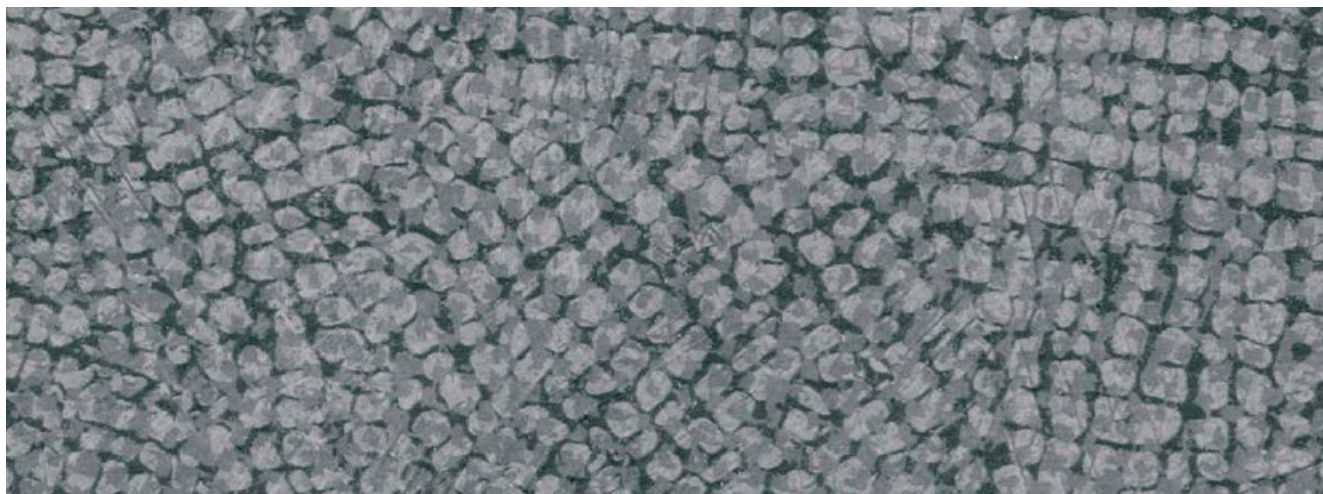
TARABUS

FLOORING FOR BUS & COACH INTERIORS



Gerflor®
theflooringgroup

GAYA MOSAIC



4482 Babel

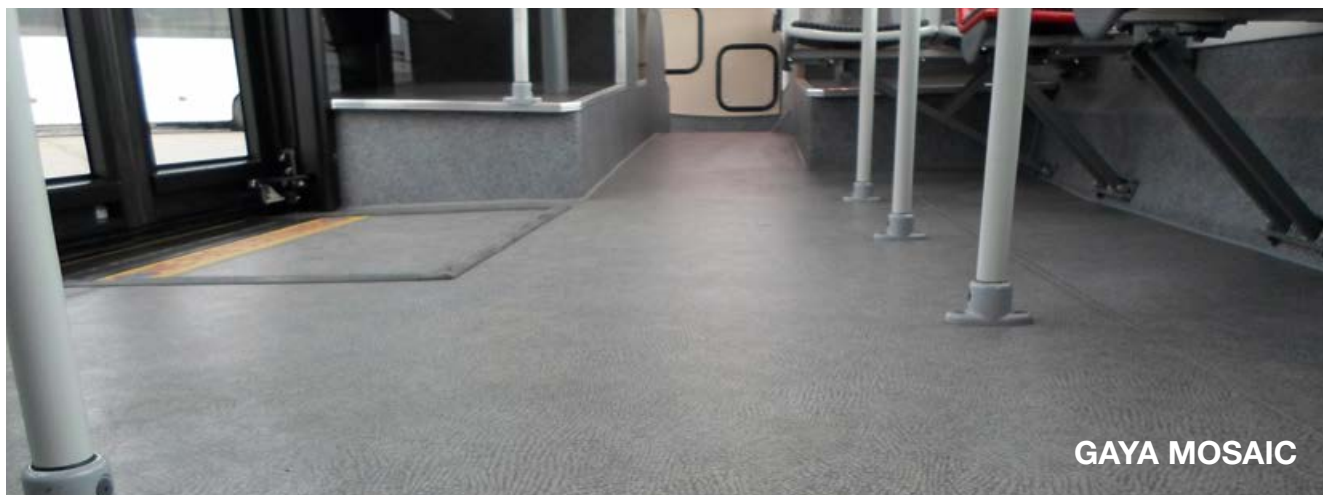
MK

NT



4519 Galata

NT



GAYA MOSAIC

GAYA WOOD Walnut



4362 Wapusk

NT



6057 Everglades

MK

NT



4521 Yellowstone

MK

NT



3724 Kruger

NT

GAYA WOOD Noma



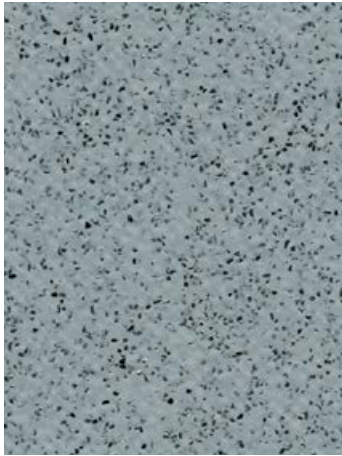
NT

8297 Yosemite



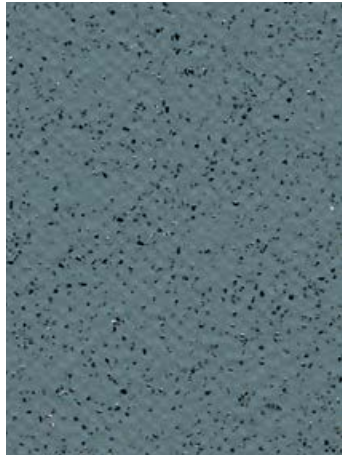
GAYA WOOD Walnut

SIRIUS



MK
NT

6768 Griffon



MK
NT

6782 Dune



NT

6451 Corsaire



MK
NT

6727 Anthracite



NT

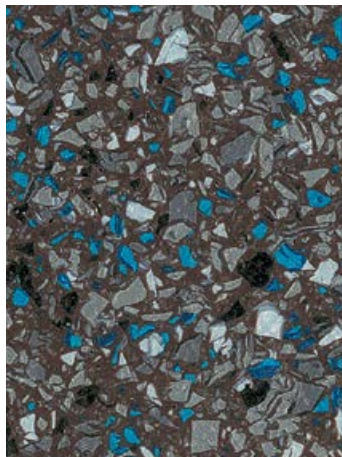
6801 Graphite

APOLLO



MK
NT

4776 Masan



MK
NT

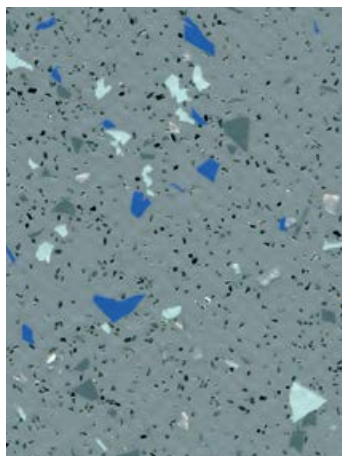
4479 Kilimanjaro



MK
NT

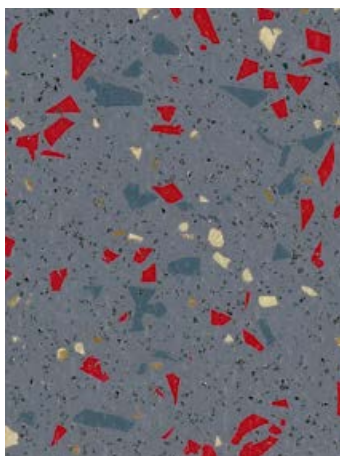
4517 Fuji

HELIOS



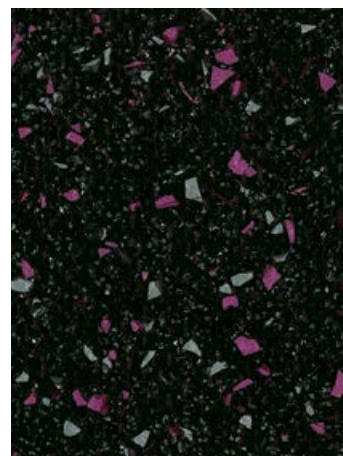
MK
NT

8804 Selenium



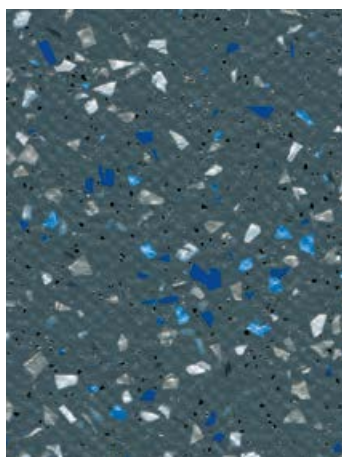
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4483 Dubnium



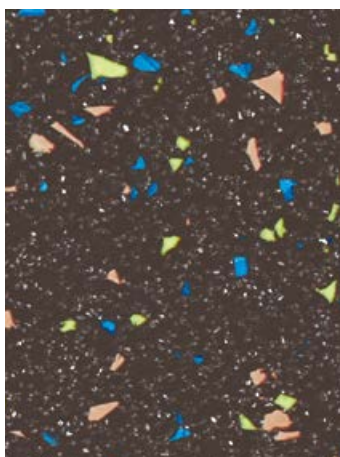
NT

3740 Indium



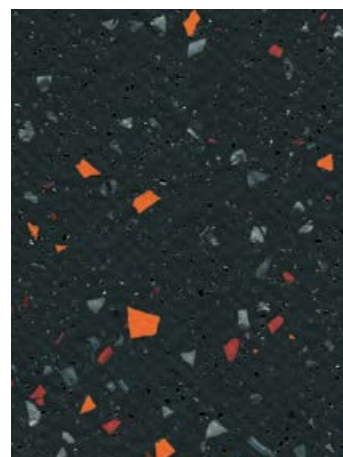
MK
NT

8805 Palladium



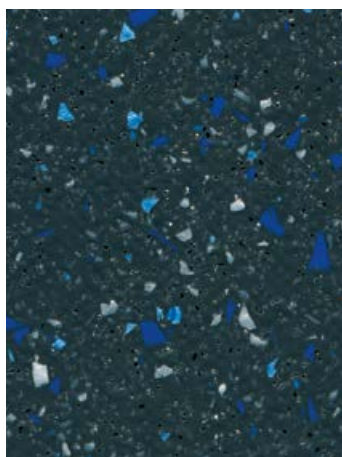
NT

8031 Samarium



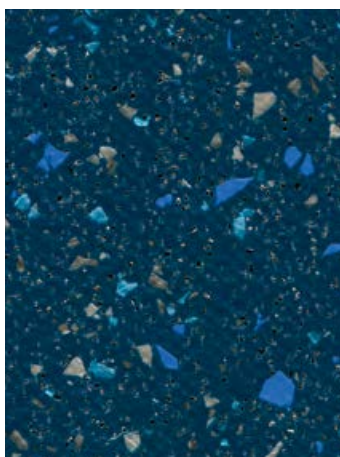
MK
NT

8803 Gallium



NT

8806 Rhodium

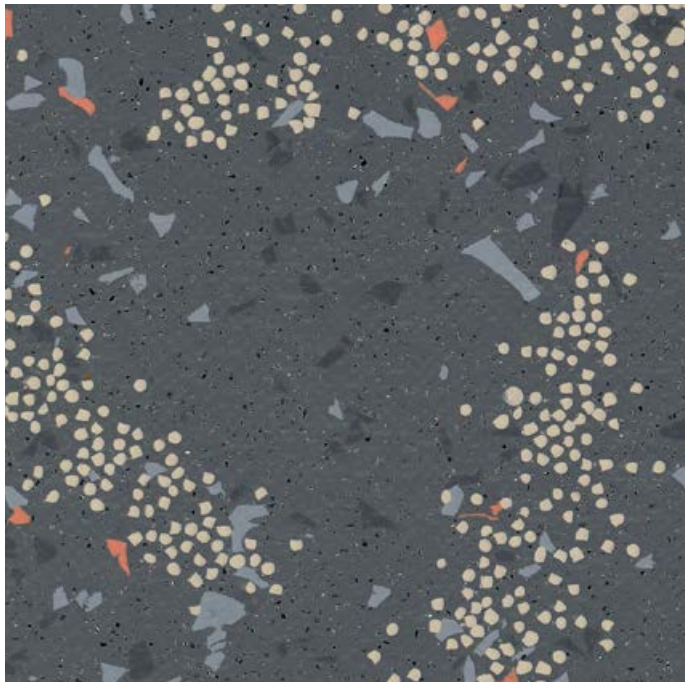


NT

8486 Vanadium

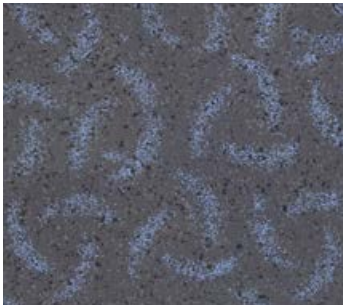
MK Foam backing

NT Textile backing



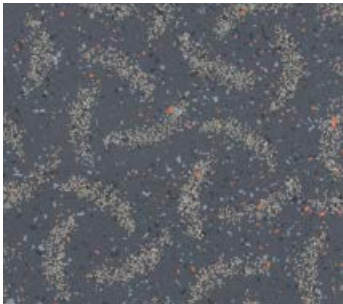
8816 Singapore

NT



NT

8729 Norway*



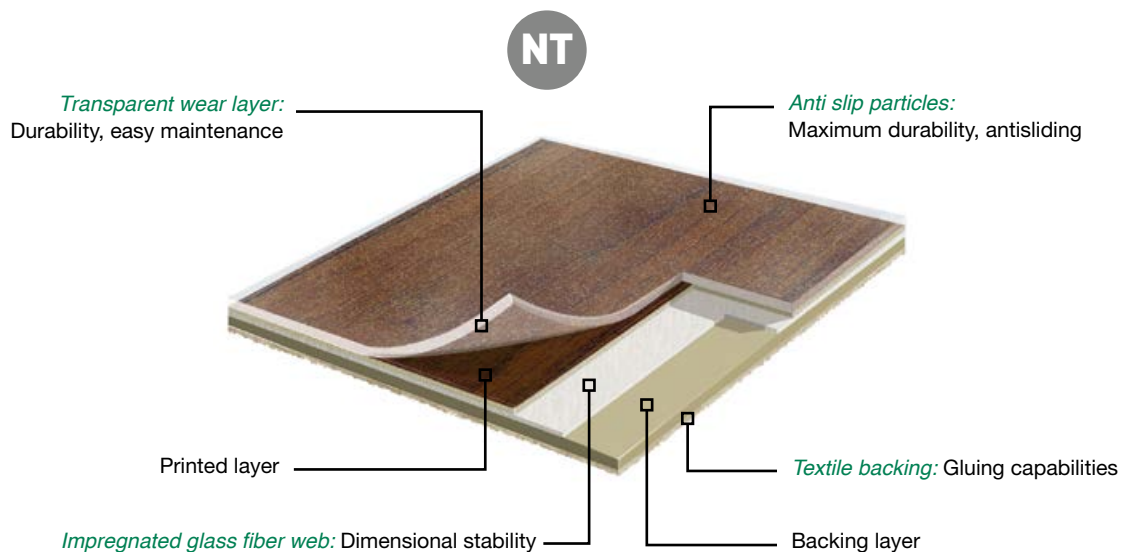
NT

8816 Singapore*

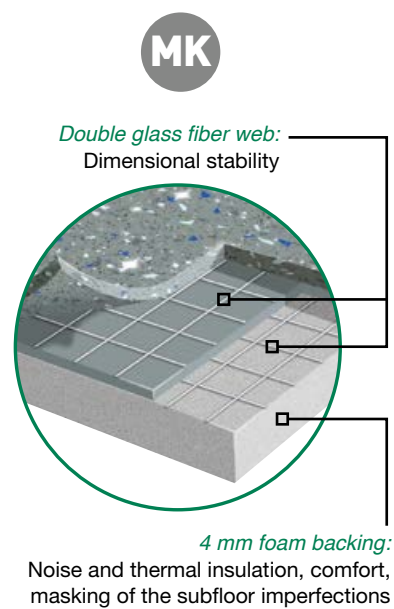
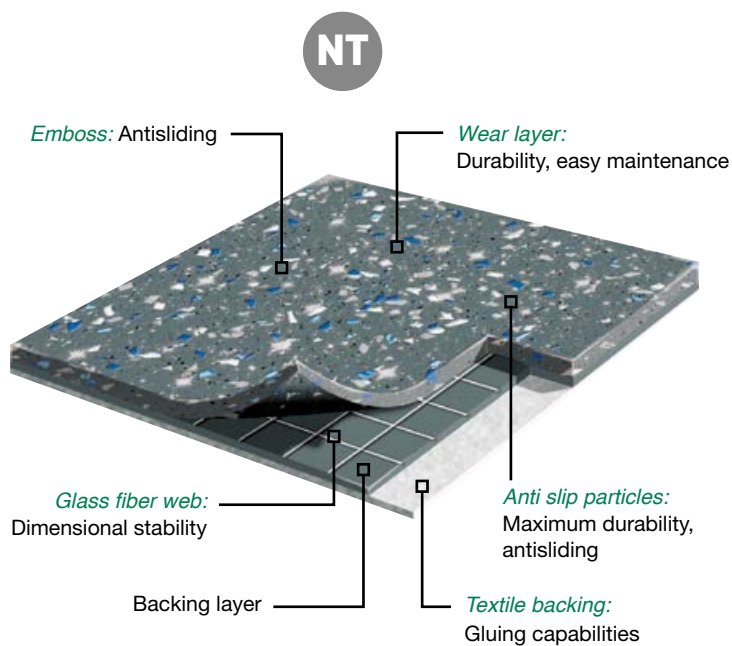
**Scale reduction*



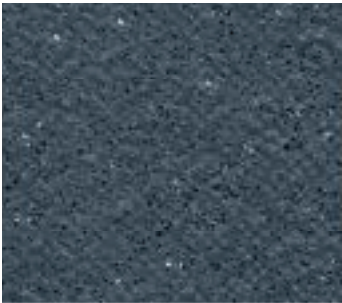
► Tarabus Gaya



► Tarabus standard



SAFEBUS X'TRA



NT

6822 Dark Grey

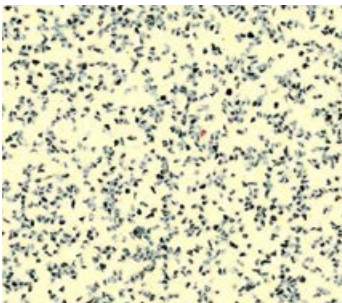
VENUS



NT

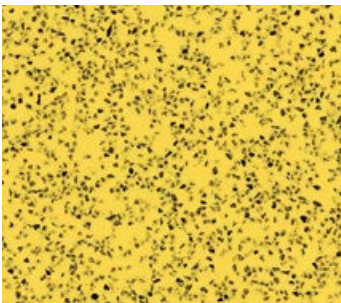
6727 Anthracite

SAFEBUS



NT

6602 Caledonia



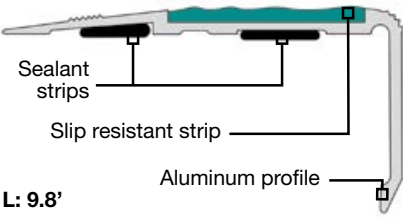
MK

NT

6203 Borneo



STEPBUS



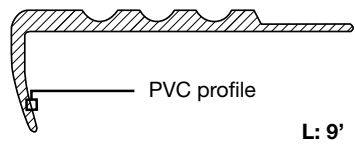
STEP NOSING



Yellow

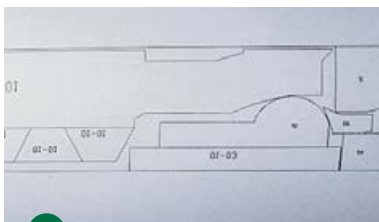


White



Khr System

Pre-cut and pre-welded **TARABUS** floor covering system according to your drawings



1 Send us your floor plan layout



2 We cut with high precision



3 ...and pre-weld if required

TARABUS Self-Adhesive



TARABUS floor covering with self-adhesive backing

- > Environmental friendly bonding
- > Ready to bond
- > No curing time
- > Safer work conditions
- > Easy to use

TIME SAVING

TARABUS LOGO

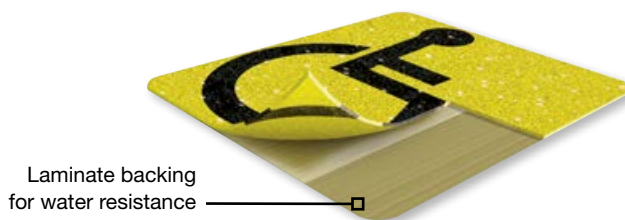
- Location for person with reduced mobility



- Advertising & Promotion



Almost unlimited possibilities of water-resistant logos





TARABUS

FLOORING FOR BUS & COACH INTERIORS

TARABUS *Be* CONNECTED!



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Bensenville 60106 IL USA
Tel : 877 GERFLOR (437 3567)
Fax : 847 394 3753
tarabus@gerflor.com
tarabusbygerflor.com



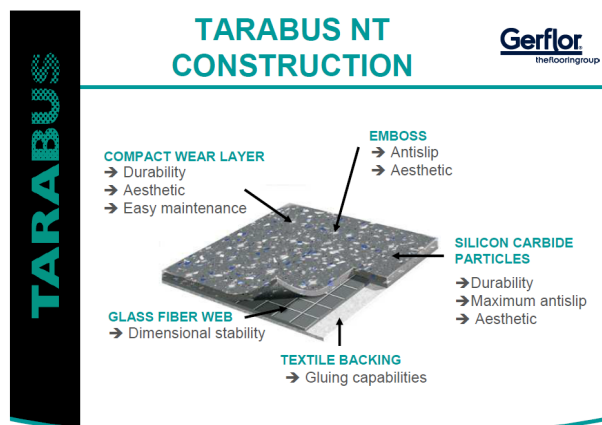
Gerflor[®]
theflooringroup

595 Supreme Drive
Bensenville, IL 60106

September 19, 2022

Please accept Gerflor Tarabus as an alternate to the specified Altro flooring. Gerflor's Tarabus flooring was designed and first introduced into the heavy-duty bus market with our 2.25mm thickness. The 2.25 mm, with its 100% pure PVC wear layer, has proven over the years to be very durable in the heavy-duty market. With the success in the heavy-duty market, this has carried over to the shuttle bus market with the 2.25 mm proving to be more than durable enough to last throughout the life cycle of a light and medium duty bus and the 12-year warranty on the Tarabus product line is longer than the average life cycle of a light/medium duty bus.

- Tarabus is 2.25 mm thick and is designed to be extremely durable and last the life of a heavy duty bus with a 12-year warranty.
- Tarabus is a homogenous floor and has a pure 100% compact PVC wear layer. Gerflor uses no fillers such as chalk or quartz.
- Tarabus has silicon carbide and emboss that makes the floor highly slip resistant and ADA compliant. (Independent ASTM D2047 slip testing data available on request)
- Tarabus wear layer is very dense creating a floor that is easy to keep mop clean.
- Tarabus has a glass fiber web that gives superior dimensional stability that resists shrinking and cracking.
- Tarabus has a unique proprietary textile backing for superior adhesion, allowing a mechanical as well as chemical adhesion.
- Tarabus is extremely lightweight weighing 4.05lb per square yard.
- All seams will be heat welded to eliminate the possibility of water intrusion.
- Gerflor Tarabus meets FMVSS 302 and Docket 90 requirements.
- Gerflor Tarabus is anti-microbial and has been tested to show that it can kill 99.8% of coronavirus on the surface within 12 hours.





gerflorusa.com



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Oct. 4, 2022

David H. Pauline

State of West Virginia

Senior Buyer

2019 Washington Street, East

Charleston, WV 25305

Re: Solicitation CRFQ 0810 2300000004

Dear Mr. Pauline,

Per solicitation section 3.24.4, please find the included flooring sample for Gerfor Tarabus Sirius NT #6451 Corsaire. As the submittal for this project is electronic, we are sending this via the mail.

This flooring was approved as equal for this solicitation, but should the Division have any questions, please reach out to me directly.

Thank you,

Matt Mashuda

Transit Bus Sales

Creative Bus Sales

(412) 992-0184

mattm@creativebussales.com

RAIN BOOTH INFORMATION

Constructed as part of a corporate-wide pre-delivery inspection facility, the Forest River 20' x 50' motorized vehicle rain booth utilized by Glaval Bus offers exceptional performance in the area of water leak detection.



The motorized vehicle rain booth adds front wall nozzles to the design of the towable rain booth, simulating the pelting of oncoming rain at highway speeds. Both booths include two 1200 gallon recycling tanks and utilize a 12Horsepower pump with multi-bank filters capable of delivering 40 – 60 p.s.i. That equates to 300 gallons per minute pushed through the spray heads, or the equivalent of a 24 inch-per-hour downpour!

With nozzles directed at the roof, sidewalls, front and undercarriage, nothing goes untouched in our quest for leak elimination. Using both velocity and volume in our test procedure ensures our valuable customers that we are doing the utmost to deliver a leak-free product to them.



Visitors are always welcome to witness the test booths whenever they are in operation.

**ILISP: Intelligent Lift
Interlock System**

INTERMOTIVE

**VEHICLE
CONTROLS**

An ISO 9001:2015 Registered Company

Intelligent Lift Interlock System™

ILISP: Shift Interlock for Electronic Doors

Overview

- Prevents the vehicle from shifting out of Park if the wheelchair lift or ramp is in use or until properly stowed
- Prohibits lift operation unless the vehicle is in a secure state
- System is fully compliant with FMVSS 403/404 and the Americans with Disabilities Act (ADA) for wheelchair lift interlocks
- Simple plug and play connections to the OEM chassis

Features

- Dash-mounted LED display panel provides system status
- Allows the lift to be operated from outside with the engine off
- Uses Intermittent Fault Filter™ (IFF) technology to eliminate erroneous lift door signals

Product features may vary by make, model or year. See instructions for complete details.



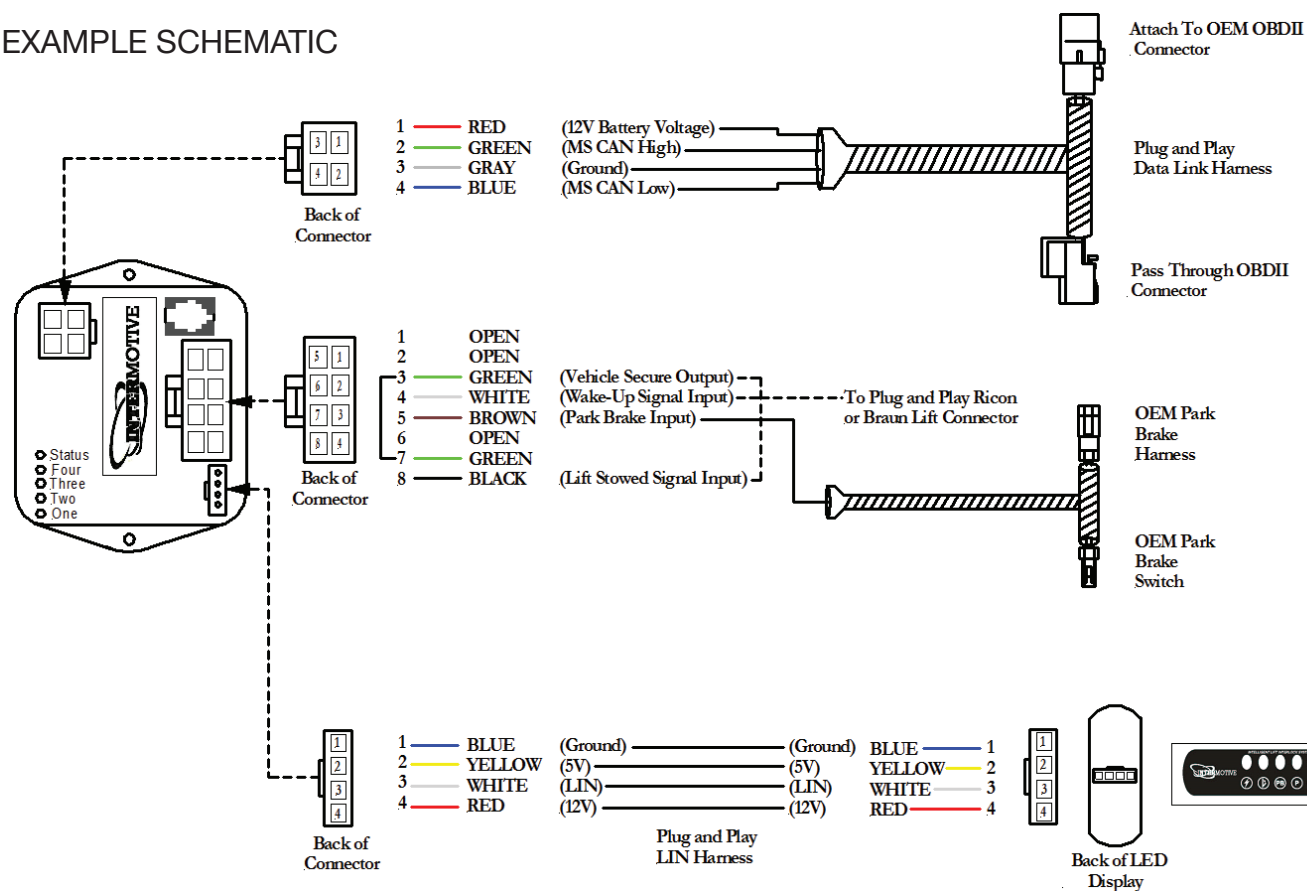
Proudly distributed by

LGS GROUP
AUTOMOTIVE TECHNOLOGIES

(775) 831-2002

Details

EXAMPLE SCHEMATIC



SPECIFICATIONS

Number of Inputs: Three active low (lift stowed, wake-up and Park Brake)

Number of Outputs: Two high/low (vehicle secure and shift lock)

Current Draw: 70 mA

Quiescent Draw: 3 mA (sleep current)

CAN Speed: High and medium speed

Temperature Range: -40°C to 80°C

Dimensions: 3" L x 2" W x 1" H

UNDERCOAT PROCESS INFORMATION

Forest River Bus includes an undercoat application with every vehicle produced. The undercoating protects the unit's most exposed areas from moisture, dirt, grime, salt and other weather-related elements. Trained technicians within two undercoating bays apply the undercoating.

Each vehicle is raised using a drive-on ramp lift system in one of the two undercoating bays. Various areas of the body conversion are masked off including, but not limited to: fuel fills, mud flaps, wheel wells, etc. A rust preventative is also added to the bottom edge of the metal skirts if applicable. A spray foam is applied for additional noise reduction as well as body seam sealing. The underbody is then sprayed with a tough, pliable, corrosion protectant material, which incorporates a sound-deadening property at a pressure of 40 psi. The application runs between 45 minutes to 1.5 hours pending vehicle length.

