

The following documentation is an electronicallysubmitted 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.



WOASIS	Jump to: PRCUID 🟦 😡 🦃 Home 🌽 Personalize 🚳 Accessibility 🛜 App Help 🌾 About 🔟
Velcome, Robert M Ross	Procurement Budgeting Accounts Receivable Accounts Payable
Solicitation Response(SR) Dept: 0810 ID: ESR0209230000003663 Ver.: 1 Function: New Phase: Final Modified by batch , 02/14/2023	
Header 🖉 66	
	🗮 List View
General Information Contact Default Values Discount Document Information Clarification Request	
Procurement Folder: 1157978	SO Doc Code: CRFQ
Procurement Type: Central Master Agreement	SO Dept: 0810
Vendor ID: VS0000011255	SO Doc ID: DMT2300000010
Legal Name: CREATIVE BUS SALES INC	Published Date: 2/7/23
Alias/DBA:	Close Date: 2/14/23
Total Bid: \$0.00	Close Time: 13:30
Response Date: 02/14/2023	Status: Closed
Response Time: 12:54	Solicitation Description: 138" Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle
Responded By User ID: CreativeBus	Total of Header Attachments: 66
First Name: Nick	Total of All Attachments: 66
Last Name: Corley	
Email: biddepartment@creativebuss	
Phone: 9094655528	



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:	1157978		
Solicitation Description:	138" Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle		
Proc Type:	Central Master Agreement		
Solicitation Closes		Solicitation Response	Version
2023-02-14 13:30		SR 0810 ESR02092300000003663	1

VENDOR					
VS0000011255 CREATIVE BUS SALES	INC				
Solicitation Number:	CRFQ 0810 DMT2300000010				
Total Bid:	0	Response Date:	2023-02-14	Response Time:	12:54:07
Comments:	There are no applicable discounts.				

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	138" WB DRW Narrow Vehicles	v Body Cutaway	0.00000	EA	0.000000	0.00
Comm	Code	Manufacturer		Specifica	ition	Model #
251015	02					

#### **Commodity Line Comments:**

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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. See attached Exhibit A Pricing page



## Table of Contents

# State of West Virginia CRFQ DMT2300000010, 138" Wheelbase, Dual Rear Wheel, Narrow Body, Cutaway Vehicle:

- 1. Tab 1 Letter of Transmittal
- 2. Tab 2 Experience and Qualifications
- 3. Tab 3 Required Documents
  - a. Bid Form 1 Technical Service and Parts Locations
  - b. Bid Form 2 Air and Water Pollution Certification
  - c. Bid Form 3 Disadvantaged Business Enterprise
  - 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 Certificate of Understanding and Acceptance
  - i. Bid Form 9 Certification of Restrictions on Lobbying
  - j. Bid Form 10 Certification of Compliance with FTA's Bus Testing Requirements
  - k. Required Bid Documentation Checklist
  - I. Documentation to be Submitted with Bid Form
  - m. Training Acknowledgement
  - n. References
  - o. Addenda and Addenda Acknowledgements
  - p. Designated Contact and Certification/Signature Form
  - q. Business Registration Certificate
  - r. Purchasing Affidavit
  - s. Conversion Location and Activities
  - t. Manufacturer Certification Signatures
  - u. Pre-Award Buy America Reports
- 4. Tab 4 Specifications
  - a. Specification Documentation Summary



- b. Floorplans
- c. Weight Calculations
- d. Glaval PrimeTime Standard Build Specifications
- e. Detail of Body Materials
- f. Mechanical Description
- g. PrimeTime Body Construction
- h. Ford E-Series Technical Specifications
- i. Altoona Test
- j. FMVSS Standards/Certification
- 5. Tab 5 Supporting Documents
  - a. Water Test Procedure
  - b. Fast Idle System
  - c. Backup Camera
  - d. Stepwell
  - e. Entry Lift and Rear Door
  - f. Energy Absorbing Bumper
  - g. Wheelchair Lift
  - h. Interlock
  - i. Air Conditioning
  - j. Heater
  - k. Floor Covering
  - I. Seating
  - m. Driver's Seat
  - n. Wheelchair Securement QRT 360
  - o. Destination Sign
  - p. Passenger Signaling System
  - q. Mobile PA System
  - r. Sound-off Strobe Light
  - s. Radio Install Prep
  - t. Dual Purpose Safety Vents
  - u. Rust Proofing and Undercoating
  - v. Security Camera



- w. Exterior Vinyl Colors
- x. Authorized Signatory Letter
- y. Financial Stability Statement
- 6. Tab 6 Warranties
  - a. Warranty Synopsis
  - b. Warranty Provider Locations
  - c. Ford Warranty
  - d. Glaval/Manufacturer Warranty
  - e. Air Conditioning
  - f. Creative Care Owner's and Warranty Guide
- 7. Tab 7 Price Proposal
  - a. Exhibit A Pricing Page

<u>Sectio</u> <u>Refere</u>		DOCUMENTATION TO BE SUBMITTED WITH BID:
3	9.2	Chassis: include Load leveling System: provide product description, warranty information and product literature.
3	.3	Engine shall be 6.8 Liter V-10 gasoline engine: provide product description, warranty information and product literature.
<u>√</u> _6	.10	Radio: AM/FM Stereo with CD: provide product description, warranty information and product literature.
3	.8	Transmission: provide product description, warranty information and product literature.
<u>√</u> 3	.5	Radiator and Cooling System: provide product description, warranty information and product literature.
<u>√</u> 3	.6	High Idle System, provide product description, warranty information and product literature.
<u> </u>	.2	Brakes: provide product description, warranty information and product literature.
- <u>-</u> 4.	.0	Tilt Wheel, Cruise Control and Power Steering: provide details of water testing procedures.
· · · <u>· · · · · · · · · · · · · · · · </u>	16	Wheelbase: provide length of proposed wheelbase.
to	9.4	Rear View Back-Up Camera: provide product description, warranty information and literature.
	3	Wheels: provide product description, warranty information and product literature.
	4	Tires: provide product description, warranty information and product literature
4.	5.6	Battery: provide product description, warranty information and product literature
···· ································	5.5	Alternator: provide product description, warranty information and product literature
. <sup>™</sup>		Front and Rear Heating and Air Conditioning: provide product description, warranty information, product literature.
	8	Body Specifications: provide a description of how conversion will take place and meet the specification requirements. Provide Actual Interior height and Body length of proposed vehicle.
	) ·	Sealant, Rustproofing and Undercoating: provide product description, warranty information and product literature.

----

. \_\_\_\_\_

\_\_\_\_

### Revised 10/27/2014

	<u>√</u> 5.1	Passenger Doors and Stepwells: Provide product description, dimensions, description of interlock system of all doors and locks to be provided.
	<u>√</u> 5.8	Flooring: provide a description of product to be used, samples of floor covering, colors to be used and assembly process.
	<u>√</u> 6.1	Seats, Grab Handles, Passenger restraints: provide product description, warranty information and product literature.
	<u>√</u> 6.2	Mobility Aid/ Occupant Restraint Systems: provide product description, warranty information and product literature.
	6.13	Training: submit letter of understanding to the terms in this Section.
	<u>√</u> 6.8	Security Cameras System Including Playback: provide product description, warranty information and product literature.
	7.12.2	Warranty on Complete Vehicle.
	7.12.3	Warranty on Basic Vehicle Structure.
	7.12.5	Warranty: warranties to be provide on subsystems and components.
	N/A) 11.3	Complete two (2) bids in binder form -one (1) marked for DTMF-PT.
	<u>√</u> 13.2 A	Complete mechanical description of vehicle, its construction and equipment including manufacturer's model name and / or number.
· · · · · · · · · · · · · · · · · · ·	13.2 B	Proposed interior floor plans, showing detailed dimensions including the location of the wheelchair securement system.
· · · · · · · · · · · · · · · · · · ·	13.2 C	Curb weight (empty weight) and gross vehicle weight rating (GVWR of vehicle.
	<u> </u>	Exterior Vinyl Colors: provide samples/chart of available colors.
	<u>√</u> 13.2 H	Identification of the conversion location of the van and listing of activities to take place at the location.
н 1997 - Алтанан Алтан 1997 - Алтанан Алтан	<b>√</b> _13.2 I	A list of five (5) users names, addresses, emails and telephone numbers who have been provided similar equipment.
	<u>√</u>	No Debt Affidavit
	$\checkmark$	Addendum Acknowledgement

\_\_\_\_\_



CRFQ DMT2300000010 138" Wheelbase Dual Rear Wheel (DRW) Narrow Body Cutaway Vehicle

13.2.D Exterior Vinyl Colors

As this is an electronic submittal, we cannot provided vinyl color samples. Rather, we will use whatever vinyl and paint colors provided to us by the individual agencies in order to match new units to their existing fleet.



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.

0 ~

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

J.R. Sauder Sr. Vice President

## Exhibit A - CRFQ DMT23\*10 138" Wheelbase Dual Rear Wheel (DRW) Narrow Body Cutaway Vehicle

CLASS	ITEM DESCRIPTION	UNIT PRICE PER VEHICLE	ESTIMATED QUANTITY	EXTENDED PRICE
Α	Vehicle Non-Accessible / Paratransit Package	\$107,650.00	5	\$538,250.00
В	Vehicle with One Wheelchair (WC) Positions/ Paratransit Package	\$121,552.00	5	\$607,760.00
C	Vehicle with Two Wheelchair (WC) Position / Paratransit Package	\$123,507.00	5	\$617,535.00
D	Vehicle/Extended Length/ Front Lift / 3 WC Positions, Paratransit Package	\$127,965.00	5	\$639,825.00
E	Vehicle/ One Wheelchair (WC)/ Fixed Route Package	\$129,186.00	5	\$645,930.00
F	Vehicle/Two WC / Fixed Route Package	\$131,230.00	5	\$656,150.00
G	Vehicle/ Extended Length / Front Lift / Three Wheelchair Positions/ Fixed Route Package	\$135,741.00	5	\$678,705.00
н	Vehicle/ One WC Position / Fixed Route Package / Full Bus Paint or 3/4 Bus Body Paint, Expanded Graphics	\$133,286.00	5	\$666,430.00
I	Vehicle / 2 WC Positions / Fixed Route Package / Full Bus Paint or 3/4 Bus Body Paint, Expanded Graphics	\$135,330.00	5	\$676,650.00
J	Vehicle / Extended Length / Fixed Route Package / Front Lift / Three WC Positions/ Full Bus Paint or 3/4 Bus Body Paint, Expanded Graphics,	\$140,441.00	5	\$702,205.00
АА	Option On-Board Automatic Audio-Visual LED Display Voice Announcement System	\$6,600.00	5	\$33,000.00
		TOTAL BI	D FOR EVALUATION	\$6,429,440.00

\*Complete form provided. \*Please note these are only estimated quantities and do not reflect any guarantee of purchase. \*The DPT may purchase more or less as needed.

\*Please do not alter pricing page.



## Letter of Transmittal

Dear Bid Clerk,

Thank you and The State of West Virginia for the opportunity to submit a response to CRFQ 0810 DMT2300000010, 138# Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle.

Our understanding of the scope of work pertaining to this Request for Quote 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 in 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 vehicles are built to meet all bid specifications and amendments unless otherwise noted in our exceptions list: Our submittal makes no exceptions to the solicitation terms and conditions.

The resulting contract will be for up to fifty (50) 138" wheelbase, dual rear wheel, narrow body, cutaway vehicles with related necessary components, and selected options. The contract shall be a one (1) year plus one (1) year extension term. The enclosed offer, specifications and statements are valid for ninety (90) days after bid opening February 14, 2023.

The information contained in our proposal contains our qualifications to perform the required work, detailed specifications, warranties, and descriptions of our facilities and staff. Your expected delivery will be within one hundred fifty (150) days after we receive a purchase order.

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

Sincerely,

Nick Corley | Sales Operations Manager Creative Bus Sales, Inc. 800-326-2877 ncorley@creativebussales.com



## **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 has 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** Over 600 Paratransit Buses & Vans Florida (FDOT) • 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 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 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, "first hand", 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.

The 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. A 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 Kanawha Valley customers.

#### 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 warranties and service as



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 downtown and a better overall experience for the KVRTA 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. A complete description of the 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 building 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 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
- Matthew 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
- 2. Sacramento, CA
- 3. Canby, OR
- 4. Mukilteo, WA
- 5. Phoenix, AZ
- 6. Albuquerque, NM
- 7. Colorado Springs, CO
- 8. Irving, TX
- 9. Lewisville, TX
- 10. Tyler, TX

- 11. Rogers, AR
- 12. Slidell, LA
- 13. Jackson, MS
- 14. Elkhart, IN
- 15. Buffalo, NY
- 16. Canonsburg, PA
- 17. Carlstadt, NJ
- 18. Hudson, NH
- 19. Jacksonville, FL
- 20. Davie, FL



21. Orlando, FL

22. Charlotte, NC

23. College Park, GA

Notices should be sent c/o

Mike WilsonCreative Bus Sales, Inc.9365 Counselors Row, Ste. 112, Indianapolis, IN, 46242Phone: 800.326.2877Fax: 909-465-5529Email: 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 to 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.

#### CERTIFICATION FOR AIR & WATER POLLUTION MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

The Vendor certifies that the vehicles proposed:

**ARE** X 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.

2-3-2023

Date

Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

#### DISADVANTAGED VEHICLE BUSINESS ENTERPRISE VENDORS/ MANUFACTURERS CERTIFICATION

#### MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

#### (Check appropriate statement)

- The Vendor, <u>if a transit vehicle manufacturer</u>, 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.
- X The Vendor, <u>if a non-manufacturing supplier</u>, 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.

2-3-2023
Date
4
h
Authorized Signature
Nick Corley
Title

Creative Bus Sales, Inc.

## BUY AMERICA CERTIFICATION ROLLING STOCK MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

#### **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:

2-3-2023 Date

Authorized Signature

Creative Bus Sales, Inc.

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

## FEDERAL MOTOR VEHICLE SAFETY STANDARDS CERTIFICATION

#### MANDATORY BID FORM - MUST BE SUBMITTED WITH BID

The vendor hereby certifies that it shall submit, as required by Title 49 of the CFR, Part 663 - Subpart D, it's 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.

2-3-2023	
Date	
71	
Authorized Signature	

Authorized Signature

Sales Operations Manager Title

Creative Bus Sales, Inc. Company Name

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

## MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

Creative Bus Sales, Inc.	hereby certifies that it
IS or	
<u>X</u> IS NOT (specify one) included on the. information available at <u>https://www.sa</u>	
<u>2-3-2023</u> Date	
Authorized Signature	
Sales Operations Manager	

Creative Bus Sales, Inc.

#### MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

#### 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),

<u>Creative Bus Sales, Inc.</u> (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),

<u>Creative Bus Sales, Inc.</u>, 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 <u>ET SEQ</u>. ARE APPLICABLE THERETO.

- Sales Operations Manager Signature and Title of Authorized Official

## BID FORM #8 MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

## 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.

	2-3-2023
Date	^
~	$\lambda$
Authoriz	zed Signature
Title	Sales Operations Manager
<u></u>	Creative Bus Sales, Inc.
Compan	y Name

### SPECIFICATION COMPLIANCE

NOTE: <u>Please check</u> if what is offered is in exact compliance with specifications. Any discrepancies must 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.

- X 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.

## BID FORM #9 MANDATORY BID FORM – MUST BE SUBMITTED WITH BID 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 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 truthfulne and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contracto understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

Authorized Signature 2-3-2023 Date

## CERTIFICATION OF COMPLIANCE WITH FTA'S BUS TESTING REQUIREMENTS

The undersigned (Vendor/Manufacturer) certifies that the vehicle offered in this procurement complies with 49 U.S.C. 5318, as amended by MAP-21, and FTA regulations, "Bus Testing," 49 CFR Part 665.

The undersigned understands that misrepresenting the testing status of a vehicle acquired with Federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regula on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29.

2-3-2023

Date

Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

Company 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:	1157978		Reason for Modification:
Doc Description:	138" Wheelbase, Dual Rear	Addendum No. 1	
Proc Type:	Central Master Agreement		
Date Issued	Solicitation Closes	Solicitation No	Version
2023-01-18	2023-01-30 13:30	CRFQ 0810 DMT2300000010	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		
Street : Counselors Row, Suite 112		
City : Indianapolis		
State : Indiana	Country: U.S.A.	<b>Zip</b> : 46240
Principal Contact : Matthew Mashuda, Transit	Bus Sale	
Vendor Contact Phone: 422-922-0184	Extension:	
FOR INFORMATION CONTACT THE BUYER		
David H Pauline 304-558-0067		
david.h.pauline@wv.gov		
·		
Vendor 4		
Signature X	FEIN# 33-0388707	DATE 2-3-2023

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. Bid opening date and time remain January 10, 2023 at 1:30 pm est.

No other changes.

Federal Terms and Conditions Apply

INVOICE TO		SHIP TO	)			
PUBLIC TRANSIT DIVIS	PUBLIC OF	PUBLIC TRANSIT DIVISION OF				
BLDG 5 RM 663		KANAWI REGION TRANSF AUTHOF				
1900 KANAWHA BLVD I	Ξ	1550 FO	URTH AVE			
CHARLESTON	WV	CHARLE	STON	WV		
US		US		······································		
Line Comm Ln De	esc	Qty	Unit Issue	Unit Price	Total Price	

		······		
1 13	8" WB DRW Narrow Body Cutaway Vehicles	0.00000	EA	Please see Exhibit A - Pricing Page
				the second se

Comm Code	Manufacturer	Specification	Model #	
25101502	Glaval	Classes A, B, C, D, E, F, G, H, I, J	PrimeTime	· · · · · · · · · · · · · · · · · · ·

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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.

See attached Exhibit A Pricing page

SCHED	ULE OF EVENTS		
Line	<u>Event</u>	Event Date	
1	Vendor Technical Questions Due 11:00 am est.	2023-01-16	

	Document Phase	Document Description	Page 3
DMT2300000010	Final	138" Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle	

#### ADDITIONAL TERMS AND CONDITIONS

\_\_\_\_\_

\_\_\_\_\_

See attached document(s) for additional Terms and Conditions



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:	1157978		Reason for Modification:
Doc Description:	138" Wheelbase, Dual Rear	Wheel, Narrow Body Cutaway Vehicle	Addendum No. 2
Proc Type:	Central Master Agreement		
Date Issued	Solicitation Closes	Solicitation No	Version
2023-01-23	2023-02-06 13:30	CRFQ 0810 DMT2300000010	3

BID RECEIVING LOCATION	
BID CLERK	
DEPARTMENT OF ADMINISTRATION	
PURCHASING DIVISION	
2019 WASHINGTON ST E	
CHARLESTON WV 25305 US	
03	
VENDOR	
Vendor Customer Code: VS0000011255	
Vendor Name : Creative Bus Sales, Inc.	
Address: 9365	
Street : Counselors Row, Suite 112	
City : Indianapolis	
State : Indiana Country :	U.S.A. <b>Zip</b> : 46240
Principal Contact : Matt Mashuda, Transit Bus Sales	
Vendor Contact Phone: 422-922-0184	Extension:
FOR INFORMATION CONTACT THE BUYER	
David H Pauline 304-558-0067	
david.h.pauline@wv.gov	
Vendor 1	
Signature X FEIN#	33-0388707 DATE 2-3-2023

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

#### ADDITIONAL INFORMATION

#### Addendum No. 2

To respond to additional vendor technical questions received, see attached. To move did opening date and time to February 6,, 2023 at 1:30 pm est.

#### No other changes.

#### Federal Terms and Conditions Apply

INVOICE TO		SHIP TO				
PUBLIC TRANSIT DIVISI OF	ON	PUBLIC TRA OF	PUBLIC TRANSIT DIVISION OF			
BLDG 5 RM 663		KANAWHA VALLEY REGIONAL TRANSPORTATION AUTHORITY				
1900 KANAWHA BLVD E		1550 FOURT	H AVE			
CHARLESTON	WV	CHARLESTON WV				
US		US				
Line Comm Ln De	SC .	Qtv	Unit Issue	Unit Price	Total Pri	ce

Lille		Qly	Unitisst	le Unit Price l'Otal Price
1	138" WB DRW Narrow Body Cutaway Vehicles	0.00000	EA	Please see Exhibit A - Pricing Page
1				

Comm Code	Manufacturer	Specification	Model #	
25101502	Glaval	Classes A, B, C, D, E, F, G, H, I	PrimeTime	

#### Extended Description:

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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.

See attached Exhibit A Pricing page

SCHED	ULE OF EVENTS		
<u>Line</u>	<u>Event</u>	Event Date	
s t <b>1</b>	Vendor Technical Questions Due 11:00 am est.	2023-01-16	

## SOLICITATION NUMBER: CRFQ DMT23\*10 Addendum Number: 2

The purpose of this addendum is to modify the solicitation identified as ("CRFQ DMT23\*10") to reflect the change(s) identified and described below.

#### **Applicable Addendum Category:**

$\boxtimes$	Modify bid opening date and time
$\boxtimes$	Modify specifications of product or service being sought
$\boxtimes$	Attachment of vendor questions and responses
	Attachment of pre-bid sign-in sheet
	Correction of error
Π	Other

#### **Description of Modification to Solicitation:**

- <u>1.</u><u>To respond to additional vendor technical questions, see attached.</u>
  - 2. To change specifications, see attached.
  - 3. To move bid opening February 6, 2023 at 1:30 pm est.
  - 4. No other changes.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as - Attachment A and is specifically incorporated herein by reference.

#### **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.

#### ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ DMT23\*10

**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)

$\boxtimes$	Addendum No. 1	Addendum No. 6
	Addendum No. 2	Addendum No. 7
	Addendum No. 3	Addendum No. 8
	Addendum No. 4	Addendum No. 9
	Addendum No. 5	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				
- 7~				
Authorized Signature				
1-23-2023				
Date				

NOTE: This addendum acknowledgement 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:	1157978	Reason for Modification:	
Doc Description:	138" Wheelbase, Dual Rear	Addendum No. 3	
Proc Type:	Central Master Agreement		
Date Issued	Solicitation Closes	Solicitation No	Version
2023-01-27	2023-02-06 13:30	CRFQ 0810 DMT2300000010	4

<b>BID RECEIVING L</b>	OCATIC	ON				
BID CLERK			ž			
DEPARTMENT OF	ADMIN	ISTRATION				
PURCHASING DIV	/ISION					
2019 WASHINGTO	DN ST E					
CHARLESTON	WV	25305				
US						

VENDOR								
Vendor Customer Code: VS0000011255								
Vendor Name : Creative Bus Sales, Inc.								
Address: 9365								
Street : Counselors Row, Suite 112								
City : Indianapolis								
State : Indiana Country :	U.S.A.	<b>Zip</b> : 46240						
Principal Contact: Matthew Mashuda, Transit Bus Sales	Principal Contact : Matthew Mashuda, Transit Bus Sales							
Vendor Contact Phone: 422-922-0184	Extension:							
FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067 david.h.pauline@wv.gov								
Vendor Signature X FEIN#	33-0388707	<b>DATE</b> 2-3-2023						
All offers subject to all terms and conditions contained in this solicitation								

#### ADDITIONAL INFORMATION

Addendum No. 3

To attached Exhibit B, C, & D that were inadvertently omitted from the original CRFQ.

Bid opening remains February 6,, 2023 at 1:30 pm est.

No other changes.

#### Federal Terms and Conditions Apply

LIC TRANSIT DIVISION
AWHA VALLEY
IONAL NSPORTATION HORITY
FOURTHAVE
RLESTON WV

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
 1 <sup></sup>	138" WB DRW Narrow Body Cutaway Vehicles	0.00000	EA		······································

 Comm Code	Manufacturer	Specification	Model #	· · · · · · · · · · · · · · · · · · ·
 25101502	Glaval	Classes A, B, C, D, E, F, G, H, I, J	PrimeTime	· · · · · ·

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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.

See attached Exhibit A Pricing page

SCHED	ULE OF EVENTS		
<u>Line</u>	Event	Event Date	
1	Vendor Technical Questions Due 11:00 am est.	2023-01-16	
			· · · · · · · · · · · · · · · · · · ·

	Document Phase	Document Description	Page 3
DMT2300000010		138" Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle	

# ADDITIONAL TERMS AND CONDITIONS

------

----- ----- - -----

------

------

See attached document(s) for additional Terms and Conditions

# SOLICITATION NUMBER: CRFQ DMT230000009 Addendum Number: 2

The purpose of this addendum is to modify the solicitation identified as CRFQ DMT2200000009 to reflect the change(s) identified and described below.

## **Applicable Addendum Category:**

- $\boxtimes$  Modify bid opening date and time
- Modify specifications of product or service being sought
- $\boxtimes$  To respond to technical questions
- □ Attachment of pre-bid sign-in sheet
- $\Box$  Correction of error
- □ Other

## Additional Documentation:

- 1. To move bid opening date and time January 12, 2023, at 1:30 pm est.
- 2. To respond to vendor technical questions, see attached.
- **3.** To change specifications, see attached.
- 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.

# ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ DMT2300000009

**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)

$\boxtimes$	Addendum No. 1	Addendum No. 6
$\boxtimes$	Addendum No. 2	Addendum No. 7
X	Addendum No. 3	Addendum No. 8
	Addendum No. 4	Addendum No. 9
	Addendum No. 5	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
1-27-2023
Date

NOTE: This addendum acknowledgement 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:	1157070		
Proc Folder:	1157978		Reason for Modification:
Doc Description:	138" Wheelbase, Dual Rear	Wheel, Narrow Body Cutaway Vehicle	Addendum No. 4
Proc Type:	Central Master Agreement		
Date Issued	Solicitation Closes	Solicitation No	Version
2023-01-30	2023-02-14 13:30	CRFQ 0810 DMT2300000010	5
BID RECEIVING LO	DCATION		
BID CLERK			
DEPARTMENT OF			
DEFAILINEINI OF			

PURCHASING DIVISION 2019 WASHINGTON ST E CHARLESTON WV 25305 US

VENDOR			
Vendor Customer Code: VS0000011255			
Vendor Name : Creative Bus Sales, Inc.			
Address : 9365			
Street : Counselors Row, Suite 112			
City : Indianapolis			
State : Indiana	Country: U.S.A.	<b>Zip</b> : 46240	
Principal Contact: Matthew Mashuda, Transit B	Bus Sales		
Vendor Contact Phone: 422-922-0184	Extension:		
FOR INFORMATION CONTACT THE BUYER David H Pauline			
304-558-0067			
david.h.pauline@wv.gov			
Vendor Signature X	FEIN# 33-0388707	<b>DATE</b> 2-8-2023	
All offers subject to all terms and conditions co	ntained in this solicitation		

#### ADDITIONAL INFORMATION

Addendum No. 4

To respond to vendor question and change specifications, see attached

To move bid opening date and time to February 14, 2023 at 1:30 pm est.

No other changes.

Federal Terms and Conditions Apply

INVOICE TO		SHIP TO
PUBLIC TRANSIT DIVIS	SION	PUBLIC TRANSIT DIVISION OF
BLDG 5 RM 663		KANAWHA VALLEY REGIONAL TRANSPORTATION AUTHORITY
1900 KANAWHA BLVD	E	1550 FOURTH AVE
CHARLESTON	WV	CHARLESTON WV
US		US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	138" WB DRW Narrow Body Cutaway	/ Vehicles - 0.00000	EA	Please see Exhibit A - Pricing Page	

· - [	Comm Code	Manufacturer	Specification	Model #	
	25101502	Glaval	Classes A, B, C, D, E, F, G, H, I, J	PrimeTime	

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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.

See attached Exhibit A Pricing page

SCHE	DULE OF EVENTS		
Line	Event	Event Date	na nana marka manana kana kana kana kana kana kana
÷ .1	Vendor Technical Questions Due 11:00 am est.	2023-01-16	· · · · · · · · · · · · · · · · · · ·

Date Printed: Jan 30, 2023

# SOLICITATION NUMBER: CRFQ DMT23\*10 Addendum Number: 4

The purpose of this addendum is to modify the solicitation identified as ("CRFQ DMT23\*10") to reflect the change(s) identified and described below.

## **Applicable Addendum Category:**

- $\boxtimes$  Modify bid opening date and time
- Modify specifications of product or service being sought
- Attachment of vendor questions and responses
- $\Box$  Attachment of pre-bid sign-in sheet
- $\Box$  Correction of error
- $\Box$  Other

#### **Description of Modification to Solicitation:**

- \_\_\_\_\_1. No respond to vendor technical question, see attached.
  - 2. To change specifications, see attached.
  - 3. To move bid opening date & time to February 14, 2023, at 1:30 pm est.
  - 4. No other changes.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

#### **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\*10

# 138" Wheelbase, Narrow Body Cutaway Vehicle

- Question: For clarification purposes, in addendum #2, it was approved to allow the 4.3L V6 Engine. The 4.3L Chassis for this vehicle is not available in a Dual Rear Wheel configuration. The Chassis for the 4.3L is a light chassis of 9,900 lbs. GVWR and normally used for school buses. This changes the specifications; will Public Transit allow this?
- Answer: Public Transit is seeking a 138" Wheelbase, narrow body cutaway vehicle with dual rear wheels. Public Transit will not allow the 4.3L V6 if the Chassis isn't available to be dual rear wheels from the manufacturer.

## ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ DMT23\*10

**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)

$\boxtimes$	Addendum No. 1	Addendum No. 6
	Addendum No. 2	Addendum No. 7
	Addendum No. 3	Addendum No. 8
$\boxtimes$	Addendum No. 4	Addendum No. 9
	Addendum No. 5	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
Ti
Authorized Signature
 2-8-2023
Date

NOTE: This addendum acknowledgement 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:	1157978		Reason for Modification:					
Doc Description:	138" Wheelbase, Dual Rear	Wheel, Narrow Body Cutaway Vehicle	Addendum No. 5					
Proc Type:	Central Master Agreement							
Date Issued	Solicitation Closes	Solicitation No	Version					
2023-02-07	2023-02-14 13:30	CRFQ 0810 DMT2300000010	6					
BID RECEIVING LO	BID RECEIVING LOCATION							
BID CLERK	BID CLERK							
DEPARTMENT OF	DEPARTMENT OF ADMINISTRATION							
PURCHASING DIV	ISION							

2019 WASHINGTON ST E CHARLESTON WV 25305 US

VENDOR				
Vendor Customer Code: VS0000011255				
Vendor Name : Creative Bus Sales, Inc.				
Address: 9365				
Street : Counselors Row, Suite 112				
City : Indianapolis				
State : Indiana	Country :	U.S.A.	<b>Zip</b> : 46240	
Principal Contact: Matthew Mashuda, Transit E	Bus Sales			
Vendor Contact Phone: 422-922-0184		Extension:		
FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067 david.h.pauline@wv.gov				
	,			
Vendor Signature X	FEIN#	33-0388707	<b>DATE</b> 2-8-2023	
All offers subject to all terms and conditions co	ntained in th	is solicitation		

#### ADDITIONAL INFORMATION

Addendum No. 5

To respond to vendor question and change specifications, see attached

Bid opening remains February 14, 2023 at 1:30 pm est.

No other changes.

Federal Terms and Conditions Apply

INVOICE TO		SHIP TO			
PUBLIC TRANSIT DIVIS	ION	PUBLIC TRANSIT DIVISION OF			
BLDG 5 RM 663		KANAWHA VALLEY REGIONAL TRANSPORTATION AUTHORITY			
1900 KANAWHA BLVD		1550 FOURTH AVE			
CHARLESTON	WV	CHARLESTON	WV		
US		US			

	Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price	1
-	1	138" WB DRW Narrow Body Cutaway Vehicles	0.00000	EA	Please see Exhibit A	- Pricing Page	

Comm Code	Manufacturer	Specification	Model #	······································
25101502	Glaval	Classes A, B, C, D, E, F, G, H, I, J	PrimeTime	

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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.

See attached Exhibit A Pricing page

<u>Line</u>	<u>Event</u>	<u>Event Date</u>	
1	Vendôr Technical Questions Due 11:00 am est.	2023-01-16	

· ··· · · · · · · · · · · · · ·

· .....

	Document Phase	Document Description	Page 3
DMT2300000010		138" Wheelbase, Dual Rear Wheel, Narrow Body Cutaway Vehicle	

## ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

		-		
			-	



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:	1157978	Reason for Modification:	
Doc Description:	138" Wheelbase, Dual Rear	Addendum #6	
Proc Type:	Central Master Agreement		
Date Issued	Solicitation Closes	Solicitation No	Version
2023-02-07	2023-02-14 13:30	CRFQ 0810 DMT2300000010	7

BID CLERK DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION 2019 WASHINGTON ST E CHARLESTON WV 25305 US VENDOR VENDOR Vendor Customer Code: VS0000011255 Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: David H Pauline 304-558-0067 david.h.pauline@wv.gov
PURCHASING DIVISION 2019 WASHINGTON ST E CHARLESTON WV 25305 US VENDOR Vendor Customer Code: VS0000011255 Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
2019 WASHINGTON ST E CHARLESTON WV 25305 US VENDOR Vendor Customer Code: VS0000011255 Vendor Name: Creative Bus Sales, Inc. Address: 9365 Street: Counselors Row, Suite 112 City: Indianapolis State: Indiana Country: U.S.A. Zip: 46240 Principal Contact: Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
CHARLESTON WV 25305 US Vendor Customer Code: VS0000011255 Vendor Name: Creative Bus Sales, Inc. Address: 9365 Street: Counselors Row, Suite 112 City: Indianapolis State: Indiana Country: U.S.A. Zip: 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: David H Pauline 304-558-0067
US VENDOR Vendor Customer Code: VS0000011255 Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
VENDOR Vendor Customer Code: VS0000011255 Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
Vendor Customer Code: V\$0000011255 Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
Vendor Name : Creative Bus Sales, Inc. Address : 9365 Street : Counselors Row, Suite 112 City : Indianapolis State : Indiana Country : U.S.A. Zip : 46240 Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
Address: 9365   Street: Counselors Row, Suite 112   City: Indianapolis   State: Indiana   Country: U.S.A.   Zip: 46240   Principal Contact: Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
Street : Counselors Row, Suite 112   City : Indianapolis   State : Indiana   Country : U.S.A.   Zip : 46240   Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
City : Indianapolis   State : Indiana   Country : U.S.A.   Zip : 46240   Principal Contact : Matthew Mashuda, Transit Bus Sales Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
State : Indiana   Country : U.S.A.   Principal Contact : Matthew Mashuda, Transit Bus Sales   Vendor Contact Phone: 422-922-0184   Extension:   FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
Principal Contact :       Matthew Mashuda, Transit Bus Sales         Vendor Contact Phone:       422-922-0184         Extension:         FOR INFORMATION CONTACT THE BUYER         David H Pauline         304-558-0067
Vendor Contact Phone: 422-922-0184 Extension: FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
FOR INFORMATION CONTACT THE BUYER David H Pauline 304-558-0067
David H Pauline 304-558-0067
304-558-0067
Vendor FEIN# 33-0388707 DATE 2-8-2023

Date Printed: Feb 7, 2023

**ADDITIONAL INFORMATION** 

Addendum No. 6

To attach the documents that were not posted with addendum 5, see attached.

To respond to vendor question and change specifications, see attached

Bid opening remains February 14, 2023 at 1:30 pm est.

No other changes.

Federal Terms and Conditions Apply

INVOICE	ETO	SHIP TO			
PUBLIC OF	TRANSIT DIVISION	PUBLIC OF	TRANSIT DIVISIO	DN	
BLDG 5	RM 663	REGION	ORTATION		
1900 KANAWHA BLVD E		1550 FO	URTH AVE		
CHARLESTON WV		CHARLE	STON	WV	
US		US			······································
Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	138" WB DRW Narrow Body Cutaway Vehicles	0.00000	EA	Please see Exhi	bit A -Pricing Page

ĿΑ Please see Exhibit A -Pricing Page

 Comm Code	Manufacturer	Specification	Model #	· .	<u>-</u> .,	
 25101502	Glaval	Classes A, B, C, D, E, F, G, H, I, J	PrimeTime	: Protein		

#### **Extended Description:**

To establish an open ended contract for 138" WB, DRW, Narrow Body Cutaway Vehicles to 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. T - 1 - 1 - 1 - 1 - 1 - 1 See attached Exhibit A Pricing page

### SCHEDULE OF EVENTS

<u>Line</u>	Event	Event Date	· · · · · ·
1	Vendor Technical Questions Due 11:00 am est.	2023-01-16	· · · · · · · · · · · · · · · · · · ·
			i an

-----

# SOLICITATION NUMBER: CRFQ DMT23\*10 Addendum Number: 6

The purpose of this addendum is to modify the solicitation identified as ("CRFQ DMT23\*10") to reflect the change(s) identified and described below.

## **Applicable Addendum Category:**

- $\Box$  Modify bid opening date and time.
- Modify specifications of product or service being sought.
- Attachment of vendor questions and responses
- □ Attachment of pre-bid sign-in sheet
- $\Box$  Correction of error
- $\Box$  Other

## **Description of Modification to Solicitation:**

- 1. No respond to vendor technical question, see attached.
  - 2. To change specifications, see attached.

  - 4. No other changes.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

#### **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\*10

# 138" Wheelbase, Narrow Body Cutaway Vehicle

Question: Dual Rear Wheel Ford Transit chassis, as the specifications were originally written around, is offered with two powertrains. The base engine is a naturally aspirated 3.5-liter V-6 that provides 275 horsepower and 262 pound-feet of torque. There's also a turbocharged 3.5-liter V-6 available that generates 310 horsepower and 410 pound-feet of torque. Both engines are paired with a 10-speed automatic transmission. Will Public Transit allow these DRW chassis' to be considered as approved equals?

<u>an sec</u>

Answer: Public Transit will allow these DRW chassis' to be approved equals.

## ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ DMT23\*10

**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)

$\boxtimes$	Addendum No. 1	H	Addendum No. 6
	Addendum No. 2		Addendum No. 7
$\boxtimes$	Addendum No. 3		Addendum No. 8
$\boxtimes$	Addendum No. 4		Addendum No. 9
	Addendum No. 5		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
2-8-2023
Date

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

**DESIGNATED CONTACT:** Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

(Printed Name and Title)	Matt Mashuda - Transit Bus Sales
(Address) <u>9365 Counselors</u>	Row, Suite 112, Indianapolis, Indiana, 46420
(Phone Number) / (Fax Numb	er) <u>412-992-0184 / 909-465-5529</u>

(Email address) <u>MattM@CreativeBusSales.com</u>

**CERTIFICATION AND SIGNATURE:** By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation/Contract in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation/Contract for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that this bid or offer was made without prior understanding, agreement, or connection with any entity submitting a bid or offer for the same material, supplies, equipment or services; that this bid or offer is in all respects fair and without collusion or fraud; that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; that I am authorized by the Vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on Vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law; and that pursuant to W. Va. Code 5A-3-63, the entity entering into this contract is prohibited from engaging in a boycott against Israel.