Forest River Bus follows the strict guidelines established by QVM. No undercoating is sprayed within 12" of the exhaust system or on fuel tank(s), brake lines, AC/heater hoses, heat shield, wire harnesses, driveshaft(s), rear suspension or OEM frame rail.

Undercoating data is available upon request.



FOREST RIVER BUS

2367 Century Drive • Goshen, Indiana 46528 • 800.348.7440 • www.forestriverinc.com



06/21/2017

MB#

Z GUARD™ 9902 STAR

A wax based undercoating intended to protect commercial vehicles from corrosion. The wax electrochemically inhibits the rate of corrosion and also, due to the film characteristics, provides a coating resistant to stone impingement and elevated temperatures.

PHYSICAL PROPERTIES

Appearance	Black Liquid
% NVM by WT.	50
Density	10.43 lb/gal
Viscosity (after reduction with water) per Brookfield RVT #5 Spindle 20RPM	2500
Viscosity per #4 Zahn cup	26 sec.
Mechanical Stability	Excellent
Heat Stability	Excellent
V.O.C.	0.00 lbs/gal
D.O.T. Flammability Rating	>200q F
pH	8.5
Cryptometer/#2 Wedge, ASTM D1212	15
60° Gloss	< 5 matt finish)
Sag (mils)	>15

Z TECHNOLOGIES CORPORATION

World Leaders in Corrosion Protection

26500 Capitol Avenue, Redford, Michigan 48239-2597
Telephone (313) 937-0710 · Fax (313) 937-1470

Z GUARD 9902 STAR Film Properties

Performance testing reflects coating on unpolished Q panels with four day air-dried films at 3.0 – 4.0 mils dry.

Dry to touch at R.T., ASTM D 1640	10 ± 2 minutes
Dry-to-Handle at R.T., ASTM D 1640	20 ± 5 minutes
Pencil Hardness	6B
Flexibility 180° bend over conical mandral	Pass
Salt Spray, ASTM B 117, 1000 hours	Field, scribe, edge clean; slight blistering
Salt Fog Resistance (463PB-10-01), 240 hours.	Pass (No rust)
◆ 500 F x 16 hours plus 240 hrs salt fog	Pass (No rust)
◆ 325 F x 16 hours plus 16 hours humidity.	Pass (No rust, nor blisters)
Salt Fog Resistance (WSS-M2P178-A), 240 hours.	
◆ 662°F x 1 hour; 1°C water quench; plus 240 hrs salt fog.	Pass (#8-9 corrosion rating or <0.1% surface rust per ASTM D 610-95)
Salt Water Immersion, 5% NaCl, 100° F, 96 Hours	Pass
Detergent Immersion, 100° F, 48 Hours	Pass
Gravelometer, ASTM D 3170, -20° F	Good(8A)
Poultice, GM 998-5470, 20 cycles	Pass
Q.U.V., ASTM G 53, 3000 Hours	Pass
Q.U.V., 100 Hours + Salt Spray, 336 Hours	Pass
Q.C.T., 3000 Hours	Pass
Humidity Resistance, ASTM D 2247, 2000 Hours	Pass
Sag resistance	≥5 mils
Impact (direct & reverse) ASTM D 3281	160/40 inch-lbs.
Adhesion (FLTM B 1 6-1 B) cross Hatch	5A Pass
Scab corrosion resistance, 20 cycles	Pass

APPLICATION

For ultimate protection, apply films to clean metals at a thickness of at least four (4) mils dry, by any of the following methods:

Airless spray, with a 33:1 1.5 - 3.5 GPM, .013 - .026 tip at 50-75 psi line pressure, 20 - 40 fan

www.ztechprotection.com

Z TECHNOLOGIES CORPORATION

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26500 Capitol Avenue, Redford, Michigan 48239-2597
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LED SIGNAGE AND COMMUNICATION

- Signs and corresponding programming are capable of displaying different messages simultaneously. Messages may include current destination, route number, or next stop.
- The characters together are capable of displaying a constant-on single line message, and of flashing a multi-line message with a complete blackout to mark the end of each line of the message. The time of display of each line of a multi-line message is adjustable and the ability to display various symbols, as required
- All signs feature an auto-dimming for varying light conditions, and must include self-diagnostic capabilities for errors and outages.
- Fonts and color must be ADA compliant (Amber exterior) standard color
- Sign and hardware must include a 10 year warranty (all parts)
- All signage is ADA compliant and meet Buy America standards
- Lifetime sign programming and service assistance

PART 1 – OPERATOR CONTROL UNIT (OCU)

- In the absence of a single mobile data terminal (MDT), all LED signs (including destination, route, and interior information displays) is controlled via a single Operator Control Unit (OCU) capable of operating up to seven (7) on-board signs simultaneously. This OCU will be located within convenient reach and view of the seated driver so that all buttons are accessible. The OCU is located so that passengers cannot easily tamper with the settings.
- The system control console contains a vacuum fluorescent or LCD display. The system control console contains an audio annunciator that beeps to alert the operator to view the display for a message, or beeps indicating that a key is depressed. The system control console will continuously display the complete message associated with the selected destination code up to 15 characters. Entire sign system operates on 12VDC ignition power. 24V is available upon request.
- System memory allows for a minimum of 1,000 message lines, with the ability to scroll, flash, or stack multi-line messages.
- OCU has an optional input and firmware support for optional emergency switch the driver can push, capable of displaying “EMERGENCY” or “DIAL 911” on all exterior signs without direct OCU interaction. The emergency message can be cancelled by activating the switch a second time. The emergency message displays on the exterior of the bus only. The OCU does not display the emergency message.
- Programming software and support is included with each sign system. Uploading new programming to the OCU may be done via standard USB drive. Programming interface operates on Windows based PC and will allow for user modification of destination and message lists.
- OCU is configured with open J1708 firmware along with the availability of the appropriate communication connectors to allow software providers to push and trigger destination message changes through the OCU. We will provide API and firmware for software integration for future projects, at the TA’s discretion. This specific OCU must be specified and required by user.

PART 2 - DESTINATION SIGNS

Transign Model LED Destinator® Full Amber LED:

12 VDC Front and Side Electronic Destination Sign System. Front and side window with automatic brightness control. Signs can display stationary, scrolling, or flashing messages. Signage includes programming resources to be provided to the agency, one unit per sign kit. Sign system provided has a minimum of 10 year warranty period. Operator control unit is programmable and uses USB port technologies to accept thumb drives.

Front LED Destination Sign:

- Front destination sign is Amber LED with a minimum LED display of 4.75”(H) x 44” (W)- 12 pixels high x 112 pixels wide, 1,344 pixels, minimum viewing distance of up to 500’.
- Each LED’s has a diameter of 10mm with a 10mm pitch.
- The destination message is readable by a person with 20/20 vision from a distance of 250 feet.
- The sign has an equal readability at 65 degrees on either side of the line perpendicular to the center of the mean plane of the display.
- The entire display area of all signs is clearly visible and readable both in direct sunlight and at night.
- Front sign is capable of displaying scrolling or flash text, with a fixed left margin to display route number.
- Front sign is installed high in the windshield, or above the windshield enclosed in a suitable compartment.

Curb-Side LED Destination Sign:

- Side destination sign are Amber LED with a minimum LED display of 4.75”(H) x 31.50” (W)- 12 pixels high x 80 pixels wide, 960 pixels, minimum viewing distance of 250’.
- Each LED’s has a minimum size diameter of 10mm with a 10mm pitch.
- The destination message is easily read from the sidewalk level. The entire display area of all signs is clearly visible and readable both in direct sunlight and at night.
- Side sign is capable of displaying scrolling text, and may display similar or different messages from the front.
- Side sign is located in a passenger window behind the front passenger entrance door. Sign is mounted in top portion of side window.

TRANSIGN

YOUR DESTINATION BEGINS HERE



The LED Destinator™ Series - perfect for fleets of all types - is available in a variety of sizes and colors to fit your installation and display needs. These versatile and highly adaptive signs offer full integration into Destination, Route, and Next Stop announcement services, always keeping your customers pointed towards their next destination.



SOFTWARE AND PROGRAMMING

Our signs and control modules are pre-programmed and include FREE software. Advanced controllers are available for J1708/J1587 system integration and Hands-Free operation, ensuring the safest and most reliable performance for any fleet.

STANDARD FEATURES

- Destination Messages
- Next Stop Announcements
- Public Relations Messaging
- Scrolling/Flashing/Stacked Messages



AVAILABLE ADVANCED FEATURES INCLUDE:

- Automated GPS message progression
- Hands-Free operation for safety
- Voice Announcements
- J1708/J1587 integration compatible
- Automatic brightness control
- Basic programming software included (USB)
- Maintenance free- ZERO cost of ownership
- Many OCU options to suit your needs



BUY AMERICA - MADE IN U.S.A.

Using the highest quality parts, our LED Destinator™ Signs are proudly made in Detroit, Michigan USA in full compliance with the **Buy America Act**.

LED DESTINATOR™ WARRANTY INFO

With a lifetime warranty that outlasts the lifetime of most vehicles (100,000 hours at full brightness), our signs will exceed your expectations in reliability and performance.



ABOUT TRANSIGN

Established in 1959, Transign is a leading provider of high-quality signage for the transit industry. We remain committed to providing world-class U.S. based customer service and technical support.

Transign LLC, 281 Collier Rd., Auburn Hills, Michigan 48326
Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930
www.transignllc.com

LED Destinator™ Electronic Signs - Dimensions

Signs	Pixel Count H x W (pixels)	Display H x W (in)	Enclosure H x W x D (in)
LD16160	16 x 160	6 1/2 x 63 1/8	9 1/2 x 64 5/8 x 2 3/8
LD16128	16 x 128	6 1/2 x 50 1/2	9 1/2 x 52 x 2 3/8
LD16112	16 x 112	6 1/2 x 44 1/8	9 1/2 x 45 3/4 x 2 3/8
LD1696	16 x 96	6 1/2 x 37 7/8	9 1/2 x 39 3/8 x 2 3/8
LD1680	16 x 80	6 1/2 x 31 5/8	9 1/2 x 33 x 2 3/8
LD1632	16 x 32	6 1/2 x 12 3/4	9 1/2 x 14 x 2 3/8
LD12112	12 x 112	4 7/8 x 44 1/8	8 x 45 3/4 x 2 3/8
LD1280	12 x 80	4 7/8 x 31 5/8	8 x 33 1/8 x 2 3/8
LD1232	12 x 32	4 3/4 x 12 3/4	8 x 14 x 2 3/8
LD896	8 x 96	3 1/4 x 37 7/8	6 3/8 x 39 3/8 x 2 3/8
LD864	8 x 64	3 1/4 x 25 1/4	6 3/8 x 26 3/4 x 2 3/8

Be sure to check out our other great products!



Stop Request Signs

- Flush, ceiling or surface mount
- Any font/color combination
- Back-lit by efficient LED's



Interior Passenger Information Sign

- Easy to install
- ADA compliant
- LED's rated at 100K hours



Roller Curtain Signs

- High-res logos & graphics
- Perfect for large fleets
- Virtually maintenance free
- Reliable, efficient LED backlight
- Available in 12 and 24 VDC
- Up to 120 destinations



Run Number Box

- Metal or plastic frame
- Available in 2, 3, or 4 digits
- Easy to read 4" lettering
- Spring loaded return
- Reliable, efficient LED backlight
- Virtually maintenance free



LED Run Number Box

- Steel enclosure
- ADA compliant
- Reliable LED's
- Multiple colors
- Automatic brightness
- 12 and 24 VDC

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Transign LLC, 281 Collier Rd., Auburn Hills, Michigan 48326
Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930
www.transignllc.com



Creative Bus Sales

CRFQ 0805 PTR2100000011 Mid Size Medium Duty Vehicles

3.38.4 Farebox Provision location

As the location of the farebox varies widely in our industry, Creative will count on each ordering agency to provide us with their desired location of any farebox provision equipment.

1 Channel PA Amplifier

#700962

Supplied with Gooseneck microphone and foot switch.



Description

2 microphone inputs

50 Watt power output

XLR priority microphone input overrides Mini-Fit secondary microphone input

Volume control and AUX audio input (1 channel)

Separate internal/external volume control and AUX audio inputw/speaker selectability (2 channel)

Approved OEM standard option equipment

8"L x 3.125"W x 1.75"H





📍 6534 L St, Omaha, NE 68117

☎ 1.402.339.2200

☎ 800.228.9275

✉ info@radioeng.com

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MS5006

- 5.25-inch waterproof speaker
- Available in black (MS5006B) or white (MS5006W)
- 30 watt maximum power
- Corrosion and UV resistant
- One-piece molded plastic chassis with integrated drip-edge
- Polypropylene cloth woofer cone

[LEARN MORE](#)



Universal PA Amplifier

JPA600



PRODUCT FEATURES

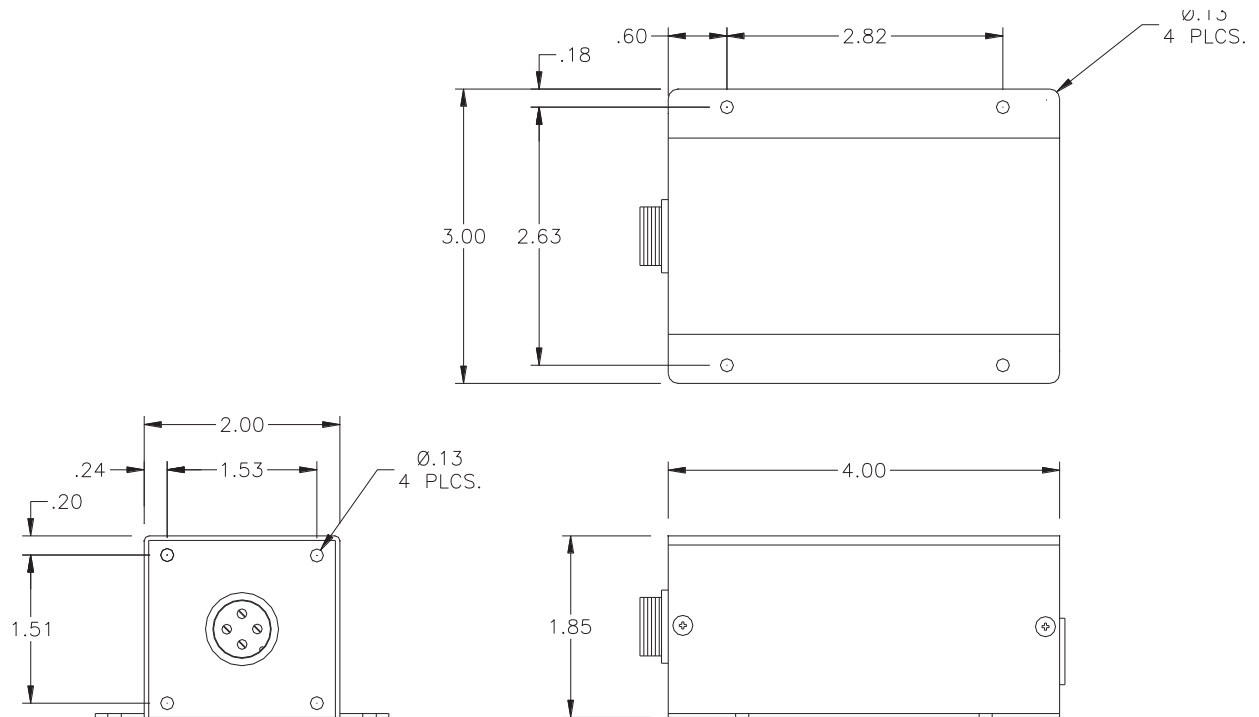
- 2 Wire - 12VDC switched power
- 4 Channel Audio Amplifier with Public Address (PA)
- Universal harness leads
- Compatible with JMICHND for volume control instead of integrated volume knob
- 4 Ohm ~ 8 Ohm Stable
- Frequency Response 100Hz ~ 10KHz
- 10 Amp Fuse in holder
- Universal PA, works with any 4 channel stereo or standalone.
- Installation: In-line between existing stereo & speakers
- Automatically interrupts stereo audio when mic is keyed
- Dimensions: 3.0"W x 1.9"H x 4.0"D

DESIGNED TO MOVE [YOU][™]

asa
ELECTRONICS.
2802 Marina Drive • Elkhart, IN 46514
www.asaelectronics.com



Universal PA Amplifier JPA600



Specifications

General Specifications

Power System		12V DC
Operating Voltage Range		10V to 18V
Current Draw @ 12V	Idle	380 mA
	Nominal	2.6 A
	Maximum	9.0 A
Operating Temperature Range		-4°F to 149°F -20°C to 65°C
Storage Temperature Range		-25°F to 185°F -30°C to 70°C
Maximum Relative Humidity		N/A
Product Weight (unpackaged)		1.0 lb
Output Power RMS		4 x 18Watts
Output Power Maximum		4 x 25Watts
Total Harmonic Distortion (1W @ 1Khz)		0.5%
Applied Test Suite Environ/ Electrical		ASA ES0001

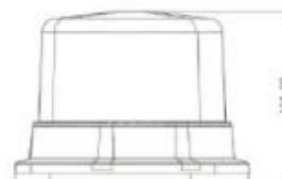


4.5" Class 1 Beacon, 3-Screw, White, Clear Lens

100BC0001

4.5" Class 1 Beacon, 3-Screw, Amber, Amber Lens

100BC0002



TECHNICAL SPECIFICATIONS

INPUT VOLTAGE RANGE	10 – 30 VDC
CURRENT DRAW	1.2A @ 13.8Vdc, 0.65A @28Vdc
LED COUNT	Standard: 36, Low-Profile: 12
FLASH PATTERNS	4
OPERATING TEMPERATURE	-40° C to +65° C
DIMENSIONS	
Height:	Standard: 124mm (4.88 in), Low-Profile: 81mm (3.19 in)
Diameter:	170.9mm (6.7 in)
MOUNTING	Surface mount, 3-holes on 152.1mm (5.99in) circle dia. Adhered EVA gasket
CERTIFICATIONS	SAE J845/J2139 CLASS 1 BEACON IP67

 **Opti-Luxx**

Vulcan™ Series V12 HD/IP Mobile DVR

12-CHANNEL DVR

DIMENSIONS

- Height: 3.5 inches
- Width: 8.7 inches
- Depth: 11.6 inches
- Weight: 5.7 pounds

TWELVE (12) A/V INPUTS

- 8 channels D1, WD1, 720P, or up to 1080P
- + 4 channels IP up to 1080P

VIDEO OUTPUTS

- 2 channels

AUDIO OUTPUTS

- 2 channels

CAMERA COMPATIBILITY

- 8 channels D1, WD1, 720P, or up to 1080P (see NTSC)
- 4 channels IP up to 1080P

STORAGE MEDIA

RECORDING MEDIUM

- One (1) 2.5" SATA hard drive and one (1) optional solid-state SD card

CAPACITY

- 1TB (standard) up to 2TB (capable) (optional) 64GB SD card up to 512GB

RECORDING OPTIONS

- SD card slot for redundant recording

INTERFACE

NETWORK DATA CONNECTION

- One RJ45 x 1 (10/100 M/1000M)

EXPANSION

- RS232 x 2, RS485 x 2

GPS INTERFACE

- Built-in, compatible with optional GPS antenna

DRIVER ACTION DETECTION

PANIC BUTTON

- The remote status indicator (panic button) can be connected to show DVR power/record status without using a video monitor
- The driver-operated panic button has the following functions:
 - Solid green LED indicates that the unit has power and is recording
 - Event marker (panic button)

DRIVER ACTION DETECTION WIRES

- 8 signal wires individually programmable to indicate alarm or event



BUILT-IN G-FORCE SENSOR

COMPRESSION FORMAT

- Video: H.264
- Audio: ADPCM, G.711A G.711U

RECORD RESOLUTION

NTSC

- 1080P, 720P, WD1(928X480), WHD1(928X240), WCIF(464X240), D1(704x480), HD1(704x240), CIF(352x240)

PAL

- 1080P, 720P, WD1(928X576), WHD1(928X288), WCIF(464X288), D1(704X576), HD1(704x288), CIF(352x288)

RECORDING OPTIONS

- **Continuous record:** System will record all channels continuously while vehicle is running (factory setting).
- **Alarm record:** System will record when an alarm is triggered.
- **Motion record:** System will record when the cameras detect motion while vehicle is running.
- **Schedule record:** System will boot and record according to user-selectable schedule.

ELECTRICAL & OPERATING REQUIREMENTS

AUTO ON/OFF DETECTION

- ACC detection

DELAY OFF SETTING

- User selectable up to 24 hours

OPERATING VOLTAGE

- 8~36VDC

OPERATING TEMPERATURE

- -14°F (-25°C) ~ +158°F (+70°C); -40°F (-40°C) ~ +158°F (+70°C) with heater

POWER CONSUMPTION

- 0W-105.3W

POWER SUPPLY

INPUT RANGE

- DC 8-36V

OUTPUT RANGE

- DC5V/DC12V

OUTPUT CURRENT

- 5V@500mA, 12V@500mA

BUILT-IN POWER PROTECTION

LOW VOLTAGE PROTECTION

- User selectable and programmed at installation

HOUSING/CASING

- Removable, shock-mounted
- Vandal-resistant locking front cover
- Shock-resistant: MIL-STD-810F
- Aluminum
- Optional fan with filter, removable for cleaning

BUILT-IN WI-FI MODULE

OPTIONAL COMPONENTS

VIRTUAL SYNCHRONIZED MAPPING

- External Virtual Synchronized Mapping™ module with North American maps
- Includes GPSV1 antenna
- Embeds GPS tracking information synchronized with recorded video footage

GPS ANTENNA

FIREPROOF BOX BACKUP

CELLULAR MODEM

Vulcan™ Series HD1700V ▽ 180° Lens 1080P Camera

CAMERA FEATURES

The Anvil™ HD1700V camera from AngelTrax features a fully articulated lens casing, adjustable vertically and horizontally, to obtain extreme wide-angle views of the vehicle's interior or exterior and surroundings. Equipped with Super Infrared, automated white balance and digital noise reduction, the Anvil™ HD1700V camera is capable of capturing astonishingly clear high-definition images day or night.

DIMENSIONS

- Height: 1.5 inches
- Width: 3.4 inches
- Depth: 2.9 inches
- Weight: 0.6 pounds

LENS

- 180° lens/
170° field of view
- 1.7mm focal length
- 2.12MP
- 1/2.7" CMOS sensor
- Fully articulated
lens casing for
image orientation

MINIMUM ILLUMINATION

- 0.05 Lux / F1.8
- 0 Lux when IR on

AUTO ELECTRONIC SHUTTER

- 1/60s (1/50s) - 1/100,000s

INFRARED

- Smart IR circuit design for auto-exposure control when IR is ON
- Super IR: 98 - 164 feet

DAY AND NIGHT

- External sensor for auto switch between day and night modes

IMAGE CONTROL

- Digital Wide Dynamic Range (DWDR)
- Auto Tracking White Balance (ATW)
1,800°K ~ 10,500°K
- Automatic Gain Control: (AGC)

SIGNAL TO NOISE RATIO

- S/N > 60dB

VIDEO OUTPUT LEVEL

- 1.0 Vp-p Composite video/
75 Ohm



OPERATING CONDITIONS

- -40°F ~ +158°F (-40° C ~ +70° C)

POWER INPUT

- DC 12V (9V ~ 16V)

POWER CONSUMPTION

- (IR on) 300mA @ DC 12V
- (IR off) 75mA @ DC 12V

IP RATING

- IP68

HOUSING/CASING MATERIAL

- Steel
- Anti-vibration
- Vandal-resistant

VIDEO COMPRESSION

- H.264

IMAGE RESOLUTION

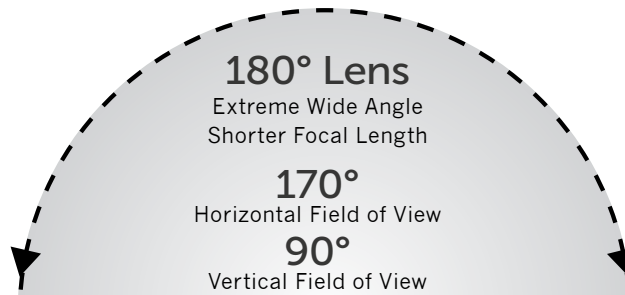
- 1080P high definition
- NTSC: 1920 x 1080 @30fps
- PAL: 1920 x 1080 @ 25fps

IMAGE FRAME RATE

- 30fps

AUDIO

- Noise-gated microphone



Vulcan™ Series HD2500V ▼ 2.5mm 1080P Camera

CAMERA FEATURES

The versatile Anvil™ HD2500V camera from AngelTrax features a fully articulated lens casing, adjustable vertically and horizontally, to obtain wide-angle views of the vehicle's interior or exterior and surroundings. Equipped with Super Infrared, automated white balance and digital noise reduction, the Anvil™ HD2500V camera is capable of capturing astonishingly clear high-definition images day or night.

DIMENSIONS

- Height: 1.5 inches
- Width: 3.4 inches
- Depth: 2.9 inches
- Weight: 0.6 pounds

LENS

- 2.5mm focal length
- 3MP
- CMOS sensor
- Fully articulated lens casing for image orientation

MINIMUM ILLUMINATION

- Color: 0.1 Lux
- B/W: 0.5 Lux
- Sens-up x 60: 0.02 Lux

ELECTRONIC SHUTTER

- NTSC: 1/60s · 1/50,000s
- PAL: 1/50s · 1/50,000s

INFRARED

- Super IR circuit design for auto-exposure control when IR is ON
- Super IR: 98 · 164 feet

DAY AND NIGHT

- External sensor for auto switch between day and night modes

IMAGE CONTROL

- Digital Wide Dynamic Range (DWDR)
- Auto Tracking White Balance (ATW)
- Automatic Gain Control: High



SIGNAL TO NOISE RATIO

- S/N > 50dB

VIDEO OUTPUT LEVEL

- 1.0 Vp-p (75 composite)

AUTOMATIC GAIN CONTROL

- Auto

VIDEO COMPRESSION

- H.264

IMAGE RESOLUTION

- NTSC: 1920 x 1080

IMAGE FRAME RATE

- 1920 x 1080 @25/30fps

FRAME INTEGRATION

- Sens-up: Low

AUDIO

- Noise-gated microphone

OPERATING CONDITIONS

- -40°F ~ +158°F (-40°C ~ +70°C)

POWER INPUT

- DC 12V ± 10%

POWER CONSUMPTION

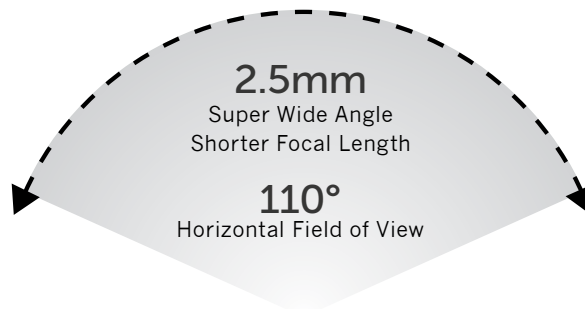
- (IR on) 300mA @ DC 12V
- (IR off) 75mA @ DC 12V

IP RATING

- IP68

HOUSING/CASING MATERIAL

- Steel
- Anti-vibration
- Vandal-resistant



Vulcan™ Series HD3600V ▼ 3.6mm 1080P Camera

CAMERA FEATURES

The versatile Anvil™ HD3600V camera from AngelTrax features a fully articulated lens casing, adjustable vertically and horizontally, to obtain the desired view of the vehicle's interior or exterior and surroundings. Equipped with Super Infrared, automated white balance and digital noise reduction, the Anvil™ HD3600V camera is capable of capturing astonishingly clear high-definition images day or night.

DIMENSIONS

- Height: 1.5 inches
- Width: 3.4 inches
- Depth: 2.9 inches
- Weight: 0.6 pounds

LENS

- 3.6mm focal length
- 3MP
- CMOS sensor
- Fully articulated lens casing for image orientation

MINIMUM ILLUMINATION

- Color: 0.1 Lux
- B/W: 0.5 Lux
- Sens-up x 60: 0.02 Lux

ELECTRONIC SHUTTER

- NTSC: 1/60s - 1/50,000s
- PAL: 1/50s - 1/50,000s

INFRARED

- Super IR circuit design for auto-exposure control when IR is ON
- Super IR: 98 - 164 feet

DAY AND NIGHT

- External sensor for auto switch between day and night modes

IMAGE CONTROL

- Digital Wide Dynamic Range (DWDR)
- Auto Tracking White Balance (ATW)
- Automatic Gain Control: High



SIGNAL TO NOISE RATIO

- S/N > 50dB

VIDEO OUTPUT LEVEL

- 1.0 Vp-p (75 composite)

AUTOMATIC GAIN CONTROL

- Auto

VIDEO COMPRESSION

- H.264

IMAGE RESOLUTION

- NTSC: 1920 x 1080

IMAGE FRAME RATE

- 1920 x 1080 @25/30fps

FRAME INTEGRATION

- Sens-up: Low

AUDIO

- Noise-gated microphone

OPERATING CONDITIONS

- -40°F ~ +158°F (-40°C ~ +70°C)

POWER INPUT

- DC 12V ± 10%

POWER CONSUMPTION

- (IR on) 300mA @ DC 12V
- (IR off) 75mA @ DC 12V

IP RATING

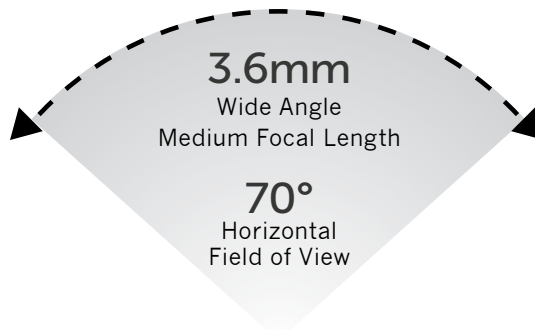
- IP68

HOUSING/CASING MATERIAL

- Steel
- Anti-vibration
- Vandal-resistant

HD3600V SHOWN WITH YELHS1 YELLOW HOUSING

For use in school bus applications as overview camera with IntelliGuard™ Automated Stop Arm Violation System



Specifications, features and applications of use are subject to change without notice. ▼ 3/2019 B

Vulcan™ Series V12 HD/IP Mobile DVR

12-CHANNEL DVR

DIMENSIONS

- Height: 3.5 inches
- Width: 8.7 inches
- Depth: 11.6 inches
- Weight: 5.7 pounds

TWELVE (12) A/V INPUTS

- 8 channels D1, WD1, 720P, or up to 1080P
- + 4 channels IP up to 1080P

VIDEO OUTPUTS

- 2 channels

AUDIO OUTPUTS

- 2 channels

CAMERA COMPATIBILITY

- 8 channels D1, WD1, 720P, or up to 1080P (see NTSC)
- 4 channels IP up to 1080P

STORAGE MEDIA

RECORDING MEDIUM

- One (1) 2.5" SATA hard drive and one (1) optional solid-state SD card

CAPACITY

- 1TB (standard) up to 2TB (capable) (optional) 64GB SD card up to 512GB

RECORDING OPTIONS

- SD card slot for redundant recording

INTERFACE

NETWORK DATA CONNECTION

- One RJ45 x 1 (10/100 M/1000M)

EXPANSION

- RS232 x 2, RS485 x 2

GPS INTERFACE

- Built-in, compatible with optional GPS antenna

DRIVER ACTION DETECTION

PANIC BUTTON

- The remote status indicator (panic button) can be connected to show DVR power/record status without using a video monitor
- The driver-operated panic button has the following functions:
 - Solid green LED indicates that the unit has power and is recording
 - Event marker (panic button)

DRIVER ACTION DETECTION WIRES

- 8 signal wires individually programmable to indicate alarm or event



BUILT-IN G-FORCE SENSOR

COMPRESSION FORMAT

- Video: H.264
- Audio: ADPCM, G.711A G.711U

RECORD RESOLUTION

NTSC

- 1080P, 720P, WD1(928X480), WHD1(928X240), WCIF(464X240), D1(704x480), HD1(704x240), CIF(352x240)

PAL

- 1080P, 720P, WD1(928X576), WHD1(928X288), WCIF(464X288), D1(704X576), HD1(704x288), CIF(352x288)

RECORDING OPTIONS

- **Continuous record:** System will record all channels continuously while vehicle is running (factory setting).
- **Alarm record:** System will record when an alarm is triggered.
- **Motion record:** System will record when the cameras detect motion while vehicle is running.
- **Schedule record:** System will boot and record according to user-selectable schedule.

ELECTRICAL & OPERATING REQUIREMENTS

AUTO ON/OFF DETECTION

- ACC detection

DELAY OFF SETTING

- User selectable up to 24 hours

OPERATING VOLTAGE

- 8~36VDC

OPERATING TEMPERATURE

- -14°F (-25°C) ~ +158°F (+70°C); -40°F (-40°C) ~ +158°F (+70°C) with heater

POWER CONSUMPTION

- 0W-105.3W

POWER SUPPLY

INPUT RANGE

- DC 8-36V

OUTPUT RANGE

- DC5V/DC12V

OUTPUT CURRENT

- 5V@500mA, 12V@500mA

BUILT-IN POWER PROTECTION

LOW VOLTAGE PROTECTION

- User selectable and programmed at installation

HOUSING/CASING

- Removable, shock-mounted
- Vandal-resistant locking front cover
- Shock-resistant: MIL-STD-810F
- Aluminum
- Optional fan with filter, removable for cleaning

BUILT-IN WI-FI MODULE

OPTIONAL COMPONENTS

VIRTUAL SYNCHRONIZED MAPPING

- External Virtual Synchronized Mapping™ module with North American maps
- Includes GPSV1 antenna
- Embeds GPS tracking information synchronized with recorded video footage

GPS ANTENNA

FIREPROOF BOX BACKUP

CELLULAR MODEM

LEADING THE INDUSTRY IN REAR VISION SAFETY


STSK4750B KIT COMPONENTS:

MONITOR: STSM244

CAMERA: STSC130B

HARNESSES: STSH349 (49FT BLACK), STSH130 (ADAPTER HARNESS)

Forest River, Inc. bus manufacturing companies will be the industry's first to offer a rear backup safety camera as standard equipment on every bus in 2019... Setting the safety tone and trend in the commercial and school bus market.

Forest River's hard stance on safety with the new 2019 rear backup safety program has selected Rosco Vision Systems in NY as the manufacturers of the STSK4750B backup camera system.


STSM244 MONITOR SPECS

SCREEN SIZE	7"
RESOLUTION	800*480 pixels
MONITOR BRIGHTNESS	700cd/m2
NUMBER OF CAMERA INPUTS	1
INPUT FORMAT	13-pin
VIEWING ANGLES	L/75°, R/75°, UP/60°, DOWN/60°
SHOCK RATING	2G
VIBRATION RATING	6G
POWER SUPPLY	12 ~ 32 VDC
OPERATING TEMPERATURE RANGE	-4°F to 158°F -20°C to 70°C

STSC130B CAMERA SPECS

TV LINES	420 TVL
FIELD OF VIEW (DIAGONAL)	150°
MINIMUM ILLUMINATION	0.2 LUX
DUST/WATER RATING	IP69K
POWER SUPPLY	12 Vdc
OPERATING TEMPERATURE	-22°F to 140°F -30°C TO 65°C


1-800-227-2095


500

500 SERIES



510

BEACONS

LIGHTBARS/
MINIBARS

SAFETY
DIRECTOR™

LED DIRECTIONAL
LIGHTS

LIGHTING
SYSTEMS

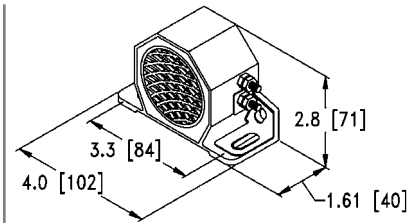
BACK-UP
ALARMS

CAMERA
SYSTEMS

Back-Up Alarm

ECCO's most compact and popular line of back-up alarms, the 500 Series provides a cost-effective warning solution with ECCO quality and reliability. A glass-filled nylon housing with epoxy-encapsulated electronics provide exceptional durability and protection against moisture, dust and vibration.

ECCO's 500 Series Smart Alarm® measures ambient noise and adjusts sound levels, creating a volume that is safe without being annoying or contributing to noise pollution. Smart Alarms eliminate the need for constant manual adjustment and help prevent intentional alarm disconnection.



Models

PART NO.	VOLTAGE	dB(A)	AMPS	SAE	WARRANTY
505	12-24	87	0.1	D	SAE J944 e
510	12	97	0.2	C	SAE J944 e
520	12-24	97	0.2	C	SAE J944 e
530	12-24	102	0.2	F	SAE J944 e
580	12-80	87	0.1	D	SAE J944 e
585	12-48	97	0.1	C	SAE J944 e
SA950	12-24	82-102	0.4	F	SAE J944 e SMART ALARM
SA951	12-48	77-97	0.2	F	SAE J944 e SMART ALARM

Models 510, 520 and 505 are AMECA certified to SAE J994

Alarm Specifications

	CURRENT (NOMINAL)	AVG. POWER (NOMINAL)		CURRENT (NOMINAL)	AVG. POWER (NOMINAL)
SA950	12V 0.65A	4.0W	585	12V 0.19A	1.2W
	24V 0.77A	9.3W		24V 0.21A	2.5W
SA951	12V 0.31A	1.9W		36V 0.22A	4.1W
	24V 0.34A	4.1W		42V 0.23A	4.9W
	36V 0.34A	6.1W		48V 0.23A	5.6W
	42V 0.34A	7.2W	505	12V 0.11A	0.6W
	48V 0.35A	8.5W		24V 0.15A	1.8W
530	12V 0.44A	2.6W	580	12V 0.03A	0.1W
	24V 0.48A	5.8W		24V 0.04A	0.5W
510	12V 0.30A	1.8W		36V 0.04A	0.7W
520	12V 0.30A	1.8W		42V 0.04A	0.8W
	24V 0.36A	4.3W		48V 0.04A	0.8W
				80V 0.04A	1.7W

CONNECTION: 8-32 Uni Stud Connection

RECOMMENDED MOUNTING BOLT: 1/4" GRADE 5 OR BETTER

RECOMMENDED WASHER: 1/4" TYPE A, SERIES N OR W

WEIGHT: 12 oz

Features and Benefits

- Compact size and universal mounting bracket maximizes location options
- Self grounding
- Sealed in epoxy for protection against dust, moisture, and vibration
- Temperature Range: -40°F to +185°F (-40°C to +85°C)
- 2 Year Warranty

ECCO®

833 West Diamond Street
Boise, Idaho 83705

T: 800-635-5900 or 208-395-8000
F: 800-688-3226 or 208-395-8190
www.eccolink.com

A DIVISION OF



SCHOOL AND SHUTTLE BUS ROOF HATCHES

TRANSPEC[®]
A Safe Fleet Brand

SAFE EGRESS. PROVEN PERFORMANCE.



ADAPTABLE
Low profile design
adapts to wide range of
roof surfaces



MADE IN THE USA
Proudly manufactured
in North Carolina
with 35 years proven
product performance



MAINTENANCE
No external fasteners
required for installation



WARRANTY
5 year



STRENGTH
Constructed of high
strength UV stable
materials



Serves as a vent on hot summer days

SPECIFICATIONS

SCHOOL AND SHUTTLE ROOF HATCHES

■ = Standard ○ = Optional

MODEL	STANDARD FEATURES & OPTIONS	APPLICATIONS	SIZES
T1170 Series Triple Value Safety Vent II	White Light Gray Dark Gray	■ ■ ■ ■ ○ ○ ○ ○	■ ■ ■ ■
T1670 Series Power Safety Vent II	White Light Gray Dark Gray Beige	■ ■ ■ ■ ○ ○ ○ ○	■ ■ ■ ■
T1970 Series Standard Safety Vent II	White Light Gray Dark Gray Beige	■ ■ ■ ○ ○ ○ ○	■ ■ ■ ■
9245 Series Pro Lo Roof Hatch	White Light Gray Dark Gray	■ ■ ■ ○ ○ ○ ○	■ ■ ■ ■

T1170 Series / Triple Value Safety Vent II

The Triple Value Safety Vent II is a combination roof ventilator/emergency exit that provides 5-position fresh air ventilation as well as incorporating a built in non-closeable static exhaust vent. The product also includes a simple release handle that allows the hatch to hinge open for emergency exit.



Additional Features

- Static Vent provided with one piece outer cover designed to minimize leaks
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Available with vandal lock feature
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1670 Series / Power Safety Vent II

The Power Safety Vent II provides all the features of the Triple Value Safety Vent II with the addition of an electric fan for extracting condensation, stale or hot air from inside the vehicle to improve passenger comfort.



Additional Features

- Interchangeable with earlier Transpec models
- Available in 12 and 24 volt
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1970 Series / Standard Safety Vent II

The Standard Safety Vent II is a combination roof ventilator/emergency exit that provides 5-position fresh air ventilation and a simple release handle that allows the hatch to hinge open for emergency exit.



Additional Features

- Retrofits to all hatch openings
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape

9245 Series / Pro Lo Roof Hatch

The Pro Lo is a combination roof ventilator/emergency exit that mounts nearly flush with the roof (0.75" above the roof). Designed to fit the roof curvature, it creates a tight seal virtually eliminating water intrusion. The hatch also incorporates a release handle allowing it to be opened as an emergency exit.



Additional Features

- Available in various radiuses to fit different roof curvatures
- Nearly flush at 0.75" above the bus
- Constructed of high strength UV stable materials
- No exterior screws for installation
- Available with vandal lock feature
- Meets D250 Standard for Canadian school bus

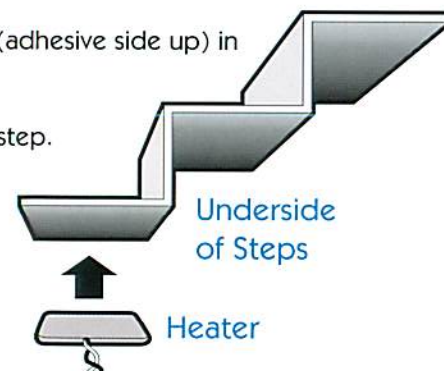
ULTRAHEAT, INC

Your First Step in Safety

Step Heater Models
SH267, SH267a
SH267b, SH 267c

INSTALLATION INSTRUCTIONS

- The SH-267 Step Heater is installed on the bottom side of the entrance step.
- The surface must be clean and dry prior to installation of the heater. Clean the surface where the heater is to be placed with Isopropyl Alcohol just before application of the heater. (Do not use Solvent based cleaners!) Make sure to allow the alcohol to dry completely before placing the heater on the step.
- Peel the release paper from the back of the heater and place it (adhesive side up) in the center of the bottom side of the bottom entrance step.
- Make sure that all parts of the heater contact the surface of the step.
- Wire leads should be connected to a 12 Volt power source with crimp type connectors.
- The heater's power circuit must have an in-line fuse or circuit breaker. Ultra Heat recommends the use of an on/off switch with the use of the SH-267 Step Heater.
- Automotive undercoating can be put on the SH-267 after installation without any adverse effects.

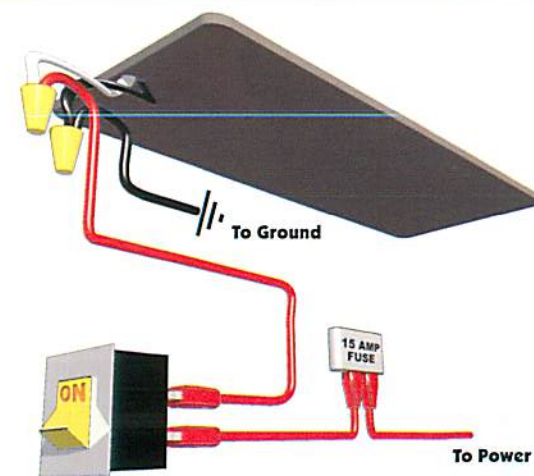


HEATER SPECIFICATIONS

Part #	Voltage	Current Draw	Power Generated	Heat Generated in BTU/HR	Lead	Thermostat
SH-267	13.5 Volts	8.39 Amps	113.27 Watts	386.61	Long	No
SH-267a	13.5 Volts	8.39 Amps	113.27 Watts	386.61	Standard	Yes
SH-267b	13.5 Volts	8.39 Amps	113.27 Watts	386.61	Standard	No
SH-267c	13.5 Volts	8.39 Amps	113.27 Watts	386.61	Long	Yes

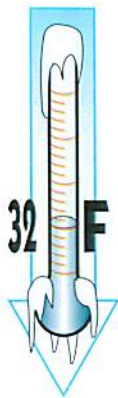
Typical Electrical Hook Up

If needed, the solid state heater may be controlled with a thermostat. The Heater is easily installed on the underside of the step, keeping it hidden from sight, and saving it from the wear and tear of years of foot traffic. It is the safest and easiest to use heater on the market.



Talk to an UltraHeat Sales Representative today! Call (574) 522-6594, or Fax us at : (574) 522-1967 or email via: info@ultraheat.com

How the UHI Step Heater Works...



Before the Temperature drops to 32F, activate the heater by simply flipping the switch to "ON". The heater goes to work immediately, warming the step so that even when the temperature falls below freezing, moisture that gathers on the step will be prevented from turning to ice!

With an optional thermostat, the heater automatically turns on at 44F, and turns off at 64F.

UltraHeat's Step Heater is a full contact Heater: that means it's designed to spread it's heat over the largest possible area. The Step Heater is placed on the under side of the step so it is not subject to the wear and tear of passenger traffic.



UltraHeat Heaters are Easy to Install & Use

About Ultra Heat Inc.

ULTRAHEAT, INC



Step Heater User Manual

UltraHeat Inc. has been in business since 1991. From the beginning, we saw the importance of year 'round Bus & Van safety. To help manufacturers, we build reliable heaters for the Bus Industry.

Using an UltraHeat Step Heater can greatly reduce the likelihood of winter-time injuries to your passengers or employees, helping avoid employee time-off or possible legal actions due to injury.

Here are some of the Bus Manufacturers using the Ultra-Heat Step Heater:

O.E.M. Bus Companies which rely on UHI Heaters.

- El Dorado National • Supreme Corporation
- Glaval Bus • Starcraft Automobile
- Coach & Equipment Manufacturing Corp.
- Minnesota Body & Equipment Co.
- Champion Coach • Goshen Coach

1314 Perkins St., Elkhart, IN 46516

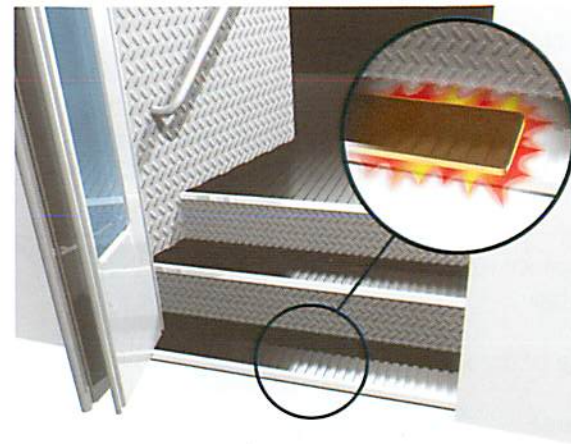
Contact us at (574) 522-6594

Fax: (574) 522-1967

email: info@ultraheat.com

www.ultraheat.com

Protect Passengers and Employees with a UHI Step Heater...



...Keeps Steps in Buses and
Cargo Vans from Icing Up in Winter...

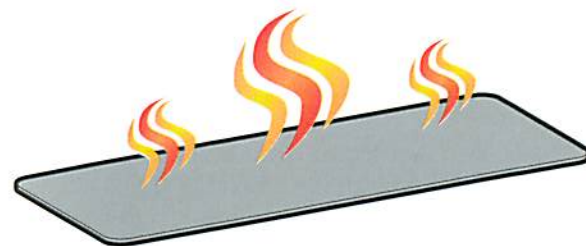
ULTRAHEAT, INC

www.ultraheat.com

Why Protect your Steps from Freezing?

It's almost a silly question isn't it? When snow and water are carried onto steps in cold temperatures, they freeze to ice! This is a potential hazard that may cause serious injury, especially to children of all ages and older adults.

The UltraHeat Step Heater will protect your passengers (and employees!) from slippery ice build-ups. The Step Heater safely heats the steps so that when they are wet with slush and water, they WILL NOT FREEZE.



UltraHeat is your First Step to Safety!



S2C Cutaway Commercial Bus Chassis



Features & Benefits

- 1** Chassis is equipped with ADA (Americans with Disabilities Act) wiring which offers body builder interface connections, eliminating the need for OEMs to splice into chassis wiring.
- 2** Between-the-rails fuel tank offers superior protection from impact and clean frame rail sides for bus body needs.
- 3** Tuned suspensions and match-marked tires offer a superior ride compared to a traditional truck suspension.
- 4** S2C offers a 20% larger windshield for better visibility compared to the competition.
- 5** Offers 30% to 50% better driver's line of sight compared to the competition, reducing blind spots and potential hazards.
- 6** Low-effort, easy-tilt hood minimizes stress on the driver during inspections. Hood also offers a dampening device that minimizes rapid closure, reducing hood damage or potential injury to maintenance personnel.
- 7** 55-degree wheel cut offers improved maneuverability compared to the traditional truck cab configuration.
- 8** Cab offers floor- and firewall-mounted noise and heat abatement package for improved driver and passenger comfort.
- 9** S2C exceeds the "Buy America" requirements, giving you the confidence that your vehicle was made in America.
- 10** Standard frame-mounted, rollout battery tray with cover. Easier accessibility than a traditional under-step configuration.
- 11** Available dual TM-21 A/C compressors and large single alternator to handle bus needs.

STANDARD FEATURES AND OPTIONS: S2C

When it comes to making the most out of its time on the road, nothing compares to our all-new S2C.

S2C CUTAWAY CHASSIS

Engine	Cummins® ISB 6.7-200 200 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm
Optional engines	Cummins ISB 6.7-220 220 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm Cummins ISB 6.7-240 240 hp @ 2,300 rpm, 2,600 GOV, 560 lb./ft. @ 1,600 rpm Cummins ISB 6.7-250 250 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm Cummins ISB 6.7-260 260 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm Cummins ISB 6.7-300 300 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm
Transmission	Allison® 1000 PTS with park pawl
Optional transmission	Allison 2100 PTS, 2200 PTS, 2500 PTS, 3000 PTS, B210, B220, B300
GVWR	19,500 lbs. to 33,000 lbs.
Alternator	Delco Remy® 160 amp, 28-SI
Optional alternator	Leece-Neville® 170 amp, 185 amp, 200 amp, 270 amp and 320 amp
Air conditioning	OEM dash A/C with Sanden SD-7 compact A/C compressor std; Dual Seltec TM-21 A/C compressors optional
Axles	
Front	Detroit DA-F-08.0-2, 8,000 lbs. FCI
Optional front axle	Detroit DA-F-10.0-3, 10,000 lbs.; DA-F-12.0-3, 12,000 lbs.
Rear	Detroit DA-RS 15-2, 15,000 lbs.
Optional rear axle	DA-RS-17.5, 17,500 lbs.; DA-RS-19.0-2, 19,000 lbs.; DA-RS-21, 21,000 lbs.
Suspension	
Front	Taper-leaf spring, 7,000 lbs.
Optional front suspension	Taper-leaf spring, 9,000 lbs., 10,000 lbs. and 12,000 lbs. ratings
Rear	52" Variable-rate multi-leaf spring, 12,500 lbs.
Optional rear suspension	52" variable-rate multi-leaf spring rear suspension with helper; 16,000 lbs., 19,000 lbs., 21,000 lbs. and 23,000 lbs. ratings; 23,000 lbs. AirLiner® air suspension with tuned Sachs® shocks with rear sway bar
Steering	TRW® tilt/telescoping steering column; TRW THP-45 or THP-60 steering gear; 55-degree wheel cut
Brakes	Bosch® hydraulic pin-slide disc brakes, front and rear WABCO® hydraulic ABS (4) channel
Optional air brakes	Bendix® air disc (front 22.5" wheel only); Meritor™ drum (front and rear)
Frame	5/16" x 3" x 10 1/8" 50 kpsi; 80 kpsi with rear air suspension
Wheelbase	179", 199", 219", 238", 259", 279", 300"
Fuel tank	60-gal. between the rails
Optional fuel tanks	100-gal. mounted between the rails; 65-gal. mounted right-hand side available
Tires	Goodyear® G647 RSS 245/70R 19.5" 14-ply
Optional tires	Goodyear or Michelin® 19.5" OR 22.5"
Dash	New automotive-styled, ergonomically designed dash; odometer/trip, hour/diagnostic/voltage display; LED backlights on switches and gauges offer solid-state design and longer life; integral driver cup holders
Wiring	Fully multiplexed electrical system with body-builder-ready electrical drop for ADA wiring
Hood	Torsion-bar-assisted for easy opening with minimal effort; composite headlamps with brighter beam pattern and integral turn signals
Bumper	Three-piece steel bumper; chrome option available
Battery box	Frame-mounted battery box with sliding tray; capable of holding dual 8 D batteries; optional available temporarily mounted
Select standards	- Daylight running lights - Standard cruise control and programmable high idle
Select options	- Center switch panel with cutouts for body-builder switches - Chrome grille and headlight bezels - T-handle shift lever with interlock

Call Freightliner Custom Chassis Corporation at (800) 545-8831, or visit us on the Web at freightlinerchassis.com.

9/14, FCC/MC-S-371. Specifications are subject to change without notice. Freightliner Custom Chassis Corporation is registered to ISO 9001:2008 and ISO 14001:2004.
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Transmission

342-1MH	ALLISON 2200 PTS AUTOMATIC TRANSMISSION WITH PARK PAWL WITHOUT PTO PROVISION
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Transmission Controls & Parameters

345-093	T-HANDLE CABLE SHIFT CONTROL WITH PARK POSITION AND PARK INTERLOCK SOLENOID
353-032	VEHICLE INTERFACE WIRING WITH ADA INTERLOCKS
343-301	PKG 354 - 1K/2K RDS/EVS/HS/MH/PTS/SPS - 5TH GEN
97F-002	ALLISON TRANS - SEM/LRTP REQ
97G-001	TRANS PROG-ENABLED
84C-003	5, 3, 2, 1 - D, 3, 2, L -1K/2K PRIMARY GEARS
85B-011	RANGE INDICATION,PARK,NEUT
84U-001	SECONDARY MODE INPUT - MODE SWITCH,FOR 1000/2000 PRODUCT FAMILIES ONLY
84W-004	AUX RNG INHIBIT,DUAL

Transmission Equipment

370-015	WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK
346-001	TRANSMISSION OIL CHECK AND FILL
35T-001	SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)



G670 RV® MRT

Goodyear's Best All-Position RV Tire for Long Service Life

Features and Benefits/Tire Specs

Features

Dependable tread compounds

5-Rib Tread pattern

Anti-oxidants and anti-oxidant compounds

High-technology belt system

Notched and siped ribs with open circumferential grooves

Benefits

Balance fuel economy and mileage

Helps produce low heat and toughness, and reduces squirm for superb handling.

Help guard against weather cracking.

Helps Offer ride comfort and long miles to removal

Help deliver traction in all season conditions.

SIZE	TREAD DEPTH	RIM WIDTH		TIRE WEIGHT		OVERALL WIDTH		OVERALL DIAMETER		STATIC LOADED RADIUS	
		(IN)	(MM)	(LBS)	(KG)	(IN)	(MM)	(IN)	(MM)	(IN)	(MM)
TUBELESS TIRES ON 15° DROP CENTER RIMS											
245/75R22.5 G	14	7.50	191	83	38	9.5	241	37.0	940	17.3	439
255/70R22.5 H	14	7.50	191	87	40	10.0	253	36.4	925	17.0	432
265/75R22.5 G	14	7.50	191	93	42	10.0	254	38.4	975	17.9	455
275/70R22.5 H	14	7.50	191	93	42	10.4	264	37.6	955	17.4	442
275/80R22.5 H	18	8.25	210	116	53	11.1	282	40.2	1,021	18.8	478
295/80R22.5 H	16	9.00	229	131	60	12.1	307	41.3	1,049	19.2	488
315/80R22.5 L	16	9.00	229	132	60	12.5	318	42.5	1,080	19.8	503

SIZE	SPEED RATING	SINGLE MAX		SINGLE		DUAL MAX		DUAL		REVS		MINIMUM		PRODUCT CODE
	(MPH/KPH)	LOAD	(KG)	INFLATION	(KPa)	LOAD	(KG)	INFLATION	(KPa)	PER	(KM)	DUAL SPACING	(MM)	
TUBELESS TIRES ON 15° DROP CENTER RIMS														
245/75R22.5 G	75/120	4,675	2,120	110	760	4,410	2,000	110	760	560	348	11.0	279	756306050
255/70R22.5 H	75/120	5,510	2,500	120	830	5,070	2,300	120	830	566	352	11.3	287	756780050
265/75R22.5 G	75/120	5,205	2,360	110	760	4,805	2,180	100	690	537	334	11.6	295	756305050
275/70R22.5 H	75/120	6,940	3,150	125	860	6,395	2,900	125	860	548	341	11.9	302	756919050
275/80R22.5 H	75/120	7,160	3,250	125	860	6,610	3,000	125	860	517	321	12.3	312	756967050
295/80R22.5 H	75/120	7,830	3,550	125	860	6,940	3,150	125	860	499	310	13.2	335	756060050
315/80R22.5 L	75/120	9,090	4,125	130	900	8,270	3,750	130	900	489	304	13.8	351	756141050



REGIONAL & URBAN APPLICATIONS

THE MICHELIN® XZE® 19.5 TIRE

Exceptional all-position radial with extra-wide, extra-deep tread designed to help deliver our best wear in high scrub regional and urban applications.

Line Haul	Regional	Urban	On/Off Road
Recommended	Recommended	Recommended	Acceptable

Provides up to **34% more miles** than leading competitors.⁽¹⁾



**MAXIMIZED
TREAD LIFE**

**SUPERIOR
TRACTION**

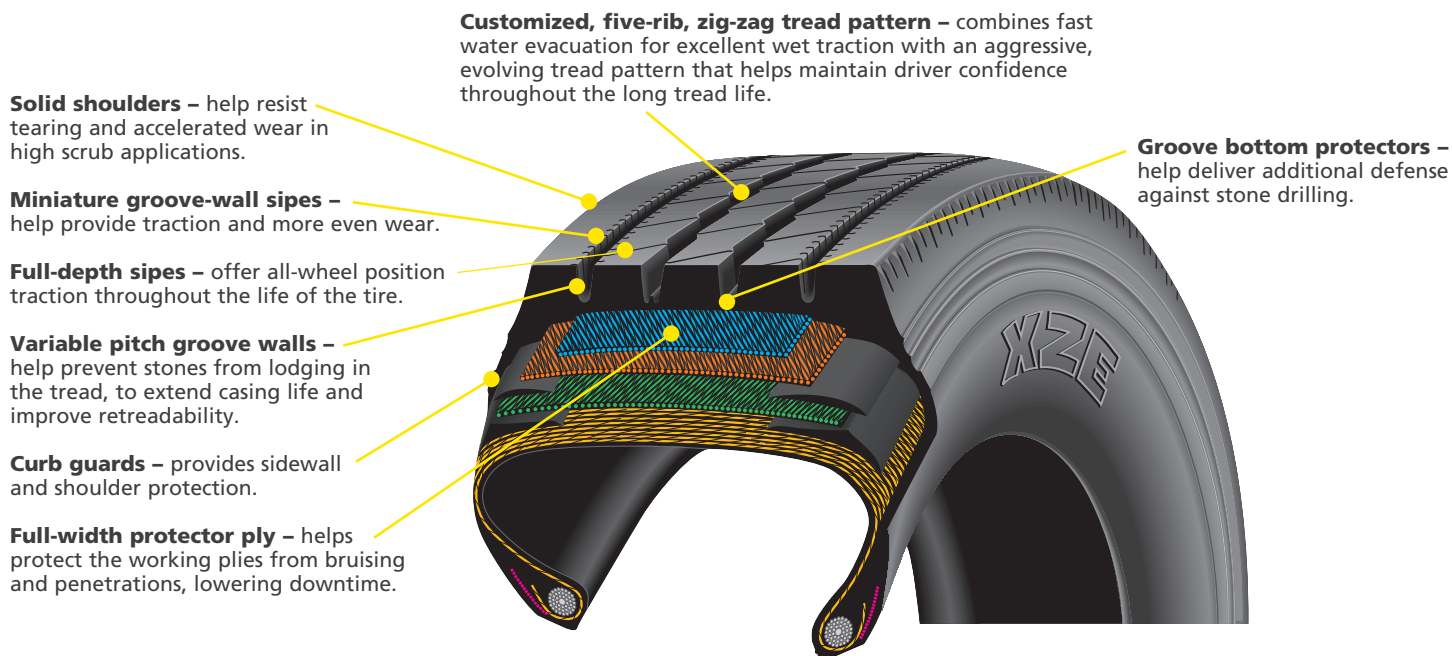
(1) Based on a treadwear test using tires in size 225/70 R19.5 LRG on a RAM 4500 versus the CONTINENTAL® HSR+™, BRIDGESTONE® R238™, and GOODYEAR® G647 RSS®. Actual on-road results may vary.

business.michelinman.com



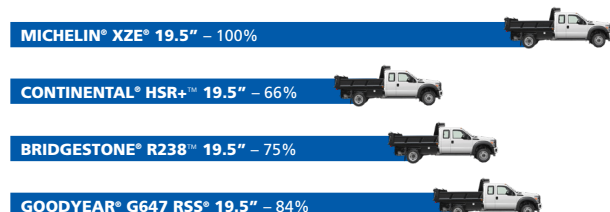
THE MICHELIN® XZE® 19.5 TIRE

Exceptional all-position radial with extra-wide, extra-deep tread designed to help deliver our best wear in high scrub regional and urban applications.



MAXIMIZED TREAD LIFE

Provides **up to 34% more miles** than leading competitors. ⁽¹⁾



SUPERIOR TRACTION

Better wet grip than leading competitors. ⁽²⁾

- Better maneuverability to help safely navigate urban and regional roads.
- Better wet braking to help stop safely.