Creative Bus Sales, Inc.	
(Company)	
(Signature of Authorized Representative)	
Nick Corley - Sales Operations Manager	
(Printed Name and Title of Authorized Representative) (Date)	
888-633-838 / 909-465-5529	
(Phone Number) (Fax Number)	
BidDepartment@CreativeBusSales.com	
(Email Address)	

# STATE OF WEST VIRGINIA Purchasing Division PURCHASING AFFIDAVIT

**CONSTRUCTION CONTRACTS:** Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

**ALL CONTRACTS:** Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

**EXCEPTION:** The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

#### **DEFINITIONS:**

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

#### WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Creative Bus Sales, Inc.	
Authorized Signature:	Date: <u>2-3-2023</u>
State ofGeorgia	
County of <u>Clayton</u> , to-wit:	
Taken, subscribed, and sworn to before me this <u>3</u> day of	February, 20 <u>23</u> .
My Commission expires September 10	_ 20_23
AFFIX SEAL HERE WALTER J M PEDERSEN III Notary Public, Georgia ** Dekalb County	ARY PUBLIC Purchasing Affidavit (Revised 01/19/2018
My Commission Expires	

# **DOCUMENTATON TO BE SUBMITTED WITH BID SUMMARY:**

#### 3.2 Chassis :

Description : Ford E350 Gasoline chassis 11,500 GVWR Warranty: 3 years/36,000 bumper to bumper and 5 years/60,000 powertrain Literature: See document labeled "Ford E350"

#### 3.3 Engine

Description: 7.3L V8

Warranty: See document labeled "7.12.2 Ford Warranty"

Literature: See document labeled "Ford E350"

#### 6.10 Radio/AM/FM/USB/MP3:

Description: OEM AM/FM/USB/MP3 \*please note CD is not available Warranty: See document labeled "7.12.2 Ford Warranty" Literature: See document labeled "Ford E350"

#### 3.8 Transmission:

Description: OEM Electric 6 Speed Automatic Warranty: See document labeled "7.12.2 Ford Warranty" Literature: See document labeled "Ford E350"

## 3.5 Radiator and Cooling System:

Description: OEM Warranty: See document labeled "7.12.2 Ford Warranty" Literature: See document labeled "Ford E350"

#### 3.6 High Idle System:

Description: Intermotive Gateway High Idle and Interlock System Warranty: 2 Years/24,000 miles Literature: See attachment document labeled "3.6 High Idle System"

#### 4.2 Brakes:

Description: OEM

Warranty: See document labeled "7.12.2 Ford Warranty"

Literature: See document labeled "Ford E350"

#### 4.0 Tilt Wheel, Cruise Control and Power Steering:

Description: OEM Warranty: See document labeled "7.12.2 Ford Warranty" Literature: See document labeled "Ford E350"

4.0 Water Test: Please find attachment provided labeled "4.0 Water Test Procedure"

**2.16 Wheelbase:** Per the bid specs for Classes A, B, C, E, F, H, I the wheelbase will be 138" and for Classes D, G, J will be 158"

#### 3.9.4 Rear View Back-Up Camera:

Description: Rosco STSK4750B Warranty: 2 Years/24,000 miles Literature: See the document labeled "3.9.4 Back up Camera"

#### 4.3 Wheels:

Description: 16" Steel Wheel painted white on both sides Warranty: See document labeled "7.12.2 Ford Warranty" Literature: See document labeled "Ford E350"

#### 4.4 Tires:

Description: Tires will be LT 225/75R16 E All Weather tires

Warranty: Tire warranty varies depending on the brand supplied from the factory. See document labeled "7.12.2 Ford Warranty"

Literature: See document labeled "Ford E350"

#### 4.5.6 Battery:

Description: Ford Provided

Warranty: See document labeled "7.12.2 Ford Warranty"

Literature: See document labeled "Ford E350"

#### 4.5.5 Alternator:

Description: 225-amp alternator

Warranty: See document labeled "7.12.2 Ford Warranty"

Literature: See document labeled "Ford E350"

#### 5.5 Front and Rear Heating and Air Conditioning:

Description: Trans Air TA712 Super Air Conditioning

ProAir 435 35,000 BTU 3 speed Floor Heater

Warranty: Three years unlimited miles A/C ----- 3 Year Heater with lifelong motor coverage

Literature: Please see multiple attachments labeled "5.5 Air Conditioning and 5.5 Heater"

**<u>4.8 Body Specifications</u>**: Please see the attachment titled "4.8 Body Construction" and "4.8 Glaval Primetime Construction Specs"

Proposed Length Class A, B, C, E, F, H, and I: 21-22 Feet

Proposed Length Class D, G, and J: 23 Feet

Proposed Actual interior Height for all Classes: 77"

5.0 Rustproofing and Undercoating: See attached documents labeled "Rustproofing and Undercoating"

#### 5.1 Passenger Doors and Stepwell:

Description: A+M Door Systems-Dual leaf entry door, single panel rear door, dual leaf lift doors Stepwell Description: Stainless Steel Entry Step Assembly-included sides and header Dimensions: Rear door 38 1/2" X 59"- Entry Door 31" Clear opening X 76"-Extra wide dual lift

Doors due to platform width chosen in the specifications.

Interlock Connectivity: Industry standard interlocking to be used except when call out in this bid Door Locks type: Standard key lock with ¼ turn handles

## 5.8 Flooring:

Description: Gerflor Sirius NT #6801

Sample: Due to it being an electronic bid, a sample of the flooring can be mailed upon request

Color to be used: Gerflor #6801 Graphite is a black color

Assembly process: Please see provided document labeled "5.8 Flooring + Flooring installation"

#### 6.1 Passengers Seats and Restraints:

Description: Freedman Feather weight Mid-Hi fixed seat and High Backs

Freedman Double Fold Way seats, Freedman USR under seat retractable belts

Description: Freedman Anti-Vandal Grab Handles

Warranty: 2 year/24,000 miles

Literature: See multiple documents labeled "6.1 Seating"

## 6.2 Mobility Aid/Occupant Restraint Systems:

Description: Q'Straint 360 Tie Downs and Quick Straps

Warranty: One year

Literature: See document provided labeled "6.2 QRT 360"

## 6.13 Training: Please see the attachment labeled "6.13 Training Acknowledgement"

## 6.8 Security Camera System Including Playback:

Description:

Angel Trax Vulcan 12 System with 6 cameras. 1TB Hardrive. SD card back up. Secured box with 2 keys. Location is open

VULCANV12 - Vulcan Series 12-Channel HD/IP Mobile Digital Video Recorder • 12 Channels with 8 Channels D1, WD1, 720P, or up to 1080P + 4 Channels IP up to 1080P

SSD500G-UPGRADE - 500GB Solid-State Hard Drive

MSD512GB - 512GB microSD Solid-State Memory Card

VULPBH - Vulcan Series Panic Button Housing PC color

DMB100-V12 - L-Shaped Vertical Mounting Bracket for Vulcan V12 MDVR

HD1700V - Vulcan Series 170-Degree HD 1080P Low Profile Cameraoverhang, facing towards the rear, Above the drivers left shoulder facing the door, Above the driver, to see the drivers operations

HD2500V - Vulcan Series 2500 HD Low Profile Camera- facing the wheelchair lift • 2.5mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation

HD2500WS - Vulcan Series 2500 HD Windshield Camera- Out the Windshield • 2.5mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation

HD3600V - Vulcan Series 3600 HD Low Profile Camera- rear of the bus • 3.6mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation

HD4CBL - 13.12 ft. HD Camera Cable

HD9CBL - 29.53 ft. HD Camera Cable

ADJBRWS - Adjustable Mounting Bracket for Vulcan Series HD-WS Starlight Camera Capturing Windshield View

WC4G - Vulcan Series Wi-Fi Cellular GPS Tri-Mode Antenna

V12SECKEY - Security Key USB 3.0 for Vulcan V12 MDVR

Warranty: 2 year/24,000 mile

Literature: See provided document labeled "6.8 Security Camera System"

#### 7.12.2 Warranty on Complete Vehicle:

Literature: See attachment labeled "7.12.2, 7.12.3, 7.12.5 Glaval Limited Warranty"

## 7.12.3 Warranty of Basic Vehicle Structure:

Literature: See attachment labeled "7.12.2, 7.12.3, 7.12.5 Glaval Limited Warranty"

#### 7.12.5 Warranty: warranties to be provided on subsystems and components:

Literature: See attachment labeled "7.12.2, 7.12.3, 7.12.5 Glaval Limited Warranty" and "7.12.5 Air Conditioning Warranty"

#### 11.3 Complete two (2) bids in binder form:

As this is an electronic submission, this is not applicable

**13.2 A Complete mechanical description of vehicle**, its construction, and equipment including manufacturer's model name: **GLAVAL PRIMETIME** 

Please find the provided document labeled:

"13.2 A Complete Mechanical Description"

"13.2 A Glaval Universal Construction Specs"

"13.2 A Detail on Body Materials"

#### 13.2 B Proposed Floor Plans: Please see attachments labeled:

"13.2 B Class A Floor Plan"

"13.2 B Class B E H Floor Plan"

"13.2 B Class C F I Floor Plan"

"13.2 B Class D G J Floor Plan"

#### 13.2 C Curb weight: Please see attachments labeled:

"13.2 B Class A Weight Calc"

"13.2 B Class B E H Weight Calc"

"13.2 B Class C F I Weight Calc"

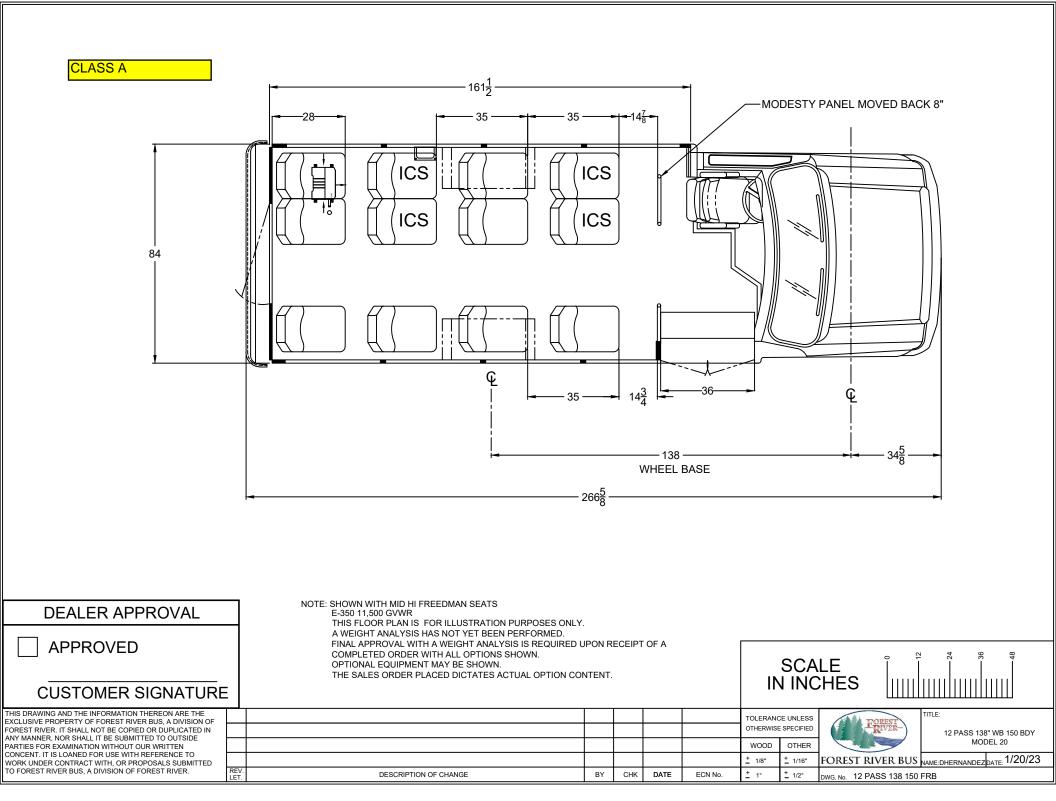
"13.2 B Class D G J Weight Calc"

\*We have provided the weight calculation sheets in lieu of the empty weight, as they calculate using the GVWR of each chassis, using the FTA approved passenger weight per seat, and they check the vehicle for 4 corner weight compliance if all seats were being used.

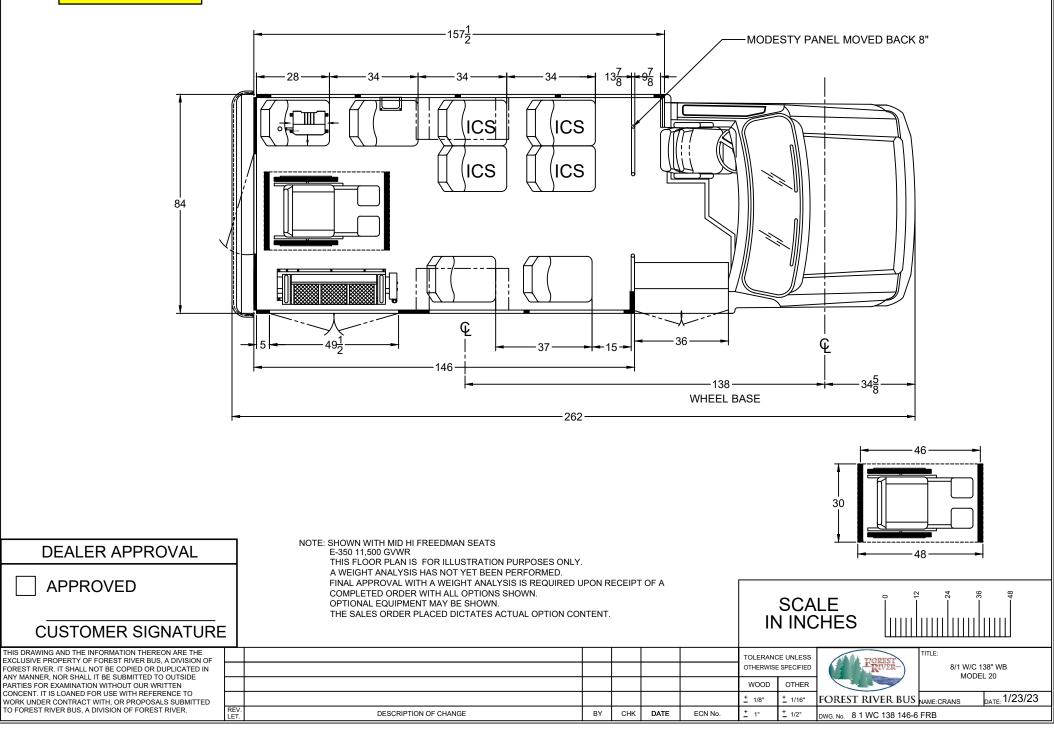
13.2 D Exterior Vinyl Colors: See attached documents labeled "13.2 D Vinyl Paint Colors"

**<u>13.2 H Identification Conversion Location and Activities:</u> See attached documents labeled "13.2 H Conversion Location and Activities"** 

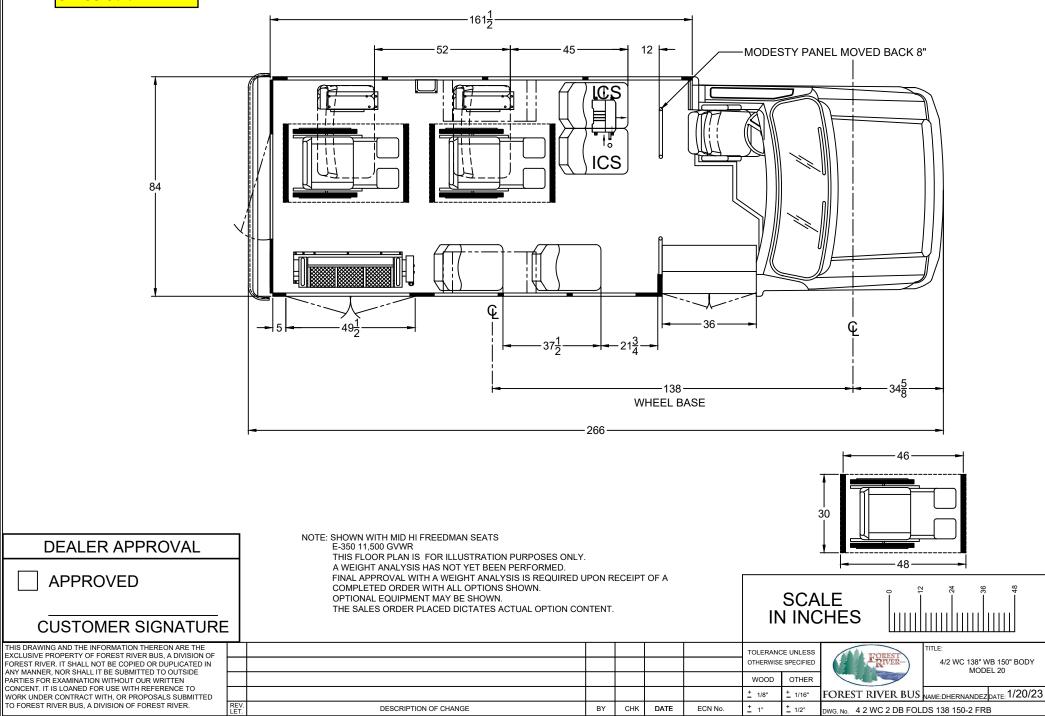
13.2 | References: See attached document labeled "13.2 | References"



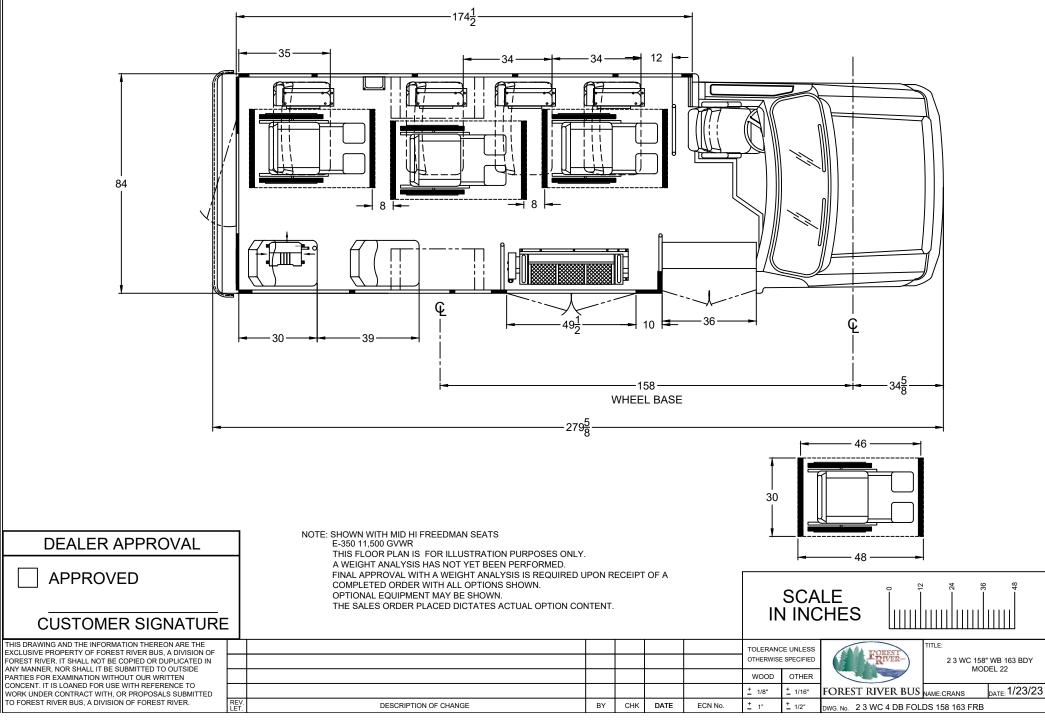
#### CLASS B/E/H



#### CLASS C /F/I



## CLASS D/G/J

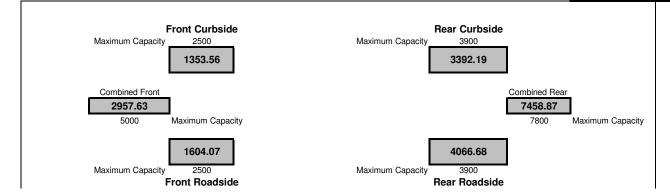


#### WEIGHT ANALYSIS

4/26/2017	12 PASS	3PT SEATS	138	146 1154
7/20/201/	12 7 433	JET JEATS	130	140 034

			4/20	<u>5/2017 12 P</u>	ASS 3PT SEA	1TS 138 146 US/					
	INPUT AREAS=						FUEL LOAD ADJ.				
	VEHICLE DESCF	RIPTION:	CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PEF	GAL.		
	12 PASS 138 146	S USA	E-350		STARLITE	GAS	40	6.1			
	WHEELBASE	PER IN. VALUE CALC.		AXLE V	WEIGHTS		FUEL AMT.	WGT OF FUEL	FUEL A	DJ. AMT.	
	138	0.72		LEFT FRONT	RIGHT FRONT		0.13	244	-30	0.50	
AXLE	CAPACITIES		3071	1623	1448		FUEL TANK CENTER		DEA	LER	
FRONT	REAR	TOTAL		LEFT REAR	RIGHT REAR		165				
5000	7800	11500	4882	2391	2491						
		LEFT (ROADSIDE	)				F	RIGHT (CURB	SIDE)		
	DISTANCE (IN.)			FRONT	REAR	DISTANCE (IN.)	WEIGHT (LBS.)			REAR	
DRIVER	48	150	34.78%	97.83	52.17	100	-32	72.46%	-8.81	-23.19	MID SNGL
MID HI DBL	97	-55	70.29%	-16.34	-38.66	135	-32	97.83%	-0.70	-31.30	MID SNGL
MID HI DBL	133	-55	96.38%	-1.99	-53.01	170	-32	123.19%	7.42	-39.42	MID SNGL
MID HI DBL	169	-55	122.46%	12.36	-67.36	205	-32	148.55%	15.54	-47.54	MID SNGL
MID HI DBL	207	-55	150.00%	27.50	-82.50	200	-32	0.00%	0.00	0.00	WID SNGL
	207	-55	0.00%	0.00	0.00			0.00%	0.00	0.00	
MID HI DBL	94	405	68.12%	129.13	275.87	103	207	74.64%	52.50	154.50	MID SNGL
MID HI DBL	130	405	94.20%	23.48	381.52	136	207	98.55%	3.00	204.00	MID SNGL
MID HI DBL	166	405	94.20% 120.29%	-82.17	487.17	169	207	98.55% 122.46%	-46.50	253.50	MID SNGL
MID HI DBL	202	405	146.38%	-82.17 -187.83	487.17 592.83	202	207	146.38%	-46.50	303.00	MID SNGL
	202	405				202	207				MID SNGL
			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			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	
			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			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	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
	TOTAL PASSEN	GER LOAD		1.96	1548.04				-73.55	773.55	2250.00
	AXLE WEIGHTS			1623.00	2391.00				1448.00	2491.00	7953.00
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
			LEFT	1604.07	4066.68	5670.75	0.544				
			RIGHT	1353.56	3392.19	4745.75	0.456				
		FRT	/ REAR TOTALS	2957.63	7458.87	10416.50	0.100				
				5000	7800	11500					
		Δx									
				2042.37	341.13	1083.50					

MID HI

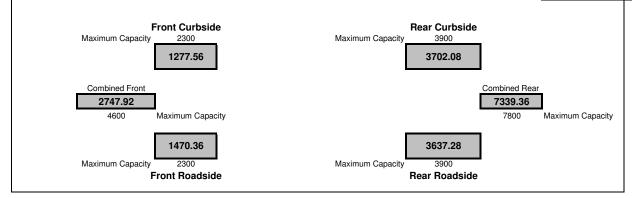


#### WEIGHT ANALYSIS 4/26/2017 12 PASS 3PT SEATS 138 146 USA

#### WEIGHT ANALYSIS 4/26/2017 8 1 WC 138 146-8 USA

	INPUT AREAS=						FUEL LOAD ADJ.				
	VEHICLE DESCR		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PER	R GAL.		
	8 1 WC 138 146-	8 EST USA	E-350			GAS	40	6.1			
		PER IN. VALUE CALC.			NEIGHTS		FUEL AMT.	WGT OF FUEL			
	138	0.72			<b>RIGHT FRONT</b>		0.13	244		.72	
	E CAPACITIES		2770	1414	1356		FUEL TANK CENTER		DEA	LER	
FRONT	REAR	TOTAL			RIGHT REAR		165				
4600	7800	11500	5371	2441	2930						
	I	LEFT (ROADSIDE	E)					<b>RIGHT (CUR</b>	BSIDE)		
	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE	FRONT	REAR	
DRIVER	48	150	34.78%	97.83	52.17	102	-32	73.91%	-8.35	-23.65	SINGLE
MID DBL	90	-55	65.22%	-19.13	-35.87	144	-32	104.35%	1.39	-33.39	SINGLE
MID DBL	122	-55	88.41%	-6.38	-48.62			0.00%	0.00	0.00	
MID DBL	154	-55	111.59%	6.38	-61.38			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	
MID DBL	97	405	70.29%	120.33	284.67	99	207	71.74%	58.50	148.50	SGL
MID DBL	132	405	95.65%	17.61	387.39	134	207	97.10%	6.00	201.00	SGL
MID SNGL	167	207	121.01%	-43.50	250.50	138	-62.5	100.00%	0.00	-62.50	MORRYDE
MID SNGL	202	207	146.38%	-96.00	303.00	191	300	138.41%	-115.22	415.22	W/C
			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	
MORRYDE	138	-62.5	100.00%	0.00	-62.50			0.00%	0.00	0.00	
	.00	GE.0	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			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	
			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			0.00%	0.00	0.00	
	TOTAL PASSEN	GERLOAD	0.00 %	77.13	1069.37			0.00 /6	-57.67	645.17	1734.00
	AXLE WEIGHTS			1414.00	2441.00				1356.00	2930.00	8141.00
				1414.00	2441.00				1000.00	2330.00	0141.00
	+			FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
	+		LEFT	1470.36	3637.28	5107.64	0.506				
			RIGHT	1277.56	3702.08	4979.64	0.494				
		FRT	/ REAR TOTALS	2747.92	7339.36	10087.28					
			LE CAPACITIES	4600 1852.08	7800 460.64	11500 1412.72					

MORRYDE MID HI SEATS

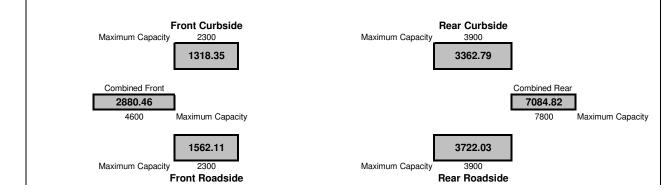


#### WEIGHT ANALYSIS

4/26/2017 4 2 WC 2 DB FOLDS 138 146 USA

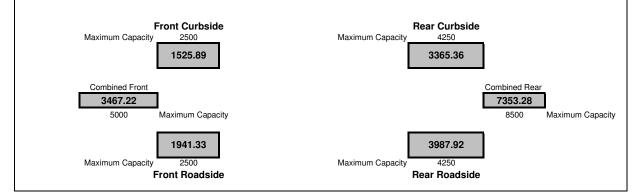
	-		7/1	20/201/ 42	WC Z DD FO	LDS 138 146 US					
	INPUT AREAS=						FUEL LOAD ADJ.				
	VEHICLE DESCRIPTION:		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PEF	R GAL.		
	4 2 WC 2 DB FO	LDS 138 146 USA	E-350	34401B	STARLITE	GAS	40	6.1			
	WHEELBASE	PER IN. VALUE CALC.		AXI F V	VEIGHTS		FUEL AMT.	WGT OF FUEL	FUEL AI	J. AMT.	
	138	0.72			RIGHT FRONT		0.13	244		.72	
AXLE CAPACITIES		2825	1529 1296			FUEL TANK CENTER			LER		
FRONT REAR TOTAL		2020		RIGHT REAR		165		52			
4600	7800	11500	5378	2449	2929						
		LEFT (ROADSIDE						<b>RIGHT (CURE</b>	SIDE)	1	
	DISTANCE (IN.)	WEIGHT (LBS.)	% REAR AXLE FRONT REAR		DISTANCE (IN.)	WEIGHT (LBS.)	FRONT				
DRIVER	40	150	28.99%	106.52	43.48	100	-32	72.46%	-8.81	REAR -23.19	SINGLE
MID DBL	86	-55	62.32%	-20.72	-34.28	142	-32	102.90%	0.93	-32.93	SINGLE
DB FOLD	119	-85	86.23%	-11.70	-73.30			0.00%	0.00	0.00	
DB FOLD	150	-85	108.70%	7.39	-92.39			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
			0.00%	0.00	0.00	105	207	76.09%	49.50	157.50	SINGLE
MID DBL	98	405	71.01%	117.39	287.61	137	207	99.28%	1.50	205.50	SINGLE
DB FOLD	139	435	100.72%	-3.15	438.15			0.00%	0.00	0.00	
DB FOLD	183	435	132.61%	-141.85	576.85			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
		1	0.00%	0.00	0.00			0.00%	0.00	0.00	
		1	0.00%	0.00	0.00			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
		1	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			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	
			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			0.00%	0.00	0.00	
			0.00%	0.00	0.00			0.00%	0.00	0.00	
	TOTAL PASSENGER LOAD			53.88	1146.12				43.12	306.88	1550.00
	AXLE WEIGHTS			1529.00	2449.00				1296.00	2929.00	8203.00
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S				
			LEFT	1562.11	3722.03	5284.14	0.530				
			RIGHT	1318.35	3362.79	4681.14	0.470				
		FRT / REAR TOTALS		2880.46	7084.82	9965.28					
		AXLE CAPACITIES		4600	7800	11500					
		AVAILAB	1719.54	715.18	1534.72						
									AS BUILT	044000	

MID HI SEATS



#### WEIGHT ANALYSIS 4/26/2017 2 3 WC 4 DBL FOLDS 158 163 USA

	INPUT AREAS=		01110015		14005		FUEL LOAD ADJ			<b>├</b> ── <b> </b>			
	VEHICLE DESCRIPTION:		CHASSIS	UNIT #	MODEL:	FUEL TYPE:	FUEL CAP.	FUEL WGT PEF	GAL.				
	7 2 WC 158 163-	1 USA	E-350		ALLSTAR	GAS	40	6.1					
		PER IN. VALUE CALC.			VEIGHTS		FUEL AMT.	WGT OF FUEL		DJ. AMT.			
	158	0.63	0440		RIGHT FRONT		0.13	244		0.50			
AXLE CAPACITIES		3446	1776	1670		FUEL TANK CENTER		DEA	ALER				
FRONT	REAR	TOTAL	5005	LEFT REAR			185			r			
5000	8500	12500	5335	2492	2843								
		LEFT (ROADSIDE)					RIGHT (CURBSIDE) DISTANCE (IN.) WEIGHT (LBS.) % REAR AXLE FRONT REAR						
	DISTANCE (IN.)		% REAR AXLE		REAR	DISTANCE (IN.)				REAR			
DRIVER	48	150	30.38%	104.43	45.57	104	-40	65.82%	-13.67	-26.33	3PT MID SNG		
DB FOLD	90	-107	56.96%	-46.05	-60.95	134	-40	84.81%	-6.08	-33.92	3PT MID SNG		
3PT MID DBL	120	-83	75.95%	-19.96	-63.04			0.00%	0.00	0.00			
3PT MID DBL	188	-83	118.99%	15.76	-98.76			0.00%	0.00	0.00			
			0.00%	0.00	0.00	179	207	113.29%	-27.51	234.51	MID SNGL		
DB FOLD	91	435	57.59%	184.46	250.54	218	207	137.97%	-78.61	285.61	MID SNGL		
DB FOLD	125	435	79.11%	90.85	344.15			0.00%	0.00	0.00			
DB FOLD	159	435	100.63%	-2.75	437.75			0.00%	0.00	0.00			
DB FOLD	210	435	132.91%	-143.16	578.16			0.00%	0.00	0.00			
MORRYDE	158	-62.5	100.00%	0.00	-62.50	158	-62.5	100.00%	0.00	-62.50	MORRYDE		
			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			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			
			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			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			
			0.00%	0.00	0.00			0.00%	0.00	0.00			
	TOTAL PASSEN			183.58	1370.92				-125.87	397.37	1826.00		
	AXLE WEIGHTS			1776.00	2492.00				1670.00	2843.00	8781.00		
				FRONT	REAR	LEFT/RIGHT TOTALS	LEFT/RIGHT %'S						
			LEFT	1941.33	3987.92	5929.25	0.548						
			RIGHT	1525.89	3365.36	4891.25	0.452						
		FRT	/ REAR TOTALS	3467.22	7353.28	10820.50							
		AXLE CAPACITIES		5000	8500	12500							
		AVAILAB	LE CAPACITIES	1532.78	1146.72	1679.50							
	•	•					•		AS BUILT	48172B			
									2DT MID	BACK, FLIFT			





The following information is submitted for all Glaval Bus products proposed on this bid 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 steel frame that is 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 14 gauge aluminzed 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.
- 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 1.5" x 2" tube that provides 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.
- 3.0.2.2 Aluminized steel Tubing 1.5"x1" lower and 1.5"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 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall belowt**the**kvisndow 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 1.5"x1" or 1.5"x2" 16 gauge wall aluinized steel tubing..
- 3.0.2.5 Full length glavanized steel tubing 1.5"x1" 16 gauge aluinized 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 1.5"x 2" aluminized steel tube 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 Aluinized steel Tubing 1.5"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 -1.5"x1" 16 gauge aluminized steel tubing 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 that allows for the roof structure to be 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 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" 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" x 2" 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.

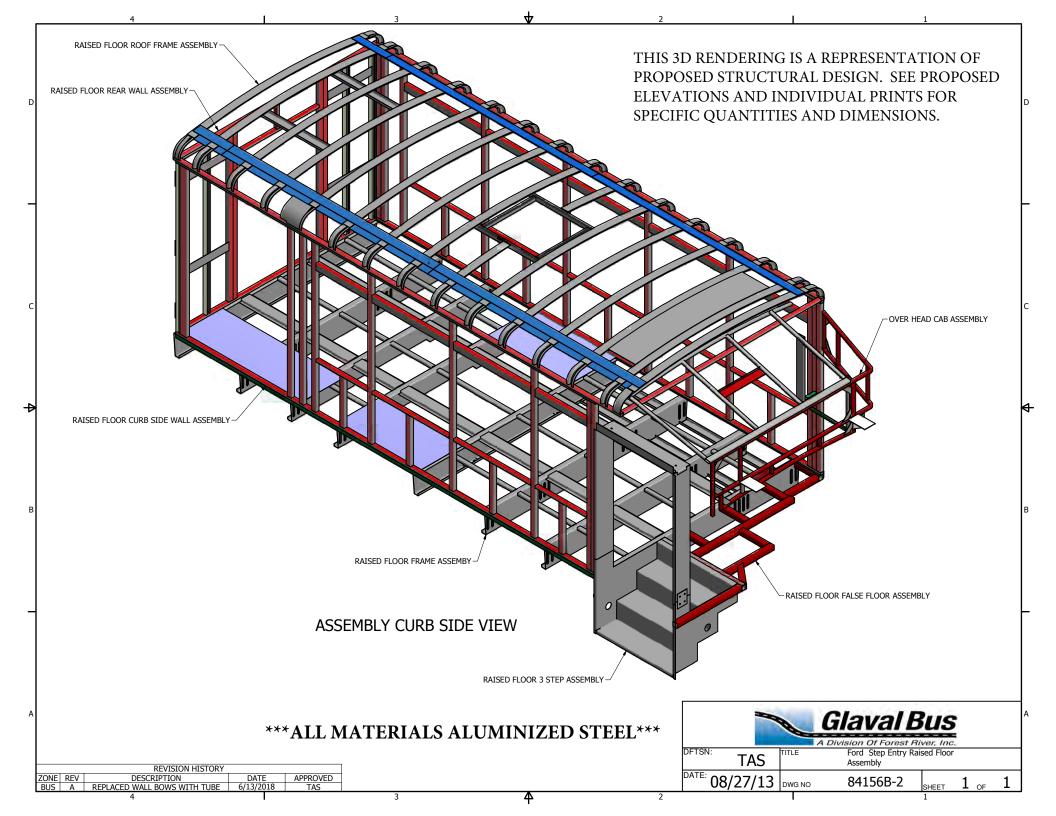
## **APPLICATION OF EXTERIOR SIDEWALL MATERIAL**

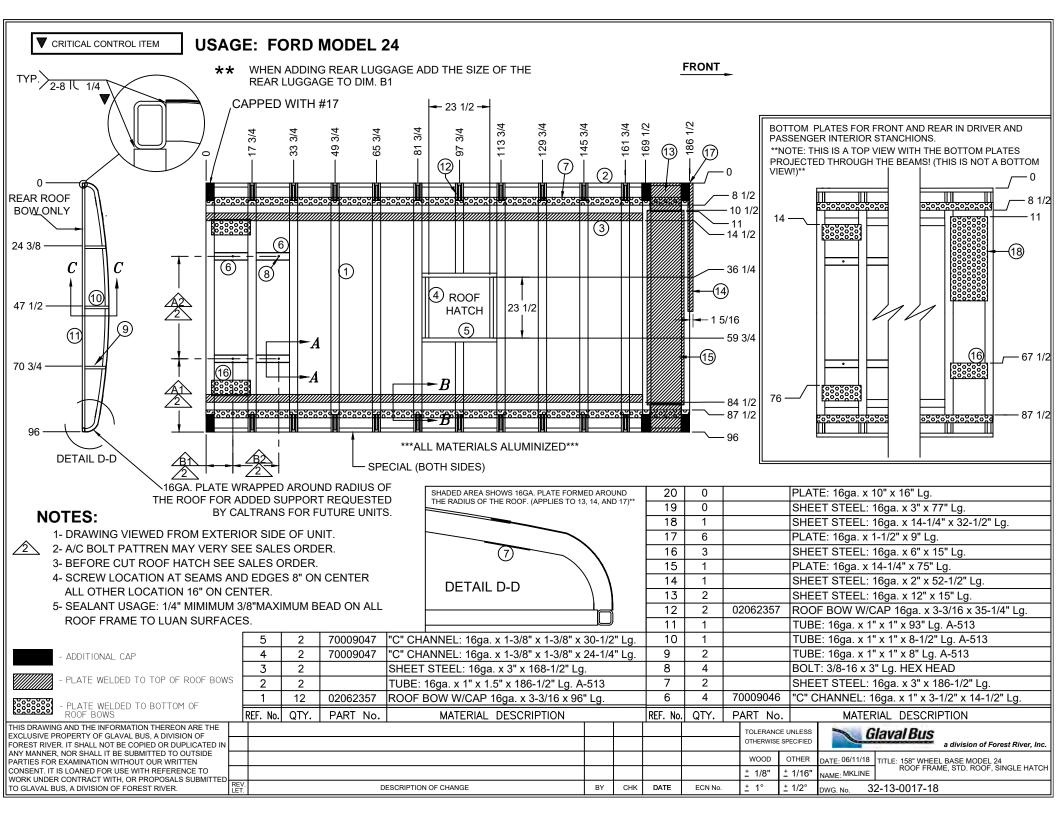
# GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

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 a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

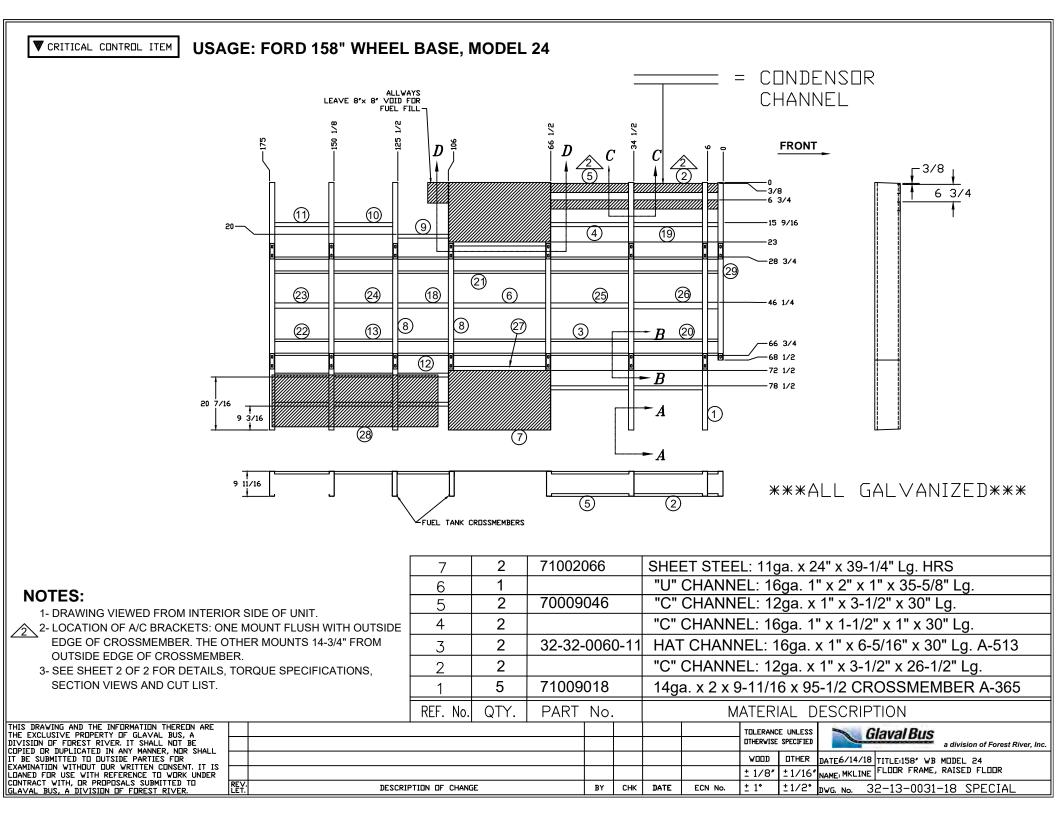
Composite FRP exterior sidewall panels are installed using the same method.