Size	Load Range	Catalog Number	Tread Depth 32nds	Max. Speed (*)		Loaded Radius		Overall Diameter		Overall Width (‡)		Approved Wheels (Measuring wheel listed first.)	Min. Dual Spacing (‡)		Revs Per Mile	Max. Load and Pressure Single				Max. Load and Pressure Dual			
				mph	kph	in.	mm	in.	mm	in.	mm		in	mm		lbs.	psi	kg.	kPa	lbs.	psi	kg.	kPa
225/70R19.5	G	91043	17	87	140	15.2	385	32.2	819	9.3	237	6.75, 6.00	10.0	254	640	3970	110	1800	760	3750	110	1700	760
245/70R19.5	H	75997	18	75	120	15.6	396	33.6	853	9.7	247	6.75, 7.50	10.7	272	619	4940	120	2240	830	4675	120	2120	830

Note: Wheel listed first is the measuring wheel.

(*) Exceeding the lawful speed limit is neither recommended nor endorsed.

(‡) Overall widths will change 0.1 inch (2.5 mm) for each 1/4 inch change in wheel width. Minimum dual spacing should be adjusted accordingly.

(1) Based on a treadwear test using tires in size 225/70 R19.5 LRG on a RAM 4500 versus the CONTINENTAL® HSR+™, BRIDGESTONE® R238™, and GOODYEAR® G647 RSS®. Actual on-road results may vary.

(2) Based on internal wet braking test at 60 mph (97 kph) using size 225/70R19.5 on asphalt measuring peak Mu, using the MICHELIN® XZE® vs. CONTINENTAL® HSR+™, BRIDGESTONE® R238™, and GOODYEAR® G647 RSS®. Actual on-road results may vary.

MICHELIN® tires and tubes are subject to a continuous development program. Michelin North America, Inc. reserves the right to change product specifications at any time without notice or obligations.

MNA, Inc. continually updates its product information to reflect any changes in Industry Standards. Printed material may not reflect the current Load and Inflation information.

Please visit business.michelinman.com for the latest product information. The actual load and inflation pressure used must not exceed the wheel manufacturer's maximum conditions. Never exceed a wheel manufacturer's limits without permission from the component manufacturer.

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US: business.michelinman.com
CA: business.michelin.ca

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Heavy Duty AM/FM/CD/DVD Weather Band Receiver, Rear USB w/ 1.5A Charging, Bluetooth® Hands Free Calling and Wireless Audio Streaming, Front/Rear Auxiliary Inputs and built in PA.

Radio Engineering Industries, Inc.

www.radioeng.com

Rev A.0 Date: 9-02-19



Installation/ Operation Manual

50W x 4

VR-5650

Thank you for purchasing VR-5650 AM/FM/CD/DVD Receiver from REI. This product is designed and tested to with stand temperature and vibration extremes. Please read the owner's manual carefully before attempting to install this unit.

If you have an installation question or need installation assistance, please call the:

SERVICE HOT LINE
1-877-726-4617 Toll Free USA & CANADA

IF ADDITIONAL INSTALLATION COMPONENTS ARE NECESSARY, CONTACT YOUR

REI SALES REP FOR:

**** OEM /FACTORY WIRING HARNESS ADAPTERS**

**** ANTENNAS & ANTENNA ADAPTERS**

**** SPEAKERS & GRILLS**

Radio Engineering Industries, Inc.

6534 "L" Street

Omaha, Nebraska 68117

(800)228-9275

www.radioeng.com

Your player will play DVDs with region code **1** labels on them.

FEATURES:

Heavy Duty construction for Tough Environments

Non-volatile memory back-up stores user settings when battery is disconnected

Clock Battery back-up

Output Power 50W x 4

Full Dot Matrix LCD display

Anti-skip Gear driven CD/DVD Mechanism

7 channel NOAA® Weather Band Tuner

AM/FM Stereo Tuner w/RBDS

Presets for up to 30 Radio Stations (18 FM, 12 AM)

EURO and USA frequency bands

USB MP3/WMA file playback w/ ID3 Tag Support

2 Aux Inputs (Front 3.5mm/Rear RCA A/V)

iPod® /iPhone® Smartphone Charging and Playback Control

Bluetooth® audio Streaming w/ support for Hands Free calling

Integrated Bluetooth® Microphone input

Rear Channel RCA Line outputs

Composite Video Output via locking BNC connection

Built in PA input (Microphones & Adapter Sold Separately)

ISO Connector for vehicles manufactured with the ISO connect harness

Wireless Remote Control

REI LIMITED WARRANTY

What Does This Warranty Cover?

This warranty only covers failures due to defects in materials or workmanship which occur during normal use.

What Does This Warranty Not Cover?

This warranty does not cover damage which occurs in shipment or failures which are caused by products not supplied by REI or failures which result from accident, misuse, abuse, neglect, mishandling, misapplication, faulty installation, set-up adjustment, improper maintenance, alteration, improper antenna, inadequate signal pick-up, maladjustment of consumer controls, modification, line power surge, or damage that is attributable to acts of God, or service by anyone other than a REI Factory Service Center. This warranty does not include service or labor charges connected with the determination or replacement of defective parts or the operation of this equipment. REI is not responsible for any labor charges incurred by any person or company other than REI authorized repair centers.

LIMITS AND EXCLUSIONS

There are no express warranties except as listed above.

REI SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY, INCLUDING WITHOUT LIMITATION, DAMAGES TO TAPES OR DISCS. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY, ARE LIMITED TO THE APPLICABLE WARRANTY PERIOD SET FORTH BELOW. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

What is the Period of Coverage?

REI will repair this product, free of charge, from the date of original purchase in the event of a defect in materials or workmanship as follows:

For ninety (90) days - microphones, speakers, antennas, housings, rechargeable batteries, remanufactured product and all non-warranty repairs (replaced parts and labor only).

For one (1) year - all other manufactured products.

For three (3) years - select manufactured motorcoach products.

For three (3) years - select surveillance equipment.

REI may have contractual agreements which provide REI motorcoach and surveillance products with additional coverage.

Call 877-726-4617 for details.

Any product supplied by REI, but not manufactured by REI, will include the original manufacturers warranty only.

What Will REI Do to Correct Problems?

Once the product is deemed by REI to be a warrantable defect, REI will, at its own discretion, repair or replace the product with new or reconditioned product. All warranty repairs and/or product replacements will include the remaining warranty from the original purchase date.

How Do You Get Service?

For assistance in obtaining service for REI products call toll free 877-726-4617 (Continental United States and Canada only) or 402-339-2200 (outside Continental United States and Canada) between the hours of 7:00A.M. - 5:00P.M. CST Monday thru Friday (excluding Holidays).

Prior to calling REI, customers must have the part number, serial number, VIN number (if it's a motorcoach product) and detailed description of the problem ready to provide to the REI service representative. After providing the proper information to REI, customers will be issued a return authorization number. When the REI service representative provides the return authorization number, they will also give instructions for returning the item. Any discrepancies in following this procedure may cause shipments to be refused or warranty claims to be rejected.

IMPORTANT! REI does not accept product returns for repair or replacement without first issuing a return authorization number. All returns must be sent freight prepaid and insured by the customer. REI will not accept COD shipments.

IMPORTANT! REI does not accept responsibility for lost shipments. It is the customer's responsibility to provide REI with the part number, serial number, return authorization number and shipper tracking number in the event REI does not have record of receiving product for repair or replacement.

Once warranty service has been performed on your product, REI will ship the item freight prepaid to any business address in the Continental United States or Canada. Customers located outside the Continental United States and Canada are responsible for all freight charges. Any duties or fees, if any, are the customer's responsibility.

Any repair deemed non-warranty by REI will be subject to all freight charges, and in some cases inspection fees, to be paid by the customer. These fees may exist regardless of whether the product is repaired. If a customer requires help in trouble shooting a problem, contact REI and request technical assistance before requesting a return authorization number.

What Must You Do To Keep This Warranty in Effect?

KEEP YOUR ORIGINAL PROOF OF PURCHASE AS IT MAY BE REQUIRED IN ORDER TO RECEIVE WARRANTY SERVICE.

Make sure the serial number is not removed, altered or defaced.

Do not attempt to have your product repaired by anyone other than a REI Factory Service Center.

Also, see "What Does This Warranty Not Cover".

REI AUTHORIZED REPAIR FACILITIES:

REI
6534 L Street
Omaha, Nebraska 68117
Phone: 877-726-4617

REI
1376 Bennett Drive, Unit 126
Longwood, Florida 32750

What if your Product is a Non-Warranty Repair?

All Products sent to REI for repair which are determined, at REI's discretion, to be non-warrantable repair may incur inspection fees regardless of actual repair being performed or will incur repair fees if the product is repaired. All non-warranty repairs include a 90 day warranty for any components that are replaced, if any, and labor performed. Inspection fees apply regardless of whether a product is determined to be non-warrantable prior to shipping to REI. All freight charges, duties or fees associated with non-warranty repair are the customer's responsibility.

FORM 640020 REV 0 1

USB INTERFACE

USB Standard.....	USB1.1/2.0 (Full Speed)
Maximum Supply	5V/1.5A
File System.....	Fat16/32

AUXILIARY INPUT SPECIFICATIONS

Input Voltage Maximum Voltage.....	1.2V
Frequency Response (+/- 1dB).....	20 – 20,000Hz
Input impedance.....	10KΩ

VIDEO

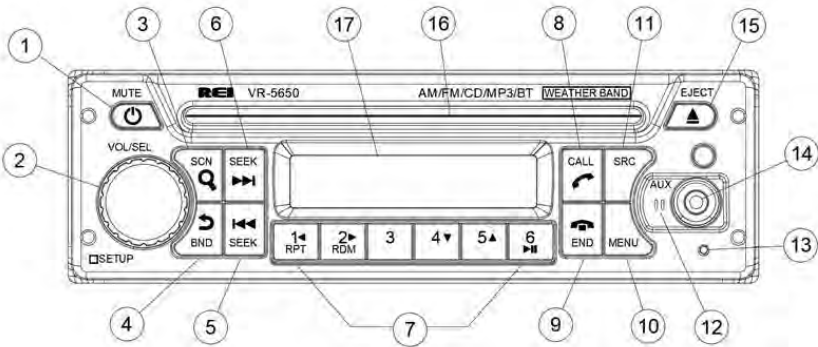
Color System	NTSC / PAL
Video Output	Composite 1.0 Vp-p (+/- 0.2) 75ohm
Video Input.....	Composite 1.0 Vp-p (+/- 0.2) 75ohm

DIMENSIONS

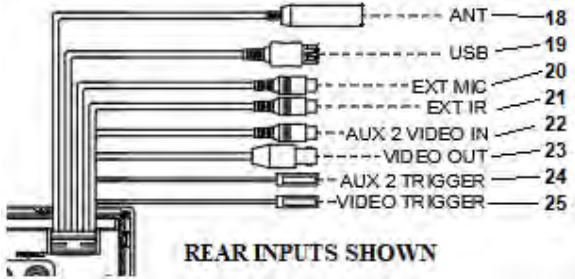
Chassis (W x H x D)	178mm (7”) x 50mm (2”) x 154mm (6”)
Nosepiece (W x H x D)	188mm (7-3/8”) x 58mm (2-1/4”) x 17mm (5/8”)
Weight	3.5lbs

**Due to continuous product improvement, specifications and design are subject to change without notice.*

CONTROLS AND INDICATORS



- 1. Power/Mute Button
 - 2. Volume/Select Knob
 - 3. Scan/Search Button
 - 4. Band /Back Button
 - 5. Tune /Seek/Track Back Button
 - 6. Tune /Seek/Track Up Button
 - 7. Preset Memory/Recall, Media Control Buttons
 - 8. Call Connect/Transfer Button
 - 9. Call End Button
 - 10. MENU/Display Button
 - 11. Source Select Button
 - 12. Internal Bluetooth Microphone
 - 13. Reset switch
 - 14. Front AUX1 Input Jack
 - 15. Disc EJECT Button
 - 16. Disc Slot
 - 17. Dot Matrix Display
- 18. Antenna input
 - 19. USB input
 - 20. EXTERNAL Bluetooth Microphone input
 - 21. IR Remote extension input
 - 22. Aux 2 RCA Composite Video Input
 - 23. BNC Composite Video Output
 - 24. Aux 2 Trigger Input
 - 25. Video Trigger Output (Power Relay Control)



OPERATION

1) Power/Mute Button

Press the Power Button to turn the unit ON or hold to turn the unit OFF. The button will illuminate RED when OFF and BLUE when ON. When ON, press to MUTE the audio on/off. **Note: Radio can also be powered on by pressing any front button.**

2) Volume/Select Knob

Rotate the knob left or right to change the volume level.

Press the knob to select one of the following functions:

VOL---BASS---TREB---BAL---FAD

Upon choosing the function, rotate the knob to adjust the desired setting.

PLEASE NOTE: If the Volume/Select Knob has not been adjusted for 3 seconds it will automatically revert to the previous informational display.

Press and hold this button to access the radio SETUP MENU.

3) Scan/Search Button

Press and hold this button for 2 seconds to auto program available stations into the preset memory buttons. This function will erase previous memorized stations and store the newly searched stations. Once completed, the radio will scan for 5 seconds through each of the preset stations of either the AM or FM band and stop.

4) BAND/Back Button

Press this button to change radio bands as follows:

FM1—FM2—FM3—AM1—AM2

5) TUNE/SEEK DOWN Button

Under Radio mode, press this button momentarily to manually tune downward. Press and hold a button and the radio will automatically seek to the previous radio station. When playing digital media, use this button to track backwards to the previous track. This button also functions as Weather Band Channel access. Under Weather Band mode, press this button to select Weather Band channels 1-7.

6) TUNE/SEEK UP Button

Under Radio mode, press this button momentarily to manually tune upward. Press and hold a button and the radio will automatically seek to the next radio station. When playing digital media, use this button to track forwards to the next track. This button also functions as Weather Band Channel access. Under Weather Band mode, press this button to select Weather Band channels 1-7.

7) Preset Memory/Recall Buttons 1-6

Press these buttons momentarily to select the preset stations.

Press and holding a button will set the current station to the button being pressed.

****Preset buttons are pre-assigned frequencies in Weather Band Mode.**

SPECIFICATIONS

AUDIO SECTION

Power supply voltage (negative ground)12V DC (10V-18V)

Standby Current.....<5mA

Max Current Consumption.....10A

Speaker impedance4-8 Ohms per channel

Maximum Pre-output Voltage.....2.0Vrms/10k ohms

POWER OUTPUT

Continuous Output into 4Ω, @1KHz at 10 % THD4 x 25Watts

Maximum Power Output (Volume control Maximum).....50W×4 (at 1kHz)

FM TUNER

Range(USA) 87.5 – 107.9 MHz

(EUR) 87.50 – 108.00 MHz

Usable Sensitivity (S/N = 30dB).....7.34dBf.(0.6uV/75ohms)

Signal to noise ratio58dB (Mono)

Stereo separation (@ 1K Hz)42 dB

AM TUNER

Range(USA)530 – 1,710 kHz

(EUR) 522 – 1,620 kHz

Usable Sensitivity (S/N = 20dB).....23dBuV (14.4uV)

Signal to noise ratio (LEVEL60dbuV)..... 60 dB

WEATHER BAND TUNER

Range162.400 –162.550MHz

Usable Sensitivity (S/N = 20dB).....0.7uV(-9dBuV)

Signal to noise ratio (LEVEL40dbuV).....42dB

CD/DVD PLAYER

Signal/Noise Ratio (1kHz).....85dB

Frequency Response (+/- 1dB).....10 – 20,000Hz (+/-1dB)

Channel Separation 2 Channel (Stereo) > 60dB @ 1 kHz

Playable disc file format.....ISO 9660 Level 1/2, Romeo, Joliet

Usable Discs.....DVD, DVD-R/RW, DVD+R/RW/DL,
CD-R/RW, CD

BLUETOOTH®

Version.....Bluetooth® v5.0

Frequency Range.....2.402 – 2.480 GHz

Output power.....+4dBm Typ

Profiles supportedHFP, A2DP, AVRCP

PLAYABLE FILE TYPES:

FILE REQUIREMENTS (.MP3/.WMA using ISO 9660 formatting)

- The MP3 files with a sampling frequency of 8-48 kHz. And a bitrates between 8 to 320 kbps. Supports ID3 Tag Versions 1.0/1.1/2.2/2.3/2.4
- The WMA file with a sampling frequency of 32-48 kHz. And a bitrates between 48 to 320 kbps.

MPEG-4 FILE REQUIREMENTS (.MP4)

- Video Codec: MPEG-4 Simple Profile
- Audio Codec: AAC
- Bitrate: Max. 4 Mbps
- Frame rate: Max. 30 fps (30p/60i)
- Image size: Max. 720 *480 pixels
- File extension: .mp4

DivX® FILE REQUIREMENTS (.AVI)

- Files encoded with Xvid or divX Profiles, Max frame rate 30 fps (30p/60i)
- Video Codec: MPEG-4 Advanced Simple Profile
- Audio Codec: MP3/AC3/PCM
- Frame rate: Max. 30 fps
- Image size: Max. 720 *480 pixels

MPEG-1/MPEG-2 (.MPG)

- Video Codec: MPEG1/2 MPG1/2
- Audio Codec: MP1/2/3
- Frame rate: Max. 30 fps
- Image size: Max. 720 *480 pixels

JPEG(.JPG)

- Still image files up to a resolution of 3072 x 2048.
- File format used by digital still cameras.
- Not compatible with progressive JPEG.
- JPEG file name requires .jpg as extension

NOTE:

Individual file size limit is 2G in accordance with Fat16/32 file restrictions.

8) CALL Button

Press this button to Place or Answer an incoming call when successfully paired using the Hands-Free Profile on a Bluetooth® enabled phone. Press this button to transfer the call from the radio to the phone and vise versa.

9) END Button

Press this button to END a call when successfully paired using the Hands-Free Profile on a Bluetooth® enabled phone. Press this button to quickly disconnect a paired device from the radio when in BT PHONE mode.

10) MENU Button

Press this button to access the DVD menu. Press to change between Clock and Mode Information display when available.

11) Source Button

Press this button to navigate between source modes:
TUNER—WB—CD/DVD—USB(when connected)—BT PHONE—BT MUSIC (if paired)—AUX1—AUX2.

12) Internal Bluetooth® Microphone

Internal Microphone for Hands Free Bluetooth calling.

13) Reset Switch

In the unlikely event that the radio is not operating correctly, press the RESET button to restart the operating system of the radio.

14) Front AUX 1 Input Jack

The unit is equipped with a front panel 3.5mm auxiliary input (AUX 1) so you can connect your external portable audio player or portable satellite radio receiver. A second REAR (AUX 2)* RCA A/V jacks are also included on the rear of the radio.

15) Disc EJECT button

With the radio ON, press this button to EJECT the Compact Disc from the radio.

16) Disc Slot

Insert a Compact Disc label side up here. The radio will switch modes and begin playback after the file is loaded.

17) Dot Matrix Display

LED Dot Matrix display shows the radios operational information.

*It may be necessary to adjust the volume level of your devise to achieve an optimal volume level.

SETUP MENU

With the unit ON, press and hold the VOL/SEL button for 2 seconds. The LCD will display MENU. Rotate the VOL/SEL knob to choose the option and press to select.

- SCROLL ON/OFF

Choose how iPod/iPhone®, and ID3 tag information is displayed on the LCD. With the scroll set to ON, information is repeated continuously on the front display. When set to OFF, information is not displayed unless the user presses the MENU/DISPLAY button.

- LOUD ON/OFF

Choose to turn LOUDNESS ON or OFF.

- RDS ON/OFF

Choose to turn the RDS (Radio Broadcast Data System) Scrolling display ON or OFF.

- BT SET

- BLUETOOTH ON/OFF (Must be set to ON to access further)
- SEL DEV
- DISCOVER ON/OFF
- ANSWER AUTO ON/OFF
- DELETE ALL NO/YES (Delete ALL previously paired devices)
- RESET BLUETOOTH NO/YES
- ALL ON/FRONT ON/FRONT LEFT/FRONT RIGHT/REAR ON

Press the BACK button to EXIT the BT SET menu and return to previous

- MIC CARBON/DYNAMIC

The first option is to select a correct PA input based on the microphone type you are using. Rotate VOL/SEL button to choose type:

DYNAMIC

Microphone does NOT have on on-board volume control. PA volume control is built into the radio. Adjustments are made by keying the microphone.

CARBON

Microphone has on on-board volume control. Radio will not control the volume. Press VOL/SEL knob to make the desired selection.

- CONTRAST 0-35

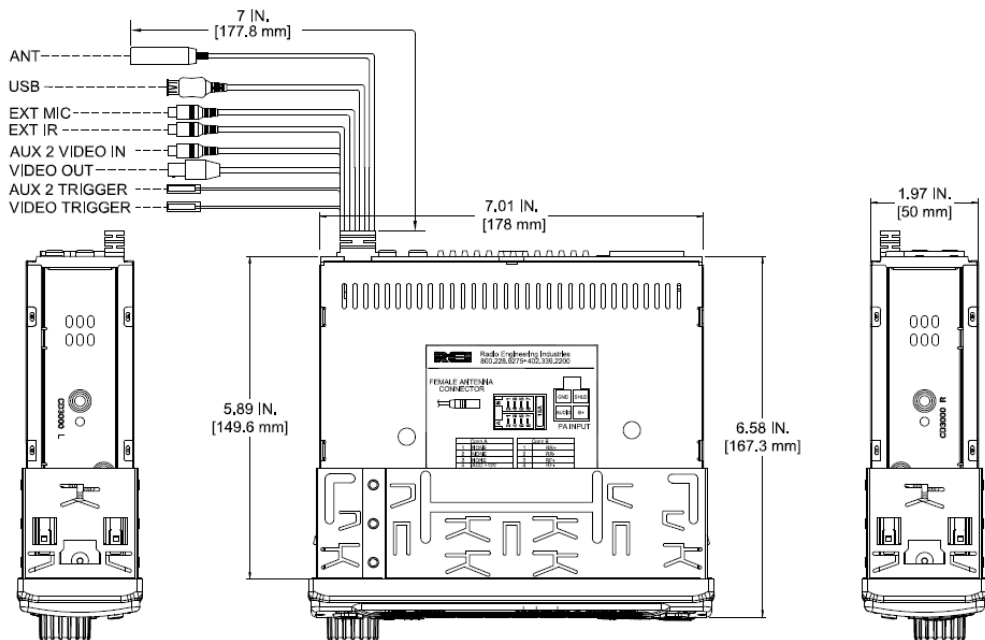
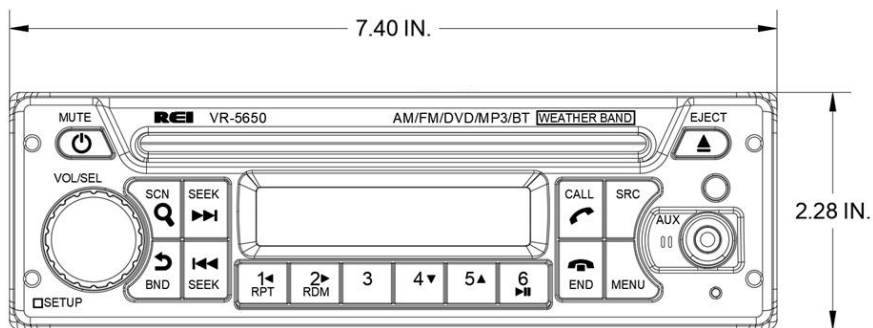
Rotate the VOL/SEL knob to choose the desired CONTRAST level of the display. Press the VOL/SEL knob to select.

- VER VR-5650-XXX

This is the firmware version present on the radio. Not all features described in this manual may be available on the radio at this time.

TROUBLE SHOOTING

Problem	Cause	Solution
Backlighting is on, but no LCD display	No power to BATTERY wire or blown 10A main fuse.	Check for both ACC & BATTERY voltage with Multi-meter, check all fuses.
No sound	Speakers not connected; speakers connected with bad splices; Speakers shorted to ground; speaker load is not within 4-8 Ω.	Connect speakers to harness; check all spliced wires; verify speakers not shorted to chassis; verify total speaker impedance. Check volume level.
Public Address can NOT be audible over speakers	PA setting in MENU is wrong; microphone is pinned wrong; wrong microphone type is used. Microphone is defective.	Turn the volume up on the microphone or radio when the LCD displays MIC; Check that the correct microphone type is connected. Check the PA settings in the radio menu.
LCD Display says MIC and front controls are locked	PA system is triggered	Remove microphone connection and verify correct pinning and or type, replace microphone. Reset the unit.
Cannot tune radio stations	The antenna cable is not connected. The signal is too weak. The radio is in the wrong frequency steps.	Connect the antenna cable. Check the frequency spacing in the SERVICE menu to the radio.
Audio is distorted or low.	Source audio level is too weak or overdriven. Bitrate of audio file is too large.	Adjust the volume level of the auxiliary source. Change the sample frequency or Bitrate of the file.
iPod® screen displays "loading" for a long period of time.	Device is not a supported device. The radio supports a majority of iPod® models, but not all are guaranteed.	Wait for iPod® to load or reconnect 30-pin plug. If still loading, then device is not supported, or has low battery. Use the AUX input or a Bluetooth® connection instead.
The Radio does NOT respond to the front buttons	An error in operation has occurred	Reset the unit from the front panel.
The Radio does not charge my device	The device requires additional current via the USB to charge the device	Unplug and try again. The USB can support 5V/1500mA.
My device will not connect to the radio via Bluetooth® &/or my device can't find the VR-5650 radio	Bluetooth® is set to OFF or the Discover mode is set to OFF on the radio.	Enter SETUP and set Bluetooth® to ON, set Discover mode to ON. Delete previously paired devices or Reset BT.
Digital media won't play, says Unsupported File Type	File Type is incompatible.	Re-encode file to a playable file type, see chart for details.



What's Included:

- 5mm Screws (Qty 4)
- Removal Tools
- Mounting Strap
- Rear Stud Hardware
- Operators Manual
- Remote

• CLOCK PRI ON/OFF

When set to on, the display defaults to LARGE format clock display. When set to off the clock displays in SMALL text format.

• LCD NORMAL/REVERSE/DIMMER

When set to NORMAL, the display defaults to BLACK text. When set to REVERSE, The TEXT is illuminated in Amber. When set to DIMMER, the ILLUMINATION +12V input controls the display.

To save and exit MENU mode, press and hold the VOL/SEL button.

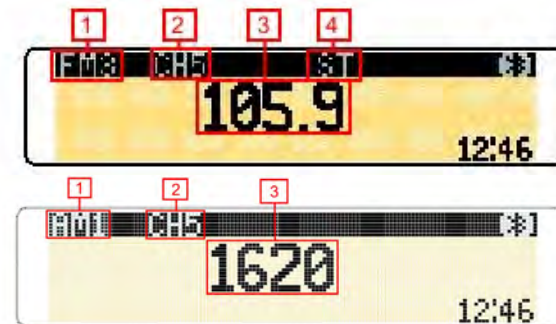
Note: Menu will exit automatically after 5 continuous seconds without saving any selections.

SETTING THE CLOCK

With the BLUE power light ON, press and hold the MENU button until the hour display begins to flash. Rotate Volume/Select Knob to adjust the hour. Press the MENU button again, and the minute display will flash. Rotate VOL/SEL Knob to adjust the minute. Press either the MENU button or let the radio time out for 3seconds on the LCD.

RADIO OPERATION

Use the SEEK/TUNE up/down buttons to tune stations. Press and hold any of the Preset buttons to save a desired station. Use the SCAN/SEARCH button to auto set and Scan channels.



1. AM/FM Band Preset Mode

Press the BAND button to switch from FM1, FM2, FM3, AM1, or AM2.

2. Preset Number

Displays the Preset Channel of the frequency.

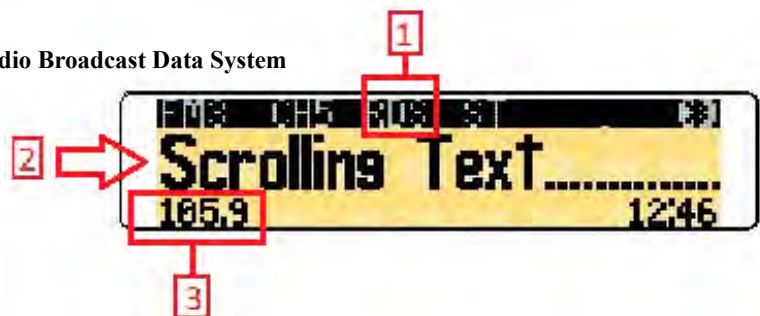
3. Frequency Display

Displays the Frequency of the current tuned station.

4. Stereo Indicator

Displays when the FM frequency is tuned in Stereo.

Radio Broadcast Data System



1. RDS Display Indication

When RDS is set to ON in the MENU, FM station's receiving RDS PS data will display this indicator.

2. RDS Text Information

Information such as the title and artist of the currently playing song.

3. Frequency Display

Displays the alternate location of the frequency when RDS is set to ON and

WEATHER BAND OPERATION

NOAA National Weather Radio Broadcasts from over 380 Locations throughout the U.S. on seven VHF/FM frequencies. Tune to receive continuous weather information 24 hours a day on one of the following frequencies.

For local station listing see: <http://www.nws.noaa.gov/nwr/nwrbr.htm>

Press preset 1 to select weather band channel 1 - 162.400MHZ

Press preset 2 to select weather band channel 2 - 162.425MHZ

Press preset 3 to select weather band channel 3 - 162.450MHZ

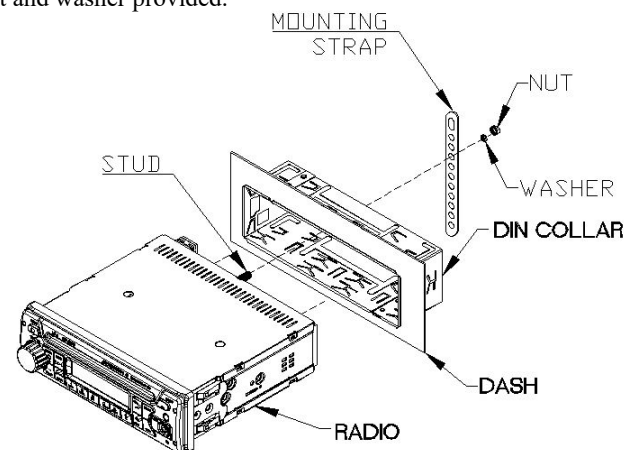
Press preset 4 to select weather band channel 4 - 162.475MHZ

Press preset 5 to select weather band channel 5 - 162.500MHZ

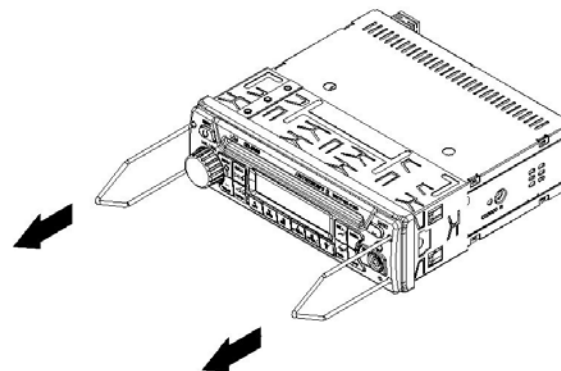
Press preset 6 to select weather band channel 6 - 162.525MHZ

**Press SEEK UP/DOWN to select weather band channel 7 - 162.550 MHz

3. If additional support is needed, bend the included support bracket, and secure it to the vehicle using a screw. Secure the opposite end to the rear stud on the radio using the nut and washer provided.