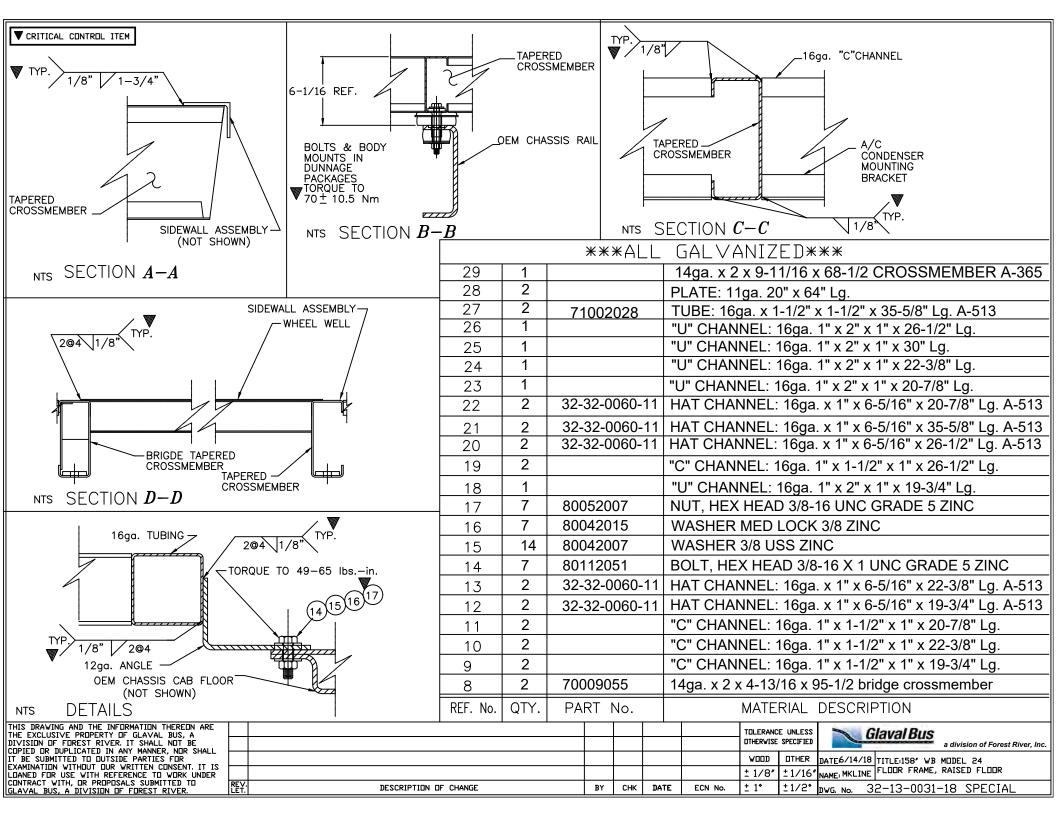
Should any further questions arise, please contact your Glaval Bus representative.

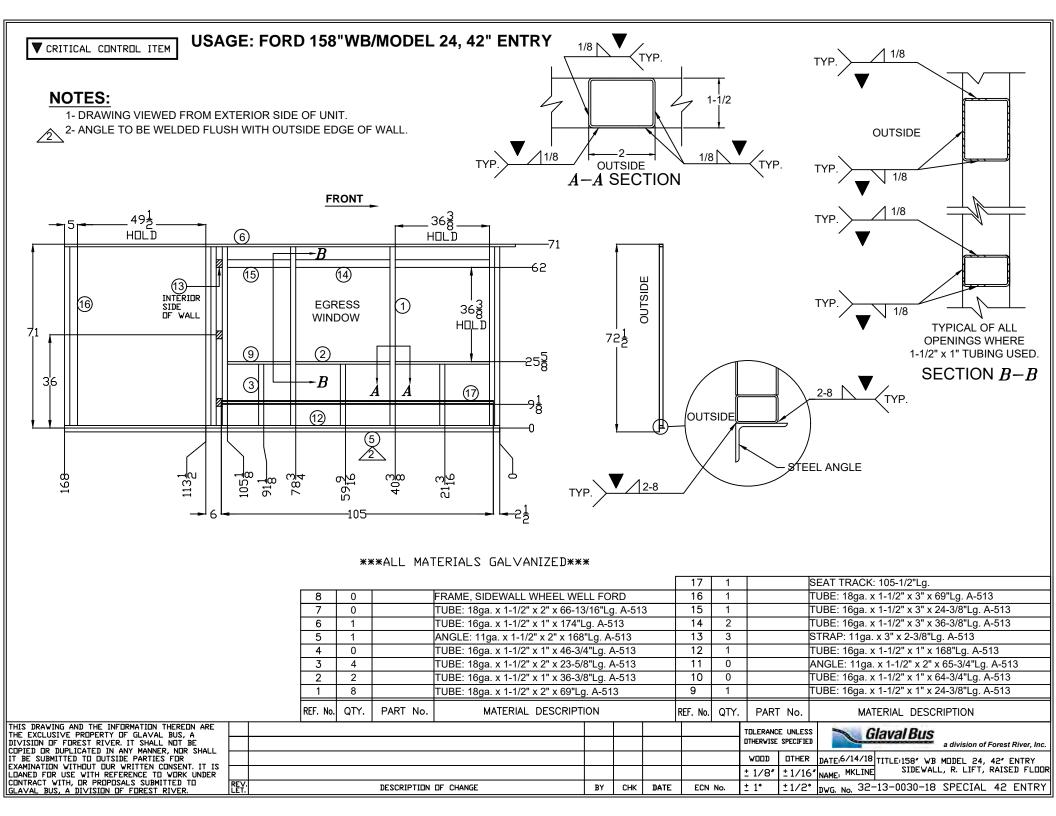


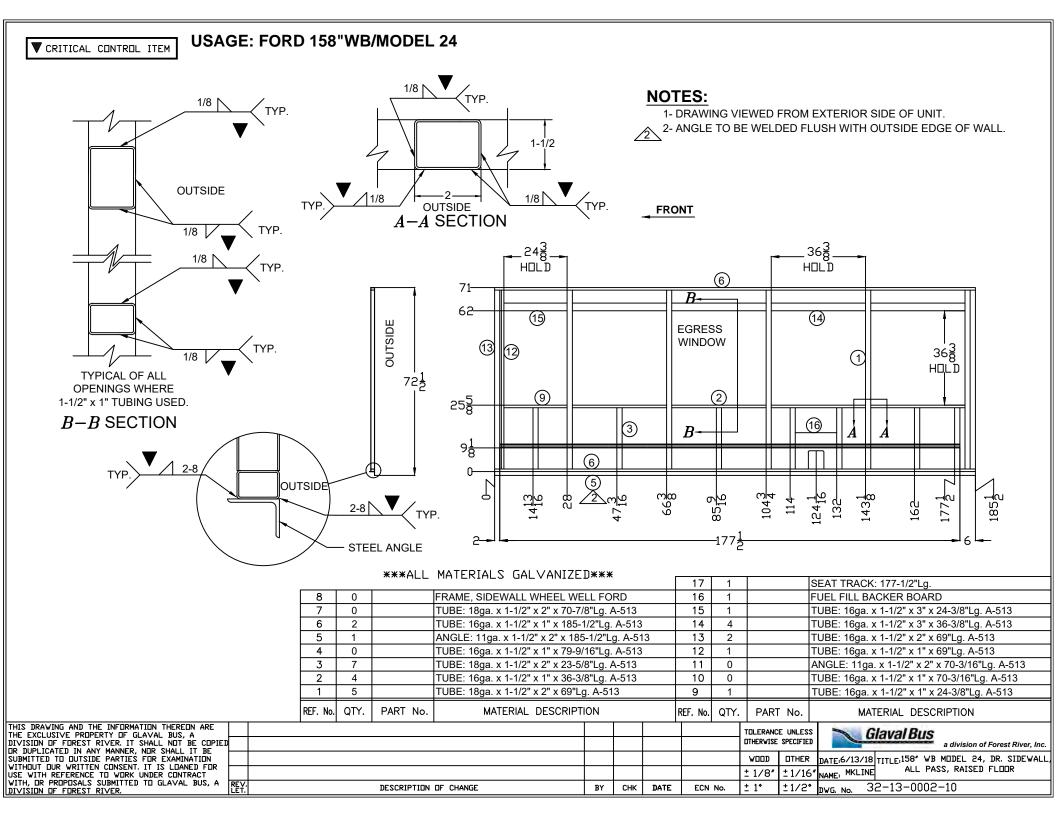


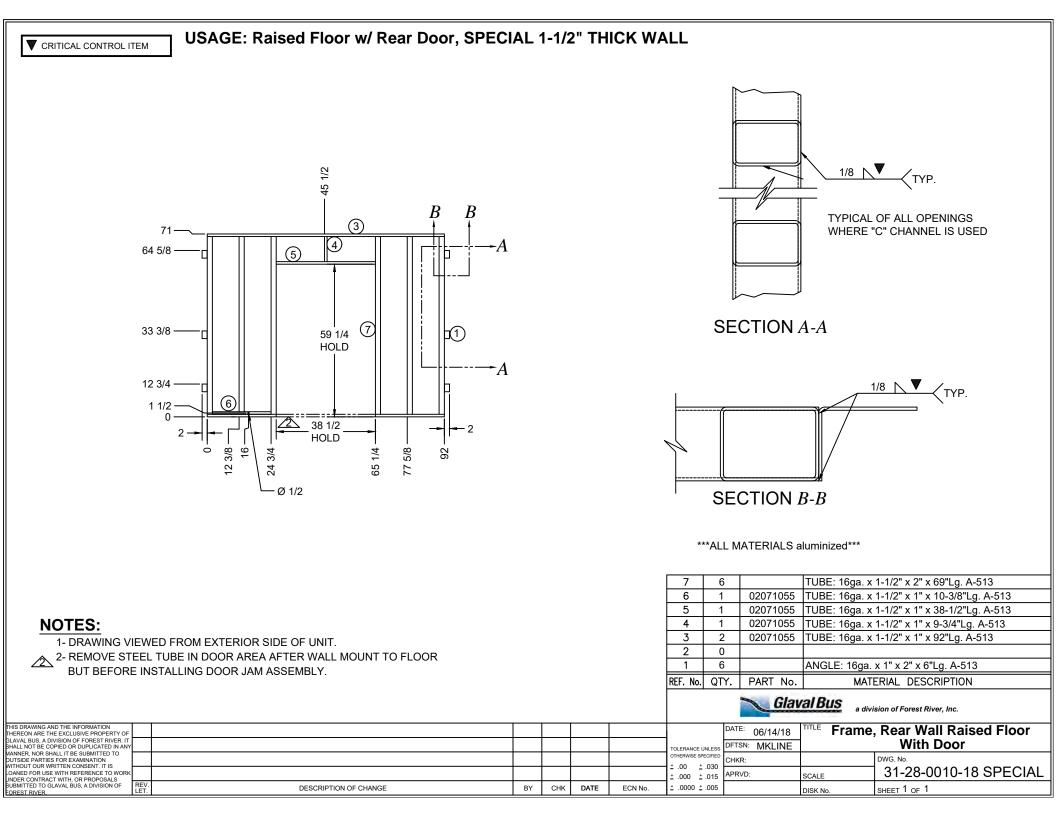
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A	CAPPED ROOF BOW	STAS 5000 SEE N #5 SH 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2	NOTE IEET 2		
BACKER PLATE	TYP.	ACC 23022 SERIES ACC 23023 SERIES T/A-77 T/A-73 T/A-71 OLD STYLE T/A-70 T/A-30 EM-14 & RE-29 EM-6 & RE-10 EM-3 & RE-30 RE-15 & RE-30 RE-15 & RE-20 EM-1 & EM-2 EM-7 GEN 5 EM-2 GEN 5	33-5/8       30         38       20         33-5/8       28-3/4         18-1/4       59-1/2         28-1/4       39-1/2         33-5/8       28-3/4         36-3/4       22-1/2         31       34         30-3/4       22-1/2         31       34         30-3/4       34-1/2         36       24         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         36-1/8       23-3/4         32-3/8       31-1/16	10 10 10 10 10 10 10 10 10 10 10 10 10 1	12-1/4 14-3/4 14-3/4 10-3/8 9-1/2 12-1/4 11-5/8 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2
SECTION <b>B-B</b>			28-3/16 39-5/8 A-1 A-2	10 B-1	9-1/2 B-2
THIS DRAWING AND THE INFORMATION THEREON ARE THE         EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF         FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN         ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE         PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN         CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO         WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED         TO GLAVAL BUS, A DIVISION OF FOREST RIVER.	Image: Constraint of the second sec	TOLERANCE UNLESS OTHERWISE SPECIFIED       WOOD     OTHER       ± 1/8"     ± 1/16"       ± 1/8"     ± 1/16"       NAME: MKLI       ± 1°     ± 1/2°       DWG. No.	I/18 TITLE: 158" WHEEL		L 24

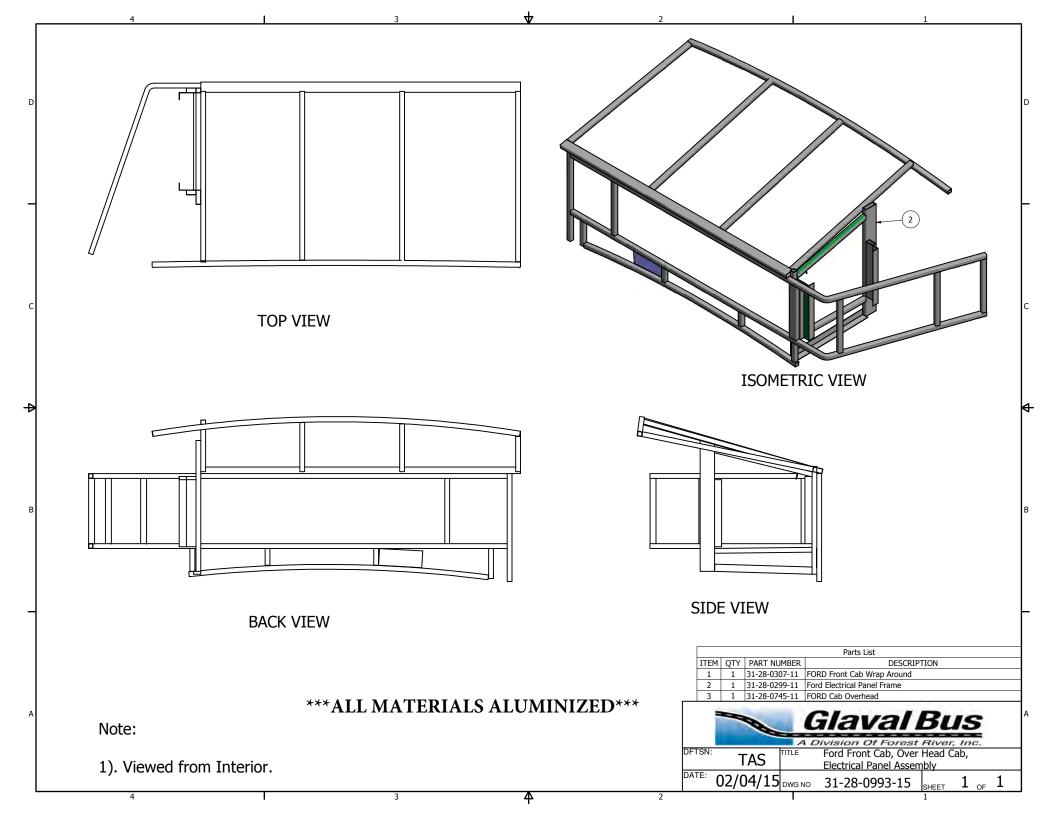


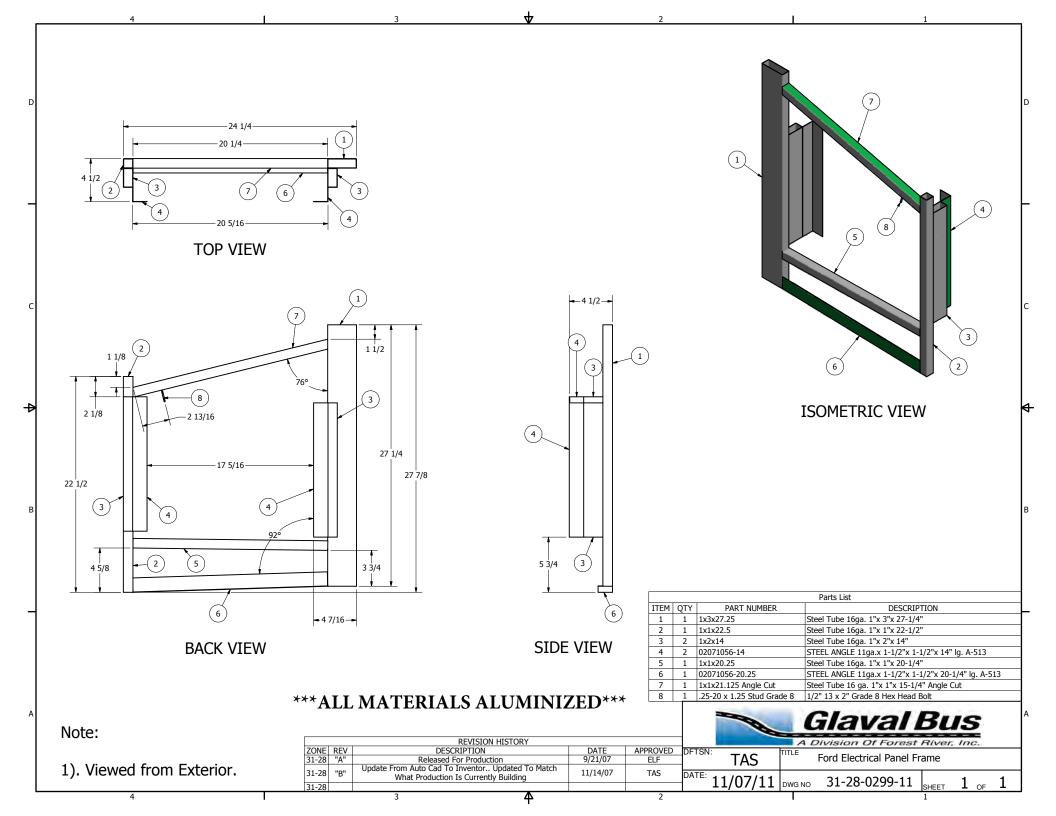


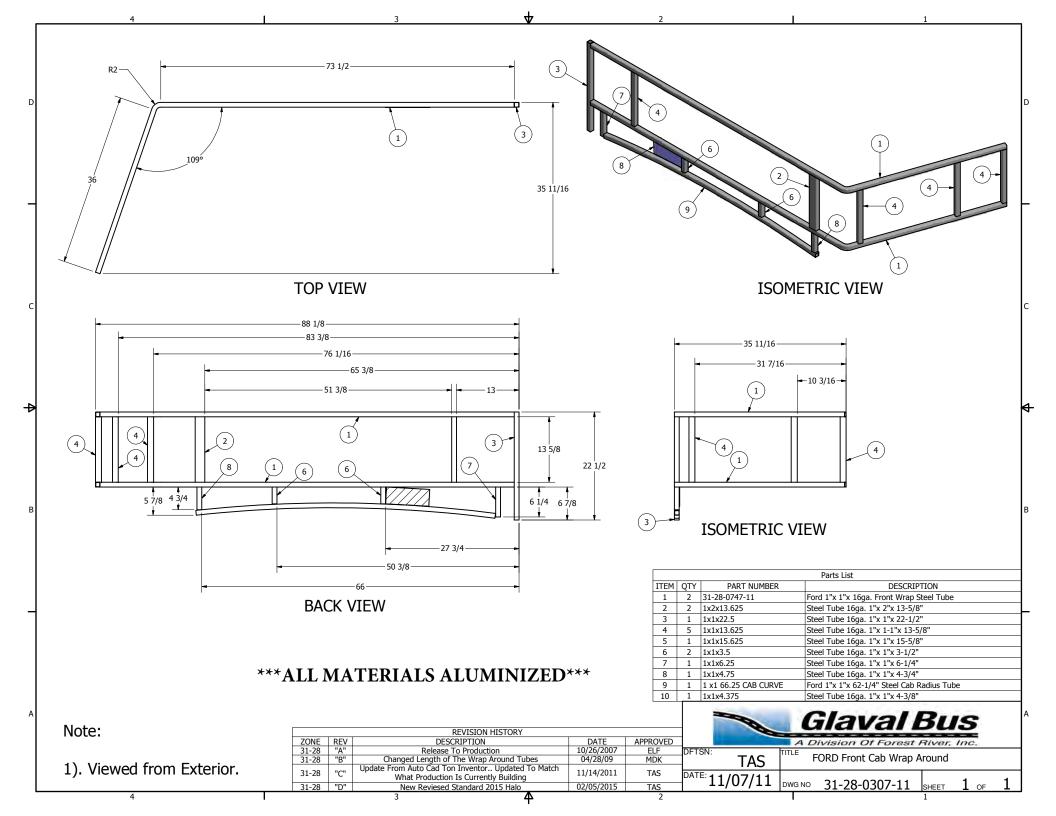


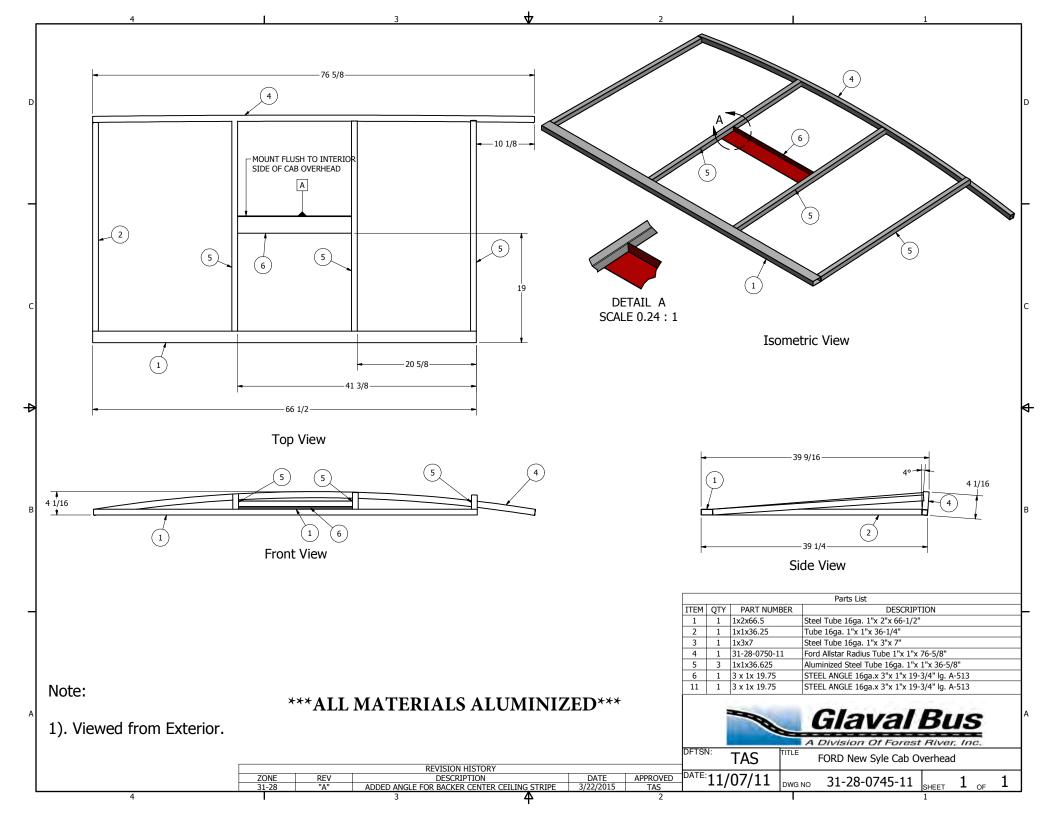


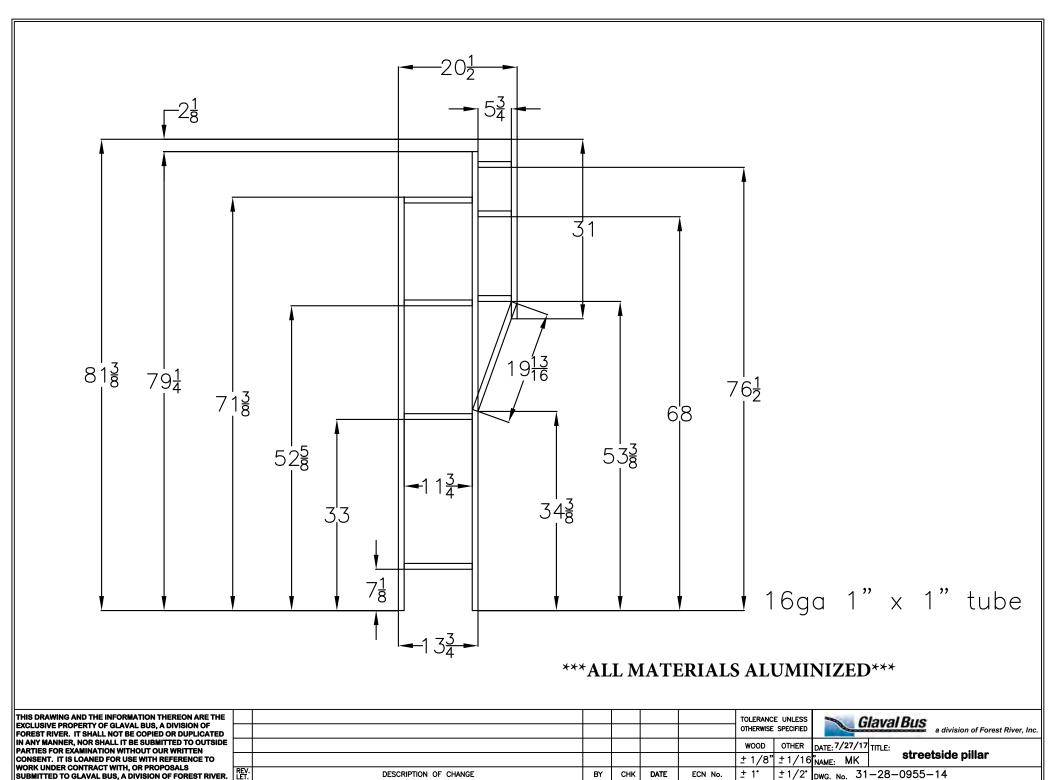












BY

СНК

DATE

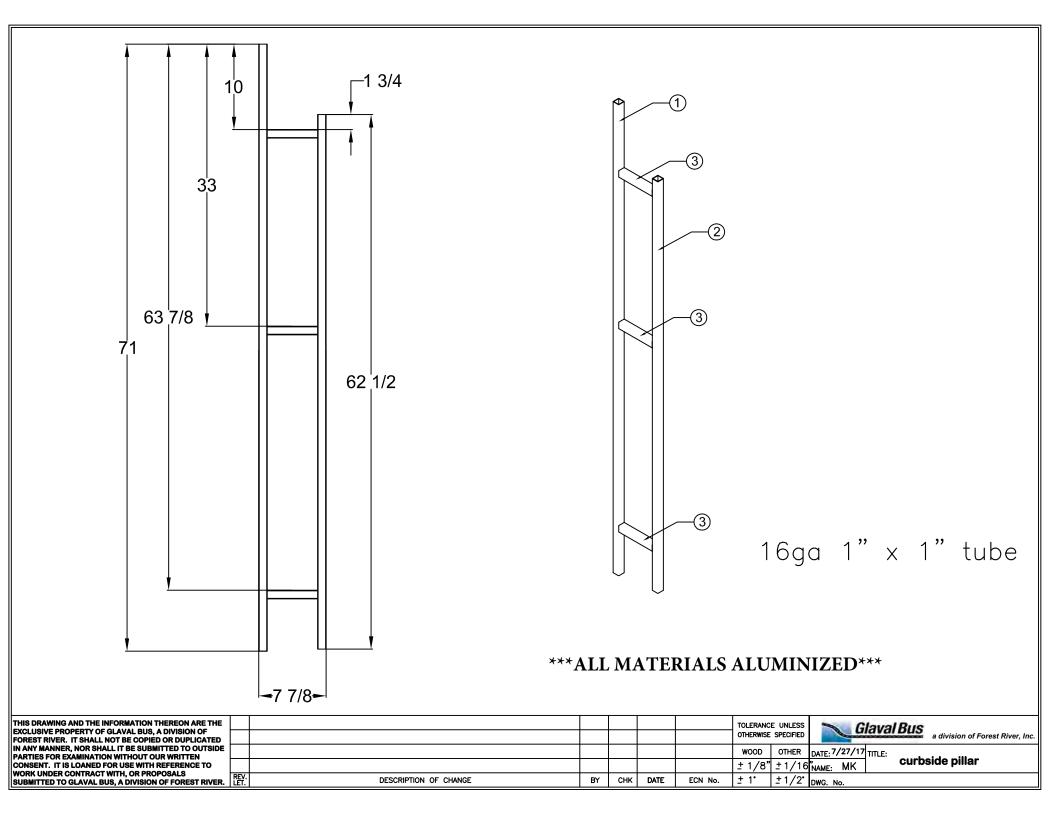
ECN No.

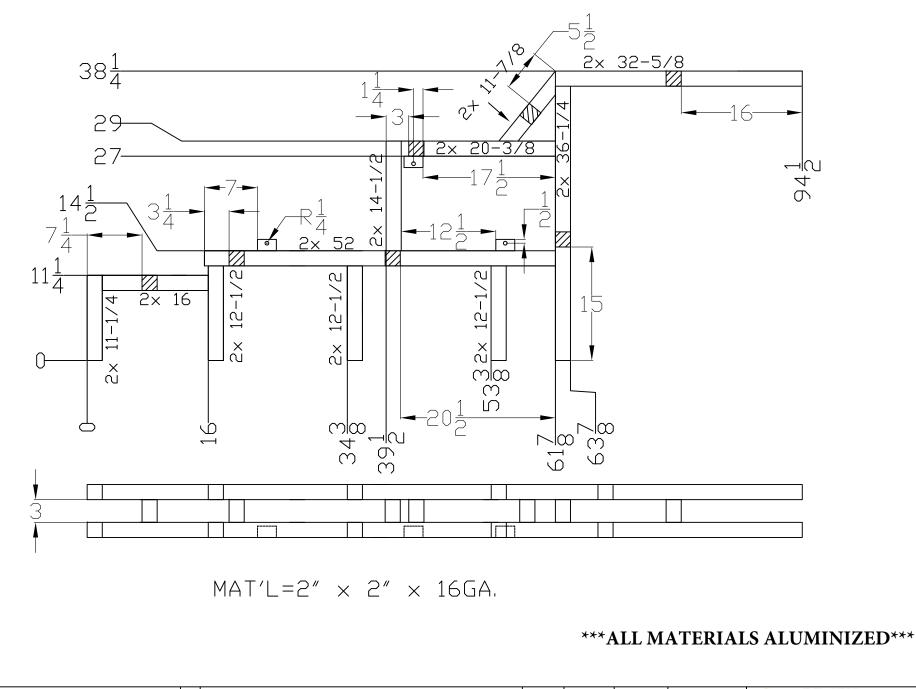
DESCRIPTION OF CHANGE

±1/2°

± 1°

DWG. No. 31-28-0955-14





THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF Glaval Bus TOLERANCE UNLESS OTHERWISE SPECIFIED a division of Forest River, Inc. FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE DATE: 06/30/17 TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY VOOD DTHER PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO ± 1/8″ ±1/16″ NAME: RTS WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO GLAVAL BUS, A DIVISION OF FOREST RIVER. REY. DESCRIPTION OF CHANGE DATE ECN No. ± 1° ±1/2\* 31-28-0531-17C ΒY DWG. No.



The following information is submitted for all Glaval Bus products proposed on this bid 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 steel frame that is 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 14 gauge aluminzed 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.
- 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 1.5" x 2" tube that provides 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.
- 3.0.2.2 Aluminized steel Tubing 1.5"x1" lower and 1.5"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 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall belowt**the**kvisndow 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 1.5"x1" or 1.5"x2" 16 gauge wall aluinized steel tubing..
- 3.0.2.5 Full length glavanized steel tubing 1.5"x1" 16 gauge aluinized 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 1.5"x 2" aluminized steel tube 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 Aluinized steel Tubing 1.5"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 -1.5"x1" 16 gauge aluminized steel tubing 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 that allows for the roof structure to be 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 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" 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" x 2" 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.

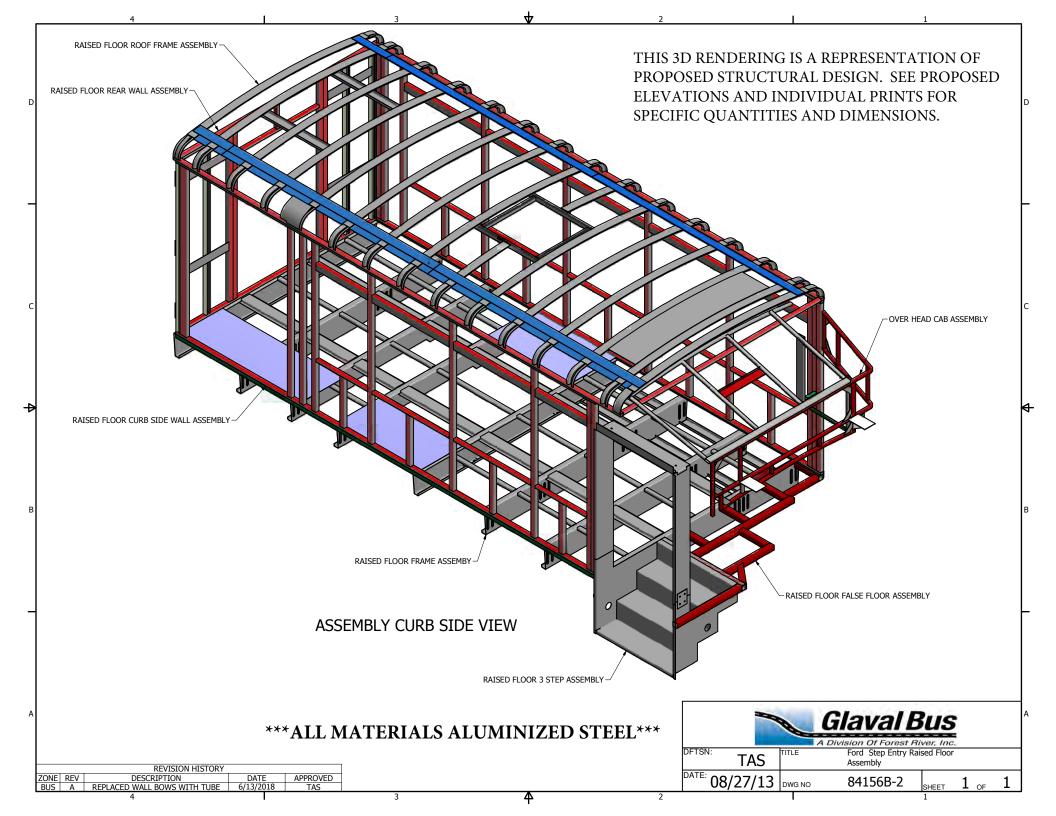
## **APPLICATION OF EXTERIOR SIDEWALL MATERIAL**

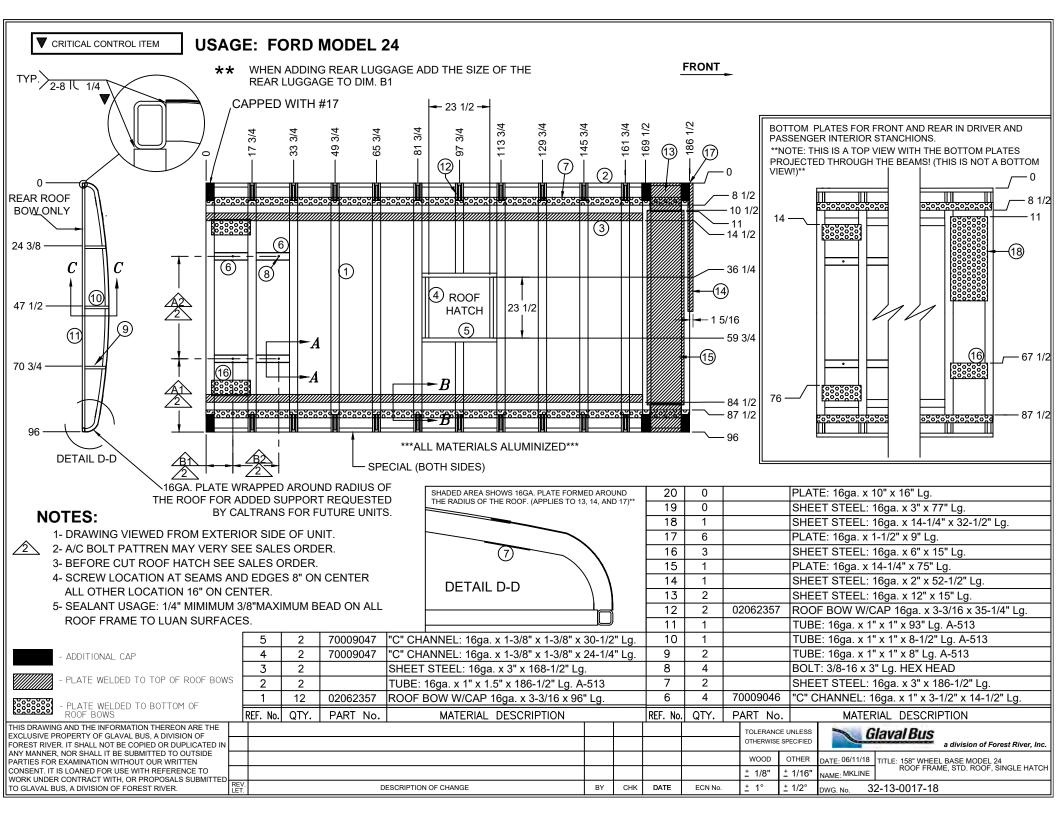
# GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

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 a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

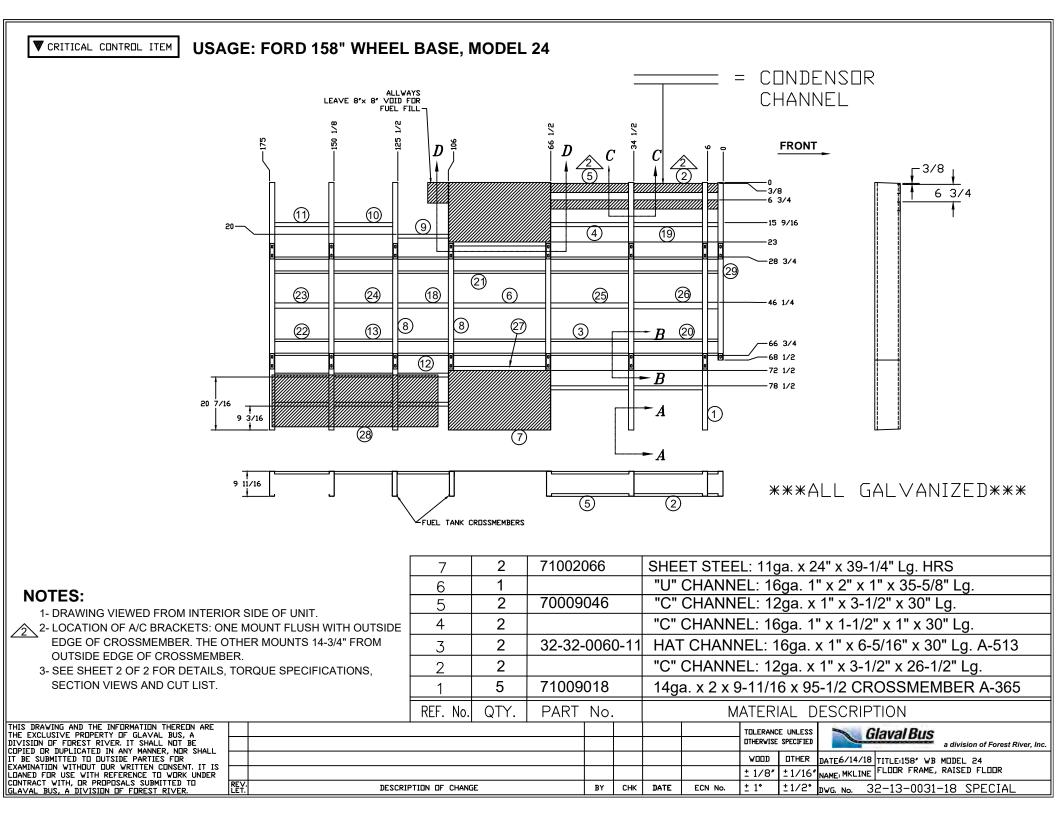
Composite FRP exterior sidewall panels are installed using the same method.