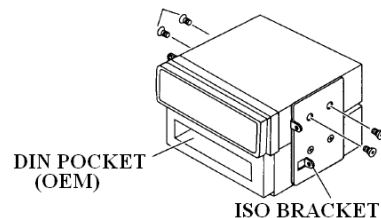


4. To remove the radio, insert the two release keys into the holes on the front face of the radio. The tools must be inserted with the notched side facing the radio. Slide the keys foreword until a click is heard. Then pull the radio out, releasing it from the DIN collar.



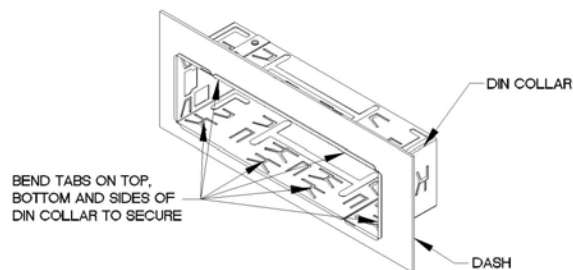
ISO INSTALLATION

1. For installations that do NOT require the use of the DIN collar. The radio has threaded holes in the chassis side panels for ISO mount applications. If necessary, four M5x10mm screws are included with the hardware pack to assist you.

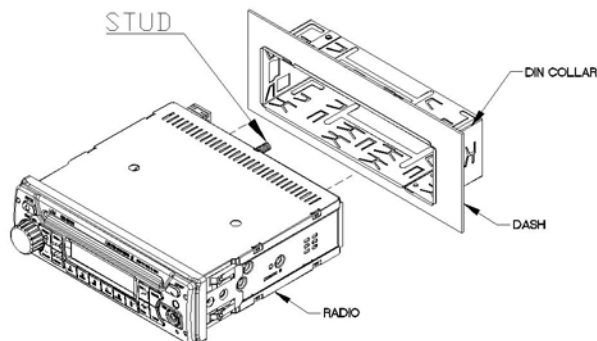


INSTALLING THE RADIO

1. Place the DIN collar into the dash opening. Bend the tabs outward as shown on the drawing below to lock into place.



2. Pass the harness and antenna cable through the DIN collar and connect to the back of the radio. Verify clearance; then gently insert the radio into the DIN Collar until both spring clips are locked into place.



CONNECTING A NEW BLUETOOTH® DEVICE

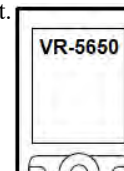
To connect your Bluetooth® device to the Radio, the device must first be paired. Verify that “BLUETOOTH” is set to “ON”, (refer to BT SET menu) and verify that “DISCOVERY” is set to “ON”, (refer to BT SET menu).

Pairing the Your mobile device with the Head Unit

Your mobile phone can initiate a search for new devices and pair to the unit. The following paragraph describes the pairing process:

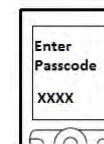
NOTE: Procedures for pairing mobile phones may vary slightly from manufacturer to manufacturer.

1. Verify that the Radio is powered up and ON.
2. Set the Bluetooth® function of the Mobile Device to ON.
3. Access the “Look for devices” feature of the Mobile device and begin searching. After searching, the Radio should appear in the list of devices as VR-5650. Press to accept.



4. A prompt to bond should appear on your Mobile device. Press to accept and continue the process. The device will then ask for the passkey, enter it on the mobile device.

NOTE: Some mobile devices require the passkey to connect. If your mobile device requires the passkey, you will need to enter it now. The default code is “0000”.

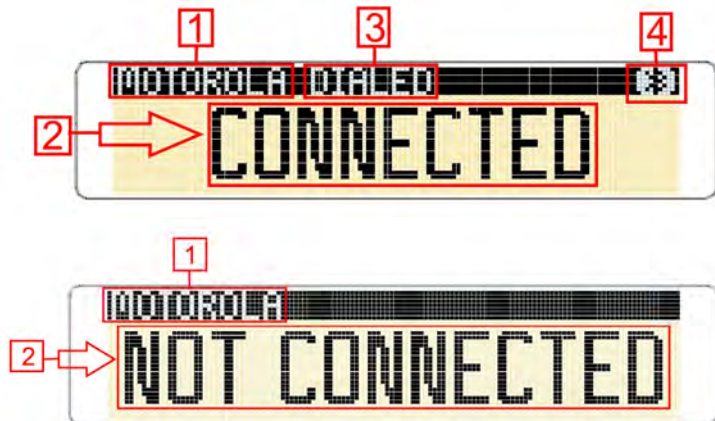


5. After entering the passkey, press OK. The Mobile device should display connected. The Bluetooth® icon on the Radio should appear in the upper right-hand corner of the screen.

NOTES:

- Only ONE mobile device can be paired with the Radio at a time.
- Turn “DISCOVERY OFF” to disable any unwanted Bluetooth® devices.
- After turning off the ignition, the Radio will automatically search for the last-connected Bluetooth® device, and if possible, restore the connection.
- This Radio does NOT support HSP (Head Set Profile)

BLUETOOTH® PHONE OPERATION



1. Bluetooth Phone ID

Displays the ID of previously paired Bluetooth Phones. Rotate to the VOL/SEL knob to display other paired devices and press the VOL/SEL to initiate re-connection.


2. Display information

Shows the connection status and phone number of the incoming or outgoing call.

3. Options Menu

When connected to a Bluetooth Enabled phone, Rotate the VOL/SEL knob to access DIALED, RECEIVED, MISSED, or PHONEBOOK.

- **DIALED** Displays all dialed calls from the currently connect phone.
- **RECEIVED** Displays all answered incoming calls from the currently connect phone.
- **MISSED** Displays all missed calls from the currently connect phone.
- **PHONEBOOK** Displays the contacts currently stored on the connected phone. Some phones require the user to accept the radio's permission to view contacts before displaying them on the radio.

The use can rotate and choose using the VOL/SEL button and press it to also select the desired number. Use the  button to return to the previous menu.

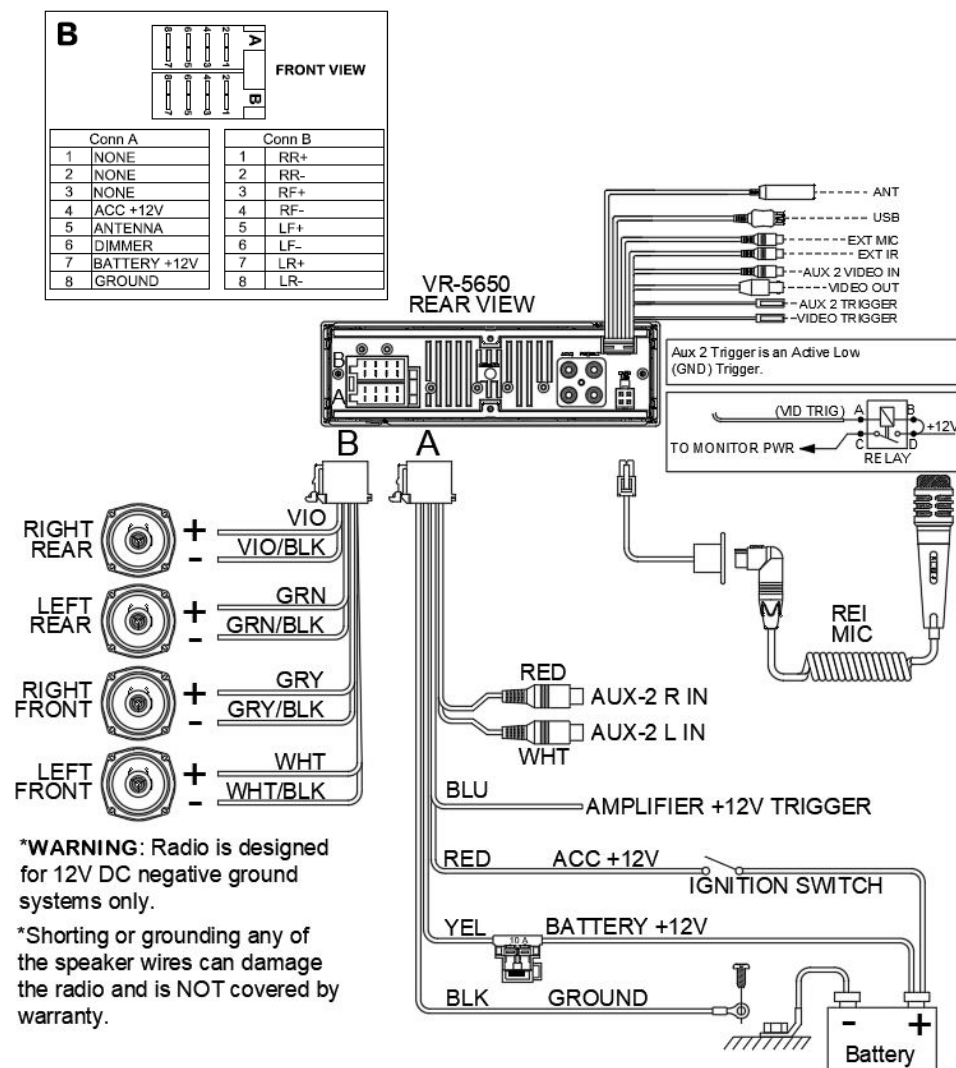
Once the phone number is displayed, press the CALL button to place the call.

4. Connection Status

Displays the Bluetooth® icon connection status of the radio.

TYPICAL INSTALLATION:

Follow this easy wiring diagram when installing Radio and Speakers.



BRIGHTNESS 0-100



CONTRAST 0-100



HUE 0-100



SATURATION 0-100



SHARPNESS 0-100

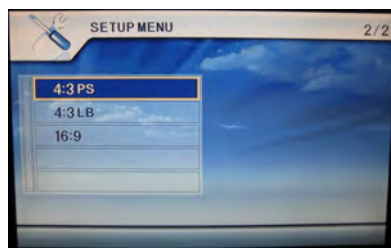
**TV RATIO:**

To select the appropriate aspect ratio of the connected monitors, select TV RATIO and press the PLAY/PAUSE button. Once selected, the user can scroll to choose either; 4:3 PAN & SCAN, 4:3 LETTERBOX, or 16:9 WIDE-SCREEN. Press the PLAY/PAUSE button to select the option.

TV RATIO



SELECT TV ASPECT RATIO



*The ZOOM button found on the remote control will also allow the user to adjust the picture during DVD playback to ZOOM in by 2X, 3X, 4X, 1/2, 1/3, 1/4, or OFF

BLUETOOTH® STREAMING AUDIO OPERATION

The unit allows you to play back audio files from your mobile device using a Bluetooth® connection. The Radio can control a Bluetooth® audio player via Advanced Audio Distribution Profile (A2DP) or Audio/Video Remote Control Profile (AVRCP). Bluetooth® audio players (or Bluetooth® adapters) compatible with these profiles can be connected to this Radio. Verify the device is connected via Bluetooth®, then Touch the SRC button on the front to access BT AUDIO.

**1. Bluetooth Phone ID**

Displays the ID of the paired Bluetooth Phone you are trying to stream audio from.

2. Connection Status

Displays the Bluetooth® icon connection status of the radio.

Press the PLAY/PAUSE button to listen to audio. While listening to audio the following functions are available:

- **SEEK UP:** Touch this button to play the next track.
- **PLAY/PAUSE:** Touch this button to pause playback. Touch again to resume playback.
- **SEEK DOWN:** Touch this button to play the previous track.

Press the MENU button to display Metadata information on the track itself (artist, track name, etc.). This option is only available on compatible devices.

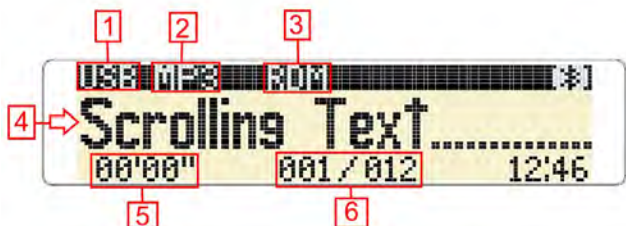
NOTE:

When there is an incoming call, the song will be paused. After the incoming call is finished, the screen will return to the music function screen and playback will continue.

Functionality may vary depending on the profile or device used.

iPod®/iPhone® OPERATION

To listen to audio through your apple device, verify that a Certified USB extension is connected to the USB pigtail on the rear of the radio. Next, connect the USB cable to the Apple device. Once connected, the iPod/iPhone® will begin charging the device. Press the SRC button to switch the source for playback. If the device has enough battery power, it will begin playback.



1. Operational Mode
2. Displays the file type
3. Shows the current playback option
4. Displays the Track Title, Artist, and Album information of the file if available.
5. Shows the elapse time of the audio track.
6. Indicates the file number and number of files in the folder.

When connected, the user can playback specific files or folders. First press the SEARCH button. The user can then rotate the VOL/SEL knob to select one of the following search options:

- Playlists
- Podcasts
- Audiobooks
- Songs
- Albums
- Artists

Press the VOL/SEL knob to choose. To return to a previous menu, press the RETURN button and choose again using the VOL/SEL knob. Use the radio's SEEK up/down buttons to change tracks, or the button to PAUSE or PLAY the track. To return to the iPod/iPhone® source from any other source menu, touch SRC on the front panel until the iPod/iPhone® icon is shown on the front display.

AUX 1/2 OPERATION

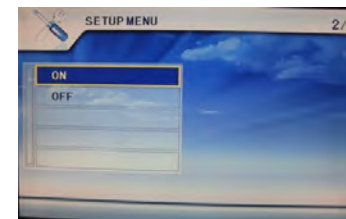
Press the SRC button on the front panel until the display shows either AUX 1 or AUX2. AUX 1 uses the front 3.5mm audio input while AUX 2 uses the rear RCA L/R audio inputs and the Composite Video RCA input. It may be necessary to adjust the VOLUME level of the AUXILARLY input device if too little or too much signal is present.

Aux 2 mode will pass video when connected to the RCA Video input. By connecting the AUX 2 trigger wire to ground, the radio will automatically switch sources to AUX 2.



AUTOPLAY:

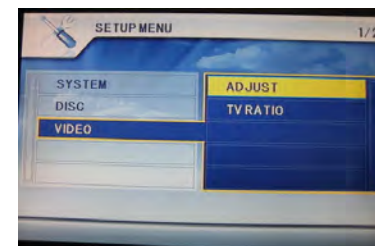
The AUTOPLAY option enables AUTO PLAY of most the DVD discs. When set to ON the disc will immediately begin playback when inserted, allowing the user to skip the MENU and previews section. When set to OFF the user must navigate to the disc MENU to playback the disc.



VIDEO OPTIONS

ADJUST:

The VIDEO options give the user control of the Video Output settings. To change, scroll to select ADJUST and press the PLAY/PAUSE button. Once selected, the user can scroll to choose the desired screen option to modify. Press the PLAY/PAUSE button to select the option; then scroll to choose the desired setting from 0 to 100. Press the PLAY/PAUSE button to confirm.



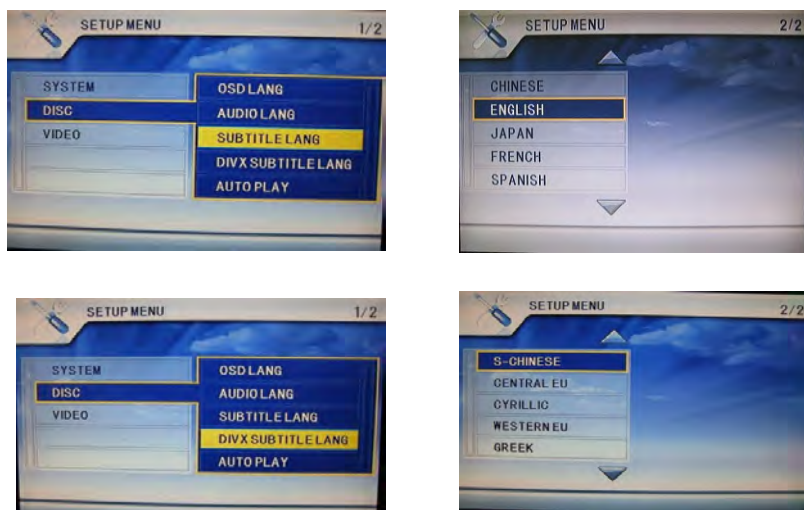
AUDIO LANG:

The AUDIO LANG option allows the user to change the default audio soundtrack on a DVD disc. The disc must support the language type. Due to different DVD encodings, this feature may not work on all discs, and the user may be required to access this feature from the main menu to the DVD. Press the PLAY/PAUSE button to confirm selection.



SUBTITLE LANG:

The SUBTITLE LANG option allows the user to change the default Subtitle Language displayed on the bottom of the screen for DVD discs. The disc must support the language type selected. Due to different DVD encodings, this feature may not work on all discs. If playing DIVX encoded media, select DIVX SUBTITLE LANG to change the subtitle language. Press the PLAY/PAUSE button to confirm selection.



CD OPERATION

Insert a disc into the unit, the radio will automatically switch MODE and begin playback after the media is successfully loaded. Use the SEEK UP/DOWN buttons to change tracks.



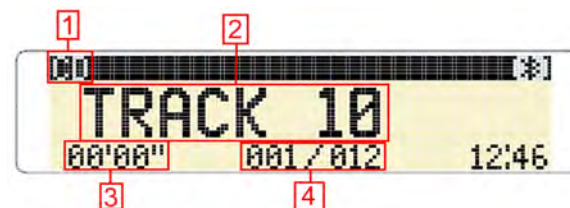
Press and hold this button to REPEAT Chapter, Title, or Off.



Press and hold this button to turn RANDOM on/off



Press this button to PAUSE/PLAY the media



1. **Operational Mode**
2. **Shows the Track number of the ID3 tag information of the MP3 file.**
Press the DISPLAY button to switch from Title, Artist, or Album information
3. **Shows the elapse time of the audio track.**
4. **File number and number of files in the folder.**

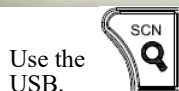
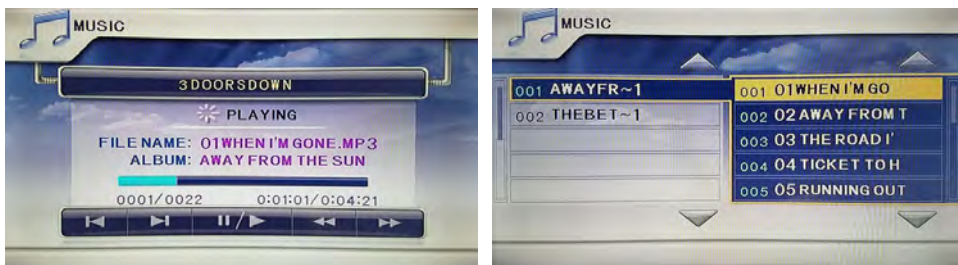
USB OPERATION

Insert a USB device into the rear input, press the SRC button to select this source.



1. **Operational Mode**
2. **Compressed media file format**
Displays either WMA or MP3 Compressed media file format file formats.
3. **Playback Mode of Operation**
Displays either RDM, RPT or nothing at all
4. **Shows the Track number of the ID3 tag information of the MP3 file.**
Press the DISPLAY button to switch from Title, Artist, or Album information
5. **Shows the elapse time of the file.**
6. **File number and number of files in the folder.**

Once selected, playback should begin automatically. Press the MENU button and use the PRESET buttons ▼ ▲ ◀ ▶ to navigate to a desired folder or file for playback.



Use the SEARCH Button to change the file type for playback when using USB.

i.e., MUSIC, PHOTO, or MOVIE when multiple formats are available.

See “**PLAYABLE FILE TYPES**” page for a list of compatible format types.

DVD OPERATION

Insert a disc into the unit, the radio will automatically switch MODE and begin playback after the media is successfully loaded.



1. Operational Mode
2. Shows the Track number
3. Shows the elapse time of the title.



Use the MENU button to return to the disc MENU.

Use the PRESET buttons ▼ ▲ ◀ ▶ to navigate the disc MENU for playback.

DEFAULT:

The DEFAULT option allows the user the option to return all SETUP settings to their default conditions including language options. Press the PLAY/PAUSE button to confirm selection.



DISC OPTIONS

OSD LANG:

The OSD LANG option allows the user to change the default On-Screen Display (OSD) language displayed on the SETUP menu from ENGLISH, SPANISH to PORTUGUESE. Press the PLAY/PAUSE button to confirm selection.



RADIO:

The RADIO option allows the user choices between either EURO MODE or USA MODE. These modes will change the frequency steps of the FM/AM tuner in the radio. Press the PLAY/PAUSE button to confirm selection.



MUSIC VIDEO:

The MUSIC VIDEO option gives the user the option to output a composite video image during digital music playback. When ON is selected, the file information is displayed on the VIDEO OUT signal. When OFF is selected, the VIDEO OUT is not active. Press the PLAY/PAUSE button to confirm selection.



Below is CD IMAGE when set to ON



Below is MP3/WMA image when set to ON

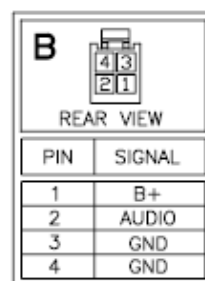


PA OPERATION (microphone sold separately)

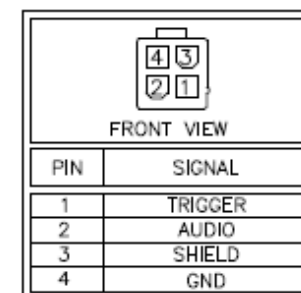
Connect a PA microphone into the 4-pin connector. Microphone has priority over all other audio modes and mutes the source audio being played when keyed. When the PA is triggered, the front display will show MIC, until the trigger is un-keyed. Any digital media being played at that time will be sent a PAUSE command. Once released, it will return to the previous source mode at the previous volume level. Any digital media will be given a PLAY command.

The PA operates regardless of radio status if the ACC and Battery power is applied to the radio.

When CARBON mode is set, the volume of the PA is only adjustable on the microphone itself. When set to DYNAMIC mode, the volume level is adjustable only when keyed from the front using the VOL/SEL button. A rear view of the optional radio PA connection is shown below:



Carbon PA



Dynamic PA

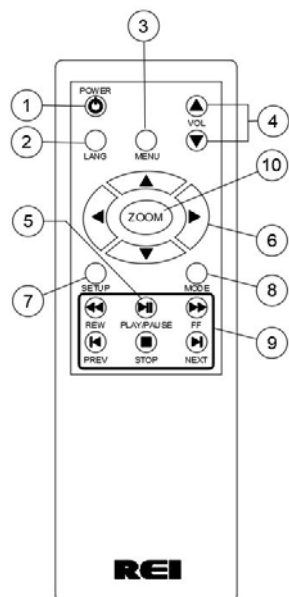
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REMOTE CONTROL

*Requires 2AA Batteries (included)



- (1) Power Button
- (2) Language Button
- (3) Menu Button
- (4) Volume Up/Down Buttons
- (5) Enter/Play/Pause Button
- (6) 4 Scroll Buttons
- (7) Setup Button
- (8) Mode Button
- (9) Playback Buttons
- (10) Zoom Button

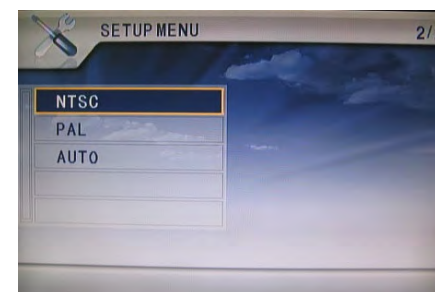
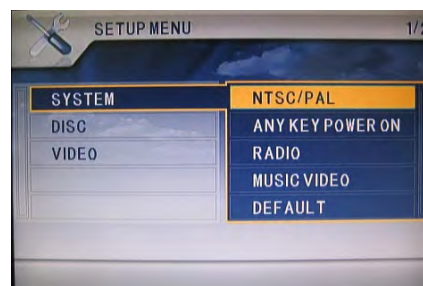
SETUP OPERATION

Setup operation requires the user be in either DVD/CD/USB mode to operate. When in one of these source modes, press SETUP on the remote to activate the on-screen display. Use the scroll up/down/left/right buttons to make changes. Use the PLAY/PAUSE button to accept changes. Press SETUP again to go BACK and/or EXIT at any time. Changes made in the SETUP menu will not return to default by pressing the RESET button on the front of the radio. To reset these changes, refer to the DEFAULT option in the SETUP menu.

SYSTEM OPTIONS:

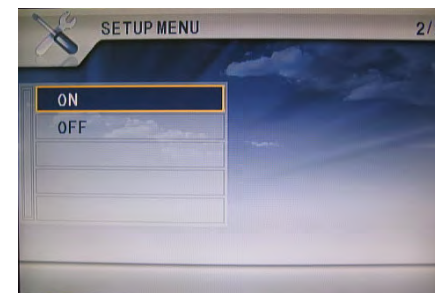
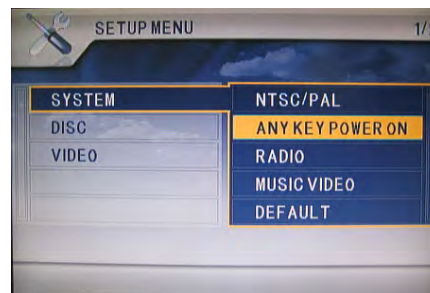
NTSC/PAL/AUTO:

This option allows the user to choose a composite output signal to either NTSC or PAL depending on the video monitor used. The AUTO option will output the signal according to the current DVD title. Scroll to highlight the desired selection as shown on the right. Press the PLAY/PAUSE button to confirm selection.



ANY KEY POWER ON:

This option gives the user a choice between having any of the front panel buttons turn the radio on, or only the power button. Having the selection at ON means any button will power up the radio, having it set to OFF means only the power button can turn the radio on. Press the PLAY/PAUSE button to confirm selection.





Creative Bus Sales

CRFQ 0810 DMT 22000000004 Mid Size Medium Duty Vehicles

10.2.D Paint samples

As it is the intent of Creative Bus Sales to allow agencies to provide us with the paint codes needed to match their new units from us to their existing fleet, it would be impossible for us to identify those codes in advance in order to provide samples with the bid.



Quality Assurance & Inspection

As buses are released from the Original Equipment body manufacturer, Creative Bus Sales has each unit shipped to our Regional location. When the bus arrives in our shop facility the VIN, and Unit Number are shared with our corporate DMV department in order to begin processing end user information for tag, title, and vehicle registration. The bus is then scheduled for Creative's Offline production where the bus goes through a Quality, Safety, and Customer specific inspection per the customer approved build/order data.

Should there be build spec, or safety concerns which warrant the unit returning to the OEM Body Manufacturer, issues are then shared with the OEM by Creative's Quality Assurance team for immediate decisions as to the corrective action. Should the bus require return to the OEM, it is usually within the same day of the QAI (Quality Assurance Inspection), due to the OEM builder being domiciled only twenty (20) miles away from Creative's Elkhart facility.

Should the bus meet the QAI expectation, the bus moves onto the offline production floor where a CBS specific PDI is performed. Creative uses an industry standard PDI form marked with additional inspection line items per industry standards. This is a Pass/Fail/QC form initialed, dated, and stored by Creative technicians for greater quality control and history.

As part of continuous improvement, Creative creates a new line item inspection on the PDI form as we acquire new failed data history, specific customer expectation, and or customer preference. This allows Creative to customize the experience by individual customer/agency.

Once the bus has passed the PDI, the bus is detailed, interior, and exterior, and is then slated for delivery to the end user by our VMO (vehicle management officer).

Once in the State the bus has a state inspection performed. Our CBS Quality Assurance Team then contacts the Creative Bus Sales DMV department for final vehicle registration to the end user. Creative's VMO then schedules with the destination (end user) the final delivery of the bus. The bus has a final DOT driver walk around inspection performed, wash, and fueled prior to moving to the new owner.

*See attached sample contract PDI form.



Contract Status Report and Update Meetings

Communication, transparency, and teamwork are key components to a successful vendor-customer relationship. If awarded, Creative Bus Sales would like to implement a best practice.

Every two weeks Creative will report on the following items:

- Report of deliveries occurring since the last report, and if there were any open issues reported at delivery
- Delivery issue status report outlining any open issues identified at delivery and outstanding warranty claims. Warranty claims will continue to be tracked, and are assigned an Issue Start Date, Repair Status, and an ETA Closed Date
- Delivery Schedule showing projected delivery dates for all open orders
- DMV status report reports the customer status of submitting needed documents to title the vehicles
- History of all vehicles shipped on the contract with shipment date
- Critical issues report outlining items that affect multiple orders. Example would chassis delays due to Ford supply chain issues

Following the issuance of the report, Creative Bus Sales would meet via conference call with contract managers to discuss open items, questions about findings in the report, review company and contract updates, and have an open line of communication.

This process of meeting for 15-30 minutes every two weeks will result in vendor and contract management being on the same page and developing ideas to increase efficiencies.



Creative Bus Sales, Inc.

Date: / /	CUSTOMER:	BODY #:	MILES:
	MAKE:	MODEL:	VIN #:

PRE-DELIVERY INSPECTION

			INSPECTION AREA	DESCRIPTION OF REPAIRS MADE
PASS	FAIL	QC	DRIVERS AREA	
			Horn operation	
			Lights: drive, marker, tail, stop, backup	
			LED Swivel Dome Light in drivers area, OEM Chassis Light Switch	
			Turn Signals	
			Panel Lamps - interior lights	
			Gauges/indicators - fuel gauge, speedometer, temperature indicator, oil pressure indicator and amperage indicator all present	
			Wiper blades - operation	
			Windshield washer - operation	
			Shift Linkage, Indicator	
			Windshield/Glass/Mirrors	
			Parking Brake	
			Inspect shift cable for potential wear (Braun Builds)	
			Seat Fabric matches order sheet, High Back Captains Seat reclines, 6-way pedestal or Adnick powered pedestal with shroud	
			Tilt Steering Wheel	
			Running Board - drivers side	
			Sequence List: place gear selector in park or neutral, depress brake and check engine for: ignition key lock and operation, starter, acceleration pedal, engine operation and idle.	
			Brake Operation: 1) Parking Brake - Check operation of parking brake release 2) Foot Brake Pedal Travel - Free pedal travel should not exceed halfway point	
			Power Steering: swing wheel lock to lock, check for full movement of wheels, belt slip, leaks	
			Check operation of heater	
PASS	FAIL	QC	UNDER HOOD INSPECTION	
			Cooling System	
			Drive Belts	
			Inspect Belts & Tensioners for proper bracketry	
			Radiator Hoses	
			Heater Hoses	
			Coolant Level	
			Radiator Cap	
			LED under hood Light (Minimum 50 lumens)	
			Engine Inspection at Idle: 1) Exhaust - listen for escaping exhaust gasses 2) Air Conditioning - examine belt tensions, check for leaks, verify that mountings are secure 3) Electrical System/Alternator/Regulator - Verify mountings are secure, check for bearing and belt squeaks, vibrations	
PASS	FAIL	QC	ELECTRICAL & CHARGING SYSTEM	
			Battery	
			Battery Cables	
			Alternator/Regulator	
			Mounted securely w/proper bushings & spacers	
			Proper Alignment	
			Wire Properly (13.5 volts under load)	
			Positive cable protected with loom	
			Inspect PCM wiring harness for wear/rubbing	
			12 V maint. Free battery, 1,200 CCA @ 0 degrees, one battery mounted in engine compartment if available from OEM	
			Minimum 200 amp Alternator	
			Stain.Steel Rollout Battery Tray/Battery Box	

PASS	FAIL	QC	ENGINE	
			Oil	
			Breather	
			Air Cleaner/Filter	
			Turbocharger clamps and hoses	
			Fuel Filter for leaks	
			PCV Valve, Filters	
			Charcoal Canister	
PASS	FAIL	QC	AIR CONDITIONER	
			Leak Test all fittings	
			Leak, compressor seal	
			OEM A/C Pressure: Low Side: _____ High Side: _____	
			Add on A/C Pressure: Low Side: _____ High Side: _____	
PASS	FAIL	QC	CONDENSORS	
			Secured to undercarriage (bolted through floor to floor rails)	
			Opening in skirt to receive maximum air flow	
			All fans blowing air in proper direction	
			Air connections tight and protected from water, salt, etc.	
			Oil wiped off fittings	
			Sight Glass Clear & Dry	
			Evaporators fans	
			Mounted to roof with proper/sufficient hardware	
			Roof Rails caulked on roof of bus	
			Air inlets/outlets unrestricted	
			Suction hose covered with insulation (Armaflex)	
			Drain lines to both sides of bus & running down hill	
			Oil wiped off fittings	
			Inspect A/C hoses along fire wall for rubbing	
			Passenger area condenser (separate from radiator) is skirt mounted with minimum of 3 fans and 3 motors	
PASS	FAIL	QC	EVAPORATOR	
			Mounting brackets riveted to ROOF BOWS ONLY	
			Both Drain lines used & RUNNING DOWN HILL	
			Electric: (Controls, relays, wiring etc.)	
			Thermostat cycles compressor	
			Driver controls located conveniently	
			Circuit breakers located within 24" of power source	
			Relays mounted in enclosed area (battery box engine compartment)	
			Wiring Harnesses routed properly/securely	
			Wired according to diagram	
			Wired protected from heat sources, sharp edges, environment	
			Belt Alignment	
			Guard/shields if equipped	
			"STOP" Warranty sticker (s) affixed to compressor (s)	
			Hoses are tied away from moving parts	
			Hoses protected from heat sources (such as exhaust system)	
			Hoses protected from sharp edges (passing through floor and walls)	
PASS	FAIL	QC	FLUIDS	
			Master Cylinder	
			Power Steering	
			Cooling System	
			Auto Transmission	

PASS	FAIL	QC	UNDER VEHICLE Inspection - BUS HOISTED FOR INSPECTION	
			Water Pump/Freeze plugs	
			Timing cover gasket, seal	
			Oil pan gasket, rear seal	
			Oil sending unit	
			Fuel Pump	
			Transmission	
			Seal leaks	
			Axles, boots	
			Brakes	
			Front Rotors & Drums	
			Front Break Linings	
			Wheel Bearings	
			Brake Hoses	
			Calipers or Wheel Cylinders	
			Wire ties and P Clamps	
			Differential	
			Bearing	
			Seals	
			U-Joints or CV-Joints	
			Driveshaft, Drive Axles	
			Suspension & Steering	
			Ball Joints/Linkages	
			Shock Absorbers	
			Steering Gear	
			Power Steering Hoses	
			Exhaust System	
			Fuel Tank/Lines	
			Tire Pressure	
PASS	FAIL	QC	UNDER VEHICLE Inspection - BUS HOISTED FOR INSPECTION	
			Steering Linkage: Check for loose parts, excessive play	
			Lube Fittings: Inspect steering linkage, control arms and universals, check lube level (rear end)	
			Leaks: Inspect break lines, transmission seals and cooling lines, oil sump and valve covers, radiator pump and heater, shocks and air conditioner seals and lines	
			Check for abrasions and damage on brake lines and cables, fuel lines, transmission, cooling and refrigerant lines, wires and hoses	
			Suspension: Inspect springs for breakage and distortion, spring hangers for distortion, breakage and loose anchors, ensure U-bolts and nuts are not loose or missing, inspect axle housing and backing plate for distortion, breakage and leaks.	
			Exhaust: Visually check for holes/excessive bends in piping and muffler, loose clamps, hangers and flanges, general damage	
			Undercoating: Inspect for completeness	
PASS	FAIL	QC	INTERIOR EQUIPMENT	
			Fast Idle	
			Door Adjust Controls	
			Radio/Speakers	
			AM/FM/CD with digital clock, Front Driver Speaker and Dual Four Rear compartment speakers	
			Fuel Gauge	
			Speedometer	
			Odometer	
			Window Latches and Slides	
			T-Slider sash window for ventilation	
			Video System	
			Spare Wheel/Tire UNMOUNTED INSIDE vehicle	
			Lift and Emergency Doors have passive Hold Open Device	
			Lights: Stepwell, Curb and Dome Lights activate when Front Passenger door is open, while engine running	
			All interior lights (6 rear) are LED with switch on dash and door operated switches on all doors	
			Passenger rear view mirror, minimum 4" x 16"	
			Handrails on both sides of steps at entry door	
			Wall mounted first aid kit, hard shell (Johnson & Johnson #8172 or approved equal)	
			Mounted, 5 pound dry chemical type A-B-C fire extinguisher	
			Emergency warning triangle, and flare kit	
			OSHA approved body fluids clean up kit, in hard Plastic case	
			Two belt cutters, shipped loose with self-adhesive Velcro tape	

PASS	FAIL	QC	EXTERIOR
			Rear center stop light
			Exhaust exits on drivers side, BEHIND rear wheels, within 6" of bumper
			Metal roof gutters, over ALL windows and doors (including driver door)
			Rear windows on each side of rear door
			Check windows/ Roof hatch for water leaks
PASS	FAIL	QC	VEHICLE ENTRY
			Front entrance door, unobstructed, clear entry. Opening at least 29" wide, and full height of at least 72"
			Stepwell treads at least 8.5" deep
			Distance from ground to first step - 11" +/- 1"
			Individual step risers no more than 9" high
			Step width minimum 29"
			Step nose is yellow in color
			Rear Emergency Door has upper/lower window
			First step is electrically heated
			Unladen clearance height PLUS 2" marked on decal/sign and is clearly visible to driver. Lettering is 1 - 1/2" high
			Escape roof hatch, alarm audible when opened, opens from inside or outside
PASS	FAIL	QC	ADDITIONAL OPTIONAL EQUIPMENT
			Wheelchair Restraints & Track
			Wheelchair lift
			Seat Latching Mechanisms
			Safety Equipment
			Stanchions & Grab Rails
			Flooring
			Backup Camera
			Backup alarm system, alarm upon backup
			Mud flaps on all wheels
PASS	FAIL	QC	VEHICLE DOCUMENTATION
			Operators manual in vehicle (Ford OEM)
			Electrical Manual in vehicle, manuals for add on equipment (USB)
			Front End Alignment documentation in vehicle
			Wiring Schematic drawings in vehicle (USB)
			* Ensure Build sheet options match actual vehicle build!! *
PASS	FAIL	QC	VEHICLE APPEARANCE
			Exterior Wash/Dry
			Interior Clean Complete
			Windows
PASS	FAIL	QC	BODY STRUCTURE
			Body Structure Damage
			Windows
			Seats
PASS	FAIL	QC	ROAD TEST
			Exterior Noises
			Interior Noises
			Vibrations
PASS	FAIL	QC	BRAKE PADS
PASS	FAIL		LF _____ RF _____
PASS	FAIL		OUTER LR _____ INNER LR _____ OUTER RR _____ INNER RR _____
SIGNATURE OF INSPECTOR:			DATE:



FOREST RIVER BUS

2367 CENTURY DRIVE • GOSHEN, INDIANA 46528 • 1.800.348.7440

Forest River Bus DBE Program TVM Bidders List Update

Moving forward the FTA Office of Civil Rights asks that any entity seeking the goal submission status for the new fiscal year to visit the eligible transit vehicle manufacturer (TVM) website:

<https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/eligible-transit-vehicle-manufacturers>

If you have any questions or concerns on Forest River Bus goal percentages or the DBE program, please contact our office of compliance at:

Donall Hasty
Director of Compliance and Customer Service
DBE Liaison Officer
O: (800) 348-7440 ext. 52168
dhasty@forestriverinc.com

Forest River Bus DBE Program Family

STARCRAFT BUS

ec
Elkhart Coach

CHAMPION

ELDORADO
A DIVISION OF FOREST RIVER, INC.

LONE STAR VAN

FRV
FOREST RIVER VAN

STARTRANS BUS
a division of Forest River, Inc.

Glaval Bus
A Division Of Forest River, Inc.



U.S. Department
Of Transportation
**Federal Transit
Administration**

Headquarters

East Building, 5th Floor – TCR
1200 New Jersey Avenue, SE
Washington, DC 20590

August 31, 2021

Donall Hasty
Forest River: Elkhart Coach, Glaval Bus,
Starcraft, StarTrans Bus, Van, Eldorado-KS
Lone Star Van, Champion Bus
2367 Century Drive
Goshen, IN 46528

Re: TVM DBE Goal Concurrence/Certification Letter – Fiscal Year 2022

Dear Mr. Hasty:

This letter is to inform you that the Federal Transit Administration's (FTA) Office of Civil Rights has received Forest River's Disadvantaged Business Enterprise (DBE) goal and methodology for FY 2022 for the period of October 1, 2021–September 30, 2022. This goal submission is required by the U.S. Department of Transportation's DBE regulations at 49 CFR Part 26 and must be implemented in good faith.

We have reviewed your firm's FY 2022 DBE goal and determined that it complies with DOT's DBE regulations. Your firm is eligible to bid on FTA-funded transit contracts. This letter or a copy of the TVM listing on FTA's website may be used to demonstrate your firm's compliance with DBE requirements when bidding on federally funded vehicle procurements.

FTA reserves the right to remove/suspend this concurrence if your DBE program or FY 2022 DBE goal is not implemented in good faith. In accordance with this good faith requirement, you must submit your DBE Uniform Report to FTA by December 1, 2021. This report should reflect all FTA-funded contracting activity for the second period of FY 2021 (i.e., from April 1 to September 30).

Also note that your FY 2023 DBE goal methodology must be submitted to FTA by August 1, 2022. Any significant updates to the program plan must be submitted to FTA as they occur. If you have any questions, please contact the FTA DBE Team via email at FTATVMSubmissions@dot.gov.

Sincerely,

John Day
Program Manager
Office of Civil Rights



Creative Bus Sales

December 9, 2021

To Whom It May Concern:

Creative Bus Sales, Inc. located at 14740 Ramona Ave Chino, CA 91710, hereby authorizes Nicholas R. Corley, Sales Operations Manager, to act as an authorized signer on behalf of Creative Bus Sales, Inc. for binding contracts with your organization.

If further information is needed, please feel free to contact me.

A handwritten signature in black ink, appearing to read 'TJ Matijevich', written over a horizontal line.

T.J. Matijevich, Vice President
Creative Bus Sales, Inc.
800-326-2877
TJ@creativebussales.com



Statement of Financial Stability

Creative Bus Sales, Inc has been operating in the bus industry for over 25 years. The Company is the nation's largest bus dealer offering products from over 20 top commercial and school bus manufacturers

Creative Bus Sales, Inc. has a long history of fulfilling similar contracts with other transportation agencies and government procurement offices in other states including California and Florida.

Creative Bus Sales Inc. has been profitable every year since its inception. The Company continues to be financially solvent and practices a conservative expansion plan.

Creative Bus Sales maintains the largest inventory in the nation, and possesses the expertise and necessary equipment to provide adequate support to any bus fleet. The Company has multiple long-term inventory finance resources enabling it to carry sufficient inventory to fulfill the requirements of this contract.

Our financial statements are audited by an external CPA firm, and are available upon request.

If you need any further information, please do not hesitate to contact me.

J.R. Sauder
Sr. Vice President



Creative Bus Sales

WARRANTY INFORMATION DOCUMENT: WEST VIRGINIA CRFQ 0805 PTR2100000011

The warranty details below are for informational purposes. All warranty claims or request for assistance should be directed to warranty@creativebussales.com. This allows Creative Bus Sales warranty department to assist the end user with identifying if the issue is a body manufacturer warranty issues or an OEM chassis warranty issue.

The list below is intended to be comprehensive, not specific to any individual order. If there is an component on your bus that is not listed below, please reach out to me directly for assistance.

Glaval Bus Body warranty-1 year 12,000 mile bumper to bumper
-5 year 100,000 mile structural

Freightliner Chassis warranty - 3 years, 50,000 miles

Supplier	Component/Function	Warranty Terms
ACF	AirConditioning	2 year unlimited
Intermotive	Interlocks-Fast Idle	1 year 12,000 mile
Jensen	PA System	1 year 12,000 mile
Transign	Destination Signs	1 year 12,000 mile
Roscoe	Ext. Mirrors/BU camera	1 year 12,000 mile
Q Straint	Wheelchair restraints	2 years
Braun	Wheelchair lift	1 year 12,000 mile
	Safety Equipment	90 days
Freedman	All seat components	1 year 12,000 mile
GerFlor	Floor Covering	1 year 12,000 mile
Transpec	Roof Hatch	1 year 12,000 mile
	Back up alarm	1 year 12,000
Intermotive	Engine Monitor	1 year 12,000 mile
Angel Trax	Camera systems	1 year 12,000 mile

Please direct all service/warranty related questions to:

Warranty@creativebussales.com

We will help each agency line up the closest facility for:

Air Conditioning, wheelchair lift, etc.

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Creative Bus Sales

CRFQ 0805 PTR2100000011 Mid Size Medium Duty Vehicles

5.9.3 Warranty Service

Creative Bus Sales takes pride in our dedication to support after the sale. All warranty repairs shall be made at any authorized OEM warranty repair facility. To that end, we have found that working with qualified shops that have relationships with a given transit authority pays dividends.

Given that the chassis for this bid is a Freightliner, the number of Freightliner shops throughout the State is reduced, as compared to a cutaway bus built on a Ford chassis.

Creative will work with capable, local shops selected by the purchaser, to facilitate body, chassis, and component repairs that are under warranty. The convenience, quality, and speed of these repairs are of the utmost importance to Creative and essential to the customer.

Please see the provided Creative Cares document that outlines our warranty support process



GLAVAL BUS WARRANTY

State of West Virginia, Mid Size, Medium Duty Cutaway Bus CRFQ 0810 DMT2300000004

NOTICE

Please return the warranty registration card to register the warranty with GLAVAL BUS so that GLAVAL BUS may record your rights under this limited warranty and to assure prompt assistance. Your dealer will provide the warranty card for you to sign. If you do not remember signing a GLAVAL BUS warranty card at the time of delivery, please contact your dealer.

1. Who Warrants the product

The product, as described and limited here, is warranted by the manufacturer and installer of the body: GLAVAL BUS, Division of Forest River, Inc., hereinafter referred to as GLAVAL BUS, 2367 Century Drive, Goshen, IN; an Indiana Corporation; and is administered by the GLAVAL BUS Customer Service Dept., Goshen, Indiana 46528.

2. Who Is Covered

GLAVAL BUS, the warrantor, extends this limited warranty to the original owner of the vehicle during the WARRANTY PERIOD.

3. What Is Covered

GLAVAL BUS, your warrantor, extends the following limited warranty to you, which limited warranty covers your conversion only as to material defects in all materials and workmanship supplied by or performed by GLAVAL BUS.

4. Warranty Period

The GLAVAL BUS limited warranty is for a period of three (3) years from the date of first delivery or 36,000 miles, whichever occurs first, except for other coverages listed under "Other Warranties that may Apply" and items listed under "Exclusions and Limitations" and "Limits of the Warranty."

5. Extended Warranty on Structural Items

Warrantor warrants to the original purchaser for a period of three (3) years from the date of first delivery or 36,000 miles, whichever comes first, that this produce shall be free of SUBSTANTIAL DEFECTS arising out of or relating to the structural portion of the product. THIS STRUCTURAL WARRANTY IS INTENDED TO COVER ONLY THE PERFORMANCE OF THE STEEL CAGE STRUCTURE OF THE BUS BODY, INCLUDING CORROSION DAMAGE TO THE BODY STRUCTURE.

Custom paint and/or tape application, if performed by GLAVAL BUS, is warranted to be free of substantial defects in workmanship and materials provided by GLAVAL BUS for one (1) year (12 months) from date of original purchase.

6. Other Warranties That May Apply

GLAVAL BUS does not warrant the base vehicle itself. The vehicle engine, chassis, drive train, suspension system, battery, and other chassis components are covered by a separate warranty offered by the manufacturer of the vehicle and administered by the manufacturer's authorized dealers. The tire manufacturer separately warrants tires. Examples of other manufacturer warranties, which may include the following, but not limited to:

- Electrical Components
- Air Conditioning and Heater(s)
- Wheelchair Restraints and Wheelchair Lifts

For a complete list of items and their respective warrantor, please contact GLAVAL BUS Customer Service Department.

7. Owner's Responsibility

Proper maintenance and cleaning of the exterior and interior of the vehicle is the responsibility of the owner. See the owner's manual for proper care instructions. Defects or damage as a result of improper care or maintenance are not covered by the warranty.

8. Exclusions and Limitations

Damage caused by abuse, misuse, neglect, failure to observe reasonable and required maintenance practices, acid rain, accidents, natural disasters, acts of war and normal wear and tear and facing of fabrics, carpeting and/or fiberglass are not covered. Light bulbs and fuses are not covered.

Damage or deterioration to the physical appearance of the unit if such damage is the result of normal use, wear and tear, or exposure to the elements.

Damages that may occur to the chassis, frame, other parts or components that occur due to overloading will not be covered and may invalidate portions of the GLAVAL BUS warranty.

Cosmetic or surface corrosion resulting from stone chips or scratches in paint are not covered.

GLAVAL BUS does not cover accessories covered by their own manufacturer's warranties. Those items listed in paragraph 6 above are not covered or warranted by GLAVAL BUS.

Replacement parts provided under terms of the warranty will whenever possible, match original equipment. When necessary, GLAVAL BUS will substitute parts of comparable function and value. Defective items may be replaced with new, remanufactured, reconditioned or repaired components.

Modifications, alterations or repairs performed by unauthorized personnel may invalidate portions of the GLAVAL BUS warranty. In addition, USING THIS VEHICLE TO TOW ANOTHER VEHICLE IS PROHIBITED AND MAY VOID WARRANTY. Contact GLAVAL BUS Customer Service before you make any changes.

9. Recovery Limitations

NO PERSON SHALL BE ENTITLED TO RECOVER FROM WARRANTOR FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING OUT OF OR RELATING TO ANY DEFECT IN THE PRODUCT. These limitations include, but are not limited to, loss of time; loss of use; loss of revenues, salaries or commissions; towing charges; bus fares; car rentals; gasoline expenses; telephone charges; inconvenience or other incidental damages.

10. How to get warranty service

To obtain warranty service, contact or visit the dealership where you originally purchased your vehicle or another warranty service facility designated by GLAVAL BUS. Have the dealership contact GLAVAL BUS Customer Service Department for authorization to have a warranty claim submitted. If you or your dealer has moved, or if your dealer is no longer in business, contact GLAVAL BUS Customer Service Department (see address and telephone numbers below) for the name of a GLAVAL BUS dealer nearest you. Your claim must be made within 30 days of the discovery of the defect. Based on the determination of GLAVAL BUS, and subject to the terms of the warranty, the warranty repair work will be authorized by GLAVAL BUS.

All warranty claims must be reported within the warranty period. Warranty personnel must authorize all warranty service prior to performance. Warranty service may be reported directly to the warrantor or to one of their authorized dealers. If warranty personnel approve warranty service, you must leave the unit at the appropriate warranty service location for a sufficient time to perform service.

11. Who Performs Warranty Service

The best place to obtain warranty service is at the dealership where you originally purchased your bus. If the dealership cannot perform the service work, they should call GLAVAL BUS Customer Service Department for assistance (see number below). If you are unable to visit your original dealer, contact GLAVAL BUS Customer Service Department (address below) for the name and location of a GLAVAL BUS dealer near you.

12. Dispute Resolution

Should you be unable to resolve a disagreement with your dealer regarding your right to pursue warranty coverage for a needed repair, contact the GLAVAL BUS Customer Service Department (see address below). If a dispute about warranty service arises between GLAVAL BUS and you, the owner, the disagreement will be resolved in accordance with the customary procedures of the American Arbitration Association relating to commercial transactions, or the dispute will be submitted to a panel of three (3) arbitrators for decision. The panel will be made up of one member appointed by GLAVAL BUS, one member appointed by the complainant/owner, and one member from the arbitrators group mentioned above. Any and all legal remedies shall be available to the owner after pursuing this informal dispute resolution if a ruling is entered against GLAVAL BUS and GLAVAL BUS fails to abide by the ruling. The expenses of arbitration will be paid by the party against whom the arbitrator(s) rule.

13. Limits Of Warranty

This written statement of limited warranty represents the entire warranty authorized and offered by GLAVAL BUS. There are no warranties or representations beyond those expressed in this written document. Any dealership, salesperson or agent cannot amend it. It expressly limits all warranties, including, but not limited to, by way of specification, both express and implied warranties, including warranties or merchantability and fitness for a particular purpose along with all other liabilities or obligations of GLAVAL BUS.

FEDERAL COMPLIANCE

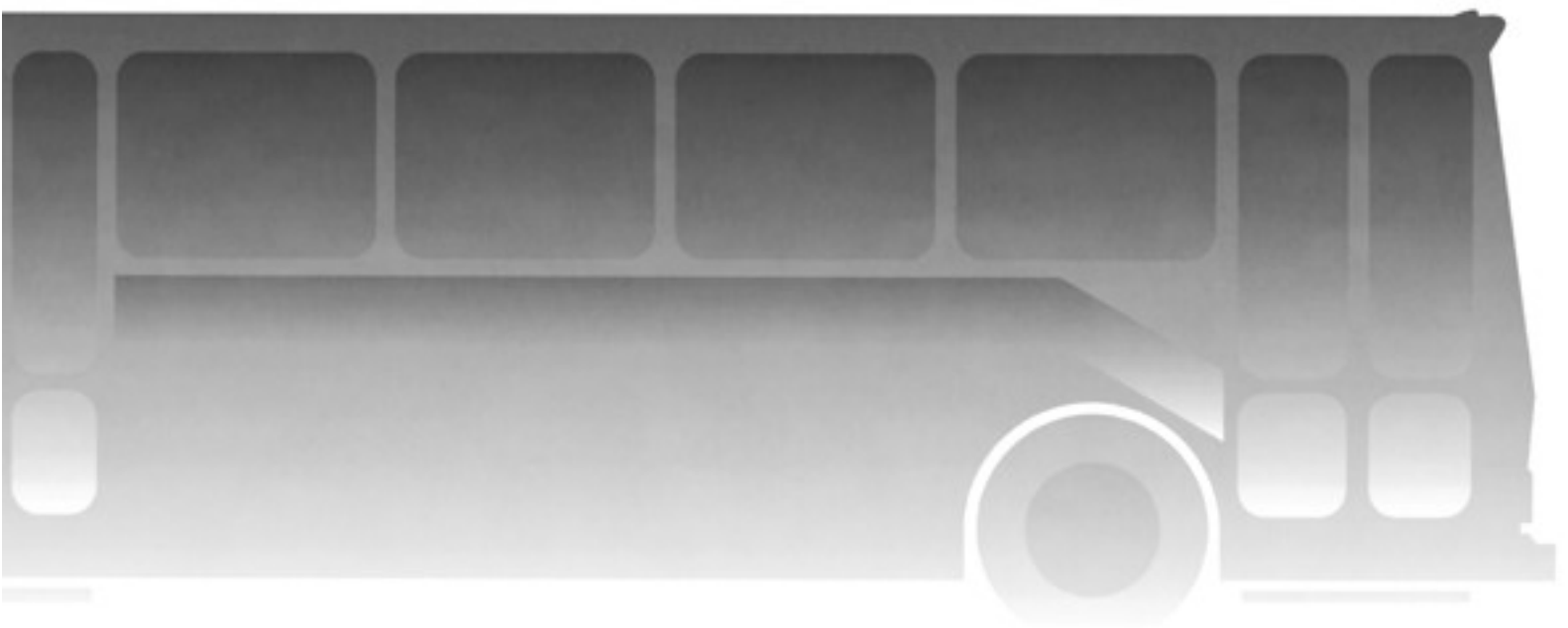
THE TERMS OF THE WARRANTOR'S UNDERTAKING EXPRESSED IN THIS LIMITED WARRANTY ARE DRAFTED TO COMPLY WITH THE MAGNUSEN MOSS WARRANTY LEGISLATION, P.L. 93-637 OF 1974, AND OTHER APPLICABLE LAW. ANY WARRANTY PROVISIONS PROMULGATED BY THE FEDERAL TRADE COMMISSION PURSUANT TO RULES OR ANY OTHER LAW RELATIVE THERETO ARE EXPRESSLY INCORPORATED HEREIN. TO THE EXTENT ANY PROVISIONS OF THIS LIMITED WARRANTY ARE INCONSISTENT WITH STATE LAWS, ONLY THOSE PARTS INCONSISTENT ARE VOID.

GLAVAL BUS
Division of Forest River, Inc.
CUSTOMER SERVICE DEPT.
2367 Century Drive
Goshen, IN 46528
Phone: 574.642.3112
Toll Free: 800.348.7440



Cummins Warranty

All Engines
Worldwide
All Bus
(Except U.S./Canada Diesel Powered School Buses)



Coverage

Products Warranted

This warranty applies to new diesel, LPG, compressed or liquid natural gas fueled engines sold by Cummins and delivered to the first user on or after January 1, 1999, that are used in all bus categories worldwide (except U.S./Canada diesel powered school buses) (Engine).

Base Engine Warranty

The Base Engine Warranty covers any failures of the Engine which result, under normal use and service, from a defect in material or factory workmanship (Warrantable Failure). This coverage begins with the sale of the Engine by Cummins and ends two years after the date of delivery of the Engine to the first user.

Engine aftertreatment components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under the Base Engine Warranty.

Extended Major Components Warranty

The Extended Major Components Warranty applies to all except B and ISB series Engines and covers Warrantable Failures of the engine cylinder block, camshaft, crankshaft, connecting rods and Cummins fan clutch (Covered Parts).

Bushing and bearing failures are not covered.

This coverage begins with the expiration of the Base Engine Warranty and ends three years or 300,000 miles (482,804 kilometers) or 10,800 hours of operation, whichever occurs first, after the date of delivery of the Engine to the first user.

Emission Warranty

Additional coverage is outlined under the Emission Warranty.

These warranties are made to all Owners in the chain of distribution and Coverage continues to all subsequent Owners until the end of the periods of Coverage.

Cummins Responsibilities

During The Base Engine Warranty

Cummins will pay for all parts and labor needed to repair the damage to the Engine resulting from a Warrantable Failure.

Cummins will pay for the lubricating oil, antifreeze, filter elements, belts, hoses and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

Cummins will pay reasonable costs for towing a vehicle disabled by a Warrantable Failure to the nearest authorized repair location. In lieu of towing expenses, Cummins will pay reasonable costs for mechanics to travel to and from the location of the vehicle, including meals, mileage, and lodging, when the repair is performed at the site of the failure.

During The Extended Major Components Warranty

Cummins will pay for the repair or, at its option, replacement of the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner Responsibilities

During The Base Engine Warranty

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during warranty repairs unless such items are not reusable due to the Warrantable Failure.

During The Extended Major Components Warranty

Owner is responsible for the cost of all labor needed to repair the Engine, including the labor to remove and reinstall the engine. When Cummins elects to repair a part instead of replacing it, Owner is not responsible for the labor needed to repair the part.

Owner is responsible for the cost of all parts required for the repair except for the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner is responsible for the cost of lubricating oil,

antifreeze, filter elements and other maintenance items replaced during the repair.

During The Base Engine and Extended Major Components Warranties

Owner is responsible for the operation and maintenance of the Engine as specified in the applicable Cummins Operation and Maintenance Manuals. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the applicable warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Except for Engines disabled by a Warrantable Failure during the Base Engine Warranty, the Owner must also deliver the Engine to the repair facility. Locations in the United States and Canada are listed in the Cummins United States and Canada Sales and Service Directory.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Engine repairs and for "downtime" expenses, fines, cargo damage, all applicable taxes, all business costs, and other losses resulting from a Warrantable Failure.

Limitations

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or catalytic reagent or by water, dirt or other contaminants in the fuel, catalytic reagent or oil.

This warranty does not apply to accessories which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans, air conditioning compressors, clutches, filters, transmissions, torque converters, vacuum pumps, power steering pumps and air compressors.

Excessive oil consumption for B series engines is covered for the duration of the coverage or 100,000 miles (160,935 kilometers) or 7,000 hours from the date of delivery of the Engine to the first user, whichever of the three occurs first. Before a claim for

excessive oil consumption will be considered, Owner must submit adequate documentation to show that consumption exceeds Cummins published standards.

Failures of belts and hoses supplied by Cummins are covered for the first year from the date of delivery of the Engine to the first user.

Parts used to repair a Warrantable Failure may be new Cummins parts, Cummins approved rebuilt parts, or repaired parts. Cummins is not responsible for failures resulting from the use of parts not approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining coverage hereunder.

Cummins Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THESE WARRANTIES AND THE EMISSION WARRANTY SET FORTH HEREINAFTER ARE THE SOLE WARRANTIES MADE BY CUMMINS IN REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or country to country.

Emission Warranty

Products Warranted

This emission warranty applies to new diesel, LPG, compressed or liquid natural gas fueled engines marketed by Cummins that are used in the United States* in vehicles designed for transporting persons or property on a street or highway. This warranty applies to Engines delivered to the first user on or after January 1, 1999.

Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built and equipped so as to conform at the time of sale by Cummins with all U.S. Federal emission regulations

applicable at the time of manufacture and that it is free from defects in material or factory workmanship which would cause it not to meet these regulations within the longer of the following periods: (A) Five years or 100,000 miles (160,935 kilometers) of operation, whichever occurs first, as measured from the date of delivery of the Engine to the first user, or (B) The Base Engine Warranty.

If the vehicle in which the Engine is installed is registered in the state of California, a separate California Emission Warranty also applies.

Limitations

Failures, other than those resulting from defects in material or factory workmanship, are not covered by this warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or catalytic reagent or by water, dirt or other contaminants in the fuel, oil or catalytic reagent.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all applicable taxes, all business costs, and other losses resulting from a Warrantable Failure.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

* United States includes American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Puerto Rico, and the U.S. Virgin Islands.