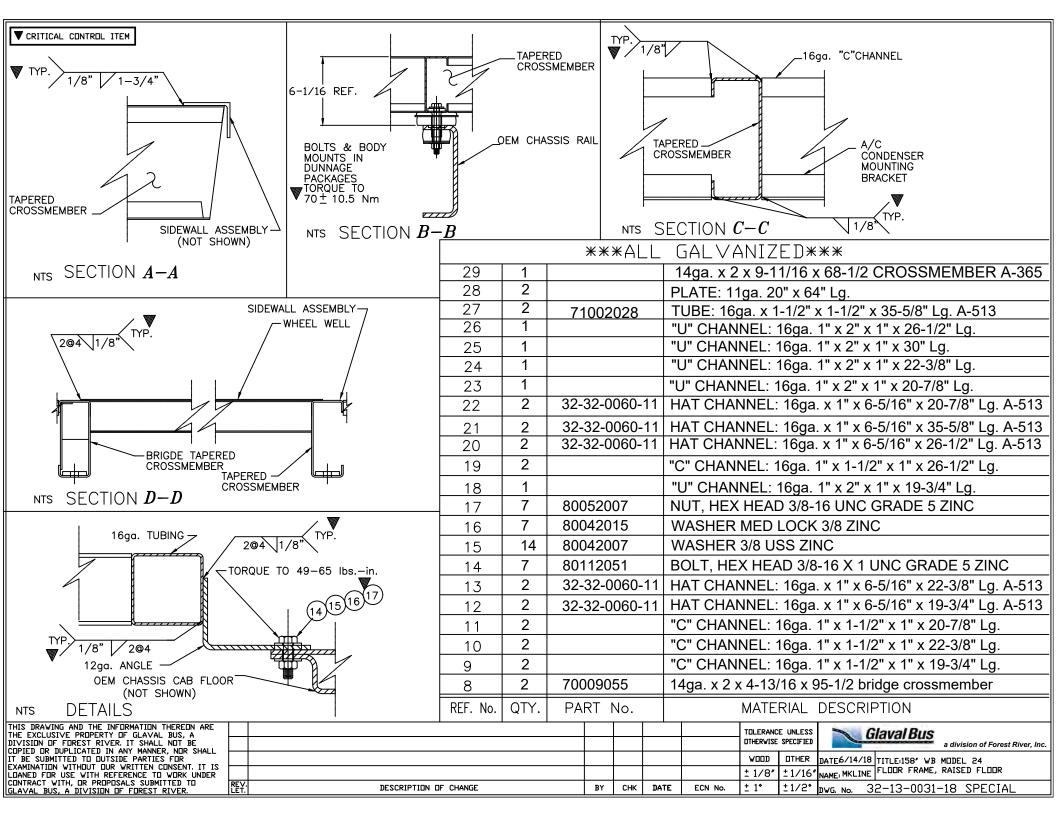
Should any further questions arise, please contact your Glaval Bus representative.

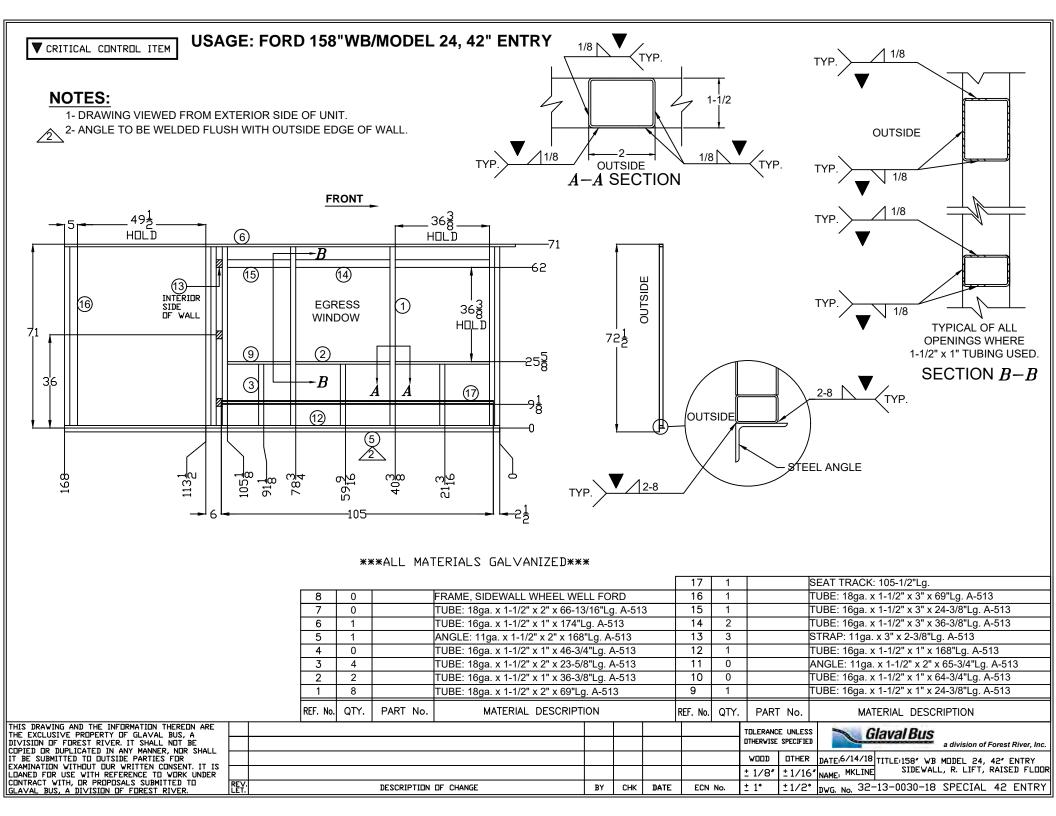


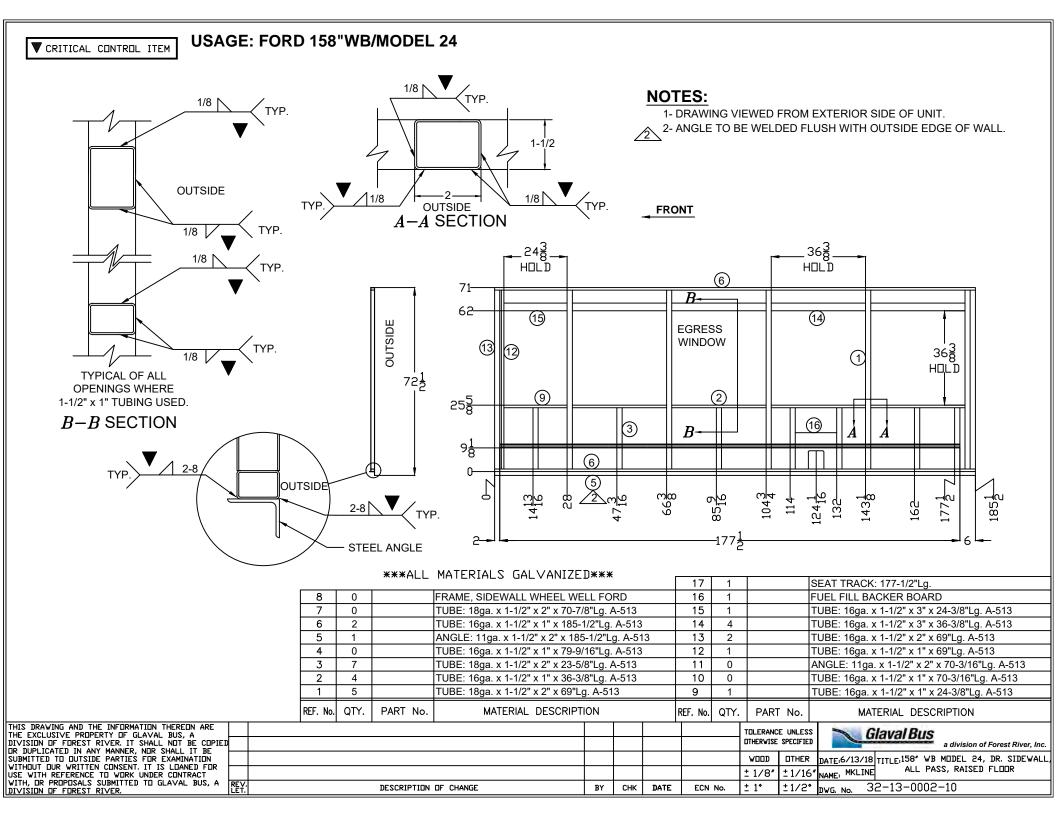


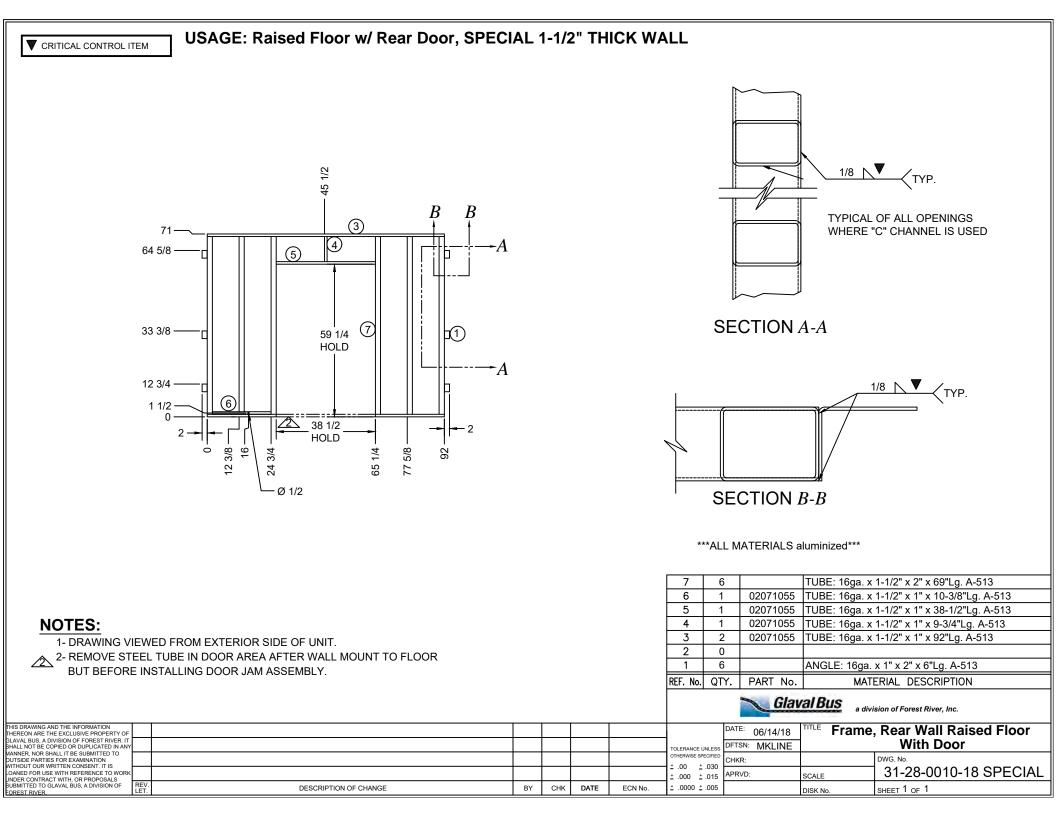
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A	CAPPED ROOF BOW	STAS 5000 SEE N #5 SH 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2	NOTE IEET 2		
BACKER PLATE	TYP.	ACC 23022 SERIES ACC 23023 SERIES T/A-77 T/A-73 T/A-71 OLD STYLE T/A-70 T/A-30 EM-14 & RE-29 EM-6 & RE-10 EM-3 & RE-30 RE-15 & RE-30 RE-15 & RE-20 EM-1 & EM-2 EM-7 GEN 5 EM-2 GEN 5	33-5/8       30         38       20         33-5/8       28-3/4         18-1/4       59-1/2         28-1/4       39-1/2         33-5/8       28-3/4         36-3/4       22-1/2         31       34         30-3/4       22-1/2         31       34         30-3/4       34-1/2         36       24         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         36-1/8       23-3/4         32-3/8       31-1/16	10 10 10 10 10 10 10 10 10 10 10 10 10 1	12-1/4 14-3/4 14-3/4 10-3/8 9-1/2 12-1/4 11-5/8 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2
SECTION <b>B-B</b>			28-3/16 39-5/8 A-1 A-2	10 B-1	9-1/2 B-2
THIS DRAWING AND THE INFORMATION THEREON ARE THE         EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF         FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN         ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE         PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN         CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO         WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED         TO GLAVAL BUS, A DIVISION OF FOREST RIVER.	Image: Constraint of the second sec	TOLERANCE UNLESS OTHERWISE SPECIFIED       WOOD     OTHER       ± 1/8"     ± 1/16"       ± 1/8"     ± 1/16"       NAME: MKLI       ± 1°     ± 1/2°       DWG. No.	I/18 TITLE: 158" WHEEL		L 24

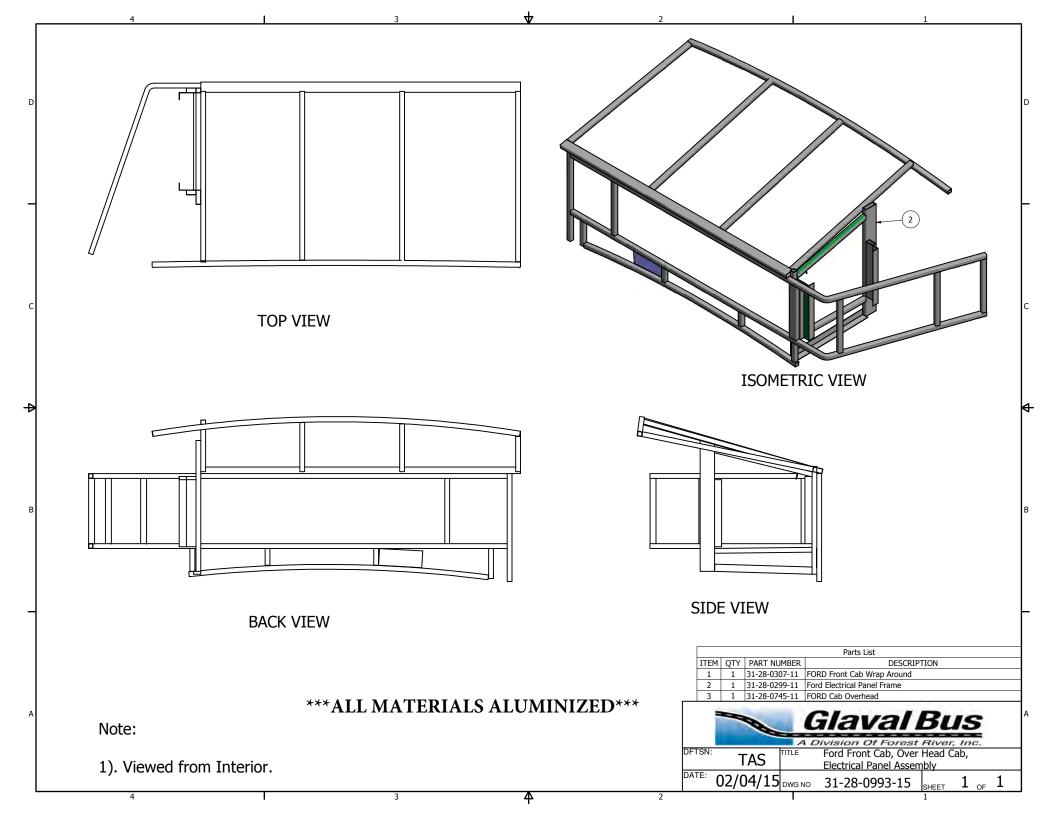


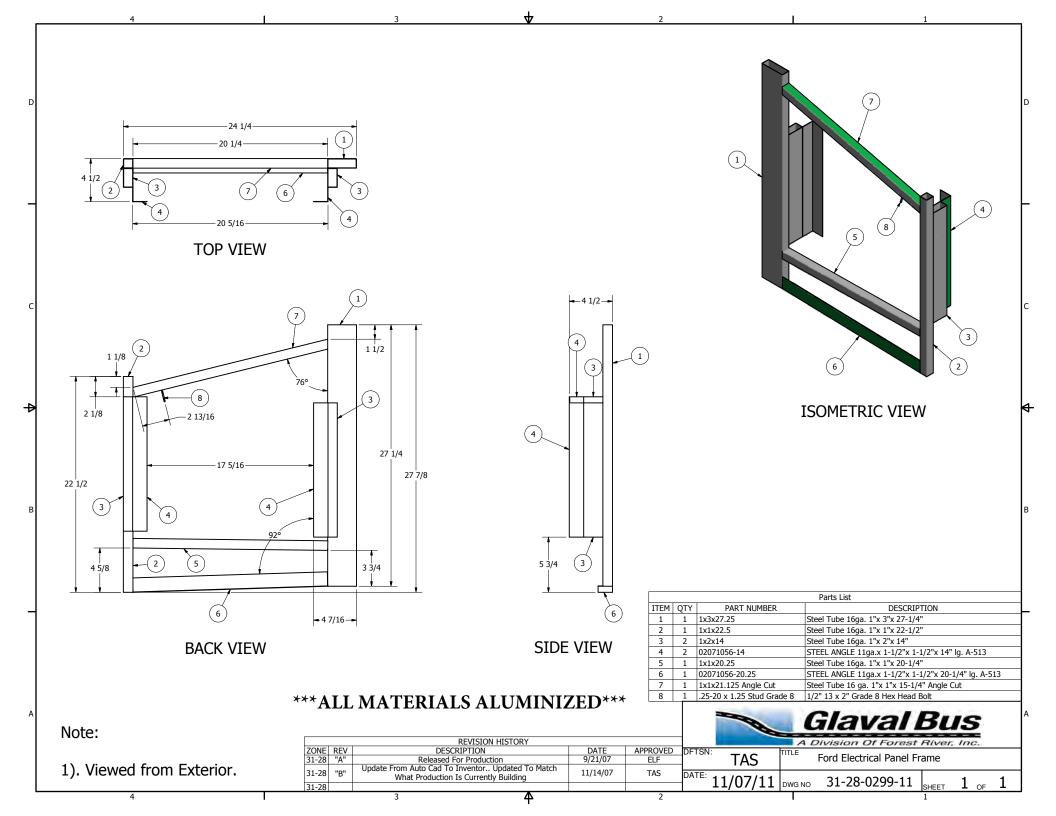


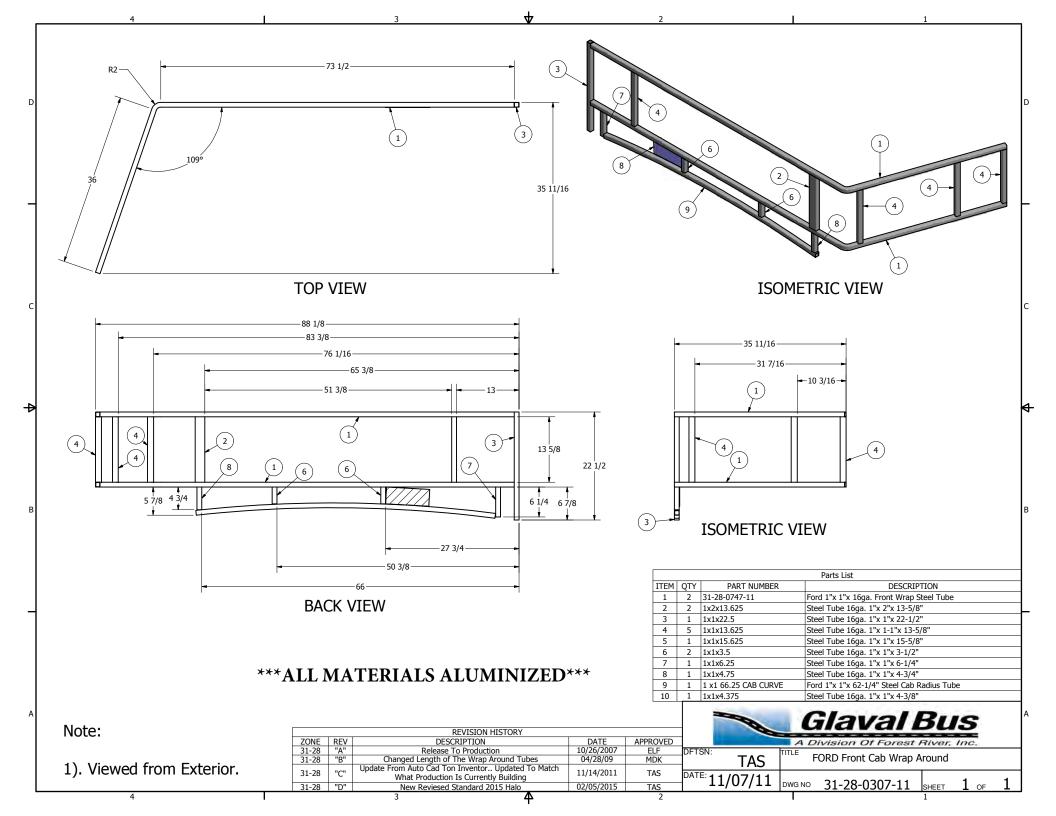


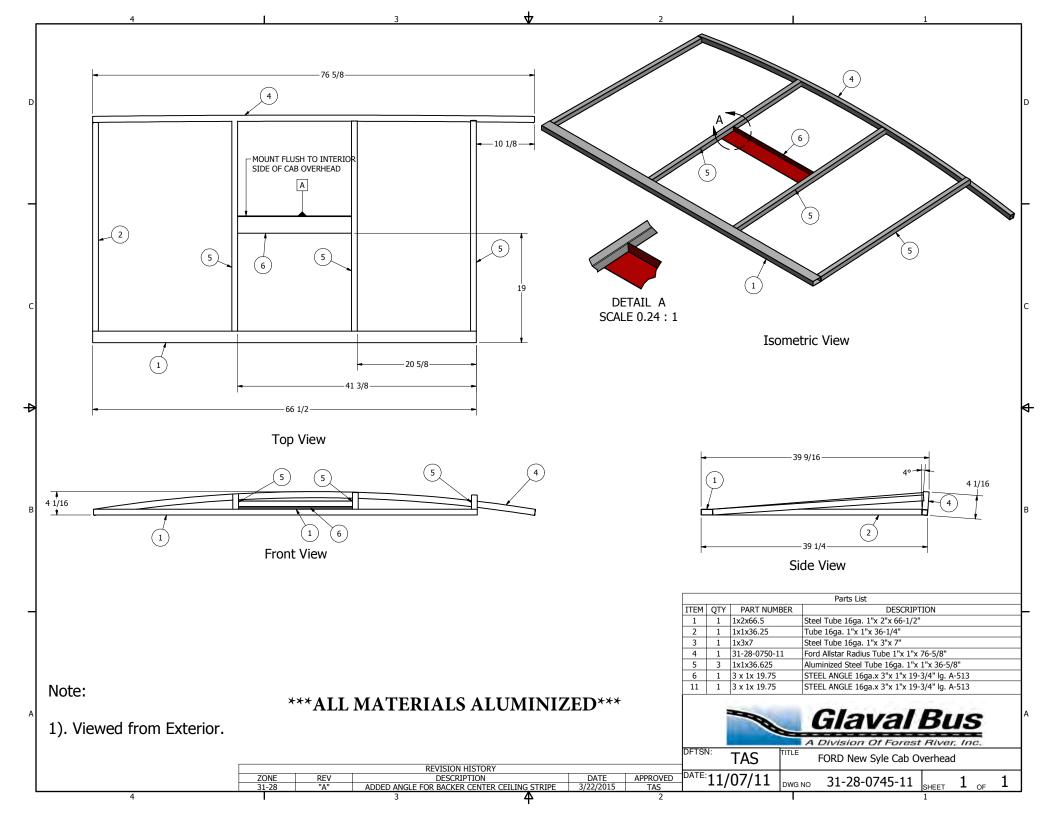


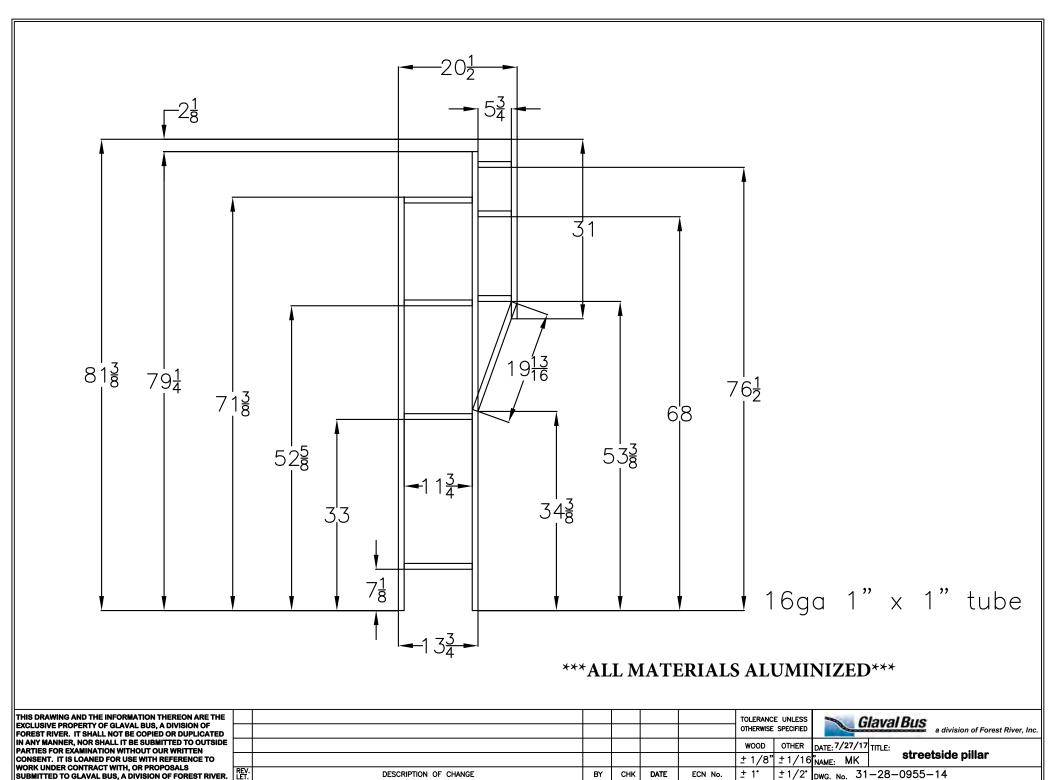












BY

СНК

DATE

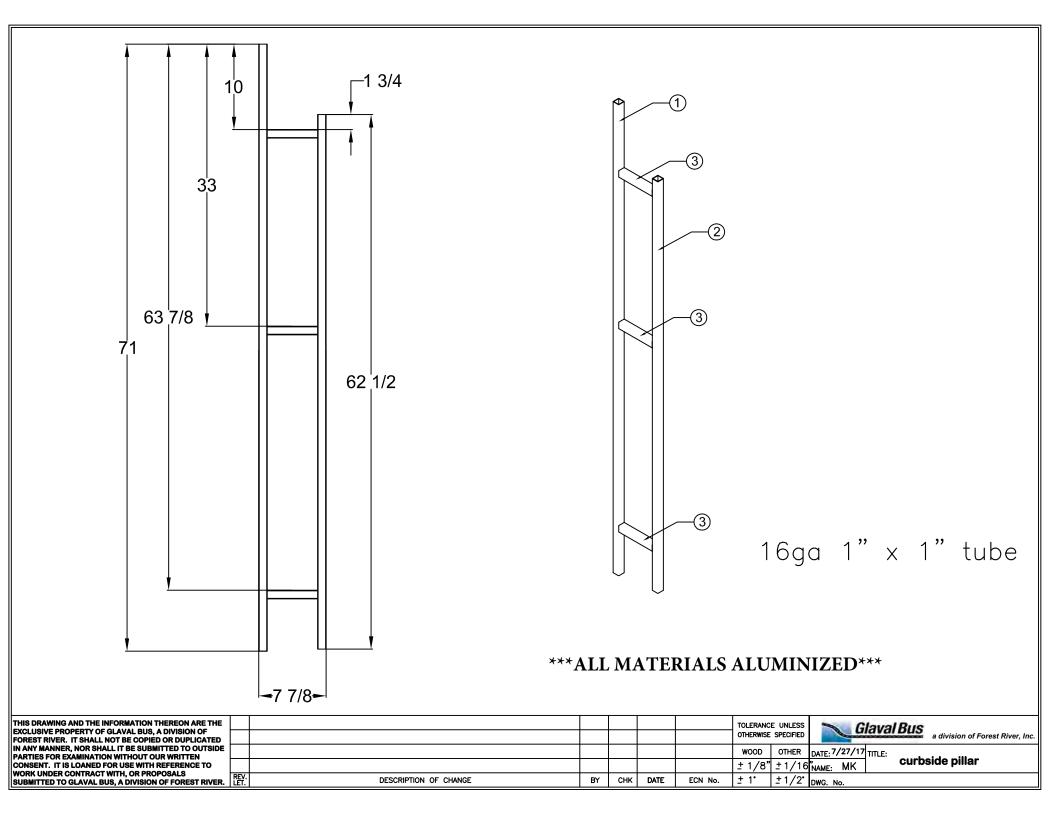
ECN No.

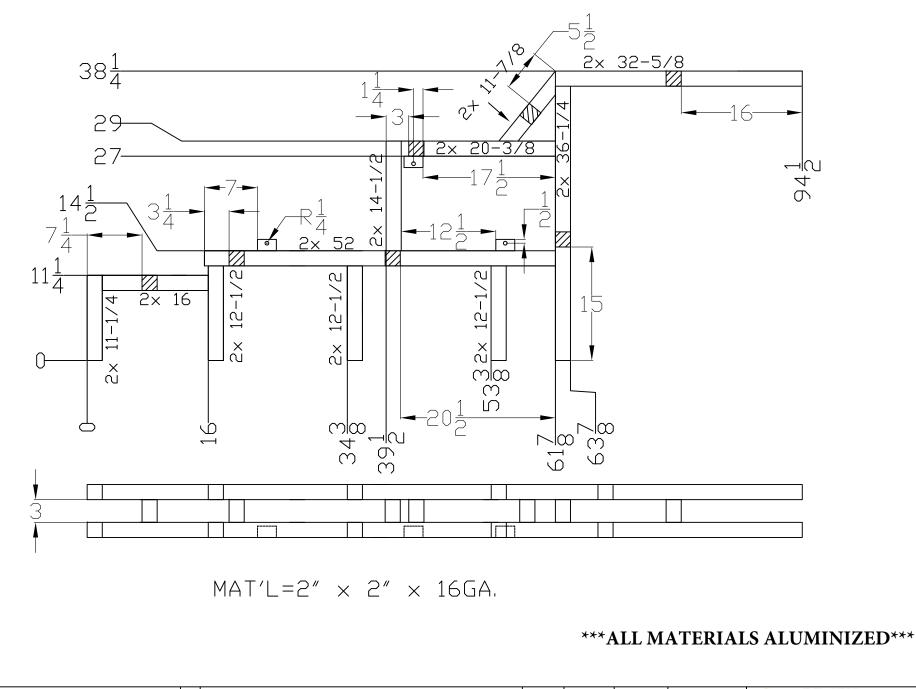
DESCRIPTION OF CHANGE

±1/2°

± 1°

DWG. No. 31-28-0955-14





THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF Glaval Bus TOLERANCE UNLESS OTHERWISE SPECIFIED a division of Forest River, Inc. FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE DATE: 06/30/17 TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY VOOD DTHER PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO ± 1/8″ ±1/16″ NAME: RTS WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO GLAVAL BUS, A DIVISION OF FOREST RIVER. REY. DESCRIPTION OF CHANGE DATE ECN No. ± 1° ±1/2\* 31-28-0531-17C ΒY DWG. No.



The following information is submitted for all Glaval Bus products proposed on this bid 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 steel frame that is 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 14 gauge aluminzed 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.
- 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 1.5" x 2" tube that provides 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.
- 3.0.2.2 Aluminized steel Tubing 1.5"x1" lower and 1.5"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 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall belowt**the**kvisndow 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 1.5"x1" or 1.5"x2" 16 gauge wall aluinized steel tubing..
- 3.0.2.5 Full length glavanized steel tubing 1.5"x1" 16 gauge aluinized 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 1.5"x 2" aluminized steel tube 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 Aluinized steel Tubing 1.5"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 -1.5"x1" 16 gauge aluminized steel tubing 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 that allows for the roof structure to be 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 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" 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" x 2" 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.