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IMPORTANT BASIC COMMERCIAL BUS CHASSIS WARRANTIES

8/28/15

FCCC CHASSIS

VOCATION	APPLICABLE MODELS	BASIC DOMESTIC WARRANTY*		BASIC EXPORT WARRANTY*	
		(Whichever occurs first)		(Whichever occurs first)	
		Years	Miles (km)	Years	Miles (km)
SHUTTLE BUS, INTERCITY BUS, TOUR COACH, and TRANSIT BUS	MB65	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	S2	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	S2C	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	XBA	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	XBP	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	XBR	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit
	XBS	3-yr	0 - 50,000 miles 0 - 80,000 km	2-yr	No Limit

NOTES: *This chart is intended to be a guide. See manufacturer's warranty for all details outlining limitations.

"DTNA Connect" (formerly "Access Freightliner") Website is available to registered chassis owner for various specific information to include warranty info, recall bulletins, part#'s, drawings, and schematics.

See your local Freightliner Dealer for shop/service manuals , special tools, etc.

FCCC chassis are approved for export to Guam and Puerto Rico only. Chassis should be ordered for the appropriate domicile and approved for FCCC Export Warranty coverage through your OEM Account Manager.

**NEW VEHICLE LIMITED WARRANTY WARRANTY COVERAGE
 DESCRIPTIONS & WARRANTY COVERAGE TABLES**

FCCC BUS CAB AND CHASSIS - COMMERCIAL

FCCC Bus Cab and Chassis - Commercial



Coverage ^a		
Description	Time ^b	Distance ^b
Basic Vehicle	3 Years	50,000 mi/80 500 km
Battery	1 Year	100,000 mi/161 000 km
Brightwork	6 Months	Unlimited
Corrosion	6 Months	Unlimited
Cab Corrosion/Perforation	3 Years	50,000 mi/80 500 km
Cab Structure	3 Years	50,000 mi/80 500 km
Crossmembers	5 Years	100,000 mi/161 000 km
Diesel Emission 2010 ^c	5 Years	100,000 mi/161 000 km
Frame Rails	5 Years	100,000 mi/161 000 km
GHG14 ^d (Light Heavy Duty Trucks)	5 Years	50,000 mi/80 500 km
GHG14 ^d (Medium Heavy Duty to Heavy Heavy Duty Trucks)	5 Years	100,000 mi/161 000 km
GHG14 ^d Tire	2 Years	24,000mi/38 400 km
Paint	1 Year	100,000 mi/161 000 km
Paint, Chassis	6 Months	Unlimited
Towing/Roadside Assistance ^e	1 Year	Unlimited
Front Axle	3 Years	36,000 mi/58 000 km
Rear Axle	3 Years	36,000 mi/58 000 km
Transfer Case	3 Years	36,000 mi/58 000 km
Transmission	3 Years	36,000 mi/58 000 km

DISCLAIMER: Failure to read or distribute this information does not provide exemption from compliance with the information contained herein.

**NEW VEHICLE LIMITED WARRANTY WARRANTY COVERAGE
 DESCRIPTIONS & WARRANTY COVERAGE TABLES**
FCCC BUS CAB AND CHASSIS - COMMERCIAL

Coverage ^a		
Description	Time ^b	Distance ^b
Detroit Front Axle (File Direct)		
Pre-Model Year 2011^f	3 Years	36,000 mi/58 000 km
Post-Model Year 2011^g	3 Years	Unlimited
Detroit Rear Axle (File Direct)		
Pre-Model Year 2011^f	3 Years	36,000 mi/58 000 km
Post-Model Year 2011^g	3 Years	Unlimited

a. Coverage may vary; check vehicle's actual warranty coverage online via OWL's *Coverage Info/Check Coverage* screen.

b. Time or distance, whichever comes first

c. Applies to vehicles equipped with EPA 2010 compliant diesel engines.

d. Applies to models 2013 and later domiciled in the United States, check actual warranty online via OWL's *Coverage Info/Check Coverage* screen for coverage listed as "GHG14..."

e. Up to a maximum of \$450 per occurrence.

f. Pre-Model Year 2011 Detroit Axle: Warranty coverage is determined by Gross Combination Weight Rating, road surface, and vocation. Please see www.ddcsn.com for specific coverage details.

g. Bus & Chassis - Custom Chassis: Warranty coverage is determined by Gross Combination Weight Rating, road surface, and vocation. Please see www.ddcsn.com for specific coverage details.

DISCLAIMER: Failure to read or distribute this information does not provide exemption from compliance with the information contained herein.

IMPORTANT BASIC COMMERCIAL BUS ENGINE WARRANTIES

8/10/15

CUMMINS ENGINES

VOCATION	APPLICABLE MODELS	STANDARD WARRANTY*		EMISSIONS WARRANTY*	
		(Whichever occurs first)		(Whichever occurs first)	
		Years	Miles (km)	Years	Miles (km)
SHUTTLE BUS, INTERCITY BUS, TOUR COACH, and TRANSIT BUS	ISB-6.7L	2-yr	No Limit	5-yr	0 - 100,000 miles 0 - 160,935 km
	ISL-9L	2-yr	No Limit	5-yr	0 - 100,000 miles 0 - 160,935 km

NOTES: *This chart is intended to be a guide. See manufacturer's warranty for all details outlining limitations.
Go to <http://cumminsengines.com/brochures.aspx?sMarket=59&sKeyword=warranty> for more info

See your local Cummins Dealer for shop/service manuals , special tools, etc.

IMPORTANT BASIC COMMERCIAL BUS TRANSMISSION WARRANTIES

8/11/15

Allison Transmission Warranty and Coverage Summary
 Shuttle Bus, School Bus, Intercity Bus/Tour Coach, and Transit Bus
 Freightliner Custom Chassis Corporation
 August 7, 2015

Allison coverage for
 transmissions supplied
 on FCCC Chassis

w/ option to purchase
 Allison ETC

VOCATION	APPLICABLE MODELS	STANDARD WARRANTY LIMITATIONS#		STANDARD WARRANTY + PARTNERSHIP COVERAGE LIMITATIONS*		STANDARD WARRANTY + EXTENDED TRANSMISSION COVERAGE (ETC) LIMITATIONS	
		(Whichever occurs first)		(Whichever occurs first)		(Whichever occurs first)	
		Years	Transmission Miles (km)	Years	Transmission Miles (km)	Years	Transmission Miles (km)
SHUTTLE BUS	B210, B220, B300, B400	2-yr	No Limit	2-yr	No Limit	5-yr	No Limit
	B500	2-yr	No Limit	2-yr	No Limit		
	1000PTS	3-yr	0 - 100,000 miles 0 - 160,000 km	3-yr	0 - 100,000 miles 0 - 160,000 km		
	2100PTS, 2200PTS, 3000PTS	3-yr	0 - 100,000 miles 0 - 160,000 km	4-yr	No Limit		
SCHOOL, CHURCH, PRISON or ACTIVITY BUS	1000PTS	3-yr	0 - 100,000 miles 0 - 160,000 km	4-yr	No Limit	5-yr	No Limit
	2100PTS, 2200PTS, 2500PTS, 3000PTS	3-yr	0 - 100,000 miles 0 - 160,000 km	5-yr	No Limit	n.a.	n.a.
INTERCITY BUS or TOUR COACH	B210, B220, B300, B400	2-yr	No Limit	2-yr	No Limit	5-yr	No Limit
	B500	2-yr	No Limit	5-yr	No Limit	n.a.	n.a.
TRANSIT BUS	B210, B220, B300, B400, B500	2-yr	No Limit	2-yr	No Limit	5-yr	No Limit

NOTES: Buses requiring PTO and all revenue-generating/FTA transit bus applications must use "B" (Bus) series transmissions.
 All shuttle bus applications greater than 33,000 lbs GVW require B300 or B400 transmissions.

*This chart is intended to be a guide. See manufacturer's warranty for all details outlining limitations.
 Go to <http://www.allisontransmission.com/transmissions> for more info.

See your local Allison Dealer for shop/service manuals, special tools, etc.

NEW PRODUCT WARRANTY



**PARTICIPATING OEM SALES
DISTRIBUTOR SALES**

LIMITED WARRANTY ON NEW ALLISON AUTOMATIC TRANSMISSIONS USED IN SHUTTLE & OTHER BUS APPLICATIONS—EXCEPT TRANSIT, SCHOOL BUS, INTERCITY BUS, or MOTORHOME

Allison Transmission, Inc. will provide for repairs or replacement, at its option, during the warranty period of each new Allison transmission listed below that is installed in a Bus, other than School Bus, Transit Bus, Intercity Bus, or Motorhome in accordance with the following terms, conditions, and limitations.

WHAT IS COVERED

- **WARRANTY APPLIES** — This warranty is for new Allison transmission models listed below installed in a Bus, other than School Bus, Transit Bus, Intercity Bus, or Motorhome and is provided to the original and any subsequent owner(s) of the vehicle during the warranty period.
- **REPAIRS COVERED** — The warranty covers repairs or replacement, at Allison Transmission's option, to correct any transmission malfunction resulting from defects in material or workmanship occurring during the warranty period. Needed repairs or replacements will be performed using the method Allison Transmission determines most appropriate under the circumstances.
- **TOWING** — Towing is covered to the nearest Allison Transmission Distributor or authorized Dealer only when necessary to prevent further damage to your transmission.
- **PAYMENT TERMS** — Warranty repairs, including parts and labor, will be covered per the schedule shown in the chart contained in section "APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE."
- **OBTAINING REPAIRS** — To obtain warranty repairs, take the vehicle to any Allison Transmission Distributor or authorized Dealer within a reasonable amount of time and request the needed repairs. A reasonable amount of time must be allowed for the Distributor or Dealer to perform necessary repairs.
- **TRANSMISSION REMOVAL AND REINSTALLATION** — Labor costs for the removal and reinstallation of the transmission, when necessary to make a warranty repair, are covered by this warranty.
- **WARRANTY PERIOD** — The warranty period for all coverages shall begin on the date the transmission is delivered to the first retail purchaser, with the following exception:

Demonstration Service—A transmission in a new truck or bus may be demonstrated to a total of 5000 miles (8000 kilometers). If the vehicle is within this limit when sold to a retail purchaser, the warranty start date is the date of purchase. Normal warranty services are applicable to the demonstrating Dealer. Should the truck or bus be sold to a retail purchaser after these limits are reached, the warranty period will begin on the date the vehicle was first placed in demonstration service and the purchaser will be entitled to the remaining warranty.

APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE

APPLICABLE MODELS	WARRANTY LIMITATIONS (Whichever occurs first)		ADJUSTMENT CHARGE TO BE PAID BY THE CUSTOMER	
	Months	Transmission Miles Or Kilometers	Parts	Labor
B 210, B 220, B 300, B 400, B 500	0-24	No Limit	No Charge	No Charge
1000 Series, 2000 Series, 2400 Series	0-36	No Limit	No Charge	No Charge
1000 PTS, 2100 PTS, 2200 PTS, 2350 PTS, 2500 PTS, 2550 PTS, 3000 PTS	0-36*	0-100,000 m 0-160 000 km	No Charge	No Charge

- * Effective July 2006, the Allison transmission in your vehicle may be covered by additional extended coverage, dependent on the Original Equipment Manufacturer (OEM) which manufactured your vehicle. **This additional coverage requires continued use of an Allison Approved TES 295 automatic transmission fluid and genuine Allison filters.** Please consult your OEM Dealer or authorized Allison Transmission Distributor or Dealer for specific information.

WHAT IS NOT COVERED

- **DAMAGE DUE TO ACCIDENT, MISUSE, or ALTERATION** — Defects and damage caused as the result of any of the following are not covered:
 - Flood, collision, fire, theft, freezing, vandalism, riot, explosion, or objects striking the vehicle;
 - Misuse of the vehicle;
 - Installation into unapproved applications and installations;
 - Alterations or modification of the transmission or the vehicle, and
 - Damage resulting from improper storage (refer to long-term storage procedure outlined in the applicable Allison Service Manual)
 - Anything other than defects in Allison Transmission material or workmanship
- NOTE:** This warranty is void on transmissions used in vehicles currently or previously titled as salvaged, scrapped, junked, or totaled.
- **CHASSIS, BODY, and COMPONENTS** — The chassis and body company (assemblers) and other component and equipment manufacturers are solely responsible for warranties on the chassis, body, component(s), and equipment they provide. Any transmission repair caused by an alteration(s) made to the Allison transmission or the vehicle which allows the transmission to be installed or operated outside of the limits defined in the appropriate Allison Installation Guideline is solely the responsibility of the entity making the alteration(s).
- **DAMAGE CAUSED by LACK of MAINTENANCE or by the USE of TRANSMISSION FLUIDS NOT RECOMMENDED in the OPERATOR'S MANUAL** — Defects and damage caused by any of the following are not covered:
 - Failure to follow the recommendations of the maintenance schedule intervals applicable to the transmission;
 - Failure to use transmission fluids or maintain transmission fluid levels recommended in the Operator's Manual.
- **MAINTENANCE** — Normal maintenance (such as replacement of filters, screens, and transmission fluid) is not covered and is the owner's responsibility.
- **REPAIRS by UNAUTHORIZED DEALERS** — Defects and damage caused by a service outlet that is not an authorized Allison Transmission Distributor or Dealer are not covered.
- **USE of OTHER THAN GENUINE ALLISON TRANSMISSION PARTS** — Defects and damage caused by the use of parts that are not genuine Allison Transmission parts are not covered.
- **EXTRA EXPENSES** — Economic loss and extra expenses are not covered. Examples include but are not limited to: loss of vehicle use; inconvenience; storage; payment for loss of time or pay; vehicle rental expense; lodging; meals; or other travel costs.
- **"DENIED PARTY" OWNERSHIP** — Warranty repair parts and labor costs are not reimbursed to any participating or non-participating OEMs, dealers or distributors who perform warranty work for, or on behalf of, end users identified by the United States as being a "denied party" or who are citizens of sanctioned or embargoed countries as defined by the U.S. Department of Treasury Office of Foreign Assets Control. Furthermore, warranty reimbursements are not guaranteed if the reimbursement would be contrary to any United States export control laws or regulations as defined by the U.S. Department of Commerce, the U.S. Department of State, or the U.S. Department of Treasury.

OTHER TERMS APPLICABLE TO CONSUMERS AS DEFINED by the MAGNUSON-MOSS WARRANTY ACT

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Allison Transmission does not authorize any person to create for it any other obligation or liability in connection with these transmissions.

ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO THESE TRANSMISSIONS IS LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. PERFORMANCE OF REPAIRS AND NEEDED ADJUSTMENTS IS THE EXCLUSIVE REMEDY UNDER THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (SUCH AS, BUT NOT LIMITED TO, LOST WAGES OR VEHICLE RENTAL EXPENSES) RESULTING FROM BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.**

** Some states do not allow limitations on how long an implied warranty will last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

OTHER TERMS APPLICABLE TO OTHER END-USERS

THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE ALLISON TRANSMISSION MODELS LISTED ABOVE AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALLISON TRANSMISSION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH SUCH TRANSMISSIONS. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTY.

QUESTIONS

If you have any questions regarding this warranty or the performance of warranty obligations, you may contact any Allison Transmission Distributor or Dealer or write to:

Allison Transmission, Inc.
P.O. Box 894
Indianapolis, IN 46206-0894
Attention: Warranty Administration PF-9
Form SE0614EN (201112)

Passenger Seats Limited Warranty & Sales Terms

WARRANTY:

Freedman Seating Company warrants to the original buyer that its Passenger Seats are free from defects in material and workmanship for the following components:

Metal Components – Five (5) years

Plastic Components – Three (3) years

Moving Components – Three (3) years

Gas Shock Components – One (1) year

Upholstered Components (foam) – Three (3) years

Cover Warranty is for defects in the material or sewing and is limited to replacement covers.

- One (1) year for Level #1 in-stock FSC material and perforated vinyl

- Two (2) years for Level #3 in-stock FSC material and higher

- No warranty for COM (Customer Own/supplied Material)

The warranty period begins at time of the bus in-service date not to exceed 180 after the date of the shipment from Freedman Seating Company.

NON-PRORATED REPLACEMENT:

In the event that a warranty-covered failure should occur within the warranty period, Freedman Seating Company will repair or replace the seat without charge and without prorating, at Freedman Seating Company's option. This is the sole and exclusive remedy for breach of any warranty. Any replacement seat or part is only covered by this warranty for the remainder of warranty period applicable to the original seat.

EXCLUSIONS:

This warranty specifically excludes foam, upholstery material, seat belts, and items exposed to normal wear and tear such as metal finish and paint and does not apply to any seat that is damaged as result of accident, derailment, improper installation, structural defects, intentional damage, abuse, vandalism, negligence, misuse, improper operating conditions, lack of maintenance, or extreme natural phenomena. Seats exposed to toxic or corrosive materials are excluded from this warranty. Seats exposed to cleaning solutions that are not listed on the Freedman Seating Company Cleaning Guide are excluded from this warranty. This warranty is provided directly to the purchaser only and does not extend to any subsequent party and is solely for the Freedman Seating Company product as it is originally manufactured.

INCIDENTAL, CONSEQUENTIAL DAMAGES, & LIMITATIONS:

This warranty shall be in lieu of any other warranty or terms, expressed warranty or terms, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. The purchaser's sole and exclusive remedy against Freedman Seating Company shall be for the repair and replacement of the defective product as provided herein. No other remedy; including but not limited to incidental or consequential damages for lost profits, lost sales, injury to person or property, shipping, freight, installation, removal, or any other incidental or consequential loss shall be available to the purchaser.

NOTIFICATION:

All reports, claims, or notices required by the warranty to be provided to Freedman Seating Company must be in writing and delivered to: Attention – Freedman Seating Company, Warranty Claim Department, 4545 W. Augusta Blvd., Chicago, IL 60630. Repairs being claimed for warranty must be sent to Freedman Seating Company for prior approval and warranty acceptance before any warranty claims can be made. Parts being claimed for warranty must be sent to Freedman Seating Company for prior approval and warranty acceptance before any warranty claims can be made.

INSPECTION AND VERIFICATION:

The owner must provide access to the failed seat so that Freedman Seating Company's authorized representative can perform an on-site inspection. Alternatively, Freedman Seating Company may ask the owner to ship the failed seat to Freedman Seating Company's laboratory for inspection. Within 30 days of the inspection, either on-site or in the laboratory, Freedman Seating Company will render an opinion as to whether or not the claimed failure is covered by the warranty.

GENERAL MAINTENANCE:

Freedman Seating Company provides the proper maintenance and cleaning instructions on its web site www.freedmanseating.com. Warranty is contingent upon documented performance of recommended maintenance and service. All replacement parts should be recommended or authorized Freedman Seating Company components. Failure to purchase proper components will null and void the warranty.

DESIGN:

Freedman Seating Company reserves the right to modify parts and design specifications without notice as long as the seats meet general specifications, unless otherwise committed per contract. In case further non-conforming changes have to be incorporated, Freedman Seating Company will submit such changes to customer for prior approval.

OTHER:

The terms and warranty are contingent upon customers meeting agreed upon payment terms as specified in Freedman Seating Company proposals. Terms and warranty supersede any other terms including but not limited to customer terms printed on the back of Purchase Orders, listed on websites, or other sources from customers.

Warranty – Passenger Seats 1-09



Gerflor Commercial Flooring limited warranty agreement – 10 Year Warranty

GERFLOR, AS A MANUFACTURER, expressly warrants that the GERFLOR COMMERCIAL FLOORCOVERING shall be free from manufacturing defects for a period of ten (10) years from the date of sales by Gerflor, provided such floorcovering are subject to normal use and receive proper maintenance.

This entire warranty will become null and void if conditions of the subflooring and method of installation do not conform exactly to GERFLOR specifications.

This entire warranty does not cover damage caused, in whole or in part, by conditions beyond our control, including, but not limited to :

- Use for which material is not designated.
- Fire, explosion, weather conditions or natural disasters.
- Faulty installation.
- Casualties.
- Ordinary wear and tear.
- Abuse.
- Faulty design or construction of the buildings.
- Failure of the adhesive to adhere to the subfloor, whether concrete or other material because of moisture migration or water vapor transmission through the subfloor.
- Fault in the subfloor.
- Failure in the vapor barriers.
- Failure of the installation contractors to adhere to specifications.
- Failure of the seams.
- Uneven wear of sections of the floorcovering.
- Gloss reduction from use.
- Alteration of the initial appearance of the floorcovering, particularly in high traffic areas and areas exposed to excessive wear due to sand, grit or dirt in entrances to buildings.
- Fading or discoloration from sunlight or heat.
- Damage caused by neglect or improper maintenance procedures and other causes not specified but beyond the control of GERFLOR.
- Damage due to stains, cuts, scratches, gouges, scuffs, punctures, tears, indentations due to loads in excess of the specified static load limit, burns, accidents, discoloration caused by tracking residue from carpet dyes, rubber or synthetic backing used on rugs or mats, painted or asphalt surfaces such as driveways, damage resulting from lack of, or improper, furniture rests and floor protectors, rubber or synthetic backed rugs or mats, or any intentional misuse of the floorcovering

The presence of moisture between the GERFLOR floorcovering and the subfloor shall be considered proof of subfloor failure or faulty design or construction of the building because moisture will break the bond between the adhesive and the subfloor, causing bubbles to appear.



Gerflor Commercial Flooring limited warranty agreement – 10 Year Warranty

This warranty will be applied only if the product is admittedly the only cause of disorder. Your sole and exclusive remedy against GERFLOR arising from the purchase or use of floorcovering is limited to supply of material in replacement of the sole defective part of material (after examination, verification and approval by GERFLOR) with material of equivalent quality. All other compensation of whatever nature will be excluded. Warranty will only be valid if product and installation concerned by the warranty are clearly identified on this document and returned to Gerflor by mail with acknowledgement of receipt.

If the claim is accepted by GERFLOR, with respect to the warranty, GERFLOR will supply the material in replacement of defective one without any cost to you. More than 5 (five) years from the date of sale of the warranted product by Gerflor, until the expiration of this express warranty you will be responsible for 20 % (twenty per cent) per year of the cost of supplied materials.

WARRANTY DISCLAIMERS AND LIMITATIONS OF LIABILITY

THE ABOVE EXPRESSED MANUFACTURER'S WARRANTY SHALL BE THE EXCLUSIVE WARRANTY and LIMITED TO THE QUALITY OF THE PRODUCT, and GERFLOR MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. GERFLOR EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

IT IS AGREED THAT GERFLOR SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, including, but not limited to, loss of income, loss of use, damage to other property, the cost of removing and reinstalling GERFLOR floorcoverings, attorney's fees, and any liability you may have with respect to any other person.

TIME LIMIT ON COMMENCING LEGAL ACTION

It is agreed that you have 30 days from the accrual of a claim to inform GERFLOR by registered mail with acknowledgement of receipt.

It is agreed that you have one year from the accrual of a claim to commence any legal action arising from the purchase or use of GERFLOR floorcoverings, or be barred forever.

To the extent any provision of this Warranty Agreement contravenes the law of any jurisdiction, such provision shall be inapplicable in such jurisdiction, and the remainder of this Warranty Agreement shall not be affected thereby.

Braun® Limited Warranty

WARRANTY COVERAGE AND WARRANTY COVERAGE TIME PERIODS

The Braun Corporation ("Braun") warranty covers certain parts of this wheelchair lift for three (3) years or 10,000 cycles and the cost of labor to repair or replace those parts for one (1) year or 3,000 cycles. If The Braun Corporation receives the warranty registration card within 20 days after the lift is put into service, the warranty labor coverage will increase from one (1) year or 3,000 cycles to three (3) years or 10,000 cycles. In addition, providing the warranty registration card is returned as noted above, the following lift's power train parts are warrantied for five (5) years or 15,000 cycles: Cable, Cylinder, Flow Control, Gear Box, Motor, Pump, Hydraulic Hose and Fittings. This limited warranty covers substantial defects in materials and workmanship of the lift, provided that the lift is operated and maintained properly and in conformity with the owner's manual. The warranty period begins on the date that the product is delivered to the first retail purchaser by an independent, authorized dealer of Braun, or, if the dealer places the product into any type of service prior to retail sale, on the date the dealer first places the product in such service. This limited warranty applies only to the first purchaser. It may not be transferred.

WHAT BRAUN WILL DO TO CORRECT PROBLEMS

In the event that a substantial defect in material or workmanship, attributable to Braun, is found to exist during the first year of warranty coverage, it will be repaired or replaced, at Braun's option, without charge for parts or labor to the owner, in accordance with the terms, conditions and limitations of this limited warranty. If the substantial defect in material or workmanship, attributable to Braun, is found to exist during the second or third year of warranty coverage, it will be repaired or replaced, at Braun's option, without charge to the owner for parts, only, in accordance with the terms, conditions and limitations of this limited warranty. Providing the warranty card is returned within 20 days as outlined above, the labor warranty period will be extended by two years of coverage in accordance with the terms, conditions, and limitations of this limited warranty. In addition, if a substantial defect in material or workmanship, attributable to Braun, is found to exist during the fourth or fifth year of warranty coverage to the following lift's power train parts: Cable, Cylinder, Flow Control, Gear Box, Motor, Pump, Hydraulic Hose and Fittings, it will be repaired or replaced, at Braun's option, without charge to the owner for parts, only, in accordance with the terms, conditions and limitations of this limited warranty. The cost of labor for repair or replacement at any time after the warranty coverage detailed above is the sole responsibility of the owner.

Braun's obligation to repair or replace defective materials or workmanship is the sole obligation of Braun under this limited warranty. Braun reserves the right to use new or remanufactured parts of similar quality to complete any work, and to make parts and design changes from time to time without notice to anyone. Braun reserves the right to make changes in the design or material of its products without incurring any obligation to incorporate such changes in any previously manufactured product. Braun makes no warranty as to the future performance of this product, and this limited warranty is not intended to extend to the future performance of the product. In addition, the owner's obligation to notify Braun, or one of its authorized, independent dealers, of a claimed defect does not modify any obligation placed on the owner to contact Braun directly when attempting to pursue remedies under state or federal law.

LIMITATIONS, EXCLUSIONS AND DISCLAIMER OF IMPLIED WARRANTIES

ANY IMPLIED WARRANTY THAT IS FOUND TO ARISE BY WAY OF STATE OR FEDERAL LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS, IS LIMITED IN DURATION TO THE TERMS OF THIS LIMITED WARRANTY AND IS LIMITED IN SCOPE OF COVERAGE TO THE SCOPE OF COVERAGE OF THIS LIMITED WARRANTY. Braun disclaims any express or implied warranty, including any implied warranty of fitness or merchantability, on items excluded from coverage as set forth in this limited warranty. Braun makes no warranty of any nature beyond that contained in this limited warranty. No one has authority to enlarge, amend or modify this limited warranty, and Braun does not authorize anyone to create any other obligation for it regarding this product. Braun is not responsible for any representation, promise or warranty made by any independent dealer or other person beyond what is expressly stated in this limited warranty. Any selling or servicing dealer is not Braun's agent, but an independent entity.

Braun® Limited Warranty

BRAUN SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT MAY RESULT FROM BREACH OF THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTY. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES SHALL BE INDEPENDENT OF ANY FAILURE OF THE ESSENTIAL PURPOSE OF ANY WARRANTY, AND THIS EXCLUSION SHALL SURVIVE ANY DETERMINATION THAT THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTY HAS FAILED OF ITS ESSENTIAL PURPOSE. This warranty does not cover, and in no event shall Braun be liable for towing charges, travel, lodging, or any other expense incurred due to the loss of use of the product or other reason.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

HOW TO GET SERVICE

To obtain warranty service the owner must do all of the following:

1. Notify an authorized service center, of the claimed defect attributable to Braun, within the warranty coverage period designated above
2. Provide the notification mentioned in (1), above, within ten (10) days of when the owner discovered, or should have discovered, the claimed defect
3. Promptly schedule an appointment with and take the product to an authorized service center for service.
4. Pay any transportation costs and all expenses associated with obtaining warranty service.

Since Braun does not control the scheduling of service work at the independent dealerships you may encounter some delay in scheduling or completion of work. If you need assistance you may contact Braun, at 631 West 11th Street, Winamac, Indiana 46996; 1-800-THE-LIFT, (843-5438).

If two (2) or more service attempts have been made to correct any covered defect that you believe impairs the value, use or safety of the product, or if it has taken longer than thirty (30) days for repairs to be completed, you must, to the extent permitted by law, notify Braun directly, in writing, at the above address, of the unsuccessful repair(s) of the alleged defect(s) so that Braun can become directly involved in providing service pursuant to the terms of this limited warranty.

WHAT IS NOT COVERED

This Limited Warranty does not cover any of the following: defects in materials, components or parts of the product not attributable to Braun, any material, component or part of the product that is warranted by another entity (Note: the written warranty provided by the manufacturer of the material, component or part is the direct responsibility of that manufacturer); items that are added or changed after the product leaves Braun's possession; additional items installed at any dealership, or other place of business, or by any other party, other than Braun; normal wear, tear, usage, maintenance, service, periodic adjustments, the effects of condensation or moisture from condensation; mold or any damage caused by mold; imperfections that do not affect the product for its intended purpose; items that are working as designed but that you are unhappy with; problems related to mis-operation, misuse, mishandling, neglect or abuse, including failure to maintain the product in accordance with the owner's manual, or other routine maintenance such as inspections, lubricating, adjustments, tightening of screws, sealing, wheel alignments or rotating tires; damage due to accident or collision, including any acts of weather or damage or corrosion due to the environment; theft, vandalism, fire, or other intervening acts not attributable to Braun; damage resulting from tire wear or tire failure; defacing, scratches, dents or chips on any interior or exterior surface of the product, including those caused by rocks or other road hazards, damage caused by off road use, overloading or alteration of the product, or any of its components or parts.

Defects and/or damage to interior and exterior surfaces and other appearance items may occur at the factory or when the product is in transit. These items are usually detected and corrected at the factory or by

Braun® Limited Warranty

a dealer prior to delivery to the purchaser. You must inspect the product for this type of damage when you take delivery. If you find any such defect or damage you must notify the selling dealer, or Braun, at the time of delivery to have these items covered by this limited warranty and to have work performed on the items at no cost to you as provided by this limited warranty.

EVENTS DISCHARGING BRAUN FROM OBLIGATION UNDER WARRANTY

The following shall completely discharge Braun from any express or implied warranty obligation to repair or replace anything and void this warranty: misuse, neglect, collision, accidents, failure to provide routine maintenance (See Owner's Manual), unauthorized alteration, off road use, Acts of Nature, damage from weather or the environment, theft, vandalism, tampering, fire, explosions, overloading the product and odometer tampering.

LEGAL REMEDIES

Any action to enforce any portion of this limited warranty, or any implied warranty, must be commenced within six (6) months after expiration of the warranty coverage period designated above or the action will be barred because of the passage of time. Any performance of repairs shall not suspend this limitation period from expiring. Any performance of repairs after the warranty coverage period has expired, or performance of repairs regarding any thing excluded from coverage under this limited warranty shall be considered "good will" repairs, and they will not alter the terms of this limited warranty, or extend the warranty coverage period or the filing limitation period in this paragraph. In addition, since it is reasonable to expect that the product will need some service during the warranty period; this warranty does not extend to future performance. It only sets forth what Braun will do and does not guarantee anything about the product for any time period. Nothing in this warranty, or any action of Braun, or any agent of Braun, shall be interpreted as an extension of any warranty period or the filing limitation period in this paragraph. Some states do not allow a reduction in the statute of limitations, so this reduction may not apply to you.