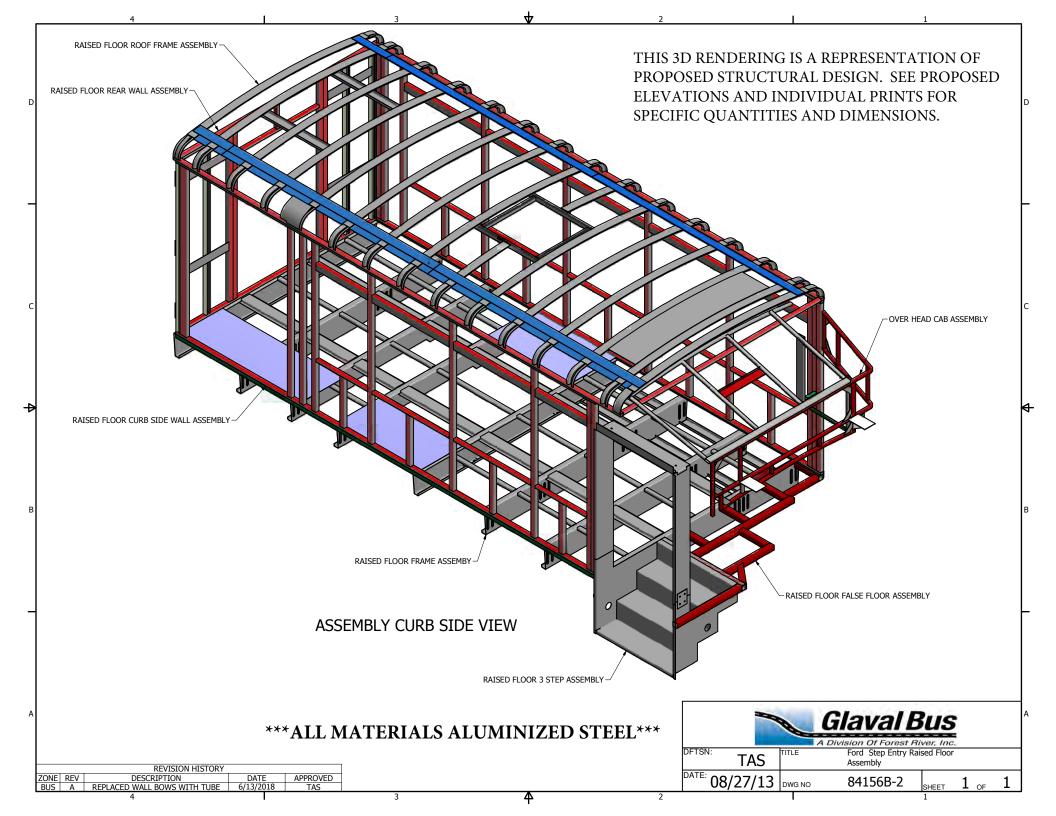
## **APPLICATION OF EXTERIOR SIDEWALL MATERIAL**

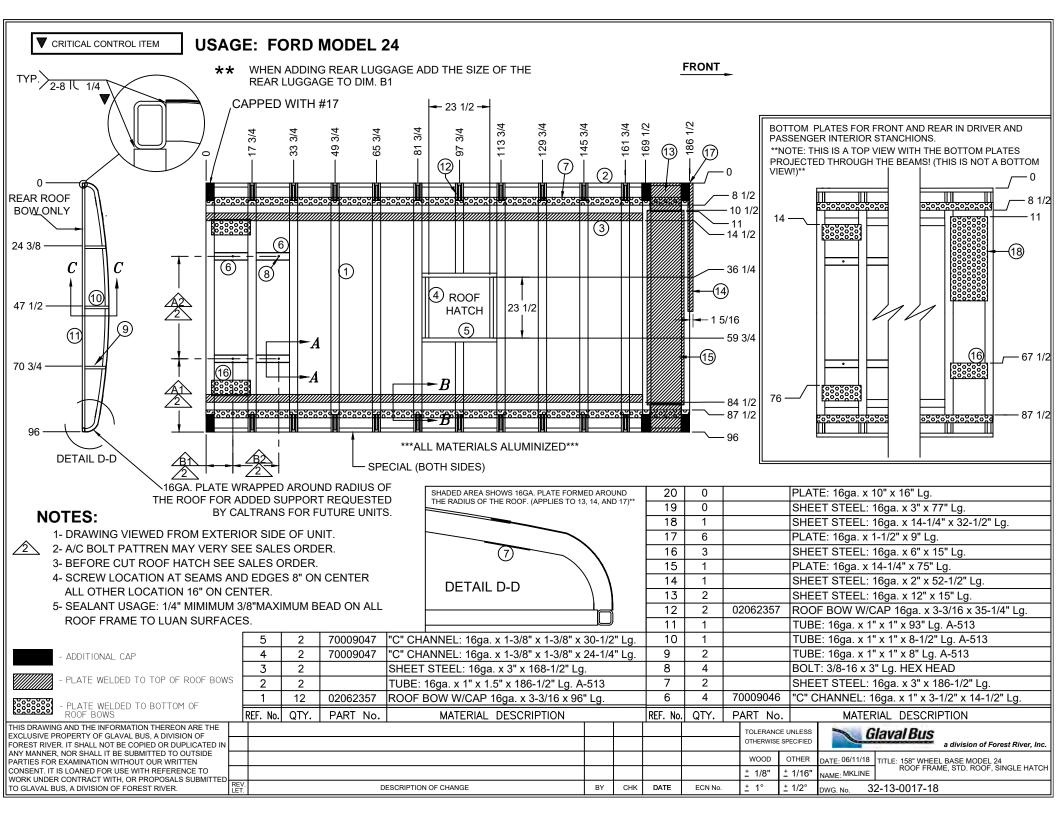
# GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

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 a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

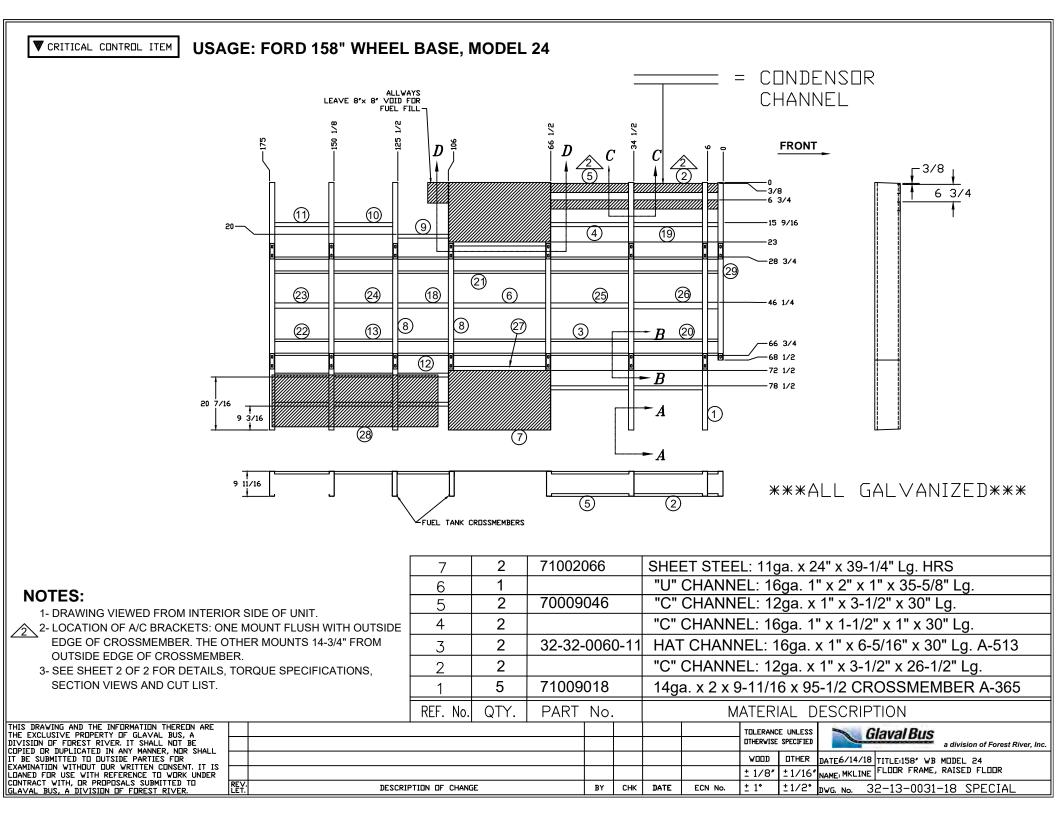
Composite FRP exterior sidewall panels are installed using the same method.

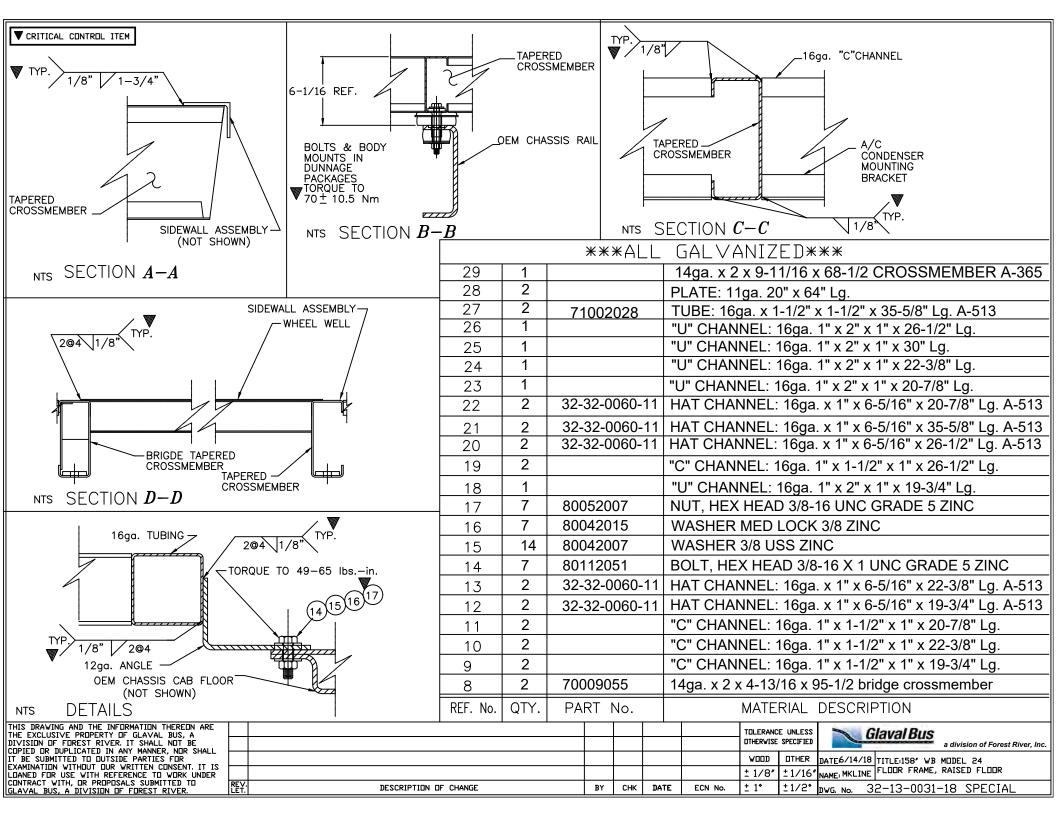
Should any further questions arise, please contact your Glaval Bus representative.

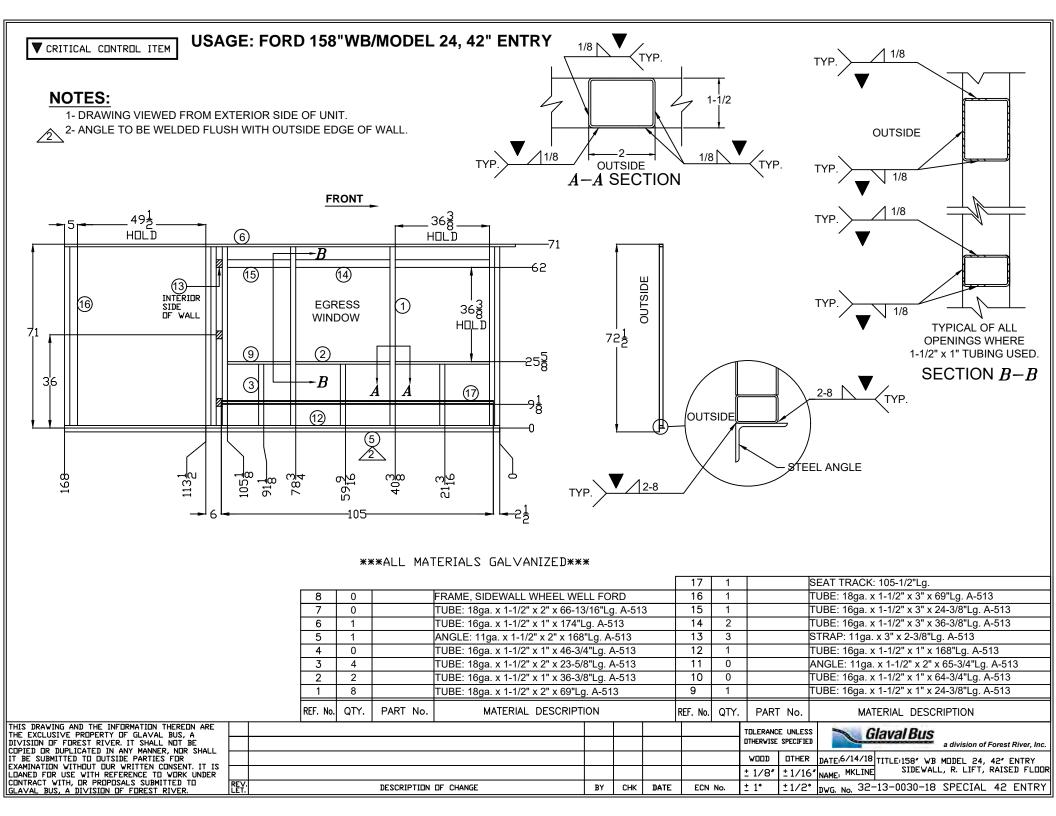


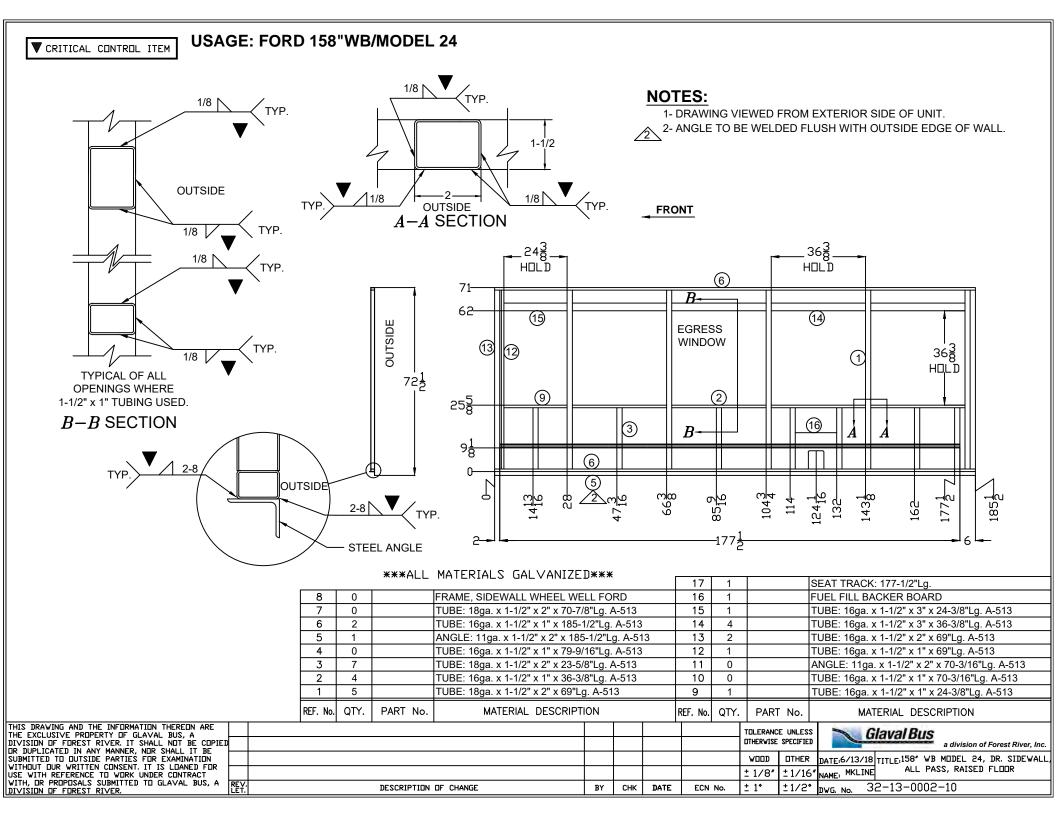


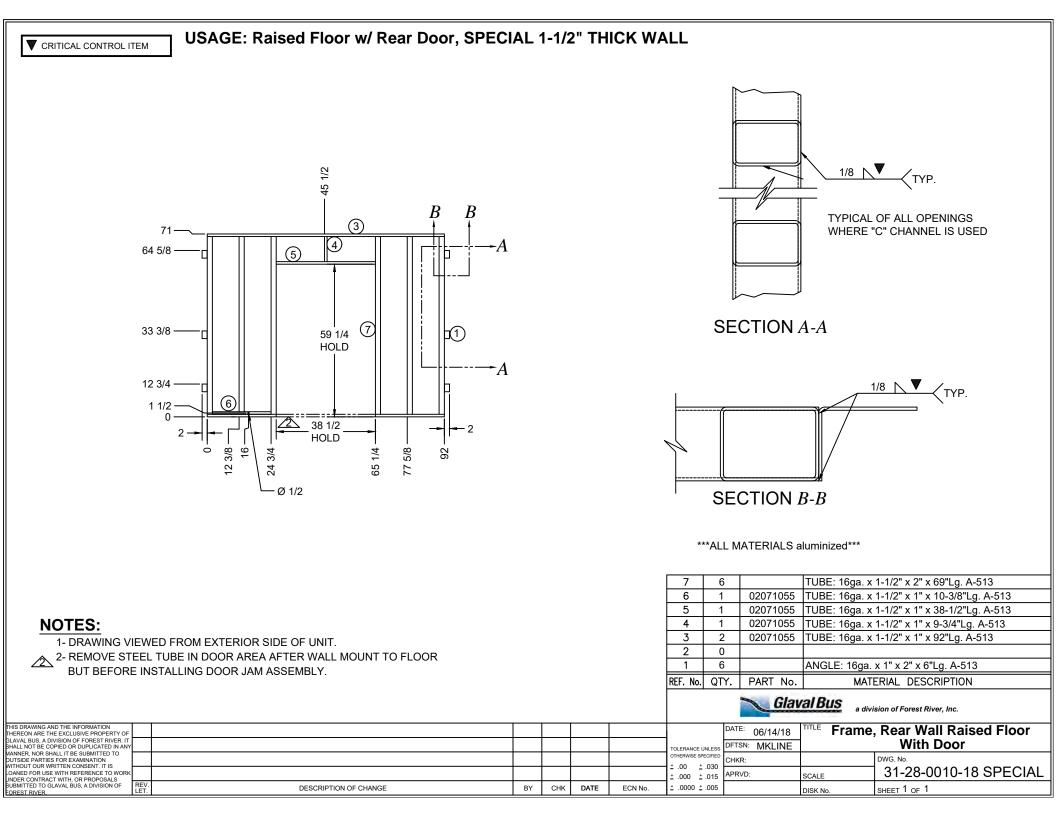
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A	CAPPED ROOF BOW	STAS 5000 SEE N #5 SH 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2	NOTE IEET 2		
BACKER PLATE	TYP.	ACC 23022 SERIES ACC 23023 SERIES T/A-77 T/A-73 T/A-71 OLD STYLE T/A-70 T/A-30 EM-14 & RE-29 EM-6 & RE-10 EM-3 & RE-30 RE-15 & RE-30 RE-15 & RE-20 EM-1 & EM-2 EM-7 GEN 5 EM-2 GEN 5	33-5/8       30         38       20         33-5/8       28-3/4         18-1/4       59-1/2         28-1/4       39-1/2         33-5/8       28-3/4         36-3/4       22-1/2         31       34         30-3/4       22-1/2         31       34         30-3/4       34-1/2         36       24         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         36-1/8       23-3/4         32-3/8       31-1/16	10 10 10 10 10 10 10 10 10 10 10 10 10 1	12-1/4 14-3/4 14-3/4 10-3/8 9-1/2 12-1/4 11-5/8 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2
SECTION <b>B-B</b>			28-3/16 39-5/8 A-1 A-2	10 B-1	9-1/2 B-2
THIS DRAWING AND THE INFORMATION THEREON ARE THE         EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF         FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN         ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE         PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN         CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO         WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED         TO GLAVAL BUS, A DIVISION OF FOREST RIVER.	Image: Constraint of the second sec	TOLERANCE UNLESS OTHERWISE SPECIFIED       WOOD     OTHER       ± 1/8"     ± 1/16"       ± 1/8"     ± 1/16"       NAME: MKLI       ± 1°     ± 1/2°       DWG. No.	I/18 TITLE: 158" WHEEL		L 24

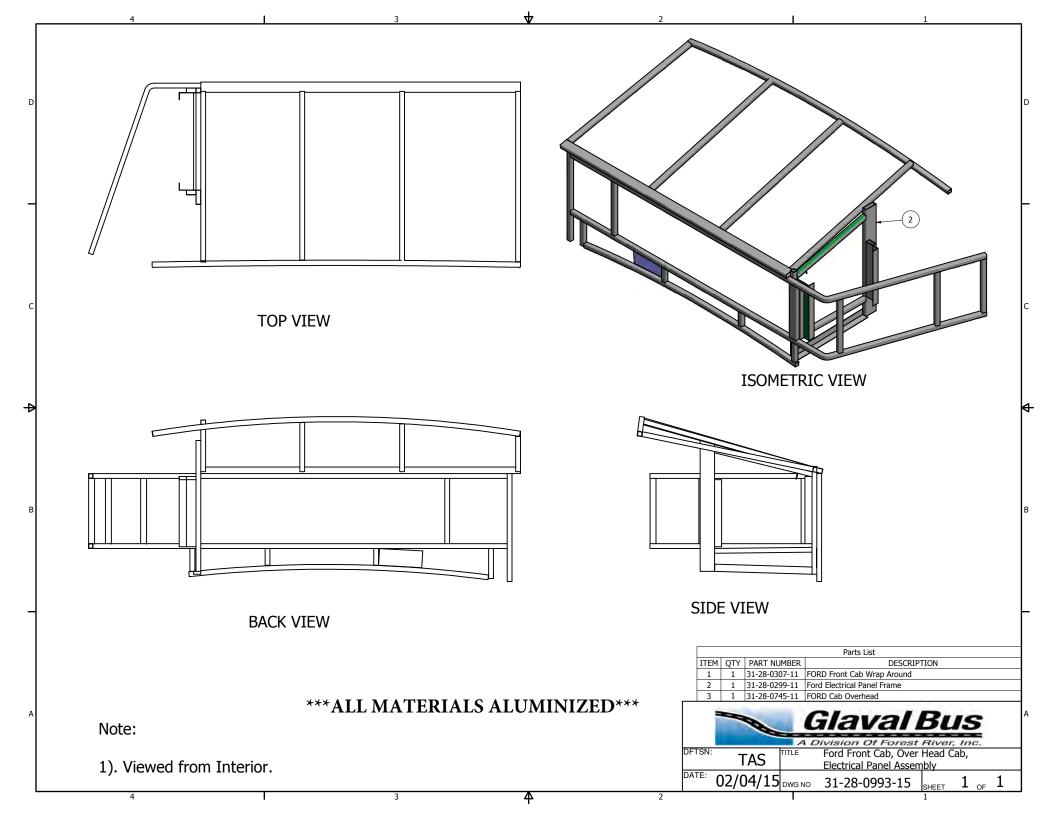


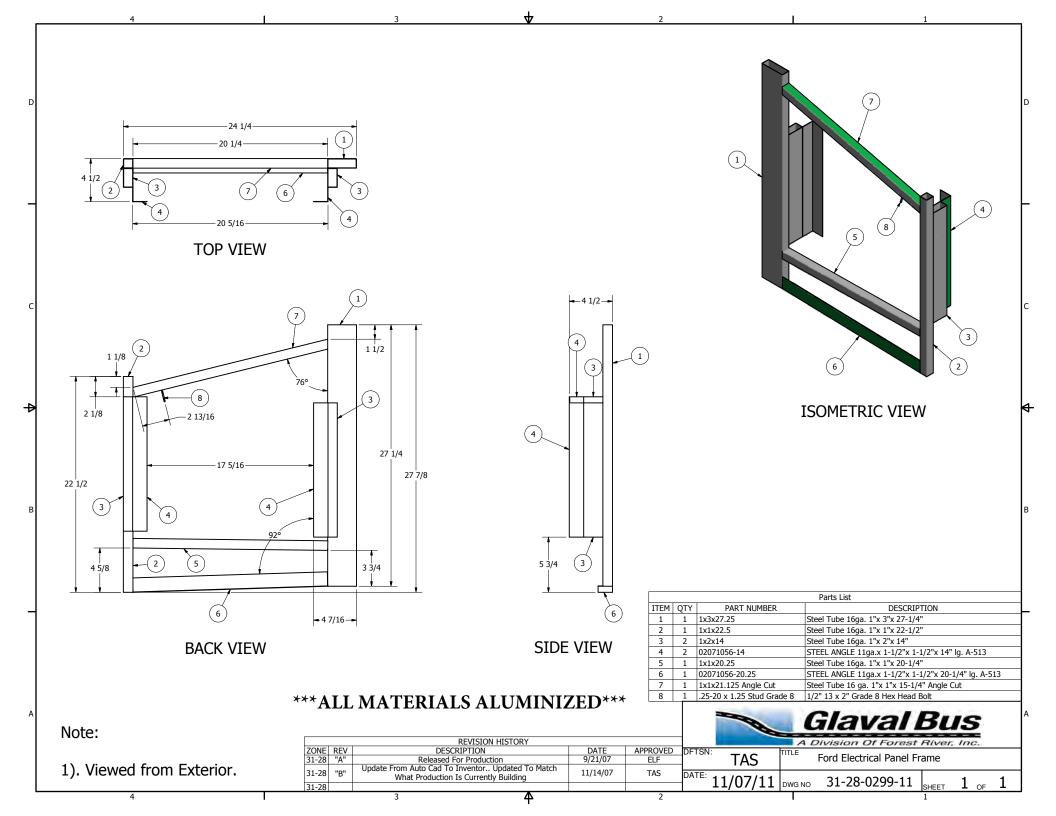


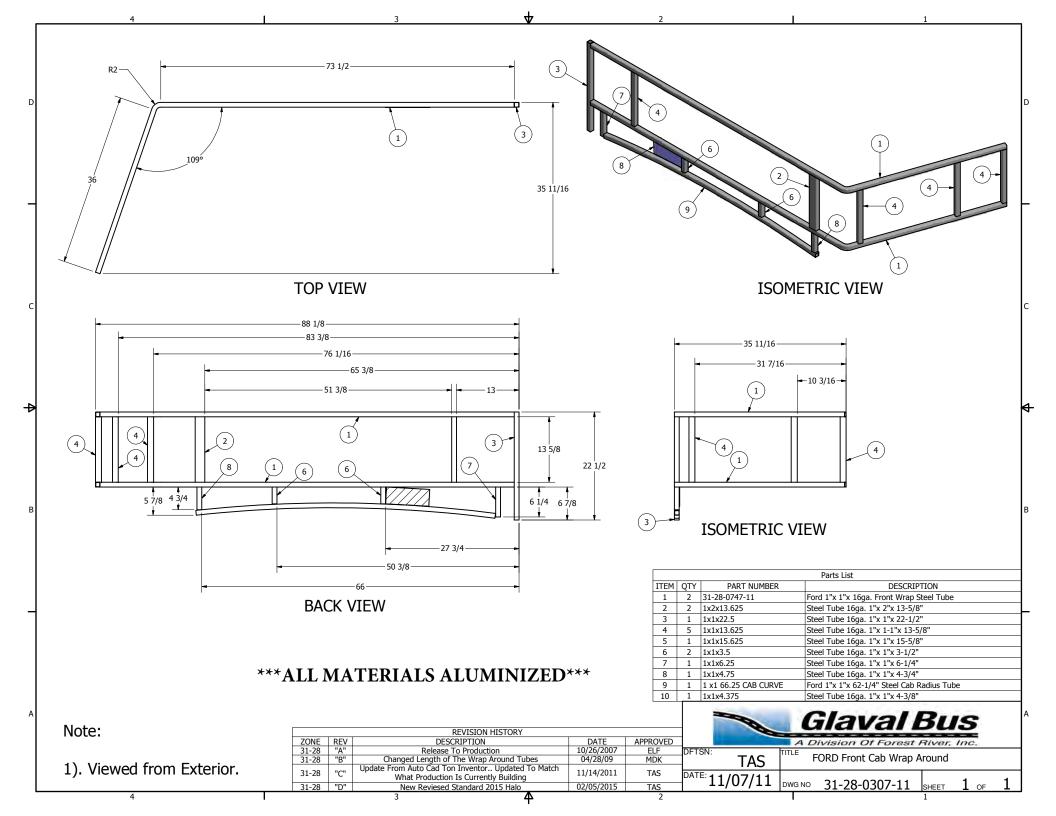


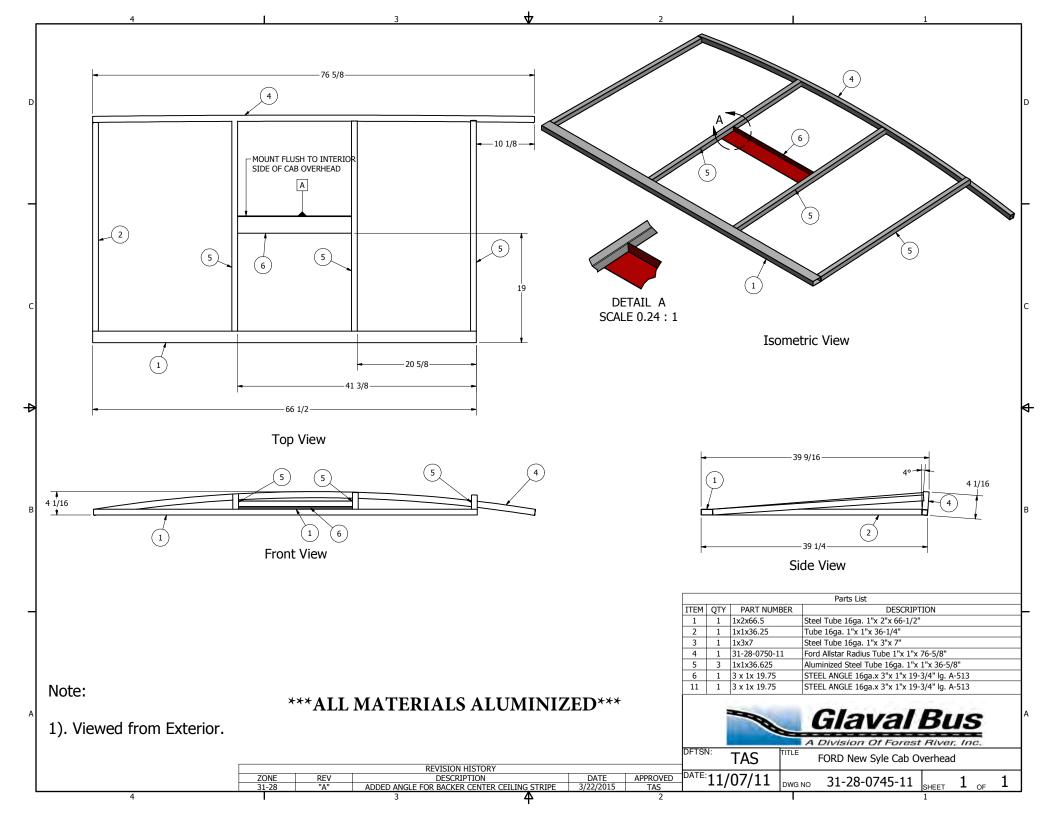


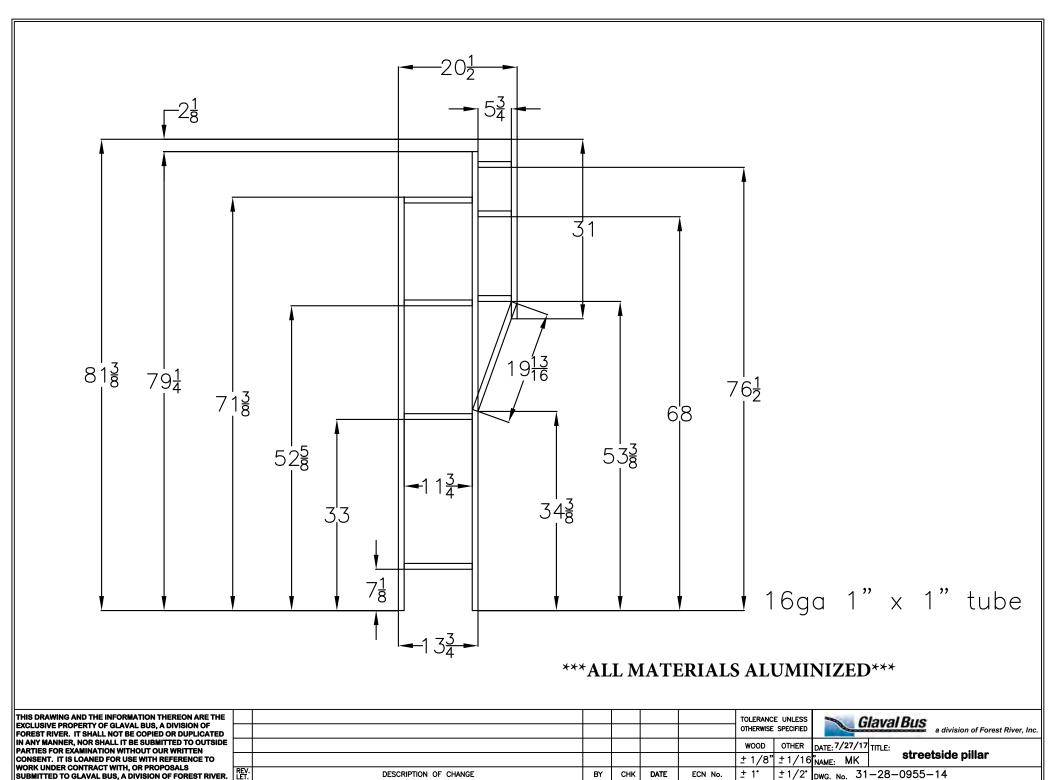












BY

СНК

DATE

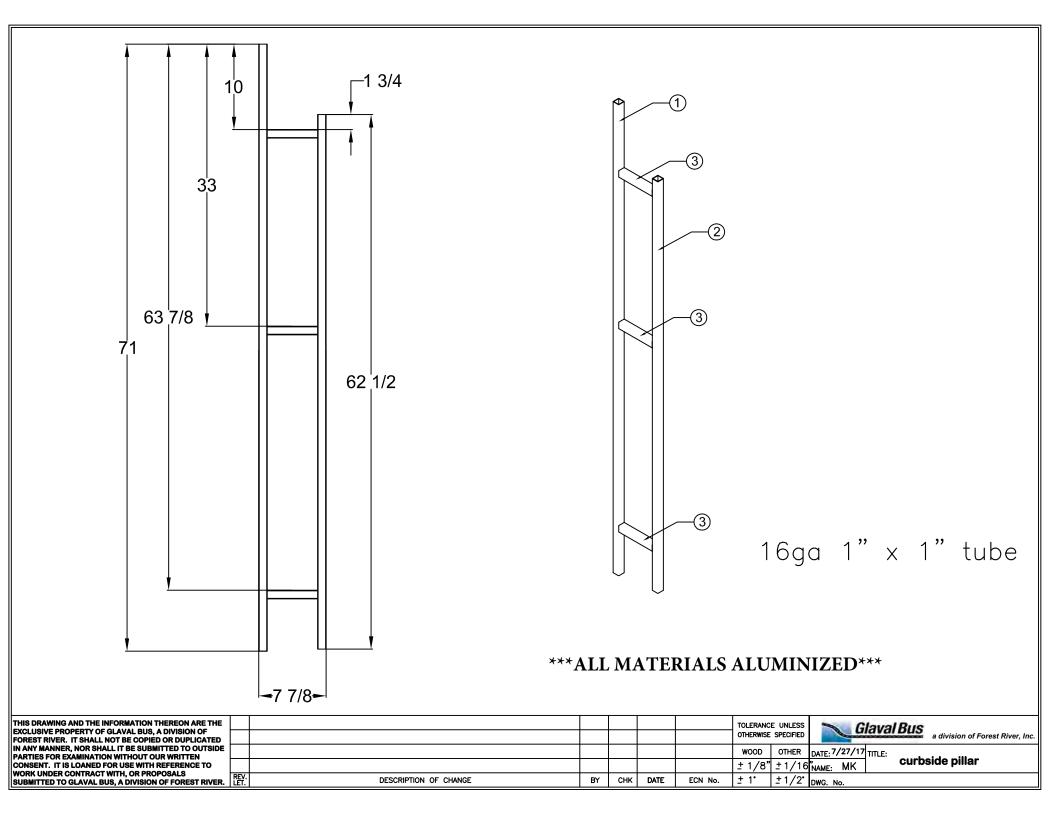
ECN No.

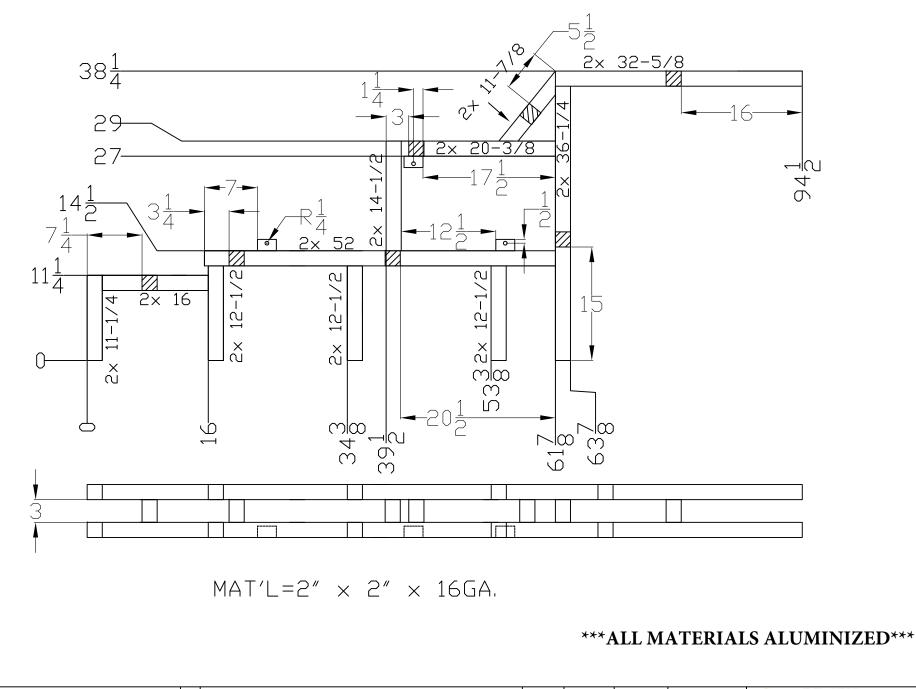
DESCRIPTION OF CHANGE

±1/2°

± 1°

DWG. No. 31-28-0955-14





THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF Glaval Bus TOLERANCE UNLESS OTHERWISE SPECIFIED a division of Forest River, Inc. FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE DATE: 06/30/17 TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY VOOD DTHER PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO ± 1/8″ ±1/16″ NAME: RTS WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO GLAVAL BUS, A DIVISION OF FOREST RIVER. REY. DESCRIPTION OF CHANGE DATE ECN No. ± 1° ±1/2\* 31-28-0531-17C ΒY DWG. No.



The following information is submitted for all Glaval Bus products proposed on

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 the 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.



The following information is submitted for all Glaval Bus products proposed on this bid 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 steel frame that is 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 14 gauge aluminzed 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.
- 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 1.5" x 2" tube that provides 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.
- 3.0.2.2 Aluminized steel Tubing 1.5"x1" lower and 1.5"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 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall belowt**the**kvisndow 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 1.5"x1" or 1.5"x2" 16 gauge wall aluinized steel tubing..
- 3.0.2.5 Full length glavanized steel tubing 1.5"x1" 16 gauge aluinized 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 1.5"x 2" aluminized steel tube 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 Aluinized steel Tubing 1.5"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 -1.5"x1" 16 gauge aluminized steel tubing 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 that allows for the roof structure to be 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 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" 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" x 2" 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.

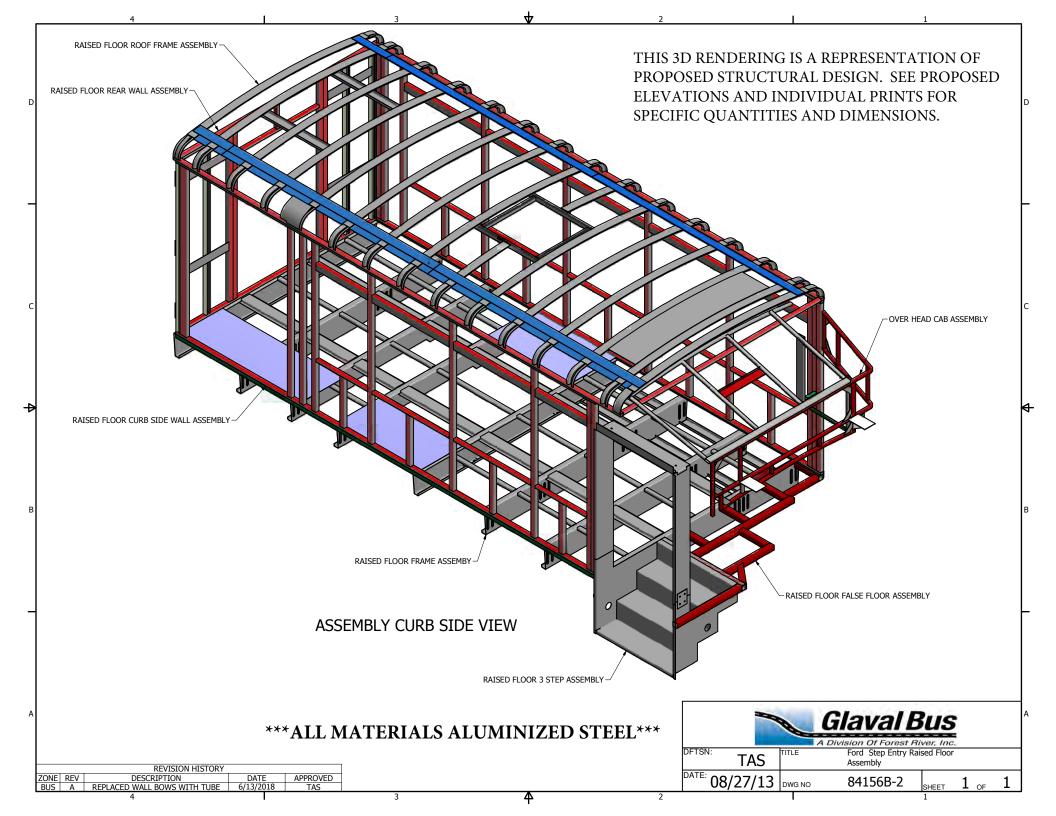
## **APPLICATION OF EXTERIOR SIDEWALL MATERIAL**

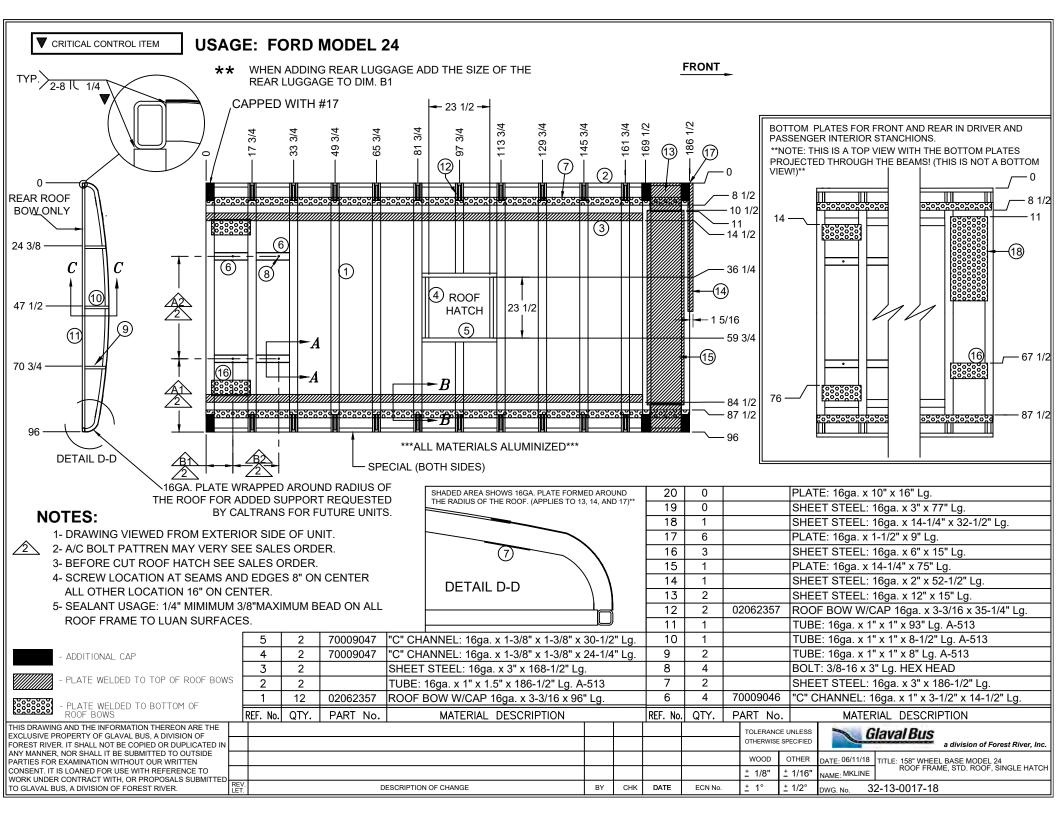
# GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

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 a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

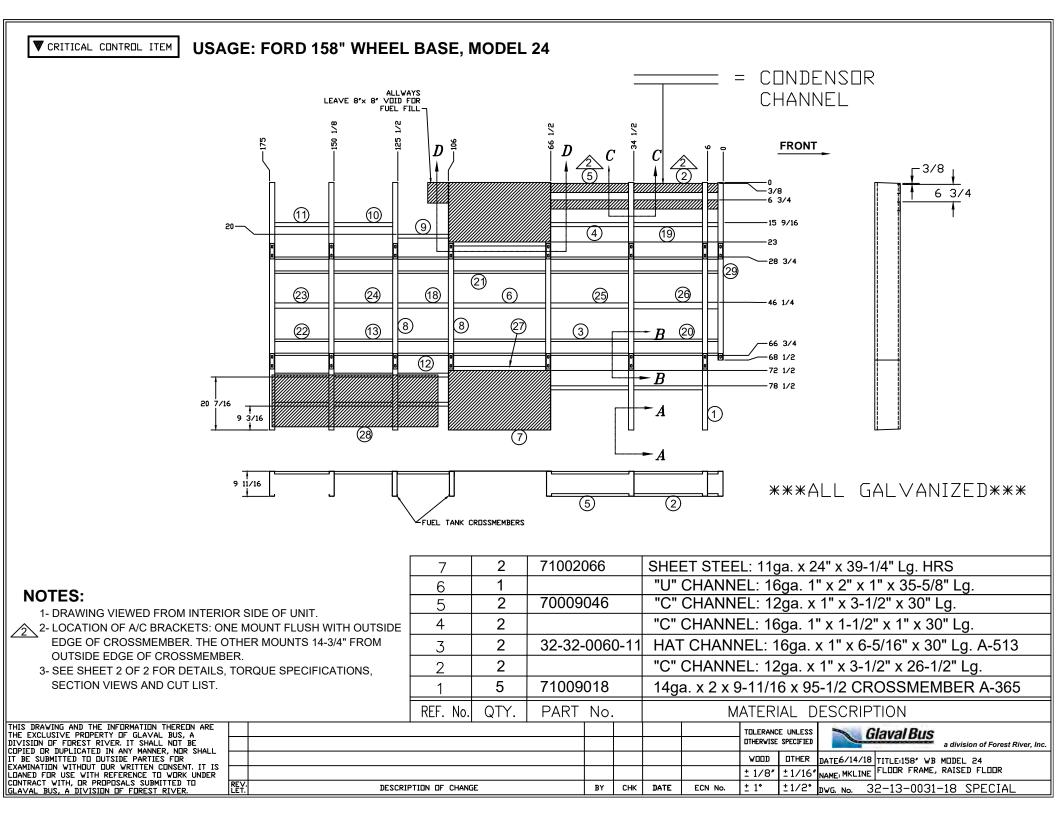
Composite FRP exterior sidewall panels are installed using the same method.

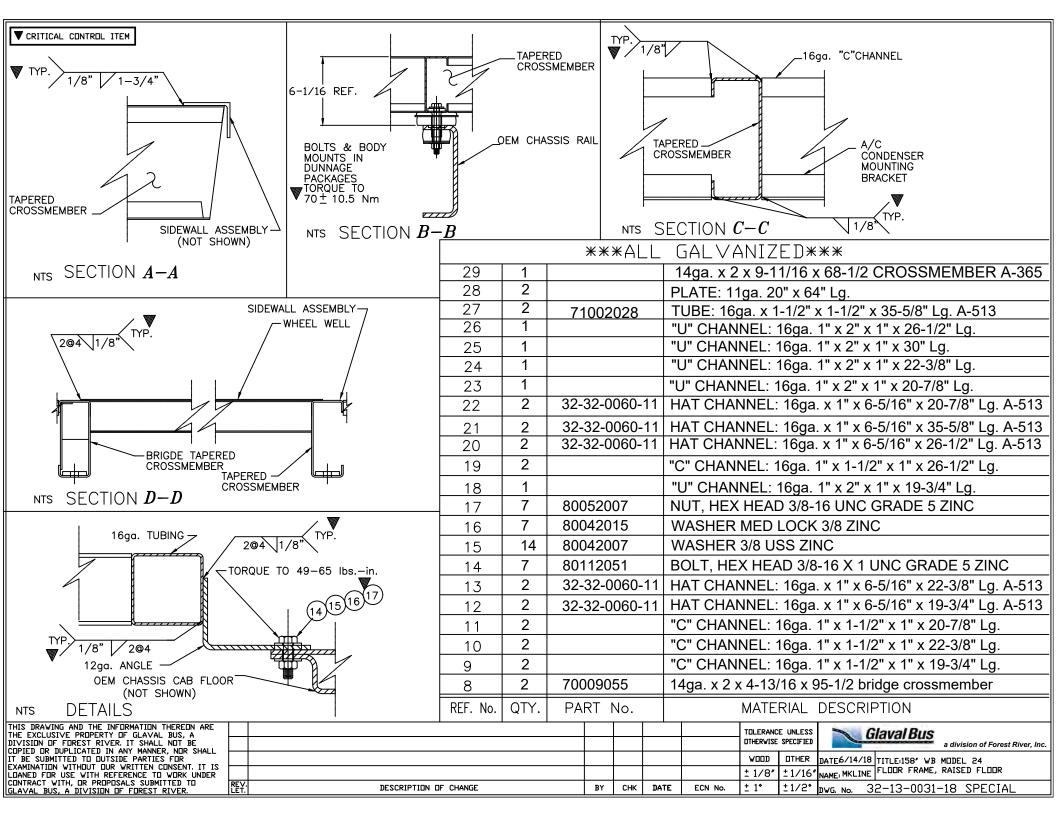
Should any further questions arise, please contact your Glaval Bus representative.

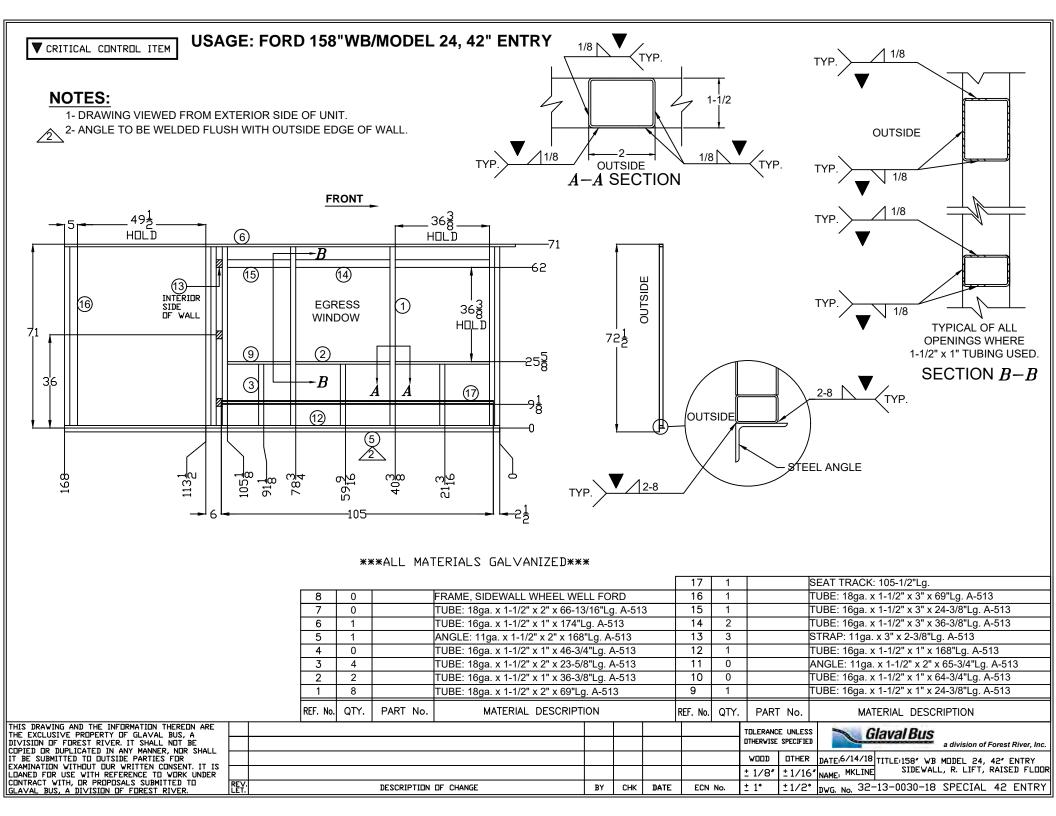


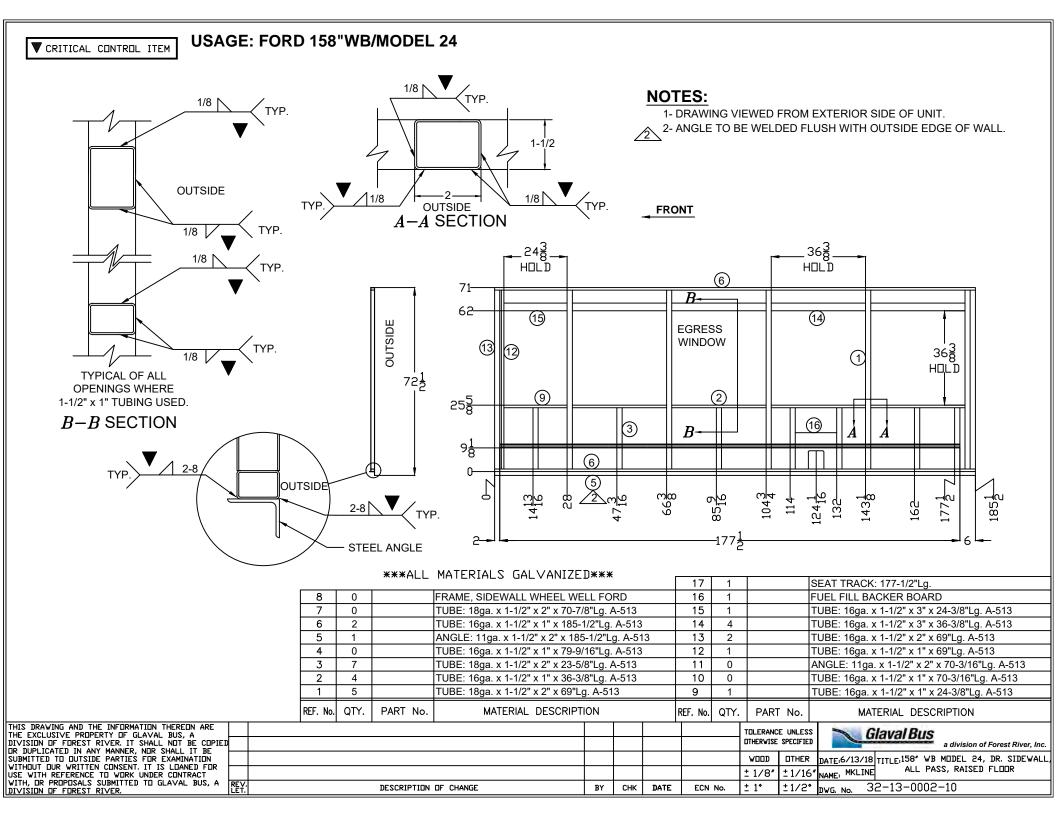


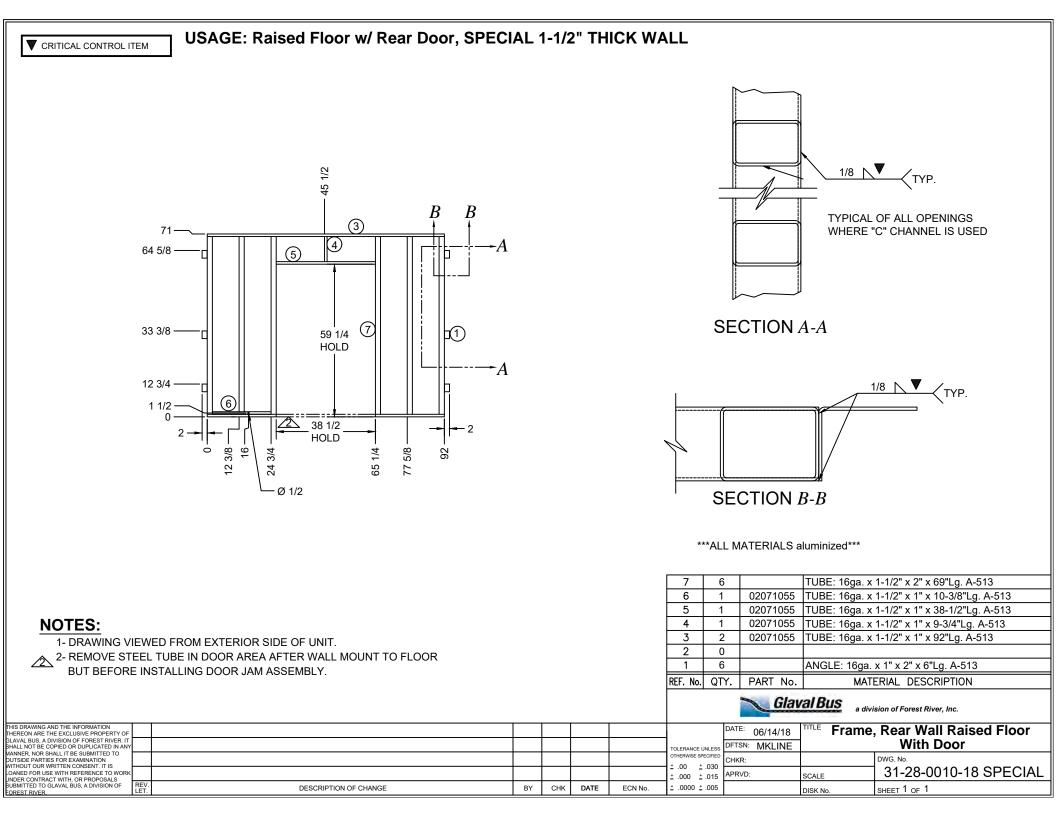
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A	CAPPED ROOF BOW	STAS 5000 SEE N #5 SH 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2	NOTE IEET 2		
BACKER PLATE	TYP.	ACC 23022 SERIES ACC 23023 SERIES T/A-77 T/A-73 T/A-71 OLD STYLE T/A-70 T/A-30 EM-14 & RE-29 EM-6 & RE-10 EM-3 & RE-30 RE-15 & RE-30 RE-15 & RE-20 EM-1 & EM-2 EM-7 GEN 5 EM-2 GEN 5	33-5/8       30         38       20         33-5/8       28-3/4         18-1/4       59-1/2         28-1/4       39-1/2         33-5/8       28-3/4         36-3/4       22-1/2         31       34         30-3/4       22-1/2         31       34         30-3/4       34-1/2         36       24         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         28-1/4       39-1/2         36-1/8       23-3/4         32-3/8       31-1/16	10 10 10 10 10 10 10 10 10 10 10 10 10 1	12-1/4 14-3/4 14-3/4 10-3/8 9-1/2 12-1/4 11-5/8 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2
SECTION <b>B-B</b>			28-3/16 39-5/8 A-1 A-2	10 B-1	9-1/2 B-2
THIS DRAWING AND THE INFORMATION THEREON ARE THE         EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF         FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN         ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE         PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN         CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO         WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED         TO GLAVAL BUS, A DIVISION OF FOREST RIVER.	Image: Constraint of the second sec	TOLERANCE UNLESS OTHERWISE SPECIFIED       WOOD     OTHER       ± 1/8"     ± 1/16"       ± 1/8"     ± 1/16"       NAME: MKLI       ± 1°     ± 1/2°       DWG. No.	I/18 TITLE: 158" WHEEL		L 24

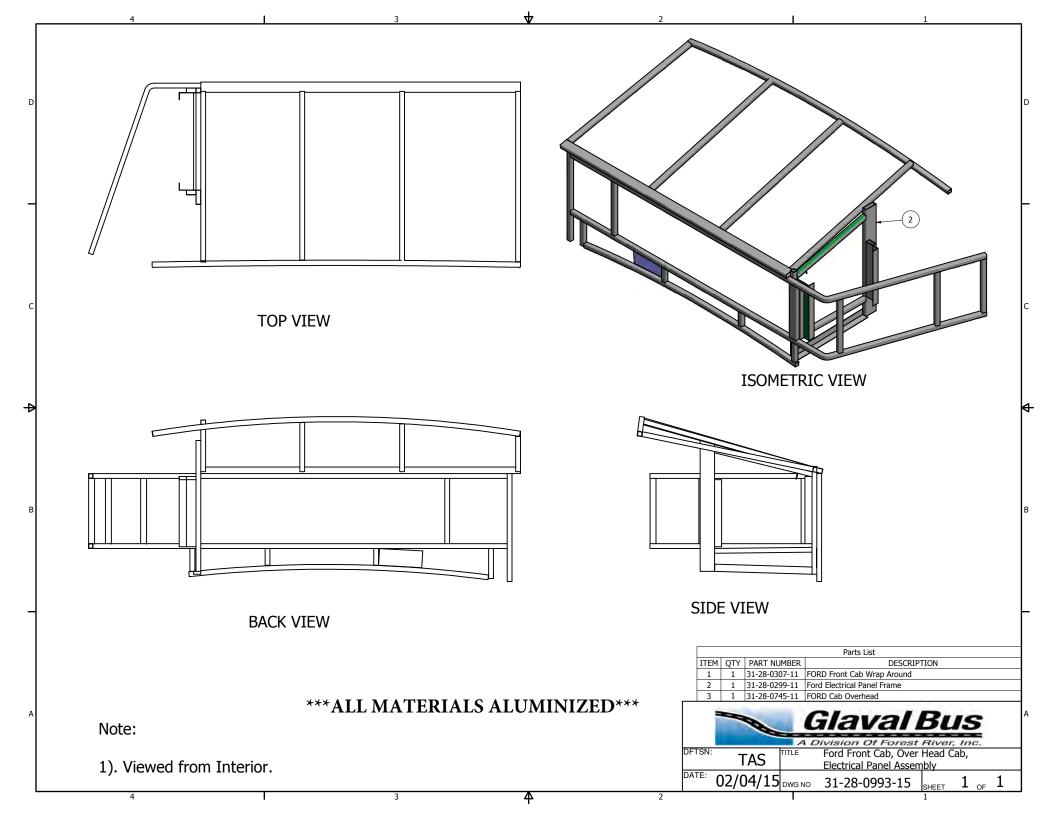


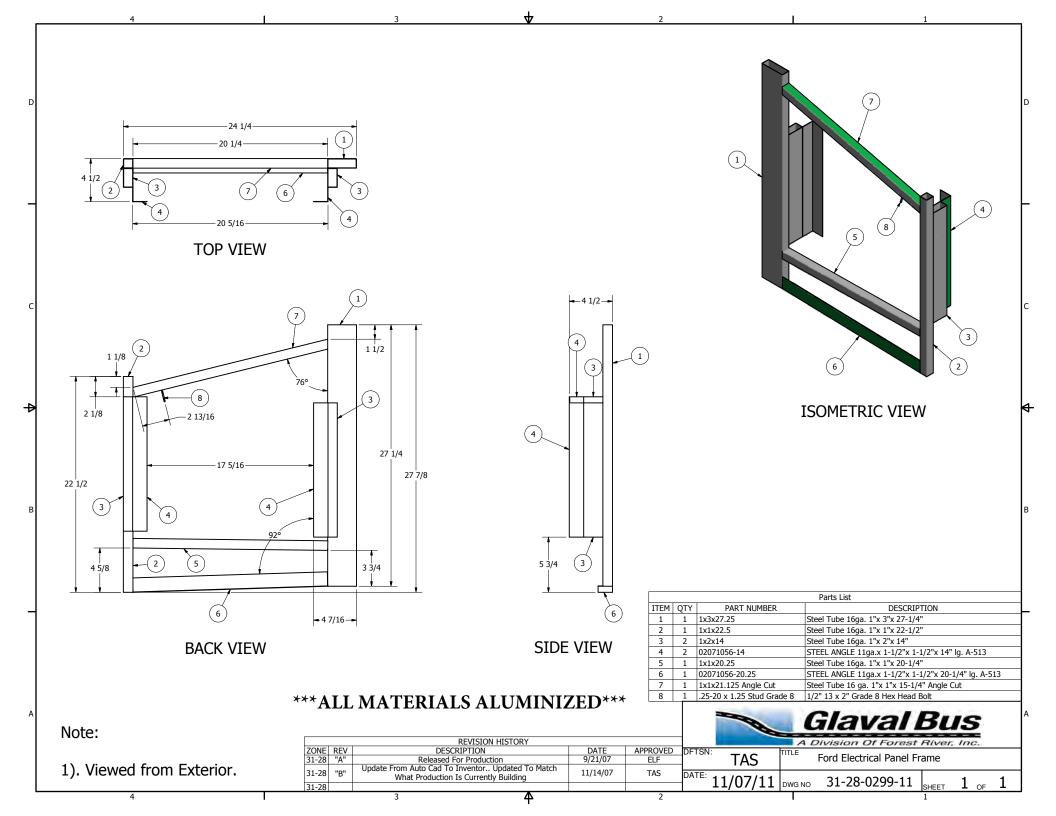


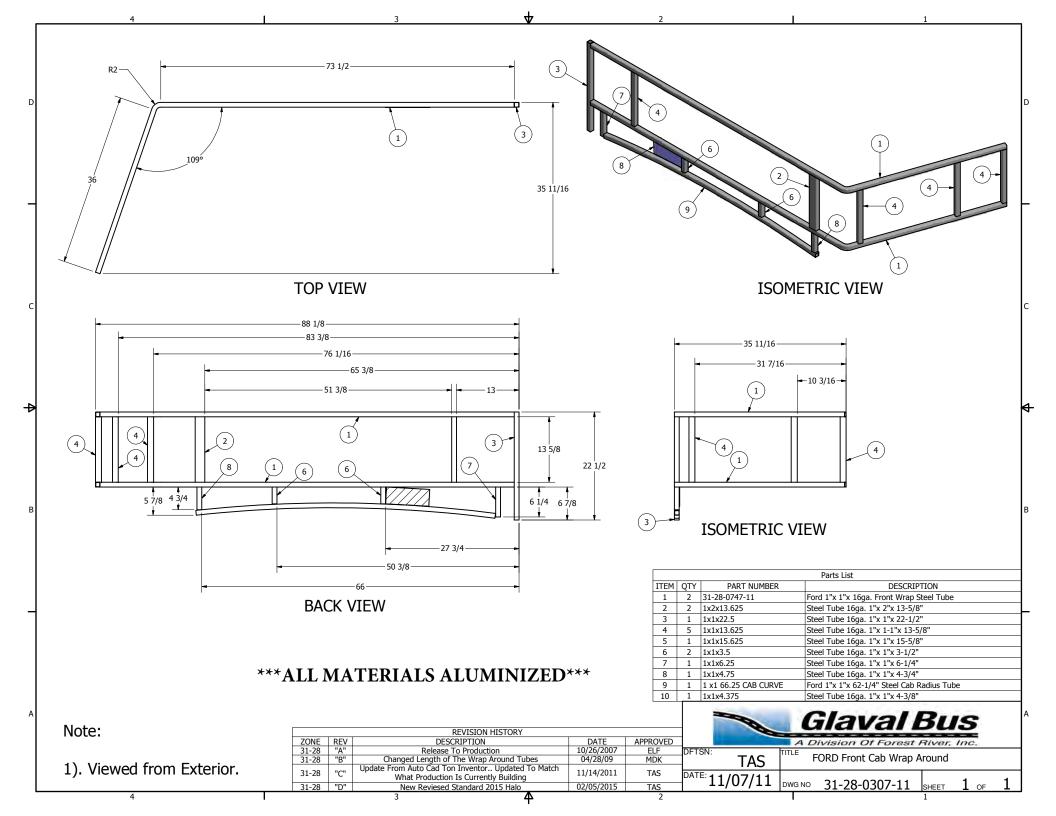


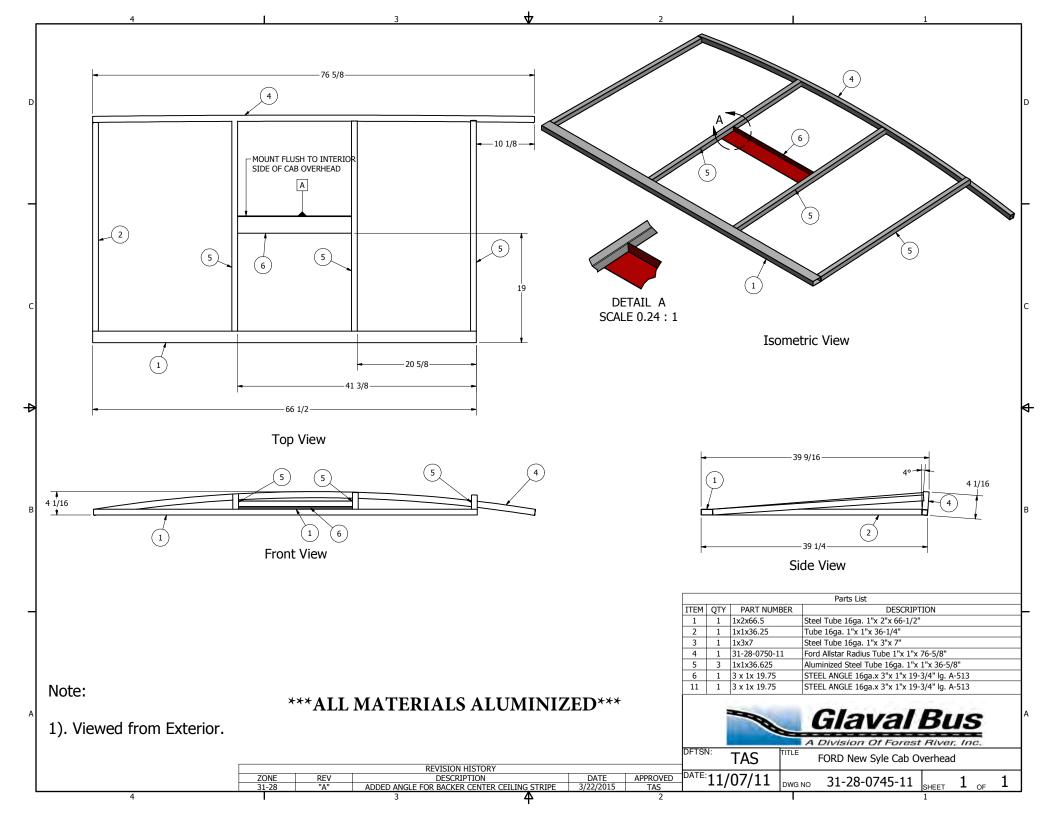


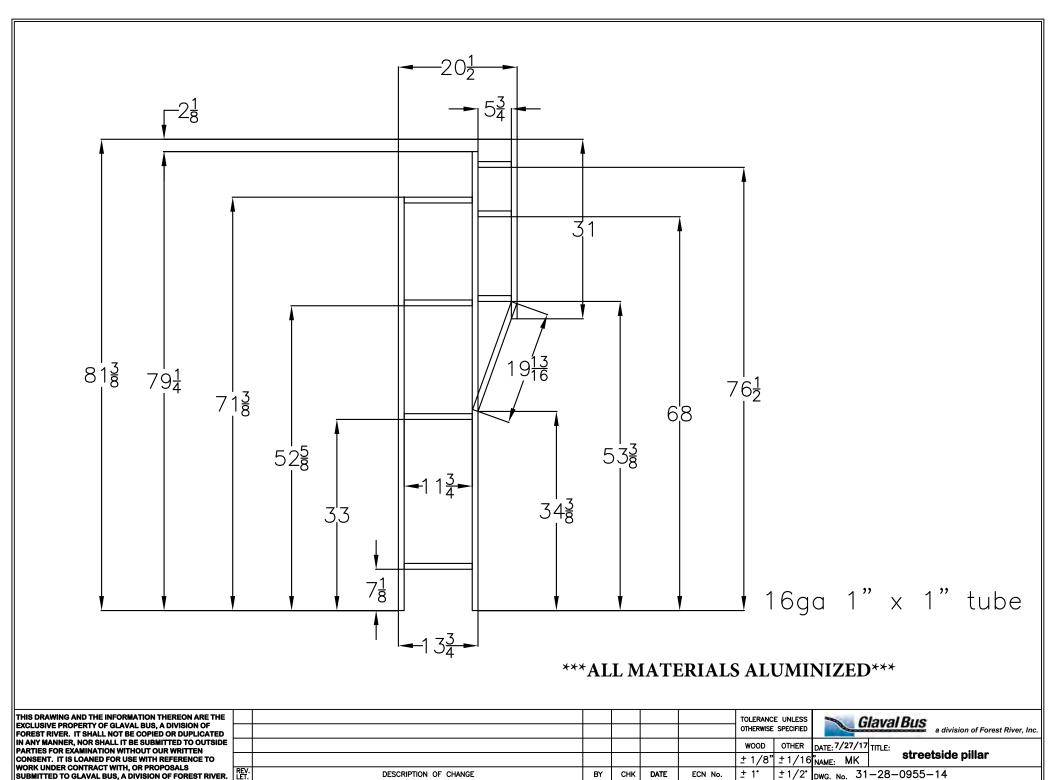












BY

СНК

DATE

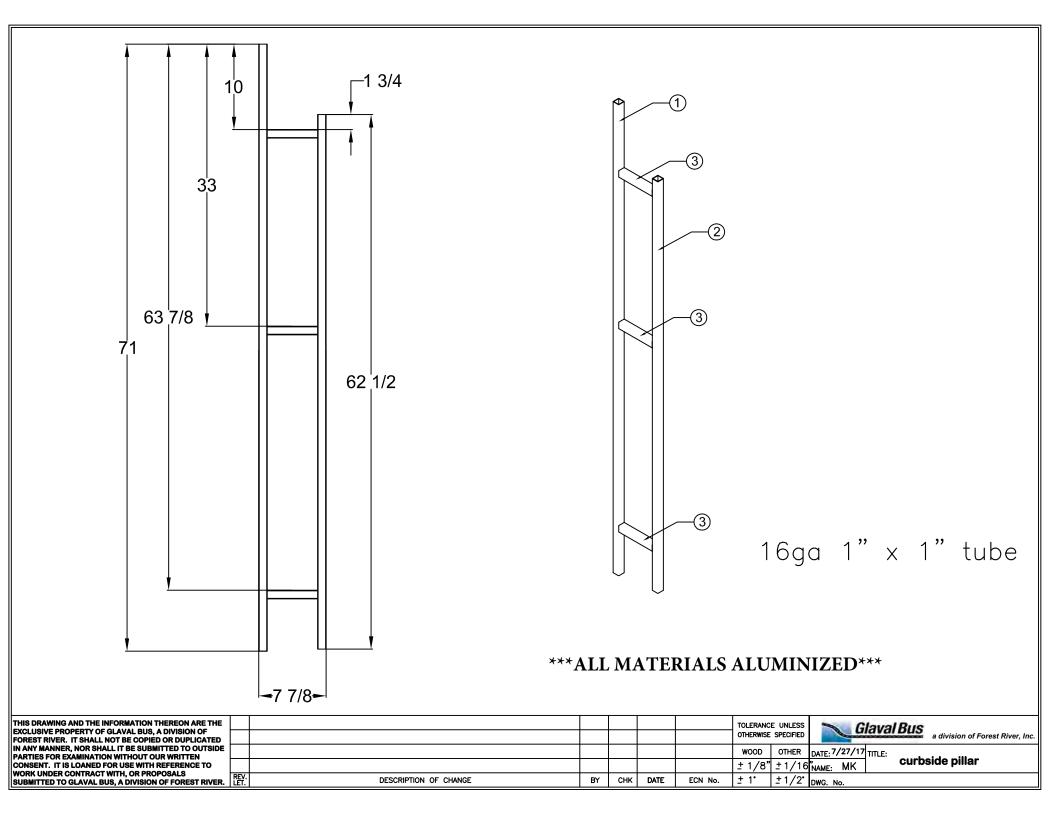
ECN No.

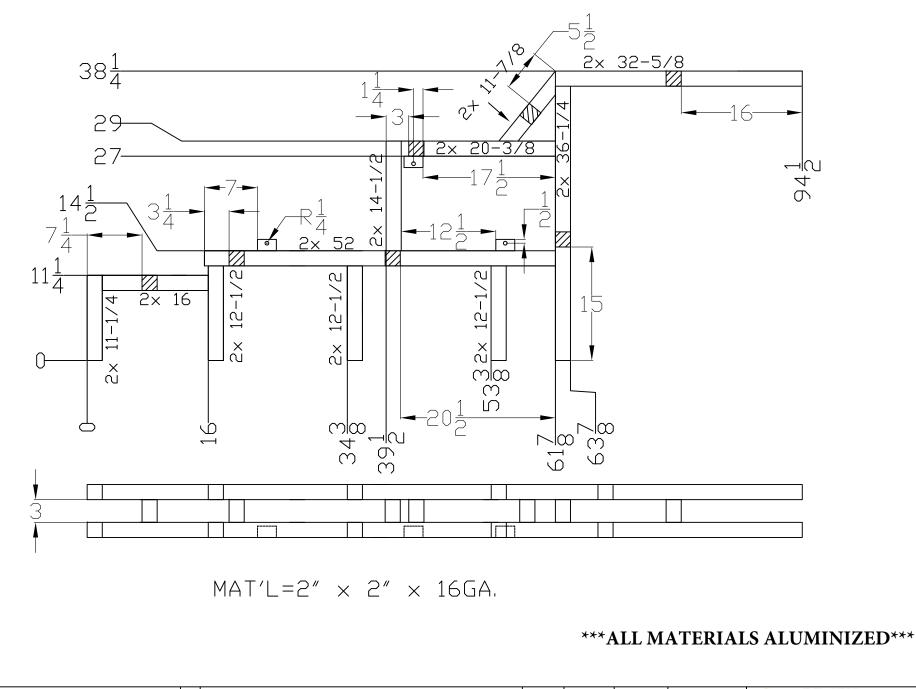
DESCRIPTION OF CHANGE

±1/2°

± 1°

DWG. No. 31-28-0955-14





THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF Glaval Bus TOLERANCE UNLESS OTHERWISE SPECIFIED a division of Forest River, Inc. FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE DATE: 06/30/17 TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY VOOD DTHER PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO ± 1/8″ ±1/16″ NAME: RTS WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO GLAVAL BUS, A DIVISION OF FOREST RIVER. REY. DESCRIPTION OF CHANGE DATE ECN No. ± 1° ±1/2\* 31-28-0531-17C ΒY DWG. No.



#### 2024 E-Series

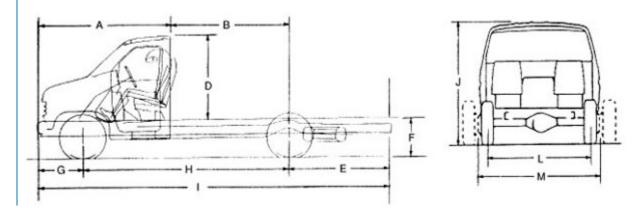
#### Specs

Key product specifications include vehicle dimensions and capacities, detailed powertrain information, transmission gear ratios and more.



### 2024 E-Series > Specs > Dimensions/Weights/Capacities

### Body Dimensions - E-350/E-450 Cutaway



Series		E-350 E-4			50		
Medel			Cutaway		Cuta	Cutaway	
Model		SRW/DRW	SRW/DRW	DRW	DRW	DRW	
Code	Description					·	
А	Cab Length	92.5	92.5	92.5	92.5	92.5	
В	Cab Rear to Rear Axle	80.0	100.0	118.0	100.0	118.0	
D	Top of Frame to Top of Cab	58.4	58.4	58.4	58.4	58.4	
E	Rear Overhang	68.5	68.5	68.5	68.5	68.5	
F	Load Height (Loaded)	25.9/26.2	25.9/26.2	26.2	26.0	26.0	
G	Front Overhang	34.6	34.6	34.6	34.6	34.6	
Н	Wheelbase	138.0	158.0	176.0	158.0	176.0	
I	Overall Length	241.1	261.1	261.1	261.1	261.1	

J	Cab Height (Curb)	80.3/80.3	80.3/80.4	80.0	80.5	80.4
L	Front Track	69.4	69.4	69.4	69.4	69.4
М	Rear Track Dual — Rear	72.1/75.4	72.1/75.4	75.4	77.7	77.7

NOTE: Front jacking point — located under the front radius arm rearward of the sloped section (use flat space provided).

NOTE: Rear jacking point - located under rear axle between U-bolts.