WARRANTY REGISTRATION and MISCELLANEOUS

Your warranty registration records should be completed and delivered to the appropriate companies, including the Braun Delivery Checklist & Warranty form. That form must be returned to Braun within twenty (20) days of purchase. The Braun warranty will not be registered unless this warranty registration is completed and received by Braun. Failure to file this warranty registration with Braun will not affect your rights under this limited warranty as long as you can present proof of purchase, but it can cause delays in obtaining the benefits of this limited warranty, and it changes the start date of the warranty to the date of final assembly of the product by Braun.

Braun agrees to repair or replace any of its factory installed parts found to have substantial defects within the appropriate warranty period designated above, provided that the repair is authorized by Braun and carried out by an authorized service center (a Braun labor schedule determines the cost allowance for repairs). Braun will not honor any warranty claim for repairs or replacement of parts unless the claim is submitted with the appropriate paperwork, and the work is completed by an independent, factory authorized service center. The appropriate paperwork can be obtained by written or phone contact with Braun at the contact information in this warranty.

Braun reserves the right to designate where any warranty work can be performed. Braun also reserves the right to examine any defective workmanship or part prior to giving any authorization for warranty work. Braun's return authorization procedure must be adhered to in order to process any warranty claims.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.

LIMITED WARRANTY

Q'STRAIT provides limited warranty coverage on Q'STRAIT products (the "Products") as described in this Limited Warranty. For customers in the U.S.: this warranty gives you specific legal rights; you also may have other rights, which vary from state to state. For customers in the European Union: the purchaser may have additional legal rights under applicable national legislation governing the sale of consumer goods, and those rights (if applicable) are not affected by this warranty.

COVERED PRODUCTS AND LIMITATIONS:

Q'STRAIT's limited warranty coverage applies only to factory defects in materials and workmanship in the Products as follows:

- **QUANTUM** – 3 years* or 10,000 cycles.
- **Q'POD, QRT-3 Series, QRT-5 Series** – 5 years* limited warranty coverage.
- **QRT Max, QRT Deluxe, QLK-150, Q'UBE** – 3 years* limited warranty coverage.
- **QRT Standard, Q-5000, M-Series, QLK-110, INQLINE, INQLINE Loader** – 2 years* limited warranty coverage.
- **All other Products** – 1 year limited warranty coverage.

***Only valid if product is registered with Q'STRAIT.** Otherwise a 1 year limited warranty applies to all products.

Each of the warranty coverage periods runs from the date the Products are shipped from Q'STRAIT, and applies only to warranted defects that first manifest themselves and are reported to Q'STRAIT within the applicable warranty period. Q'STRAIT retains the right to determine to its reasonable satisfaction whether any claimed defect is covered by this warranty.

CERTAIN ITEMS ARE EXCLUDED FROM WARRANTY COVERAGE BY Q'STRAIT, AND THIS LIMITED WARRANTY COVERAGE DOES NOT APPLY TO:

1. Products which are not installed and maintained in accordance with Q'STRAIT's instructions.
2. Products which are subject to misuse, abuse, accident, negligence, or exposure to the elements or chemicals.
3. Products which are altered or not repaired by a Q'STRAIT authorized repair service.
4. Normal wear and tear, and routine maintenance.
5. Products which are not used in applications or in a manner approved by Q'STRAIT.

ALL STATUTORY OR IMPLIED WARRANTIES (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), CONDITIONS AND GUARANTIES ARE EXCLUDED AND DISCLAIMED TO THE FULLEST EXTENT ALLOWED BY LAW. If any implied warranties, conditions or guarantees are required under applicable law, they are limited to the minimum duration allowed by law (not longer than the duration of the applicable express limited warranty coverage). For customers in the U.S.: some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

REMEDIES UNDER THIS LIMITED WARRANTY

If a defect covered by this warranty occurs, Q'STRAIT (or one of its authorized dealers, as determined by Q'STRAIT) will repair or replace the defective Products, in its sole discretion. This "repair or replacement" remedy is the **exclusive remedy** under this warranty. Q'STRAIT has **no responsibility or liability for any incidental or consequential damages**, such as loss of use, interest or finance charges, the cost of repairs by unauthorized repair services, depreciation, etc., all of which are specifically **excluded and disclaimed** from this warranty. For customers in the U.S.: some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

RESPONSIBILITY OF PURCHASER

1. Any claims under this limited warranty must be made to Q'STRAIT within fifteen (15) days after the defect first arises.

2. The Products must be returned to Q'STRAIT (or its authorized repair facility, as determined by Q'STRAIT) within the warranty period for inspection and warranty service. The expense of disassembly, returning the Products for warranty service, and of returning the Products to the owner and reassembly after any warranty service has been completed, is the responsibility of the owner and will not be reimbursed by Q'STRAIT. Contact Q'STRAIT Customer Service for information on how to return Products.
3. If your Product includes a registration form it must be returned to Q'STRAIT within thirty (30) days after the Products are delivered to the purchaser.

Q'STRAIT reserves the right to improve its products through changes in design or materials without being obligated to the owners of other Products.

Q'STRAIT may be contacted at **800-987-9987** or via email at customersatisfaction@qstraint.com.

AngelTrax Vulcan™ Series V12HCNVR

12-Channel Mobile Network Video Recorder with Modular Design for Mass Transit Applications

WARRANTY, SERVICE AND SUPPORT

1. All MNVR hardware shall include a limited warranty of five (5) years parts and labor.
2. Unlimited telephone and email technical support shall be provided at no additional charge for the life of the system.
3. Additional extended warranty and service contracts shall be available.

Specifications, features and applications of use are subject to change without notice. ▼ 10/2018



1.800.673.1788 | www.angeltrax.com | Page 6 of 6



Support > Warranties & Guarantees

[VISIT ROSCOMIRRORS.COM](https://www.roscovision.com)

WARRANTIES & GUARANTEES

ROSCO COMMERCIAL WARRANTY

We warrant that all ROSCO mirror, camera, sun visor, and electronic vision products are free from defects in workmanship and materials for a period of ONE (1) YEAR (unless specified longer) from the date of receipt of the product. During the warranty period, we agree to provide a replacement for (or at our option repair) any ROSCO product and/or any one or more component parts of a ROSCO product, which malfunctions under normal use and service.

Upon discovering a defect, the customer must contact ROSCO for a return authorization and then must return the product, and/or component part, together with proof of date of receipt of the product, to ROSCO INC. 144-31 91 Ave. Jamaica, New York 11435. The customer and not ROSCO will be responsible for the payment of all removal, installation and transportation charges for return of defective products or components to ROSCO. Transportation charges for such return must be prepaid. The repaired or replaced equipment will be returned to the customer with transportation charges prepaid by ROSCO. Replacement (or repaired) products and/or component parts are warranted only for the unexpired term of the original warranty.

This warranty does not cover defects caused by neglect, misuse, incorrect application, incorrect installation, water damage, vehicle wash facilities, alteration or repair in any manner outside ROSCO's factory, or damage caused by the return shipment due to inadequate packaging or mishandling. If the alleged defect is due to any of these causes, the customer will be advised of the findings and asked what action is to be taken. If ROSCO is requested to repair the product, a repair charge estimate will be prepared and the customer's written permission (purchase order, repair, etc.) will be necessary to proceed with the repair of the product and/or component part. Transportation charges for such returns will be the responsibility of the customer.

This warranty may not be expanded by oral representation, written sales information, drawings or otherwise. Repair or replacement is the exclusive remedy for defective products under this warranty. This warranty is expressly in lieu of all other warranties, including any implied warranty of merchantability or any implied warranty of fitness for a particular purpose on any ROSCO product. ROSCO shall not be liable for any consequential or incidental damages for breach of any express or implied warranty on any ROSCO product.

NEWSLETTER SIGNUP

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Our Newsletter contains information regarding our newest products, upcoming product releases, and the latest industry information!

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Careers

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PRODUCTS

Backup Camera Systems

180/360 Surround Cams

Dual-Vision® Recording

Cyl-V HD Recorder

Backup Sensors

Mobileye Shield+

Parts/Accessories

ROSCOLive Cloud Storage

D•CAMS

SUPPORT

Warranties & Guarantees

Shipping Policies

<https://www.roscovision.com/support/warranties-guarantees>

[Shipping Policy](#)

[Rosco Returns Policy](#)

[Links & Resources](#)

[Dealers](#)

[Terms & Conditions](#)

[COVID-19 Updates](#)

CONTACT

1-800-227-2095

Sales@roscovision.com





Support > Warranties & Guarantees

[VISIT ROSCOMIRRORS.COM](https://www.roscovision.com)

WARRANTIES & GUARANTEES

ROSCO COMMERCIAL WARRANTY

We warrant that all ROSCO mirror, camera, sun visor, and electronic vision products are free from defects in workmanship and materials for a period of ONE (1) YEAR (unless specified longer) from the date of receipt of the product. During the warranty period, we agree to provide a replacement for (or at our option repair) any ROSCO product and/or any one or more component parts of a ROSCO product, which malfunctions under normal use and service.

Upon discovering a defect, the customer must contact ROSCO for a return authorization and then must return the product, and/or component part, together with proof of date of receipt of the product, to ROSCO INC. 144-31 91 Ave. Jamaica, New York 11435. The customer and not ROSCO will be responsible for the payment of all removal, installation and transportation charges for return of defective products or components to ROSCO. Transportation charges for such return must be prepaid. The repaired or replaced equipment will be returned to the customer with transportation charges prepaid by ROSCO. Replacement (or repaired) products and/or component parts are warranted only for the unexpired term of the original warranty.

This warranty does not cover defects caused by neglect, misuse, incorrect application, incorrect installation, water damage, vehicle wash facilities, alteration or repair in any manner outside ROSCO's factory, or damage caused by the return shipment due to inadequate packaging or mishandling. If the alleged defect is due to any of these causes, the customer will be advised of the findings and asked what action is to be taken. If ROSCO is requested to repair the product, a repair charge estimate will be prepared and the customer's written permission (purchase order, repair, etc.) will be necessary to proceed with the repair of the product and/or component part. Transportation charges for such returns will be the responsibility of the customer.

This warranty may not be expanded by oral representation, written sales information, drawings or otherwise. Repair or replacement is the exclusive remedy for defective products under this warranty. This warranty is expressly in lieu of all other warranties, including any implied warranty of merchantability or any implied warranty of fitness for a particular purpose on any ROSCO product. ROSCO shall not be liable for any consequential or incidental damages for breach of any express or implied warranty on any ROSCO product.

NEWSLETTER SIGNUP

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Testimonials

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PRODUCTS

Backup Camera Systems

180/360 Surround Cams

Dual-Vision® Recording

Cyl-V HD Recorder

Backup Sensors

Mobileye Shield+

Parts/Accessories

ROSCOLive Cloud Storage

D•CAMS

SUPPORT

Warranties & Guarantees

Shipping Policies

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[Rosco Returns Policy](#)

[Links & Resources](#)

[Dealers](#)

[Terms & Conditions](#)

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CONTACT

1-800-227-2095

Sales@roscovision.com



Warranty and Terms of Purchase:

This Terms of Purchase Agreement sets forth UHI Worldwide Inc.'s ("UHI") standards for the advertising, marketing, distribution, or use of its products. By implementation of any and all procurement order and/or completion of monetary transaction against an Invoice for UHI products, you and/or your Company (the "Purchaser") agree to these terms and conditions. If you do not agree to the terms and conditions of this Agreement, you should immediately cease all use and/or purchase of UHI's products.

Limited Warranty.

All UltraHeat brand of RV Heaters and heating items we manufacture carry a limited warranty under normal use against manufacturing defects from workmanship and material defects for up to one (1) year from the date of original purchase. This Limited Warranty covers only those defects which occur or exist within the one (1) year period referenced above. Any modification of UHI products, from original design and/or intended use, or improper installation shall VOID all warranties.

As of July 01, 2019; UltraHeat RV dedicated heat panels purchased will have their Limited Warranty expanded to the period of Life Time once registered online.

A stated exception in the stated warranty; Loss of product adhesion, while the proprietary adhesives used in UltraHeat's panels are designed to last for decades, proper installation surface preparation is solely in the hands of the installer and outside of the control of UHI. Even if properly dressed, the mounting surface itself may undergo continuing change that could affect the adhesive properties. "Goodwill" replacement of the product under this issue is at the sole consideration of UHI.

If any item is deemed to be covered under the Limited Warranty, UHI's obligations are limited to replacing the item itself at no additional cost.

An RGA (Returned Goods Authorizing) number is required prior, for all items returned for warranty consideration. Issuance of an RGA does not constitute an automatic issuance of credit or replacement; it allows the tracking of items being returned for testing and inspection. Returned items must include the original product label attached with the serial number clearly legible, along with a copy of the original sales receipt.

Disclaimer of Warranties.

UHI MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. UHI DISCLAIMS ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NONINFRINGEMENT.

To the extent that applicable state and/or federal law prohibits the exclusion of any remedy permitted under state, federal, or international law, any such remedy, including, but not limited to, implied warranties of merchantability, fitness, use, or purpose, is limited to one (1) year from the date of the original purchase.

Limitation of Liability.

IN NO EVENT SHALL UHI BE LIABLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, INCLUDING REIMBURSEMENT FOR SERVICE CHARGES, INSPECTIONS, REPAIRS, INBOUND SHIPPING, LOST PROFITS, OR COST OF PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES.

Marketing Practices.

Purchaser agrees to put forth its best efforts to actively and diligently promote the sale of UHI's products. Purchaser shall advertise itself as an authorized agent of UHI's products. All advertised pricing associated with the Purchaser, printed or digital, may NOT be lower than Manufacturer's Suggested Retail Price values as published by UHI, without prior written permission of an authorized officer of UHI.

Advertisements.

All advertising of any products contained within a current Sales Order, Invoice, or future purchases of UHI products that the Purchaser either has direct control or association with shall contain and reference UHI, its trademarks, trade names, and logos. Purchaser is granted the right to use product trademarks, trade names, and logos in advertising, but only where such advertising directly refers to the products or states the fact that the Purchaser is a distributor for such products on behalf of UHI. Such advertising must reference these marks as proprietary to UHI. Purchaser will not advertise in any publication or communications medium that could damage the goodwill of UHI. Purchaser shall not remove, alter, or otherwise modify any identification marks or trademarks affixed by UHI to products.

Compliance with Laws.

Purchaser assumes all knowledge of applicable laws and is responsible for compliance with any such laws. Purchaser may not advertise market, distribute, or use UHI's products in any way that violates applicable state, federal, or international laws, regulations, or other governmental requirements.

Force Majeure.

UHI shall not be liable for damages resulting from delays in shipment or inability to ship due to normal production and shipment delays or those resulting from acts of God, fires, floods, wars, sabotage, accidents, labor disputes or shortages, plant shutdown or equipment failure, voluntary or involuntary compliances with any law, order, rule or regulation of governmental agency or authority; or inability to obtain material, equipment or transportation, or arising from any other contingency, circumstances or event beyond the control of the UHI.

Amendments.

UHI reserves the right, at any time, to modify, alter, or update the terms and conditions of this Agreement without prior notice. Modifications shall become effective immediately, upon publication. Your continued marketing, sale and/or use of UHI products after amendments are posted or received constitute an acknowledgement and acceptance of the Agreement and its modifications. Except as provided in this paragraph, this Agreement may not be amended.

Entire Agreement.

This Agreement constitutes the entire agreement and understanding between UHI and Purchaser with respect to the subject matter hereof and supersedes and terminates all other prior commitments, arrangements, or understandings, both oral and written between the parties with respect thereto.

Severability.

If any provision of this Agreement shall be unlawful, void, or unenforceable for any reason, the other provisions (and any partially-enforceable provision) shall not be affected thereby and shall remain valid and enforceable to the maximum possible extent.

Effect of Waiver.

No waiver by UHI or the Purchaser of any provision of this Agreement shall be deemed a waiver of any other provision hereof. None of the terms of this Agreement shall be deemed to have been waived or altered by any act or acquiescence on the part of either party unless such waiver or alteration is in writing and signed by officers of UHI and the Purchaser.

Forum Selection and Applicable Law.

Any legal action related to or arising out of this Agreement shall be brought only in the United States District Court for the Northern District of Indiana, South Bend Division, or in a state court in Elkhart or St. Joseph Counties, Indiana. If such legal action is initiated in any other court, than the parties will voluntarily agree to have such action transferred to or re-filed in the United States District Court for the Northern District of Indiana, South Bend Division, or in a state court in Elkhart or St. Joseph Counties, Indiana. This Agreement will be governed by the laws of the State of Indiana without regard to its conflict of law provisions.

PRODUCT LIMITED WARRANTY POLICY

LIMITED WARRANTY

SAFE FLEET Bus and Rail warrants its products against defects in materials and workmanship for the time stated and to the extent and subject to the limitations set forth below:

STOP ARMS AND CROSSING ARMS: Defender Series - Three (3) years on all components, 7-Series and Air – Two (2) years on all components, from the date of manufacture (as evidenced by the SAFE FLEET product label on the product).

PROLO, TRIPLE VALUE, DUAL PURPOSE, STANDARD SAFETY VENT, POWER and MSV ROOF HATCHES: Three (2) years on all electrical components, Five (5) years on all other components from the date of manufacture (as evidenced by the SAFE FLEET product label on the product).

LED ROOF MOUNTED STROBE LIGHTS: Five (5) years from the date of manufacture (as evidenced by the SAFE FLEET product label on the product).

DRIVER ALERT AND MERGE ALERT: Five (5) years from the date of manufacture (as evidenced by the SAFE FLEET product label on the product).

FLUORESCENT INTERIOR LIGHTING AND OVERHEAD PARCEL RACK SYSTEMS: Five (5) years to the original purchaser from the original date of product shipment. SAFE FLEET will repair or replace at their option within this warranty period. Repaired or replaced products will remain under warranty for the remainder of the original warranty period.

LED INTERIOR LIGHTING SYSTEMS: Twelve (12) years from the date of manufacture. The malfunction of 14 adjoining or 5% of the total LED's in the same light fixture of any length in a solid state LED interior lighting system will constitute a warranty claim. It is normal for LED's to experience a reduction of light output as much 30% over the life of the product and this reduction of light output does not constitute a warranty claim.

STEP TREAD: Three (3) years from date of manufacture.

ALL OTHER SAFE FLEET PRODUCTS (Including all service/replacement parts): One (1) year from the date of manufacture.

This limited warranty extends only to the original purchase of products from SMI by an original equipment manufacturer, dealer, or distributor (the "Buyer").

All product warranties apply ONLY to defective components, not full assemblies. SMI's sole and exclusive obligation (and Buyer's sole and exclusive remedy) with respect to this limited warranty shall be to, at its option, provide repair or replacement (provided suitable replacement parts are available), or issue credit (non-repairable or non-replaceable parts) ONLY for those components assessed by SMI as defective. Repaired or replaced products will remain under warranty for the remainder of the original warranty period.

EXCLUSION FROM COVERAGE

ALL PRODUCTS: This warranty applies only to the operation or use of the covered product under conditions for which it was designed, and does not cover any loss or damage resulting from external causes beyond our control such as dropping the product, collision with an object, theft, vandalism, environmental conditions, such as fire, flooding, windstorm, hail, or earthquake, misuse, abuse, neglect or accidental damage resulting from improper use of any electrical power source, service not authorized by SAFE FLEET, negligent or improper installation processes or operation, failure to follow documented procedures, use of non-SAFE FLEET parts in conjunction with products of SAFE FLEET's manufacture, abuse, general misuse of the product, or acts of God.

STEP TREAD PRODUCTS: SAFE FLEET shall have no liability whatsoever to the buyer in the event the product becomes defective if such defect is caused in whole or in part by cuts, tears, vandalism, fire, willful destruction, damage from high heels, pivot points, spiked footwear, improper installation or maintenance, solvent based cleaners, sub-floor and / or substrate irregularities, moisture, accidents or acts of God.

Routine and preventive maintenance must be performed by the Buyer as recommended by the manufacturer. Loss or damage resulting from the failure to abide by the manufacturer's recommended maintenance is specifically not covered by this limited warranty.

Any attempt to deface, remove, alter, or paint over the serial numbers and/or date of manufacture will void the warranty.

PRODUCT LIMITED WARRANTY POLICY

GENERAL POLICY

1. Failure to comply with above statements will void this limited warranty.
2. SAFE FLEET assumes no responsibility or liability for the expense incurred for removal and/or installation of product requiring service and/or repair; or for the expense of packaging and handling; or for the handling of product returned to sender after necessary service or repair.
3. Except as expressly provided in this limited warranty, there are no other express or implied warranties for the products; including without limitation any implied warranties of merchantability or fitness for a particular purpose.

IN NO EVENT WILL SAFE FLEET BE LIABLE FOR MONETARY DAMAGES (REGARDLESS OF THE CAUSE AND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT OR IN TORT, INCLUDING NEGLIGENCE) OR FOR ANY LOST PROFITS, LOST SAVINGS, INCIDENTAL DAMAGES OR OTHER CONSEQUENTIAL DAMAGES, OR FOR PUNITIVE DAMAGES, EVEN IF SAFE FLEET HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY BUYER BASED ON ANY THIRD PARTY CLAIM OR FOR ANY COSTS OR ATTORNEY FEES INCURRED BY THE BUYER.

THIS LIMITED WARRANTY POLICY SUPERCEDES ALL PREVIOUS WARRANTY POLICIES. SAFE FLEET RESERVES THE RIGHT TO MODIFY, WITHOUT NOTICE, THIS LIMITED WARRANTY POLICY AT ANY TIME, AND AT SAFE FLEET'S SOLE DISCRETION.

To request warranty service you must call SMI at (800) 951-7867 within the warranty period stated above, with the SMI part number and a complete description of the problem, or send an e-mail to: warrantysmi@safefleet.net

If warranty service is required, SMI will issue a Return Material authorization number (RMA). You must return any RMA materials in sufficient packaging to avoid damage, prepay shipping charges (if the RMA is accepted SAFE FLEET will ship replacement parts at no charge to return address), and insure the shipment or accept the risk of loss or damage during shipment. To be considered for credit, **THE RMA NUMBER MUST BE IDENTIFIED ON ALL RETURNED PRODUCTS AND PARTS MUST BE RETURNED WITHIN 30 DAYS OF THE INITIAL RMA FILE DATE.**



BETTER VALUE • BETTER OPTIONS • BETTER LIGHTING

OPTRONICS® LED LIFETIME LIMITED WARRANTY



Optronics LED lighting products are warranted for the lifetime of original purchaser from defects in workmanship and/or materials only. Optronics will replace the product to the original purchaser or refund the purchase price if the product fails because of defect due to workmanship and/or materials. This limited lifetime warranty covers every and all diodes within each unit. Connector failure is covered by our three year limited warranty. The LED Lifetime Warranty does not apply to severe applications such as construction or off-road use and does not cover damage resulting from accident, misuse, or abuse. If warrantor is unable to provide replacement and repair is not commercially practicable or cannot be timely made, then warrantor will refund the purchase price. This offer does not constitute in any way a product guarantee and Optronics does not assume any obligations beyond replacement of the product. This warranty is not transferable and applies to the original installation of the product.

INCANDESCENT 3-YEAR LIMITED WARRANTY

Optronics' incandescent 12-volt lighting products are warranted for a period of three years from defects in workmanship and/or materials only. Optronics will replace the product to the original purchaser or refund the purchase price if the product fails because of defect due to workmanship and/or materials within the limited warranty period from the date or lot code printed on the product. If warrantor is unable to provide replacement and repair is not commercially practicable or cannot be timely made, then warrantor will refund the purchase price. This offer does not constitute in any way a product guarantee and Optronics does not assume any obligations beyond replacement of the product. This warranty is not transferable and applies to the original installation of the product.

CONSPICUITY TAPE LIMITED WARRANTY

Optronics' conspicuity tape products are warranted for a period of seven years from defects in workmanship and/or materials and adhesion failure only. Optronics will replace the product to the original purchaser or refund the purchase price if the product fails within the limited warranty period from the date or lot code printed on the product. If warrantor is unable to provide replacement and repair is not commercially practicable or cannot be timely made, then warrantor will refund the purchase price. This offer does not constitute in any way a product guarantee and Optronics does not assume any obligations beyond replacement of the product. This warranty is not transferable and applies to the original installation of the product.

PRODUCT REPLACEMENT PROCEDURES

To be eligible for Limited Warranty consideration, please contact your local authorized distributor/dealer or Optronics' customer service. Optronics' authorized distributor/dealer has full authority to issue an upfront warranty replacement/credit. If the product is found to be out of warranty at a later date, Optronics' customer service will rebill the customer for the replacement/credit. Customer service will determine if the failed product requires a return to Optronics. If return is required, a RETURN GOODS AUTHORIZATION NUMBER (RGA) will be issued.

THESE WARRANTIES DO NOT COVER DAMAGE RESULTING FROM ACCIDENT, MISUSE, OR ABUSE. CONSEQUENTIAL DAMAGES ARE EXCLUDED UNDER THIS WARRANTY AND ANY IMPLIED WARRANTY, EXCEPT FOR PERSONAL INJURY. THIS WARRANTY IS OFFERED IN LIEU OF ALL OTHER WARRANTIES. HOWEVER, MODIFICATION, LIMITATIONS OR EXCLUSIONS ON IMPLIED WARRANTIES MAY BE UNENFORCEABLE IN SOME STATES. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.



OKLAHOMA

401 South 41st Street East
Muskogee OK 74403
Warranty Contact – Michelle Majors
Phone – 800-364-5483 ext. 349
Fax – 918-683-9517



INDIANA

3535 Corrie Drive
Goshen IN 46526
Warranty Contact – Keia Rolston
Phone – 800-826-5483 ext. 120
Fax – 574-389-0041



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

About Your Warranty

Department Overview

Creative Bus Sales would like to thank you and congratulate you on the purchase of your recent vehicle. We value your trust in our company for your transportation needs. Our nationwide network of Parts, Service, Warranty, and Customer Care departments is dedicated to ensuring that we continue to fulfill or exceed your expectations.

Below you will find an overview of your Creative Bus Sales support team in the event any issues or concerns arise.

Creative Care Department

Our Creative Care Department is here to respond to your inquiries or concerns about your vehicle purchase. Creative Care is available to help resolve any issue that may arise over the serviceable life of your vehicle. Creative Care is also your primary resource to assist you in reaching the correct department or individual that you desire to speak with. To reach our Creative Care Department, call 1.844.374.8915 or email CreativeCare@CreativeBusSales.com

Service Department

Our Service Department will work diligently to ensure that your vehicles are maintained to the highest standard. Creative Bus Sales Service Department welcomes our customers' vehicles for any maintenance or service-related concerns. Creative Bus Sales has 18 service locations located across the United States that are ready to assist you. With an appointment, our service team will make sure to get your vehicle back on the road as quickly as possible. To reach our Service Department, call 1.800.326.2877 or email CreativeCare@CreativeBusSales.com

Parts Department

Creative Bus Sales stocks a large variety of parts to ensure we have what you need to keep your vehicles operational. The Parts Department staff includes experienced parts sales associates, shipping and receiving associates, inventory specialists, and delivery drivers where applicable. To reach our Parts Department, call 1.888.993.5040 or email Parts@CreativeBusSales.com

Warranty

Our Warranty Department will work for you to address any warranty concerns that you have with your vehicle. Creative Bus Sales Warranty Department will act as liaison between the customer and chassis manufacturer to expedite a satisfactory resolution for your concerns. Our Warranty Department will ensure that all your warrantable concerns are corrected to the manufacturer standards. To reach your Warranty Department, call 1.800.326.2877 or email Warranty@CreativeBusSales.com.



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Warranty Claims

If the bus has an issue during the warranty period, please contact our warranty department at Warranty@CreativeBusSales.com so that they can assist. The following information below will be needed in order to determine warranty coverage.

- **VIN**
- **Mileage**
- **Pictures of the issue (if applicable)**

Warranty FAQs

If you are near a Creative Bus Sales location, we invite you to come and visit us for all warranty repairs. We do realize that you may not be close to any of our service locations. If that is that case our warranty team will assist in locating a repair facility that can complete the needed warranty repairs. After determining where the repairs will be completed, a repair estimate must be provided to the Warranty Department. No repairs are authorized to be completed for warranty purposes until the Warranty Department has approved the estimate provided.

Below you will find a list of FAQs' regarding the warranty process. If there are still questions, please do not hesitate to reach out to Warranty@CreativeBusSales.com and someone will respond promptly.

How long does it take for someone to respond after I contact Warranty@CreativeBusSales.com?

Our targeted response time is within 24 hours. However, we strive to achieve a quicker response time when possible.

Where can I go for warranty service?

Depending on the vehicle concern, your Warranty Administrator will discuss with you the best way to get your bus repaired. We invite you to come into any of our Creative Bus Sales service locations for any repair issues. If you are not close to one of our facilities, please contact Warranty@CreativeBusSales.com and our team will be happy to assist you in locating a manufacturer authorized warranty repair facility near your area.

If the issue you are experiencing is OEM-related (Ford, Chevy, Dodge, Freightliner, International) — such as engine, transmission or a check engine light — the bus must be taken to the appropriate manufacturer dealership in your area. Creative Bus Sales is not authorized to complete warranty repairs on any OEM-related failure. Our Warranty Department can also assist in locating an OEM dealership that can service your vehicle. We can always be reached at Warranty@CreativeBusSales.com.

What procedure do I follow when warranty repairs are made at my own facility?

Warranty repairs should not be performed without contacting Warranty@CreativeBusSales.com for prior authorization. Once Creative Bus Sales is contacted we will acquire authorization from the manufacturer and provide you with a claim number so you can receive a credit/payment for the warranty repairs that you performed. Failure to get prior authorization before repairs are completed may result in claim denial.



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

How do I get parts for warranty repairs performed at my own facility?

Please contact Warranty@CreativeBusSales.com and your Warranty Administrator will acquire the authorizations needed and arrange for parts to be shipped to your location at no charge. However, it is imperative that all defective parts be kept until up to 90 days after repair has been completed or otherwise notified. Neglecting to do so can result in claim denial.

Does warranty cover the cost of transporting the bus to and from authorized warranty repair centers?

No, you are responsible for the cost of transporting the bus to and from the authorized warranty service center.

Is towing covered under warranty?

If the failure is OEM-related — engine, transmission, check engine light, etc. — the tow will be covered under warranty through Ford, Chevy or Dodge roadside. Again, the tow must be set up through the perspective roadside customer service line. If you need OEM roadside assistance please reach out to Warranty@CreativeBusSales.com and a Warranty Administrator can assist.

- Ford roadside: 1.800.241.3673
- Chevy roadside: 1.888.899.1327
- Freightliner: 1.800.367.6372
- International: 1.800.336.4500

If the failure is related to the aftermarket body side of the bus towing is not covered.

What do I do when I have problems with the bus while under warranty but cannot get it in for repairs right away?

If you have a warranty concern that you are unable to address at the time please contact Warranty@CreativeBusSales.com so we can document the complaint with the manufacturer.

How long does it take to receive credit for my warranty claims?

We want to expedite the processing of your warranty claims. We are committed to crediting you within thirty days after receipt of all the paperwork and failed parts.

Note: It is extremely important to file your Warranty claim within 30 days of the repair, or your claim could be subject to disapproval.