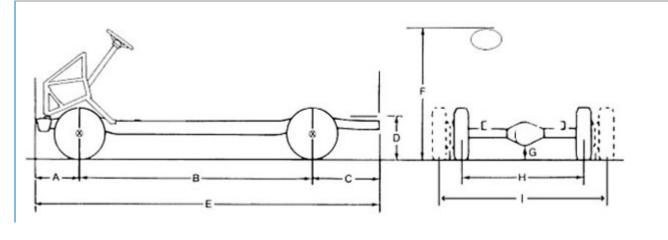
### 2024 E-Series > Specs > Dimensions/Weights/Capacities

### Interior Dimensions - E-350/E-450 Cutaway

Series		E-350					
Model		Cutaway			Cutaway		
Model	SRW/DRW	SRW/DRW	DRW	DRW	DRW		
Description							
Head Room (in.)	42.0	42.0	42.0	42.0	42.0		
Max. Leg Room (in.)	42.1	42.1	42.1	42.1	42.1		
Hip Room (in.)	65.6	65.6	65.6	65.6	65.6		
Shoulder Room (in.)	68.1	68.1	68.1	68.1	68.1		

## 2024 E-Series > Specs > Dimensions/Weights/Capacities

### Body Dimensions - E-350/E-450 Stripped Chassis



Model		Stripped Chassis		
Series		E-350	E-350/E-450	E-350/E-450
Selles		DRW	DRW	DRW
Code	Description		- -	
А	Frame to Front Axle	26.2	26.2	26.2
В	Wheelbase	138.0	158.0	176.0

,				
С	Rear Overhang	68.5	68.5	50.5
D	Load Height (Loaded)	26.2	26.2/26.0	26.2/26.0
E	Overall Length	232.7	252.7	252.7
F	Height at Top of Steering Wheel (Loaded)	71.9	71.9/71.7	71.8/71.7
G	Rear Axle Clearance, Loaded	7.0	7.0	7.0
Н	Front Track	69.4	69.4	69.4
I	Rear Track	75.4	75.4/77.7	75.4/77.7

NOTE: Front jacking point – located under the front radius arm rearward of the sloped section (use flat space provided).

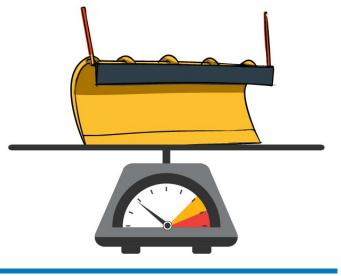
**NOTE:** Rear jacking point – located under rear axle between U-bolts.

# **2024 E-Series** > **Specs** > Dimensions/Weights/Capacities > General Truck Payload Information Accessory Reserve Capacity (ARC) Calculation

This section provides the information needed to calculate the effect that vehicle options have on the payload capacity of Ford commercial vehicles.

This information is useful when the plan is to add aftermarket accessories or haul cargo at or near the vehicle's maximum capacity.

This section includes charts for each series, listing the maximum allowable weights for each GVWR.



#### ACCESSORY RESERVE CAPACITY

You can help prospective buyers estimate the total weight of accessories, equipment and modifications that may be added to the completed vehicle.

Ford vehicles are certified for compliance with the following FMVSS (Federal Motor Vehicle Safety Standards) or CMVSS (Canadian Motor Vehicle Safety Standards): $^{(1)}$ 

- 204 Steering Column Rearward Displacement
- 208 Occupant Crash Protection
- 212 Windshield Mounting
- 219 Windshield Zone Intrusion
- 301 Fuel System Integrity
- 303 CNG Fuel System Integrity (Canadian Standard 301.2)

The total added accessory weight must not exceed the allowable weight shown in the tables. Awareness is critical if the vehicle is going to be modified or have accessories installed.

If the modification or installation of accessories or equipment causes the unloaded weight of the vehicle, as revised with the added equipment, to exceed the test vehicle weight, the U.S. vehicle alterer<sup>(2)</sup> may be responsible to certify the altered vehicle according to Title 49, Code of Federal Regulations 567.7 and 568.8. A Canadian vehicle alterer may be responsible to certify the altered vehicle according to Section 6 of the Canadian Motor Vehicle Safety Regulations.

In this section, each vehicle has a worksheet that addresses Total Accessory Reserve Capacity only. It does not consider Front Axle Accessory Reserve Capacity and does not include DSO option weights in the calculations.

To approximate the amount of accessory equipment or modification weight that can be added to a Ford light truck without exceeding the test vehicle weight, calculate an estimated Total Accessory Reserve Capacity as follows:

- Determine the "Total Actual Regular Production Option Content Weight" of the desired regular production options from the corresponding Accessory Reserve Capacity Calculation/Worksheet on the following page
- 2. Subtract the "Total Actual Regular Production Option Content Weight" from the "Maximum Allowable Weight (Regular Production Options & Aftermarket Equipment)" for the appropriate model. The difference is the estimated "Total Accessory Reserve Capacity"

Maximum Allowable Weight (Regular Production Options & Aftermarket Equipment)

- Total Actual Regular Production Option Content Weight
- = Total Accessory Reserve Capacity

**Warning:** The Accessory Reserve Capacity weight information addresses FMVSS and CMVSS Nos. 204, 208, 212, 219, 301 and 303 compliance only. For all light-duty trucks with a GVW rating under 8,500 lbs., federally certified trucks with a GVW rating of 8,500 to 10,000 lbs. that are optionally emissions certified to light-duty standards and all California complete vehicles with a GVW rating of 14,000 lbs. or less, if more than 500 lbs. is added to the vehicle's "maximum vehicle weight,"<sup>(3)</sup> the modifier may be responsible for recertification to the applicable EPA or CARB emissions standards.

(1) Ford Motor Company's certification of compliance with FMVSS/CMVSS is based on specific vehicle test weights. These standards are applicable to completed vehicles of 10,000-lb. GVWR or less. Maximum allowable weights shown in the tables for vehicles above 10,000-lb. GVWR are maximum recommended values for optimum performance, durability and customer satisfaction.

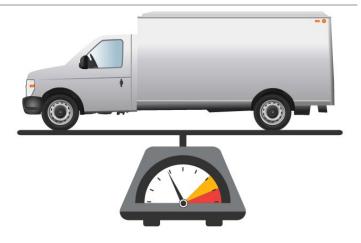
(2) The same procedure to estimate the "Total Accessory Reserve Capacity" is recommended to completed vehicle alterers in Canada.

(3) Important: "Maximum vehicle weight" is calculated in accordance with the definition provided in an EPA guidance letter dated July 13, 1979, from C.N. Freed of the EPA to M.H. McBride, legal counsel of the Recreation Vehicle Industry Association. The preceding conditions are based on that letter and on EPA Advisory Circular No. 64 – a March 7, 1977, publication that provides guidance on the need for separate certification of vehicles modified after original manufacture, but prior to sale and delivery to the ultimate purchaser. Additional guidance or questions concerning EPA's policies with respect to alterers of completed vehicles should be directed to legal counsel or the Environmental Protection Agency.

#### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Base Curb Weight

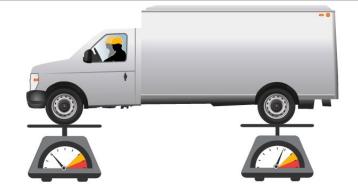
- The weight of the vehicle including standard equipment, oil, lubricants and a full tank of fuel. It does not include the weight of driver, passengers, cargo or any optional or aftermarket equipment
- Base curb weights for each engine/standard equipment transmission combination are listed in the Weight Ratings pages of each vehicle section (see Maximum Payload Weight Ratings for reference)
- Actual Regular Production Option Content Weights can be found in the charts under Actual Regular Production Option Content Weights



#### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

#### Gross Axle Weight

The total weight placed on each axle of the vehicle (front and rear).



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Gross Axle Weight Rating (GAWR)

The maximum allowable weight to be placed on an individual axle (front or rear). Gross Axle Weight Ratings are provided for both front and rear axles.



#### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Gross Combination Weight (GCW)

Gross vehicle weight plus the trailer weight.



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Gross Combination Weight Rating (GCWR)

The maximum allowable weight of the towing vehicle, the trailer and all associated passengers, cargo and equipment.

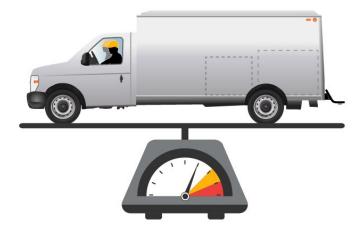
The point to remember is that the actual weights should never exceed the listed weight ratings. If recommended weight ratings are exceeded, the vehicle could be disqualified for warranty coverage.



# 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Gross Vehicle Weight (GVW)

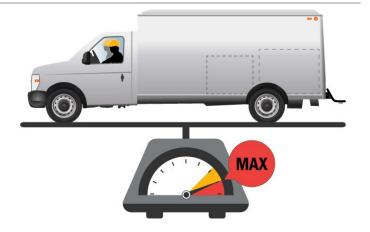
The weight of the vehicle including driver, passengers, optional and aftermarket equipment, and all cargo.



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Gross Vehicle Weight Rating (GVWR)

The maximum allowable weight of the fully loaded vehicle (including passengers and cargo).



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

#### Maximum Payload Weight Rating

This is the advertised payload rating. It is the maximum allowable payload for the truck, including driver, passengers, optional and aftermarket equipment, and cargo. The weight of the engine and its standard transmission is already factored into the Maximum Payload Weight Rating. If the engine is also available with an optional transmission, that engine/transmission weight can be found in the Actual Regular Production Option Content Weight charts.

Vehicle Payload Calculation	Front/Total (lbs.)
Maximum Payload Weight Rating <sup>(1)</sup>	/
Less Total Actual Regular Production Option Content Weight (from Line A, Payload/GVWR Worksheet)	/
Equals Net Total Vehicle Payload (Front and rear axles and spring capacities will be sufficient to carry this payload uniformly distributed in vehicle cargo area)	/

(1) Weight for driver and passengers must be deducted. Refer to the individual vehicle weight rating pages for maximum payload weight ratings. Refer to Regular Production Option Content Weight.

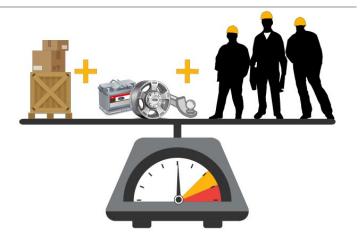
NOTE: Front springs are computer selected to meet specific option requirements for each vehicle; HD front springs are standard if vehicle option weights require.

CAPABILITY NOTE: Maximum payload and towing capabilities are for properly equipped base vehicles with required equipment and a 150-lb. driver, and vary based on cargo, vehicle configuration, accessories and number of passengers. See label on doorjamb for carrying capacity of a specific vehicle.

### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

#### Maximum Payload Weight Ratings

The Payload Weight Ratings and the Max. Option Weight/Max. Total Accessory Reserve Capacity (ARC) Weight Charts<sup>(1)</sup> are published and can be found in the weight ratings pages of the individual vehicle sections. This information is grouped together with other model, engine/ transmission and maximum gross vehicle weight rating (GVWR) data for ease of use.

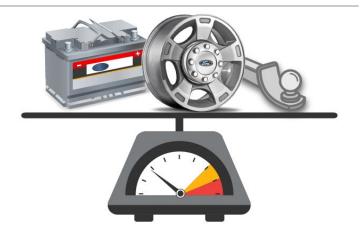


(1) OPT/ARC Weight is the maximum allowable weight for regular production options (OPT) and aftermarket equipment. Accessory Reserve Capacity (ARC) for models with standard equipment and the engine/transmission combination indicated.

#### **2024 E-Series** > **Specs** > Dimensions/Weights/Capacities > General Truck Payload Information

#### **Option Weights**

The weight of any added equipment that is not included in the base curb weight.



#### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Passenger Weight

Defined as 150 lbs. multiplied by the number of safety-belted seating positions, including the driver, that the vehicle can carry.



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

#### Payload

- Maximum payload is defined as the weight of all passengers, optional and aftermarket equipment, and cargo
- Net payload is defined as the weight that can be placed in the truck after subtracting for driver, passengers, and optional and aftermarket equipment



#### **Tongue Weight**

The amount of the trailer's weight that bears down on the trailer hitch (10% to 15% of the total loaded conventional trailer weight or 15% to 25% of the total loaded 5th-wheel trailer weight).



#### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

#### Trailer Weight

The weight of a fully loaded trailer, including all attachments, lights, etc.



### 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

### Truck "Nominal Tonnage"

"Nominal Tonnage" is a term that Ford and other manufacturers have historically used to **generally categorize** the load capacity of a vehicle series; it is not a term defined by federal or state law.

Our COV (Certificate of Origin for a Vehicle) includes each particular vehicle's shipping weight, as well as the vehicle's gross vehicle weight rating or GVWR (from which one can determine the particular vehicle's rated carrying capacity, including driver, passengers, fluids, body upfit [if applicable] and aftermarket accessories). The COV also includes the vehicle's "Nominal Tonnage."

"Nominal Tonnage" provides the **general** usable cargo capability that most (but not all) of the vehicles with the designated nominal tonnage can expect to handle. That is, nominal tonnage states the general load capacity for each vehicle series, although particular vehicles may have a higher (or in some circumstances, lower) load capacity based on the specifications of the particular vehicle.

	Relevant Vehicle Series/Nominal Tonnage Relationship Categories
Nominal Tonnage	Vehicle
1/2	Ranger, F-150, Transit Connect, Transit Passenger Van
3/4	E-350 Cutaway/Stripped Chassis, Transit-150 Cargo Van/Crew Van/Passenger Van, Transit-250 Cargo Van/Crew Van, Transit-350 Cargo Van/Crew Van/Passenger Van (GVWR 9,499 lbs.), Transit-250 Cutaway/Chassis Cab, F-250 Pickup
1	E-450 Cutaway/Stripped Chassis, Transit-350 Cargo Van/Crew Van/Passenger Van (GVWR 9,500 lbs.), Transit-350 Cutaway/Chassis Cab, F-350 Pickup, F-350 Chassis Cab
11/2	F-450 Pickup, F-450 Chassis Cab
2	F-550 Chassis Cab

# **2024 E-Series** > **Specs** > Dimensions/Weights/Capacities > General Truck Payload Information

Vehicle Class Ratings by GVWR

Weight Class	GVWR Range (lbs.)	Vehicle/Model
1	Up to 6,000	Transit Connect Cargo Van (5,110–5,302 lbs.) Transit Connect Passenger Wagon (5,302–5,420 lbs.)
2	6,001 to 10,000	Ranger (6,050 lbs.)           Transit-150 Cargo Van/Passenger Van (8,670/8,550 lbs.)           Transit-250 Cargo Van/Crew Van (9,070 lbs.)           Transit-350 Cargo Van/Crew Van (9,250–9,950 lbs.)           Transit-350 Passenger Van (9,250–9,550 lbs.)           Transit-250 Cutaway/Chassis Cabs (9,070 lbs.)           Transit-350 Cargo Van/Crew Van (9,250–9,550 lbs.)           Transit-250 Cutaway/Chassis Cabs (9,070 lbs.)           Transit-350 Cutaway/Chassis Cabs (9,070 lbs.)           E-Transit T350 Cargo Van, Chassis Cab and Cutaway (9,500 lbs.)           F-150 (6,070–7,850 lbs.)           F-250 Pickup (9,900–10,000 lbs.)           F-350 Chassis Cab SRW (9,800–10,000 lbs.)
3	10,001 to 14,000	E-350 Cutaway (10,050–12,500 lbs.) E-350 Stripped Chassis (11,500–12,500 lbs.) Transit-350 Cargo Van/Crew Van/Passenger Van (10,360 lbs.; 11,000 lbs. [Cargo Van only]) Transit-350 Cutaway/Chassis Cab (10,360 and 11,000 lbs.) F-250 Pickup (10,400–10,800 lbs.) F-350 SRW Pickup (10,100–12,400 lbs.) F-350 DRW Pickup (13,000 <sup>(1)</sup> –14,000 lbs.) F-350 Chassis Cab SRW (10,500–11,500 lbs.) F-350 DRW Chassis Cab (14,000 lbs.) E-450 Cutaway (14,000 lbs.) E-450 Stripped Chassis (14,000 lbs.) F-450 Pickup (14,000 lbs.)
4	14,001 to 16,000	E-450 Cutaway (14,200–14,500 lbs.) E-450 Stripped Chassis (14,200–14,500 lbs.) F-450 Chassis (15,000–16,000 lbs.) F59 Commercial Stripped Chassis (16,000 lbs.) F53 Motorhome Chassis (16,000 lbs.)
5	16,001 to 19,500	F-450 Chassis Cab (16,500 lbs.) F-550 (17,500–19,500 lbs.) F59 Commercial Stripped Chassis (19,500 lbs.) F53 Motorhome Chassis (18,000 lbs.)
б	19,501 to 26,000	F-600 (22,000 lbs.) F-650 Gasoline (22,000–26,000 lbs.)/Diesel (22,000–26,000 lbs.) F59 Commercial Stripped Chassis (22,000 lbs.) F53 Motorhome Chassis (20,500–26,000 lbs.)
7	26,001 to 33,000	F-650 (27,500–29,000 lbs. Gas and Diesel) F-750 (31,000–33,000 lbs. Gas and Diesel)
8	33,001 and above	F-750 (34,200–37,000 lbs. Diesel)

(1) 13,000 lbs. Pickup Box Delete only.

## 2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Weight Distribution

That portion of a vehicle's total weight that will be supported by each axle and each tire. Proper distribution of vehicle weight is critical to braking, handling and to the service life of components such as axles, springs, bearings and tires.



## 2024 E-Series > Specs > Dimensions/Weights/Capacities

## GVWR/Payload/Spring & GAWR/Base Curb Weight

	WB		Maximum GVWR	Maximum	Spring/GAWR <sup>(1)</sup>	)(lbs.)	Base	e Curb Weight (lbs.)	
Model	(in.)	Engine/Trans.	(lbs.)	Payload <sup>(1)</sup> (lbs.)	Front Range MinMax.	Rear	Front	Rear	Total
E-350 Cutaway	138 SRW	7.3L PFI V8 Premium/6R140	10,050	5,100	4,200	6,084	2,958	1,992	4,950
	138 DRW	7.3L PFI V8 Premium/6R140	11,500	6,270	4,050-4,600	7,800	3,001	2,224	5,225
	158 SRW	7.3L PFI V8 Premium/6R140	10,050	5,030	4,200	6,084	3,039	1,973	5,012
E-350 Cutaway	158 DRW	7.3L PFI V8 Premium/6R140	11,500	6,210	4,200-4,600	7,800	3,082	2,205	5,287
		7.3L PFI V8 Premium/6R140	12,500	7,210	4,200-5,000	8,500	3,082	2,205	5,287
	176 DRW	7.3L PFI V8 Premium/6R140	12,500	7,200	4,200-5,000	8,500	3,148	2,149	5,297
E-350 Stripped Chassis	138 DRW	7.3L PFI V8 Premium/6R140	11,500	6,870	4,400-4,600	7,800	2,421	2,204	4,625
	158 DRW	7.3L PFI V8 Premium/6R140	12,500	7,820	4,600-5,000	8,500	2,480	2,198	4,678
	176 DRW	7.3L PFI V8 Premium/6R140	12,500	7,760	4,600-5,000	8,500	2,535	2,197	4,732
E-450 Cutaway	158 DRW	7.3L PFI V8 Premium/6R140	14,200	8,680	4,600	9,600	3,078	2,434	5,512
		7.3L PFI V8 Premium/6R140	14,500	8,980	5,000	9,600	3,078	2,434	5,512
	176 DRW	7.3L PFI V8 Premium/6R140	14,200	8,680	4,600	9,600	3,161	2,358	5,519
		7.3L PFI V8 Premium/6R140	14,500	8,980	5,000	9,600	3,161	2,358	5,519
E-450 Stripped Chassis	158 DRW	7.3L PFI V8 Premium/6R140	14,500	9,690	5,000	9,600	2,531	2,274	4,805
	176	7.3L PFI V8	14,500	9,640	5,000	9,600	2,566	2,292	4,858

DRW	Premium/6R140				

(1) Gross Axle Weight Rating is determined by the rated capacity of the minimum component of the axle system (axle, wheels, tires) of a specific vehicle. Front and rear GAWRs will, in all cases, sum to a number equal to or greater than the GVWR for the particular vehicle. Maximum loaded vehicle (including passengers, equipment and payload) cannot exceed the GVWR or GAWR (front or rear).

### 2024 E-Series > Specs > Dimensions/Weights/Capacities > Option Content Weight

### Cutaway - Actual Regular Production Option Content Weight

Option Weight	(Front/Total) (lbs.)
REAR DIFFERENTIAL	
Limited-slip rear axle (E-350 SRW)	(0/7)
Limited-slip rear axle (E-350/E-450 DRW)	(0/4)
TIRES (add tire weight even if specified as standard equipment)	
T225/75R16E (DRW)	(0/0)
T245/75R16E (SRW)	(0/0)
IRE EQUIPMENT	
Spare Tire (LT225/75R16E)	(-5/37)
pare Tire (LT245/75R16E)	(-6/43)
Spare Wheel	(-5/35)
PACKAGES	
Auxiliary Heater Prep Package	(5/9)
leater & A/C Prep Package	(18/21)
leater & A/C Prep Package w/Rear Controls	(17/22)
nsulation Package	(1/1)
Power Windows/Locks Group	(9/13)
Seat Prep Package — Driver Only	(-27/-44)
eat Prep Package — Driver and Passenger	(-57/-95)
railer Tow (Class I)	(1/2)
Ipgraded Trailer Tow (Class I)	(1/2)
PTIONS	
A/C – delete	(-51/-49)
Airbag, passenger cutoff switch	(1/1)
Airbag, passenger delete	(-9/-11)
Alternator, extra-heavy-duty	(3/3)
Backup alarm, electric (102 dBA)	Not available
Battery, heavy-duty/auxiliary	(29/67)
Bumper, chrome front	(5/4)
Captain's chairs, without trim	(-3/-5)
Carpeting — front	(5/8)
Console, engine cover delete	(-9/-11)

Cruise control	(2/2)
Daytime running lamps, non-configurable	Not available
Door delete, RH (138" WB)	(-58/-82)
Door delete, RH (158" WB)	(-61/-82)
Door delete, RH (176" WB)	(-63/-82)
Floor covering delete	(-6/-9)
Fuel tank, 40-gallon	(18/-107)
Fuel tank, 55-gallon	(-18/107)
Headlamps, halogen aerodynamic	(4/3)
Headliner delete	(-2/-4)
Heater, engine block	(1/1)
ack, 2-ton mechanical (SRW)	(-1/6)
lack, 4-ton hydraulic (DRW)	(-2/13)
icense plate bracket, front	(1/1)
Mirror, exterior delete	(0/0)
/irror, interior day/night	(1/1)
Mirrors, trailer tow — manual	(16/20)
Mirrors, trailer tow — power	(17/21)
Radio Prep Package with 2 speakers	Not available
Radio Prep Package with 4 speakers	Not available
Radio, delete	(-3/-4)
Rear View Camera Kit	(1/1)
Rear View Video Camera Kit	Not available
Remote Keyless Entry System	(1/1)
Running boards	(13/27)
Seat, power driver's	(6/10)
Seat delete, passenger	(-47/-77)
Spacers, alternate pattern frame (138" WB)	(-2/165)
Spacers, alternate pattern frame (158" WB)	(25/165)
Spacers, alternate pattern frame (176" WB)	(42/165)
Spacers, standard pattern frame, not included (138" WB)	(8/129)
Spacers, standard pattern frame, not included (158" WB)	(8/129)
Spacers, standard pattern frame, not included (176" WB)	(44/147)
Speakers, 4	(3/4)
Sun visor delete	(-1/-2)
railer brake controller	(2/2)
Jpfitter switch pack	(2/2)
Wheels, 16" x 7" forged aluminum	(-26/-52)
Wheels, aluminum hubcaps	(2/4)
Wheels, sport wheel covers	(2/4)
Line A) Total Actual Option Content Weight: (Front/Total)	/

### 2024 E-Series > Specs > Dimensions/Weights/Capacities > Option Content Weight

## Stripped Chassis – Actual Regular Production Option Content Weight

Option Weight	(Front/Total) (lbs.)
REAR DIFFERENTIAL	·
Limited-slip rear axle (E-350/E-450 DRW)	(0/4)
TIRE EQUIPMENT	·
Spare tire (LT225/75R16E)	(-5/37)
Spare tire (LT245/75R16E)	(-6/43)
Spare wheel	(-5/35)
PACKAGES	·
A/C Prep	(24/25)
OPTIONS	·
Alternator, extra-heavy-duty	(3/3)
Daytime running lamps, non-configurable	(TBA/TBA)
Fuel tank, 40-gallon	(18/-107)
Fuel tank, 55-gallon	(18/-107)
Heater, engine block	(1/1)
Jack, 2-ton mechanical (SRW)	(-1/6)
Jack, 4-ton hydraulic (DRW)	(-2/13)
Upfitter switch pack	(2/2)
Wheels, sport wheel covers	(2/4)
Line A) Total Actual Option Content Weight: (Front/Total)	/

### 2024 E-Series > Specs > Standard Equipment

### E-350 Cutaway Standard Equipment

AXLES						
Transmission	Туре	6-speed TorqShift au	to			
	Туре	7.3L PFI V8 premium-	rated			
Engine	Application	Refer to order guide				
POWERTRAI	N					
WHEELBASE	(in.)	138	138	158	158	176
REAR WHEEL	S	SRW	DRW	SRW	DRW	DRW

#### 11/4/2

2, 10:07 AM		202	24 E-Series Cutaway/Stripped Chassis - Sp	pecs print section				
Front Axle	Туре	Twin I-beam IFS						
	Capacity (Rating @ Ground)	5,000 lbs.	5,000 lbs.					
Rear Axle	Туре	Full-floating, Dana 10	-ull-floating, Dana 10.5"					
	Capacity (Rating @ Ground)	7,800 lbs.	8,500 lbs.					
BRAKES	1	1	1					
Front Disc	Туре	Dual-piston caliper (	2.36" diameter piston)					
	Size (in.)	13.58 diameter rotor						
Rear Disc	Туре	Dual-piston caliper (	1.89" diameter piston)					
	Size (in.)	13.58 diameter rotor						
Power-Assist	Туре	Vacuum-boost (SRW	/)/Hydro-boost (DRW)					
Unit	Boost Ratio	13.46"	7.5:1 (SRW), 6.76:1 (DRW)					
Anti-Lock System	Туре	Dual diaphragm (SR)	Dual diaphragm (SRW), Hydro-boost (DRW)					
Parking Brake	Rear brake drum-in- hat	Foot-operated, push	Foot-operated, push to apply/pull release lever to disengage					
ELECTRICAL	1	1						
Alternator	Rating	210 amperes, 2,835 v	vatts <sup>(1)</sup>					
Battery	Туре	Maintenance-free						
	Rating	78-AH						
Kit		Modified vehicle wiri	ng					
FUEL TANK	Capacity <sup>(2)</sup>	40-gallon aft-of-rea	r-axle					
ЈАСК	Capacity	2.0-ton (SRW), 4.0-t	on (DRW)					
STEERING	Туре	Gear assembly powe	r steering					
	Ratio	17.0:1						
SUSPENSION	<u>ا</u>	1						
Frame	Туре		ossmembers, 36,000-psi steel (includes 2 la 8" and 158" WB. or, 4 lateral spacers, 2 long	ateral spacers, 4 longitudinal spacers and 12 itudinal spacers and 12 body mounts with				
	Section Modulus	5.73 cu. in.						
Springs,	Туре	Coil, computer-selec	ted					
Front	Rating @ Ground (min.)	3,199 lbs. 3,100 lbs. 3,100 lbs.						
Springs, Rear	Туре	Multi-leaf, single-sta	ge					
	Rating @ Ground (min.)	7,310 lbs. 8,500 lbs.						
Shock Absorbers	Gas-type	35 mm						
Stabilizer Bar	Front/Rear— Diameter	Front — 25.4 mm (SF	2W)/23 mm (DRW); rear — 28.6 mm (DRW)					
TIRES	Туре	Four, truck-type stee	l-belted radial, all-season (six with DRW)					

LT245/75R16E

LT225/75R16E

Size

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application-dependent.

(2) Also includes 7.5-gallon plastic transit fuel tank (may be deleted), Auxiliary Fuel Port and Fuel System Conversion Kit.

### 2024 E-Series > Specs > Standard Equipment

### E-350 Stripped Chassis Standard Equipment

REAR WHEEI	_S	DRW	DRW	DRW	DRW	DRW		
WHEELBASE	(in.)	138	158	176	158	176		
POWERTRAII	N	1	1	1	1	1		
Engine	Application	Refer to order guide						
	Туре	7.3L PFI V8 premium-	-rated					
Transmission	Туре	6-speed TorqShift au	ito					
AXLES	1	1						
Front Axle	Туре	Twin I-beam IFS						
	Capacity (Rating @ Ground)	5,000 lbs.						
Rear Axle	Туре	Full-floating, Dana 10	).5"					
	Capacity (Rating @ Ground)	6,340 lbs.	8,500 lbs.	7,800 lbs.				
BRAKES	1	1	1	1				
Front Disc	Туре	Dual piston caliper (2	2.36" diameter piston)					
	Size (in.)	13.58 diameter rotor						
Rear Disc	Туре	Dual piston caliper (1	.89" diameter piston)					
	Size (in.)	13.58 diameter rotor						
Power-Assist	Boost Ratio	Hydro-Boost 6.76:1 ([	Hydro-Boost 6.76:1 (DRW)					
Unit	Effective Diameter	13.46"						
Anti-Lock Sys	tem	4-wheel						
Parking Brake	Rear brake drum-in- hat	Foot-operated, push	to apply/pull release l	ever to disengage				
ELECTRICAL	1	1						
Alternator	Rating	210 amperes, 2,835 w	vatts <sup>(1)</sup>					
Battery	Туре	Maintenance-free						
	Rating	78-AH						
Kit	1	Modified vehicle wirir	ng					
FUEL TANK	Capacity	40-gallon aft-of-rear	-axle					
STEERING	Туре	Gear assembly power steering						
	Ratio	17.0:1						
SUSPENSION	1							
Frame	Туре	Single-channel, 6 cro	ssmembers, 36,000-p	osi steel				
	Section Modulus	5.73 cu. in.						
Springs,	Туре	Coil, computer-selec	ted					
Front								

,			,				
	Rating @ Ground (min.)	3,100 lbs.	3,550 lbs.	3,800 lbs.	4,050 lbs.		
Springs, Rear	Туре	Multi-leaf, single-st	age		· ·		
	Rating @ Ground (min.)	8,500 lbs. (DRW)					
Shock Absorbers	Gas-type	35 mm					
Stabilizer	Front — Diameter	23 mm (DRW)					
Bar	Rear — Diameter	28.6 mm (DRW)	28.6 mm (DRW)				
TIRES	Туре	Truck-type steel-be	lted radial, all-season				
	Size	Six, LT225/75R16E	2)				
	Spare tire carrier	None					
WHEELS	Type & Size	Six, 8-hole disc, 16"	x 6.0" K steel <sup>(2)</sup>				

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application-dependent.

(2) Spare tire and wheel are shipped temporarily mounted to the top of the frame.

### 2024 E-Series > Specs > Standard Equipment

## E-450 Cutaway Standard Equipment

REAR WHEELS		DRW	DRW		
WHEELBASE (in.)	)	158	176		
POWERTRAIN					
Engine	Application	Refer to order guide			
	Туре	7.3L PFI V8 premium-rated			
Transmission	Туре	6-speed TorqShift auto			
AXLES	·	·			
Front Axle	Туре	Twin I-beam IFS			
	Capacity (Rating @ Ground)	4,600 lbs.			
Rear Axle	Туре	Full-floating, Dana 10.75" HD			
	Capacity (Rating @ Ground)	9,600 lbs.			
BRAKES	·	·			
Front Disc	Туре	Dual piston caliper (2.36" diameter piston)			
	Size (in.)	13.58 diameter rotor			
Rear Disc	Туре	Dual piston caliper (2.12" diameter piston)			
	Size (in.)	13.58 diameter rotor			
Power-Assist Unit	Boost Ratio	Hydro-Boost, 6.76:1			
Anti-Lock System		4-wheel			
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever	to disengage		
ELECTRICAL		·			
Alternator	Rating	210 amperes, 2,835 watts <sup>(1)</sup>			

11/4/22, 10:07 AM

#### 2024 E-Series Cutaway/Stripped Chassis - Specs print section

2, 10:07 AM		2024 E-Series Cutaway/Stripped Chassis - Specs print section
Battery	Туре	Maintenance-free
	Rating	78-AH
Kit		Modified vehicle wiring
FUEL TANK	Capacity <sup>(2)</sup>	55-gallon, aft-of-rear-axle
STEERING	Туре	Gear assembly power steering
	Ratio	17.0:1
SUSPENSION	-	
Frame	Туре	Single-channel, 6 crossmembers, 36,000-psi steel
	Section Modulus	6.40 cu. in.
Springs, Front	Туре	Coil
	Rating @ Ground (min.)	4,600 lbs.
Springs, Rear	Туре	Multi-leaf, single-stage
	Rating @ Ground (min.)	9,600 lbs.
Shock Absorbers	Gas-type	35 mm
Stabilizer Bar	Front — Diameter	23 mm
	Rear — Diameter (DRW only)	28.6 mm
TIRES	Туре	Six truck-type steel-belted radial, all-season
	Size	LT225/75R16E
WHEELS	Type & Size	Six, 8-hole disc, 16" x 6.0" K steel

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application-dependent.

(2) Also includes 7.5-gallon plastic transit fuel tank (may be deleted), Auxiliary Fuel Port and Fuel System Conversion Kit.

### 2024 E-Series > Specs > Standard Equipment

### E-450 Stripped Chassis Standard Equipment

REAR WHEELS		DRW	DRW
WHEELBASE (in	n.)	158	176
POWERTRAIN		·	·
Engine	Application	Refer to order guide	
	Туре	7.3L PFI V8 premium-rated	
Transmission	Туре	6-speed TorqShift auto	
AXLES			
Front Axle	Туре	Twin I-beam IFS	
	Capacity (Rating @ Ground)	5,000 lbs.	
Rear Axle	Туре	Full-floating, Dana 10.75" HD	
	Capacity (Rating @ Ground)	9,600 lbs.	
BRAKES	I	1	
Front Disc	Туре	Dual piston caliper (2.36" diameter piston)	
	Size (in.)	13.58 diameter rotor	

Rear Disc	Туре	Dual piston caliper (2.12" diameter piston)				
	Size (in.)	13.58 diameter rotor				
Power-Assist Unit	Туре	Hydro-Boost				
	Boost Ratio	6.76:1	6.76:1			
Anti-Lock System		4-wheel				
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever	r to disengage			
ELECTRICAL		·				
Alternator	Rating	210 amperes, 2,835 watts <sup>(1)</sup>				
Battery	Туре	Maintenance-free				
	Rating	78-AH				
Kit		Modified vehicle wiring				
FUEL TANK	Capacity	55-gallon				
STEERING	Туре	Gear assembly power steering				
	Ratio	17.0:1				
SUSPENSION		·				
Frame	Туре	Single-channel, 6 crossmembers, 36,000-psi s	teel			
	Section Modulus	5.730 cu. in.				
Springs, Front	Туре	Coil, computer-selected				
	Rating @ Ground (min.)	5,000 lbs.				
Springs, Rear	Туре	Multi-leaf, single-stage				
	Rating @ Ground (min.)	9,600 lbs.				
Shock Absorbers	Gas-type	35 mm				
Stabilizer Bar	Front — Diameter	Front — 23 mm	Rear — 28.6 mm			
TIRES	Туре	Truck-type steel-belted radial, all-season				
	Size	Six, LT225/75R16E				
	Spare tire carrier	None				
WHEELS	Type & Size	Six, 8-hole disc, 16" x 6.0" K steel <sup>(2)</sup>				
	1					

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application- dependent.

(2) Spare tire and wheel are shipped temporarily mounted to the top of the frame.

### 2024 E-Series > Specs > Powertrain

### Auxiliary Automatic Transmission Oil Cooler Applications

Model/Series	Engine	Transmission	Standard No. of Plates	Air Conditioning No. of Plates	Trailer Towing No. of Plates
E-350/E-450	7.3L PFI V8 Premium-rated	TorqShift	20 — 1/2" Ports	20 — 1/2" Ports	24 — 1/2" Ports

#### 2024 E-Series > Specs > Powertrain

### **Cooling System Specifications**

			Frontal	Coi	re Size (i	n.)	Rows	Fins	Cooling System	Fan	Specifica	tions
Engine	Cooling	Trans. Usage	Area (sq. in.)	Height	Width	Thick.	of Tubes	per Inch	Capacity (approx. quarts)	Туре	No. of Blades	Blade Dia. (in.)
7.3L PFI V8 Premium-rated	All	Auto	708	23.6	30.0	1.4	1	16.5	30.4	Plastic	8	20.0

#### 2024 E-Series > Specs > Powertrain

## Engine

Driveline Layout	Front Engine, Rear Wheel (RWD)
Engine Type	7.3L PFI V8 Premium-Rated
Displacement (liters/cu. in.)	7.3/445
Horsepower @ rpm	325 @ 3,750
Torque (lbft.) @ rpm	450 @ 3,750
Compression Ratio	10.5:1
Valvetrain	SOHC
Valve Operation	Push rod
Bore & Stroke (in.)	4.21 x 3.98
Main Bearings	5
Induction	Naturally aspirated
Fuel System	Sequential Multiport
Fuel Requirement (octane)	87 (min.)

PERFORMANCE NOTE: Horsepower and torque are independent attributes and may not be achieved simultaneously.

### 2024 E-Series > Specs > Powertrain

## Fuel System Data

Electronic Fuel Injection	7.3L PFI V8 Premium-rated	Sequential Multiport Fuel Injection
Fuel Pump	7.3L PFI V8 Premium-rated	Electric-in-Tank High Pressure
Fuel Filter	7.3L PFI V8 Premium-rated	In-line Large Capacity (One)
Air Cleaner	7.3L PFI V8 Premium-rated	Dry Element, Replaceable

#### 2024 E-Series > Specs > Powertrain

### Transmission Specifications

ed TorqShift Automatic
Plate, 2 Stage
gneaux
d In-Tank
i

## 2024 E-Series > Specs > Chassis

## Front Axle Specifications

Model/Series		E-350/E-450
Max. Rating @ Ground (lbs.)		5.000
Туре		Twin-I-beam spindle with ball joints
Axle	Material	Nodular cast iron
	Spring Centers (in.)	47.0
Radius Arms	No.	2
	Material	High-strength low-alloy steel
Ball Joint		Lubed-for-life ball joints
Spindle Material		Nodular cast iron body with forged steel stem
Wheel Bearings Type		Tapered roller

### 2024 E-Series > Specs > Chassis

Rear Axle Specifications

#### 11/4/22, 10:07 AM

#### 2024 E-Series Cutaway/Stripped Chassis - Specs print section

Model/Series		E-350	E-450			
Make		Dana 10.5"	Dana 10.75" HD			
Rating @ Ground (lbs.)		7,800/8,500	9,600			
Туре		Full-floating	Full-floating			
Driveline Attachment, Ci	ircular Flange	4.25"	4.75"			
Housing	Туре	Cast center	Cast center			
	Cover Attachment	Bolted	Bolted			
Section	Tube Diameter (in.)	3.50	4.00			
	Thickness (in.)	0.39/0.56	0.625			
Lubricant Capacity (pt.)		6.6	9.6			
Spring Centers (in.)		48.92	48.92			
Wheel Bearings	Туре	Tapered roller, 2 opp	Tapered roller, 2 opposed			
Gears	Туре	Hypoid	Hypoid			
	Material	Alloy steel	Alloy steel			
Ring Gear	Pitch Diameter (in.)	10.50	10.75			
	Mounting	Overhung	Overhung			
Differential	Туре	2-pinion <sup>(1)</sup>	2-pinion <sup>(1)</sup>			
	L/S Type	Traction-Lok	Traction-Lok			
Axle Shaft	Spline — Minor Dia. (in.)	1.268	1.268			
	Spline — Major Dia. (in.)	1.375	1.375			
	Number of Splines	32	35			

(1) 4-pinion for limited-slip.

### 2024 E-Series > Specs > Chassis

## Brake Equipment Specifications - Front/Rear

Туре	Type Model/Series		Rotor Dia. (in.)		Area (sq. in.)/ Width (in.)/ Thickness (in.)	Caliper Piston Dia. (in.)	Gross Lining Area Per Axle	Total Swept Area Per Axle (sq. in.)
		OD	ID	Segment	Thekness (III.)		(sq. in.)	Axte (sq. m.)
Disc	All (Front)	13.58	8.70	Outboard	7.16/2.34/0.489	2.36	47.8	341.6
				Inboard	_			
	E-450 (Rear)	13.58	9.88	Outboard	5.96/1.74/0.51	2.12	43.65	272.70
				Inboard	_			
	E-350 (Rear)	13.58	9.88	Outboard	6.65/2.33/0.346	1.89	39.50	272.70
				Inboard	5.31/2.03/0.413			

### 2024 E-Series > Specs > Chassis

### Brake Master Cylinder Specifications

Туре	Model/Series	Bore Diameter (in.)	
Dual System, Dash-mounted	E-350 SRW	1.31	
	E-350/E-450 DRW	1.38	

### 2024 E-Series > Specs > Chassis

### Power Brakes Hydraulic Booster Specifications

Туре	Model/Series	Ratio
Hydro-Boost	E-350 (DRW)/E-450	6.76:1

### 2024 E-Series > Specs > Chassis

### Power Brakes Vacuum Booster Specifications

Туре	Model/Series	Ratio	Diaphragm Type
Bendix, <sup>®</sup> Dash-mounted	E-350 (SRW)	7.5:1	Dual

### 2024 E-Series > Specs > Chassis

### Frame Specifications

Model/Series	Wheelbase (in.)	Maximum Side Rail Section (in.)	Section Modulus (cu. in.)	Yield Strength (psi)
E-350/E-450 Cutaway/Stripped Chassis	138, 158, 176	7.69 x 3.18 x 0.228	5.73	36,000
E-450 Cutaway	158, 176	7.69 x 3.18 x 0.248	6.40	36,000

## 2024 E-Series > Specs > Chassis

### Shock Absorber Specifications

E-350/E-450	Standard	4	35 mm	Gas-pressurized		
Model/Series	Usage	Number	Piston Diameter (mm)	Туре		
		Front & Rear				

### 2024 E-Series > Specs > Chassis

## Spring Specifications – Front Coil

Model/Series	GVWR (lbs.)	Combined Rating @ Ground (lbs.)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lbs. per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lbs. per spring)
E-350	10,050	3,800	12.0	0.72	328	4.0	2,165
Cutaway	(SRW), 11,500,	3,900	12.0	0.73	341	4.0	2,224
	12,500	4,050	12.0	0.74	354	4.0	2,318
		4,200	12.0	0.74	354	4.0	2,414
		4,400	12.0	0.76	366	4.0	2,542
		4,600	12.0	0.78	366	4.0	2,670
		5,000	12.0	0.79	418	4.0	2,900
E-350	11,500,	3,800	12.0	0.72	328	4.0	2,165
Stripped Chassis	12,500	3,900	12.0	0.73	341	4.0	2,229
		4,050	12.0	0.74	354	4.0	2,318
		4,200	12.0	0.74	354	4.0	2,414
		4,400	12.0	0.76	366	4.0	2,542
		4,600	12.0	0.78	366	4.0	2,670
		5,000	12.0	0.79	418	4.0	2,900
E-450 Cutaway/	14,200	4,600	12.0	0.78	366	4.0	2,670
Stripped Chassis	14,500	5,000	12.0	0.79	418	4.0	2,900

### 2024 E-Series > Specs > Chassis

### Spring Specifications - Rear Main Leaf

Model/Series	Combined Rating @ Ground (lbs.)	Number of Leaves	Total Thickness @ Pad (in.)	Length (in.)	Width (in.)	Deflection Rear (lbs. per in. per spring) <sup>(1)</sup>	Rating Each @ Pad (lbs. per spring)
E-350 Extended Cutaway	6,195	4	1.99	55.0	3.00	373.0/699.0	2,772
E-350 Cutaway/ Stripped Chassis SRW	7,310	9	3.59	55.0	3.00	924.7	3,296
E-350 Cutaway/ Stripped Chassis DRW	8,500	9	3.79	58.5	3.00	1,087	3,790
E-450 Cutaway/ Stripped Chassis	9,600	11	4.66	58.5	3.00	1,138	4,288

(1) Dual numbers indicate two-stage spring.

### 2024 E-Series > Specs > Chassis

## Steering Specifications

Model/Series	Wheelbeen (in )	Power Steering	Power Steering <sup>(1)</sup>		Turning Diameter (ft.) <sup>(2)</sup>	
Model/Series	Wheelbase (in.)	Gear Ratio	Overall Ratio	Curb-to-Curb	Wall-to-Wall	
E-350 SRW	138	17:1	21.2:1	48.6	50.0/50.0 <sup>(3)</sup>	
E-350 DRW	138	17:1	21.2:1	48.6	50.0/50.1 <sup>(3)</sup>	
E-350 SRW	158	17:1	21.2:1	54.9	56.2 <sup>(3)</sup>	
E-350 DRW/	158	17:1	21.2:1	54.8	56.2 <sup>(3)</sup>	
E-450	176	17:1	21.2:1	60.3	61.8 <sup>(3)</sup>	

(1) 15 1/2" diameter steering wheel. Cutaway and Stripped Chassis models include HD steering gear.

(2) Average of left and right turns with standard tires.

(3) Cutaway only.

### 2024 E-Series > Specs > Chassis

### Tire Specifications

Type/Size	SRW/ DRW	Rim Width (in.)	Section Width (in.)	Ply Rating	Load Rating	Maximum Inflation Pressure (psi)	Load Limits @ Maximum Inflation Pressure (lbs.)	Static Loaded Radius (in.)	Revolutions Per Mile @ 45 mph
LT225/75Rx16	DRW	6.0	9.60	10	E	80	2,680/2,470 <sup>(1)</sup>	14.60	709
LT245/75Rx16	SRW	7.0	10.20	10	E	80	3,042	14.10	677

(1) Tire rating when in the front single position/rating when in the dual position.

## 2024 E-Series > Specs > Chassis

### Wheel Specifications

Wheel Type	Wheel Size	Nominal Offset (mm)	No. of Studs	Bolt Circle (in.)	Max. Wheel Capacity Load (lbs. @ ground)
Steel	16" x 7.0" K	0.25	8	6.5	2,300 Front 3,045 Rear
	16" x 6.0" K (Dual)	5.15	8	6.5	2,500 Front 2,500 Rear
Aluminum	16" x 7.0" J	0.25	8	6.5	3,045

### 2024 E-Series > Specs > Special Applications

### Trailer Towing Information

For additional towing information, refer to the RV & Trailer Towing Guide, available as a printable PDF on **eSourceBook**, or the vehicle Owner's Manual.



### 2024 E-Series > Specs > Special Applications

### **Snow Plow Applications**

Not recommended for Snow Plow Applications.



### 2024 E-Series > Specs > Electrical

### Alternator Specifications

Output <sup>(1)</sup> (amperes)	210	240	240/157
Output (watts)	2,835	3,240	5,360

(1) Actual output is temperature- and application-dependent.

### 2024 E-Series > Specs > Electrical > Alternator Performance Curves

#### 210-Ampere Alternator

En	igine	Pulley Ratio	Model Application
7.3	L PFI V8	3.03:1	E-Series Cutaway and Stripped Chassis

#### **2024 E-Series** > **Specs** > Electrical > Alternator Performance Curves

#### 240-Ampere Alternator

Engine	Pulley Ratio	Model Application
7.3L PFI V8	3.03:1	E-Series Cutaway and Stripped Chassis (optional)

#### 2024 E-Series > Specs > Electrical > Alternator Performance Curves

#### 240-/157-Ampere Alternator

Engine	Pulley Ratio	Model Application
7.3L PFI V8 (Premium-rated)	3.03:1/2.80:1	E-Series Cutaway and Stripped Chassis (optional)

### 2024 E-Series > Specs > Electrical

### **Battery Applications**

E-Series						
E-Series						
Cold-Cranking Amps at 0°F	750	1,500				
Ampere-Hour Rating	78	Dual 78				

### 2024 E-Series > Specs > Electrical

### Cold Weather Recommendations

Minimum Temperature	Equipment	
winning remperatore	Dual 78 Amp-Hr Batteries (opt.)	Engine Block Heater
0° F	Suggested	Not Needed
-10° F	Recommended	Suggested
-20° F	Recommended	Recommended

https://www.esourcebook.dealerconnection.com/content/ret-ford/en/vehicles/truck/eseries/2024/specs.printable.section.html

Below -20° F	Strongly Recommended	Strongly Recommended
--------------	----------------------	----------------------

#### DEFINITIONS

Suggested: Helpful, but not needed.

**Recommended:** Could improve reliability in less-than-ideal conditions.

Strongly Recommended: Will give definite improvement over the standard components.

Dual Batteries: Higher-capacity batteries available. (Usage varies by model.)

Engine Block Heater: Available equipment for all engines. (Usage and heater capacity vary with engine requirements.)

#### 2024 E-Series > Specs > Electrical

### Standard Lighting/Reflector Equipment

Light Reflector	Application
Headlamps (Halogen)	All Series — Two replaceable bulbs with all models
Parking Lamps	All Series — Integral with turn signals
Front/Rear Turn Signals	All Series
Front Side Marker Lamps	All Series
Front Side Reflectors	All Series
Rear Side Reflectors	All Series
Rear Side Marker Lamps	All Series — Integral with taillamps
License Plate Lamps	All Series
Two Combination Taillamps with Integral Stop, Turn Signal and Backup Lamps and Reflective Surface	All Series
Rear Reflectors	All Series
Front Daytime Running Lamps	All Vehicles Registered in Canada

### 2024 E-Series > Specs > Electrical

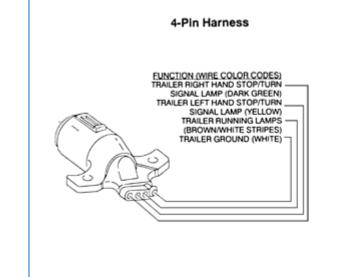
### Light Specifications and Usage

Lamp	Code	Description	Usage
Daytime Running Lamps — Configurable	STD	(2) Replaceable Bulbs, Halogen	All Vehicles Registered in Canada
Headlamps	STD	(2) Replaceable Bulbs, Halogen	All Vehicles Registered in U.S. and Canada

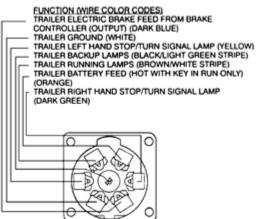
### 2024 E-Series > Specs > Electrical

### Trailer Towing Wiring Harness

Circuit Number	Circuit Description	Color Code
RAT08	Ground	White
CAT17	Parking Lamps	Brown
CAT14	Trailer Battery Feed	Orange
CAT19	To Electric Brakes	Dark Blue
CAT09	RH Turn Signal and Stop Lamps	Dark Green
CAT06	LH Turn Signal and Stop Lamps	Yellow
CAT03/CAT16	Trailer Backup Lamps	Gray with Brown Stripe
CBP30	Front Brake Controller Running Lamp Feed/Park Lamp Feed	Yellow with Blue Stripe
CBP40	Rear Brake Controller Running Lamp Feed/Park Lamp Feed	Yellow with Green Stripe
CLS30	Brake Controller Running Lamp Feed/Park Lamp Feed	Violet with White Stripe
CCB08	Vehicle Stop Lamps	Violet with White Stripe
SBB18/SBB17	B+ to Electric Brake Controller	Yellow with Red Stripe



#### 7-Pin Harness



#### 2024 E-Series > Specs

#### Warranties

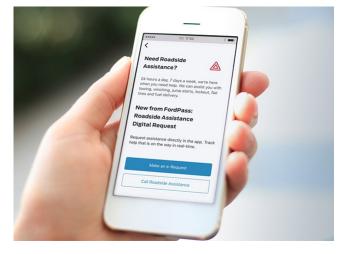
#### 24-HOUR ROADSIDE ASSISTANCE<sup>(1)</sup>

- Owners can call the toll-free number (1-800-241-3673) 24 hours a day
- FordPass<sup>(2)</sup> App key functionality
  - Tap the Service symbol on the bottom menu
  - Tap on 24/7 Assistance to make a request
  - Follow the prompts, which allow owners to identify the type of service they need

#### 11/4/22, 10:07 AM

#### 2024 E-Series Cutaway/Stripped Chassis - Specs print section

- Owners can follow real-time progress of their request on the FordPass map
- Services available include flat tire change, towing to the nearest Ford dealership, fuel delivery, jump start and lockout assistance
- The FordPass App also offers a link to Accident Assistance under Vehicle Details/Vehicle Support
  - Accident Assistance includes information on what to do in an accident and about collision repairs
  - It also provides a collision shop locator that identifies the nearest Ford Certified Collision Center



#### **POWERTRAIN LIMITED WARRANTY**

- Powertrain Limited Warranty for Ford vehicles is 5 years or 100,000 miles, whichever comes first
- That's an additional 2 years/64,000 miles (whichever comes first) of coverage for components such as the engine, transmission and rearwheel-drive parts (refer to the vehicle Owner's Manual for a more comprehensive list of all the parts covered) beyond the vehicle's 3-year/36,000-mile (whichever comes first) bumper-to-bumper limited warranty

#### **NEW VEHICLE LIMITED WARRANTIES**

- 3-year/36,000-mile (whichever comes first) bumper-to-bumper; no deductible
- 5-year/unlimited-mileage (whichever comes first) Corrosion Perforation (aluminum panels don't require perforation)
- 5-year/60,000-mile (whichever comes first) Safety Restraint Warranty
- (1) Roadside Assistance is included for certain owners and available to everyone for a per-service fee. Ford reserves the right to change program details without obligations. Ford Roadside Assistance is a complimentary offering to all Ford owners for up to 5 years or 60,000 miles (from the date of sale), whichever occurs first. Ford reserves the right to change program details without obligations.

(2) FordPass App, compatible with select smartphone platforms, is available via a download. Message and data rates may apply.

NOTE: See dealer for limited warranty details.

NOTE: See www.motorcraftservice.com for a link to a printable PDF of the Warranty Guide.

® Copyright 2022, Ford Motor Company | Rights are granted to dealership personnel to download the contents of this web page in electronic or paper form. All other rights are reserved, including the rights to create derivative works and/or other web pages. Content is confidential and not to be posted on other sites or shared.

# **2023 FORD E-SERIES CUTAWAY**

# **TECHNICAL SPECIFICATIONS**



#### BODY High-strength C-section, steel frame Construction/materials Body-on-frame Body style Ohio Assembly Plant, Avon Lake, Ohio Final assembly location **DRIVETRAIN** Front-engine, rear-drive Layout **ENGINES** 7.3-liter premium V8 (standard) 7.3-liter economy V8 (optional) 90-degree V8, single in-block cam 90-degree V8, single in-block cam Configuration Cast iron block, aluminum heads Cast iron block, aluminum heads Block/head material Displacement 7.3 liters (445 cubic inches) 7.3 liters (445 cubic inches) 4.22 x 3.97 4.22 x 3.97 Bore x stroke Compression ratio 10.5:1 10.5:1 Valvetrain Pushrod and rocker arms, two valves per cylinder Pushrod and rocker arms, two valves per cylinder Recommended fuel 87 octane 87 octane Sequential multiport electronic Sequential multiport electronic Fuel delivery Electronic Electronic Engine control system Intake manifold Naturally aspirated, tuned intake Naturally aspirated, tuned intake Dyno certified horsepower 350 @ 3,900 rpm 300 @ 3,750 rpm 468 lb.-ft. @ 3,900 rpm 425 lb.-ft. @ 3,250 rpm Dyno certified torque **Oil-life monitor** Oil-minder system Oil-minder system **ELECTRICAL**

Alternator	Standard 210-amp, optional 240-amp, or optional dual 240-amp/157-amp
Battery group	12-volt; 750-CCA 78-amp/hr

### **TRANSMISSION**

Configuration	Aluminum 6-speed with two overdrive speeds and tow/haul; auxiliary cooler
Gear ratios:	
First	3.974:1
Second	2.318:1
Third	1.516:1
Fourth	1.149:1
Fifth	0.858:1
Sixth	0.674:1
Reverse	-3.128:1



**FORD E-SERIES** 

# **CHASSIS SPECIFICATIONS**

Front suspension	Twin I-beam independent with computer-selected coil springs and stabilizer bar
Rear suspension	Multileaf single-stage leaf springs/solid axle and stabilizer bar (DRW only)
Front and rear shocks	Heavy-duty gas-pressurized
Steering	Recirculating ball, power-assisted

### BRAKES

Туре	Power four-wheel vented discs, ABS, traction control
Front (rotor diameter)	13.58 inches (345 millimeters)
Rear (rotor diameter)	13.58 inches (345 millimeters)

#### WHEELS

Туре	Steel
Size	16 inches
Number of studs	Eight
Bolt-circle diameter	6.5 inches

# EXTERIOR DIMENSIONS (INCHES UNLESS OTHERWISE NOTED)

	138-inch wheelbase E-350 SRW	158-inch wheelbase E-350 SRW	138-inch wheelbase E-350 DRW	158-inch wheelbase E-350 DRW	176-inch wheelbase E-350 DRW	<mark>158-inch</mark> wheelbase E-450 DRW	176-inch wheelbase E-450 DRW
Overall length	241.1	261.1	241.1	261.1	261.1	261.1	261.1
Overall width	79.4	79.4	94.9	94.9	94.9	94.9	94.9
Rear track	72.1	72.1	75.4	75.4	75.4	77.7	77.7
Cab, rear to rear axle	80	100	80	100	118	100	118
Rear axle to end of frame	68.5	68.5	68.5	68.5	50.5	68.5	50.5
Front overhang	34.6	34.6	34.6	34.6	34.6	34.6	34.6

## **INTERIOR DIMENSIONS**

	E-350/E-450 Cutaway
First row headroom	42 inches
First row shoulder room	68.1 inches
First row hip room	65.6 inches
First row maximum legroom	42.1 inches



#### **PASSENGER AND FUEL CAPACITIES**

	E-350 SRW, DRW	E-450 DRW
Seating capacity	Two (one optional)	Two (one optional)
Fuel capacity	40 gallons (55 optional)	55 gallons (40 optional)

# **PAYLOAD PACKAGE SELECTOR (LBS.)**

	Engine	GCWR	GVWR	Payload
E-350 SRW 138-inch wheelbase	7.3-liter economy	13,000	10,050	5,100
E-350 SRW 138-inch wheelbase	7.3-liter premium	18,500	10,050	5,100
E-350 DRW 138-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,270
E-350 DRW 138-inch wheelbase	7.3-liter premium	18,500	11,500	6,270
E-350 SRW 158-inch wheelbase	7.3-liter economy	13,000	10,050	5,030
E-350 SRW 158-inch wheelbase	7.3-liter premium	18,500	10,050	5,030
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000	12,500	7,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	12,500	7,210
E-350 DRW 176-inch wheelbase	7.3-liter economy	13,000/17,000	12,500	7,200
E-350 DRW 176-inch wheelbase	7.3-liter premium	18,500	12,500	7,200
E-450 DRW 158-inch wheelbase	7.3-liter economy	18,000	14,000	8,480
E-450 DRW 176-inch wheelbase	7.3-liter premium	22,000	14,200/14,500	8,680/8,980

# WARRANTY

Bumper to bumper:	Three years/36,000 miles
Powertrain:	Five years/60,000 miles
Safety restraint system:	Five years/60,000 miles
Corrosion (perforation only):	Five years/unlimited miles
Roadside assistance program:	Five years/60,000 miles



**FORD E-SERIES** 



U.S. Department of Transportation Federal Transit Administration 1200 New Jersey Avenue SE Washington, D.C. 20590

September 18, 2009

Vince Cline Design Engineer Glaval Bus 914 County Road 1 North Elkhart, IN 46514

Dear Mr. Cline:

This is in response to your letter dated April 16, 2009, in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulation (49 CFR Part 665) to a version of the Glaval Sport (Primetime) bus model built on the Ford E-Series chassis. Your letter states that:

- Glaval has had its 96-inch wide Universal model built on a Ford E-Series chassis tested at the Altoona Bus Testing Center (Altoona) in the 5-year/150,000-mile service life category (Report No. PTI-BT-R9910). The Universal model also completed partial testing (Structural Durability and Reliability) in the 7-year/200,000-mile service life category (Report No. PTI-BT-R0122-P).
- Glaval has had its 84-inch wide Sport model built on a GM chassis tested at Altoona in the 5year/150,000-mile service life category (Report No. PTI-BT-R0805).
- Glaval now proposes to offer a version of the 84-inch wide Sport model on the Ford E-Series chassis, which will be "built with the same concepts" as the version tested on the GM chassis. This version was to have been called Primetime, however you subsequently advised FTA that Glaval has since decided to call this model Sport also.

You have asked FTA to "grandfather" the Sport/Primetime model built on the Ford E-Series chassis from additional Altoona testing based on its similarity to previously-tested models.

FTA has reviewed your request and accompanying documentation and has determined that **no additional testing** will be required for the Sport/Primetime bus model built on the Ford E-Series chassis, provided that it is offered in no higher than the 5-year/150,000-mile service life category. This determination is based on the following conclusions drawn from information submitted by Glaval or contained in our files:

- The Glaval Sport bus model built on a GM chassis has been tested at Altoona (Report No. PTI-BT-R0805). Consequently, the Sport is eligible for Partial Testing procedures; only those tests in which significantly different data may be expected would need to be repeated.
- The Ford E-Series chassis has been evaluated at Altoona with the Glaval Universal bus model, as well as numerous other bus models built by various manufacturers.
- Under FTA's "family of vehicles" concept, outlined in FTA's November 3, 1993 Federal Register notice, FTA generally permits a manufacturer of a bus body that has been tested on one unmodified third-party chassis to offer the same or closely related body built on another similar unmodified third-party chassis that has been tested at Altoona (on one of its own buses or on a competitor's similar bus), without requiring additional testing. This generally includes changes in bus length, such as from one standard wheelbase offering to another.
- The family of vehicles concept does not apply to buses in the 7-year or higher service life categories.

Before final acceptance (i.e., the release of FTA funds by a grantee) of a bus, the grantee must certify that it possesses the applicable Bus Testing Report(s) for that bus model. In the case of the Glaval Sport built on the E-Series chassis, Glaval would need to provide report number PTI-BT-R0805 on the Sport with GM chassis, as well as report number PTI-BT-R9910 of a bus built on the Ford chassis (a report including the chassis data from another manufacturer's similar size and weight bus built on the Ford chassis would also be acceptable).

This determination is based on the changes detailed in your letter or mentioned above. Should you make any other changes to the vehicle, additional testing may be required. If you require any further assistance with this or other matters concerning bus testing, I encourage you to consult the resources provided at <u>www.fta.dot.gov/bustesting</u>. If you still have questions after checking this website, please feel free to contact me at the address above, or by e-mail (<u>marcel.belanger@dot.gov</u>), fax (202-366-3765), or telephone (202-366-0725).

Sincerely, Boy

Marcel Belanger Bus Testing Program Manager Office of Mobility Innovation, TRI-12

O:\TRI\BUSTEST\GLAVAL\Glaval 041609 - Sport or Primetime on Ford E-Series.doc



U.S. Department of Transportation Federal Transit Administration 1200 New Jersey Avenue SE Washington, D.C. 20590

May 6, 2019

Larry Hall StarCraft Bus, Division Forest River, Inc. A Berkshire Hathaway Company 2367 Century Drive Goshen In.46528 (via email: <u>Ihall@forestriverinc.com</u>)

Dear Mr. Hall:

4

This is in response to your email with attached letter, model comparison chart, and drawings dated April 19, 2019. Your submission asked the Federal Transit Administration (FTA) to determine whether the Bus Testing Regulation (49 CFR Part 665) requires additional testing for the StarCraft Allstar, StarTrans Senator II, and Glaval Universal bus models manufactured by Forest River. Taken together, your submissions state that:

- Forest River has consolidated three of its bus divisions, StarCraft, StarTrans, and Glaval. These divisions manufacture bus models called the Allstar, Senator II, and Universal, respectively.
- The StarCraft Allstar completed FTA Bus Testing in the 7-year/200,000-mile service life category, resulting in Bus Testing Report number PTI-BT-R0518.
- All three divisions build these bus models on mass-produced chassis, and the bus bodies are mounted to the chassis using the same process and materials.
- All three bus bodies use the same gauge of steel.
- Differences between the models are limited to:
  - o Cosmetic differences in the front and rear fiberglass caps and body lines.
  - Spray-primed coating on the steel structure of the StarCraft, and aluminized coating on the steel structure of the StarTrans and Glaval.
  - Hand-hugged exterior skin on the StarCraft, and Pinched-laminated exterior skin on the StarTrans and Glaval.

Your submission included a sampling of drawings for each bus model to illustrate the similarities.

FTA has reviewed your request and accompanying documentation and has determined that no additional testing will be required for the StarTrans Senator II and Glaval Universal bus models built by Forest River divisions. Our rationale for this determination is as follows:

- The StarCraft Allstar completed full testing in the 7-year/200,000-mile service life category at the Altoona Bus Testing Center (Report # PTI-BT-R0518). The Allstar test unit had a gross vehicle weight rating (GVWR) of 14,050 pounds, and a wheelbase of 190 inches. Consequently, variants of the Allstar, such as the StarTrans Senator II and Glaval Universal, are eligible for Partial Testing procedures; only those tests in which we would expect to obtain significantly different data would need to be repeated.
- The Glaval and StarTrans models feature the use of aluminized steel in their construction compared with an epoxy spray coating on the StarCraft model. The coatings are not expected to affect the results of the Structural Durability and Reliability tests directly, corrosion resistance is not specifically evaluated under the Bus Testing Program, and corrosion rarely occurs to any significant degree during FTA Bus Testing.
- The StarCraft Allstar and StarTrans Senator II appear to have identical fiberglass endcaps. The Glaval Universal appears to have cosmetic differences in the fiberglass end caps compared with the other two models. FTA has typically treated cosmetic shape changes to fiberglass end caps as minor changes and we do not expect significantly different data in the Durability and Reliability tests.
- The lamination process of the Glaval and StarTrans models is "Pinched-laminated," compared with the "hand-hugged" lamination of the exterior skin panels on the StarCraft. These processes would be expected to produce a similar quality of lamination of the exterior panels and would not be expected to produce significantly different results in the Durability and Reliability tests.
- The three subject bus models have buses have similar (though not identical) structures. The
  previously-tested StarCraft Allstar uses wall bows with a modified C-channel cross section,
  while the StarTrans Senator II and Glaval Universal use closed rectangular tubing. We would
  anticipate that the open modified C-channel may be less rigid than the closed tubes, and
  would therefore be a "worse case" for structural integrity. Since the Allstar is considered a
  worse case structurally, and no structural failures were documented during testing of the
  Allstar (Report PTI-BT-R0518), we would not expect additional testing of the Senator II or
  Universal to produce significantly different results in the Durability and Reliability tests.
- The StarCraft, StarTrans, and Glaval bus models are all similar or identical in size shape and weight and as such would not be expected to produce significantly different results in the Performance, Noise, Fuel Economy, Safety, and Emissions tests.

Bus Testing Report PTI-BT-R0518 on the StarCraft Allstar bus model satisfies Bus Testing requirements for the closely-related gasoline-powered StarTrans Senator II and Glaval Universal bus models without additional testing, provided that they do not significantly exceed the tested unit's key specifications. For example, buses with a longer overall length or wheelbase, buses with a greater GVWR, and/or buses offered in the 10-year or higher service life category are not included in this determination. This determination is based on the information and claims in your submission or mentioned above. If Forest River or its subsidiaries make significant changes to these bus models, additional testing may be required.

If you require any further assistance with this or other matters concerning Bus Testing, I encourage you to consult the resources provided at <u>www.transit.dot.gov/research-innovation/bus-</u><u>testing</u>. If you still have questions after checking this website, please feel free to contact me.

Sincerely,

Pily lar

Marcel Belanger Bus Testing Program Manager Office of Infrastructure & Asset Management TRI-20 <u>marcel.belanger@dot.gov</u> 202-366-0725

O:\TRI\BUSTEST\Forest River\Forest River 041919 - Forest River Brands Comparison - Allstar, Senator II, Universal.docx

.



U.S. Department of Transportation Federal Transit Administration 1200 New Jersey Avenue SE Washington, D.C. 20590

December 30, 2020

Larry Hall Director of Engineering StarCraft Bus A Division of Forest River 2367 Century Drive Goshen, IN 46528 (*via email:* lhall@forestriverinc.com)

Dear Mr. Hall:

This is in response to your letter and attachments dated June 6, 2019, in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulation (49 CFR Part 665) to the StarCraft Starlite, Glaval Primetime, and StarTrans Candidate II bus models manufactured by the respective divisions of Forest River. Your submissions, which are attached and incorporated by reference, state that:

- The StarCraft, Glaval, and StarTrans divisions of Forest River build essentially similar bus models called the Starlite, Primetime, and Candidate II, respectively.
- The differences between the models are limited to:
  - Front and rear fiberglass caps body lines only cosmetic.
  - Coating on the steel frame, Glaval and StarTrans aluminized, StarCraft is spray primed.
    - Exterior skin, Glaval and StarTrans is pinched laminated, StarCraft is hand hugged.
- These models are offered on Ford E-350 and E-450 chassis.
- FTA issued a previous determination recognizing similarities between the StarCraft Allstar and Starlite models.

You have asked FTA to determine whether these bus models qualify as a "family group" or whether additional FTA Bus Testing is required for any of these bus models.

FTA has reviewed your request and accompanying documentation and has determined that **no additional testing will be required for the StarCraft Starlite, Glaval Primetime, and StarTrans Candidate II bus models manufactured by the respective divisions of Forest River**. Our rationale for this determination is as follows:

- The StarCraft Allstar has completed FTA Bus Testing in the 7-year, 200,000-mile service life category (Bus Testing Report # PTI-BT-R0518). Consequently, variants of the Allstar, such as the Glaval Primetime, and StarTrans Candidate II, are eligible for Partial Testing procedures; only those tests in which we would expect to obtain significantly different data would need to be repeated.
- The Glaval and StarTrans models feature the use of aluminized steel in their construction compared with an epoxy spray coating on the StarCraft model. The aluminized steel coating is arguably superior to the spray epoxy coating however corrosion is not a factor, nor is it measured during the relatively short testing duration at LTI. As corrosion resistance is not specifically tested and would not influence other testing, significantly different test data would not be expected in the Structural Integrity and Reliability tests.
- The StarCraft Starlite and StarTrans Candidate II have identical fiberglass endcaps. The Glaval Primetime has "cosmetic" differences in the fiberglass end caps compared with the other two models. FTA has typically treated cosmetic shape changes to fiberglass end caps as minor changes and significantly different data would not be expected in the Structural Integrity and Reliability tests.
- The lamination process of the StarCraft and StarTrans models is "pinched laminated" compared with the "hand hugged" lamination of the exterior skin panels on the Glaval. These processes would be expected to produce a similar quality of lamination of the exterior panels and would not be expected to produce significantly different results in the Structural Integrity and Reliability tests.
- The three subject bus models have buses have similar structures. The previously tested StarCraft Allstar/Starlite has a slightly different tube extrusion profile in the wall structure. The different profile is not considered a major change to the structure and would not be expected to produce significantly different results in the Structural Integrity and Reliability tests.
- The Starlite, Primetime, and Candidate II bus models are all built on the Ford E-350 and E-450 cutaway chassis and are similar in size, shape, and weight. Therefore, we would not expect to obtain significantly different data in the Accessibility, Performance, Noise, Fuel Economy, Safety, and Emissions tests.

Based on these considerations, **Bus Testing Report PTI-BT-R0518 satisfies Bus Testing** requirements for the StarCraft Starlite, Glaval Primetime, and StarTrans Candidate II bus models manufactured by the respective divisions of Forest River. This determination is based on the information and representations in your submission or mentioned above. If Forest River makes any other changes to the vehicles, additional testing may be required. If you require any further assistance with this or other matters concerning Bus Testing, I encourage you to consult the resources provided at <u>www.transit.dot.gov/research-innovation/bus-testing</u>. If you still have questions after checking this website, please feel free to contact me.

Sincerely,

Mariel Belange

Marcel Belanger Bus Testing Program Manager Office of Infrastructure, Safety, and Asset Innovation, TRI-20 <u>marcel.belanger@dot.gov</u> 202-366-0725

Attachments: June 6, 2019 Forest River letter and attachments

O:\TRI\BUSTEST\Forest River\Forest River 060619 - Narrow Starlite Primetime Candidate II model comparison.docx



June 6, 2019

Marcel Belanger Bus Testing Program Manager Federal Transit Administration Office of Mobility Innovation, TRI-12 Room E43-471 1200 New Jersey Ave.SE East Building, 4<sup>th</sup> floor Washington, DC 20590

Re: Brand Comparison of Forest River Commercial Bus Group StarCraft Bus, Model Starlite, Glaval Bus, Model Primetime, and StarTrans Bus, model Candidate II.

Dear Mr. Belanger:

Forest River Bus has consolidated three of their bus divisions, Glaval Bus, Starcraft Bus, and StarTrans Bus. We are asking that FTA recognize the "Family Group" to minimize the testing load of our product line "Altoona Testing".

All three divisions build on mass produced chassis, the bus body is mounted to the chassis using the same process and materials. All three brands are built with the same gage of steel.

The different between models:

- a- Front and rear fiberglass caps body lines only cosmetic.
- b- Coating on the steel frame, Glaval and StarTrans aluminized, Starcarft is spray primed.
- c- Exterior skin, Glaval and StarTrans is pinched laminated, Starcraft is hand hugged.

Attached to this E-mail are detailed frame prints to illustrate the similarities in the construction of the frame, and a model comparison chart. Along with a previous FTA determination letter recognizing similarities between that Allstar and Starlite models. Please refer to test number PTI-BT-R0518

If FTA decides that additional testing is required, please indicate which test is needed.

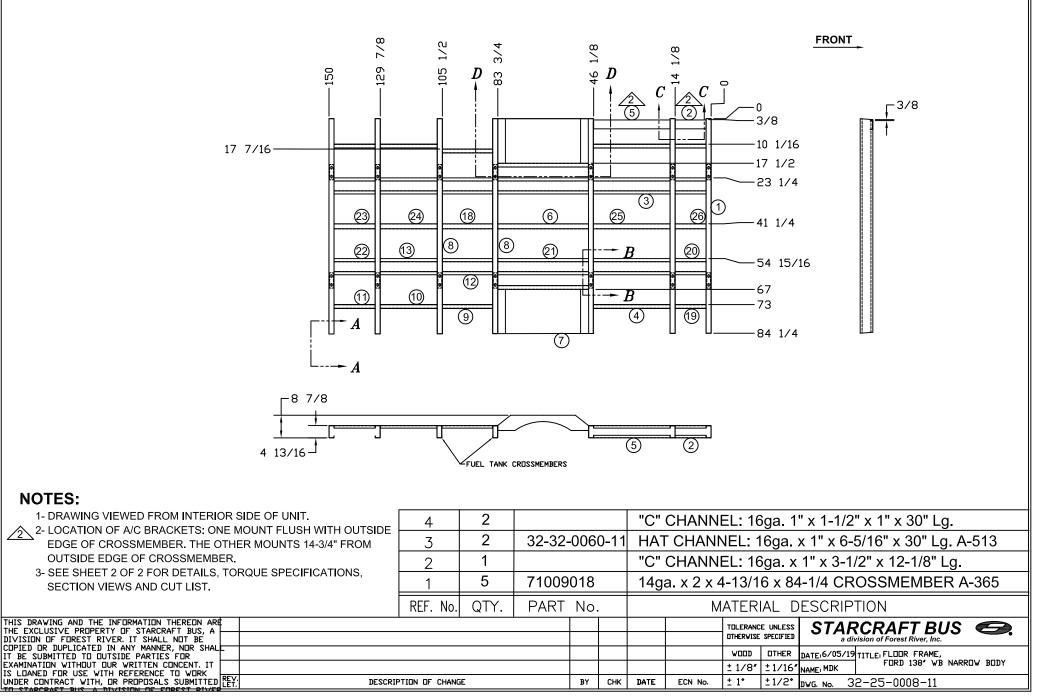
Sincerely,

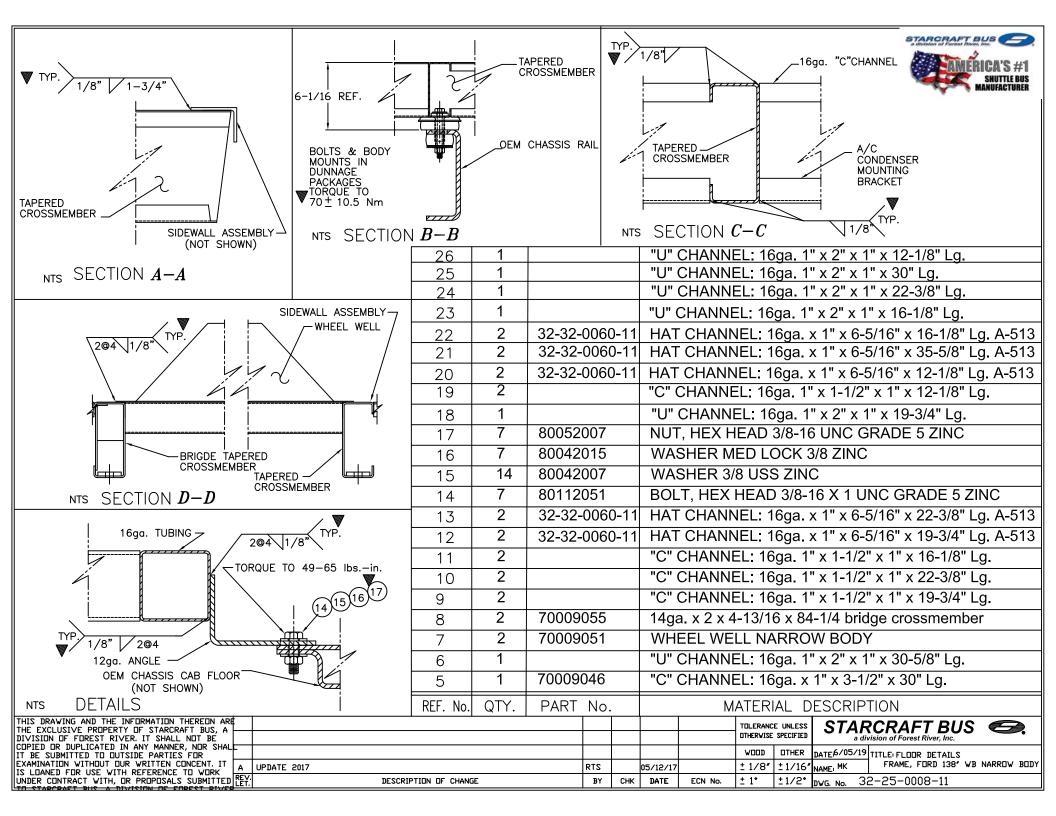
Larry Hall Director of Engineering Starcraft Bus A Division of Forest River, Inc.

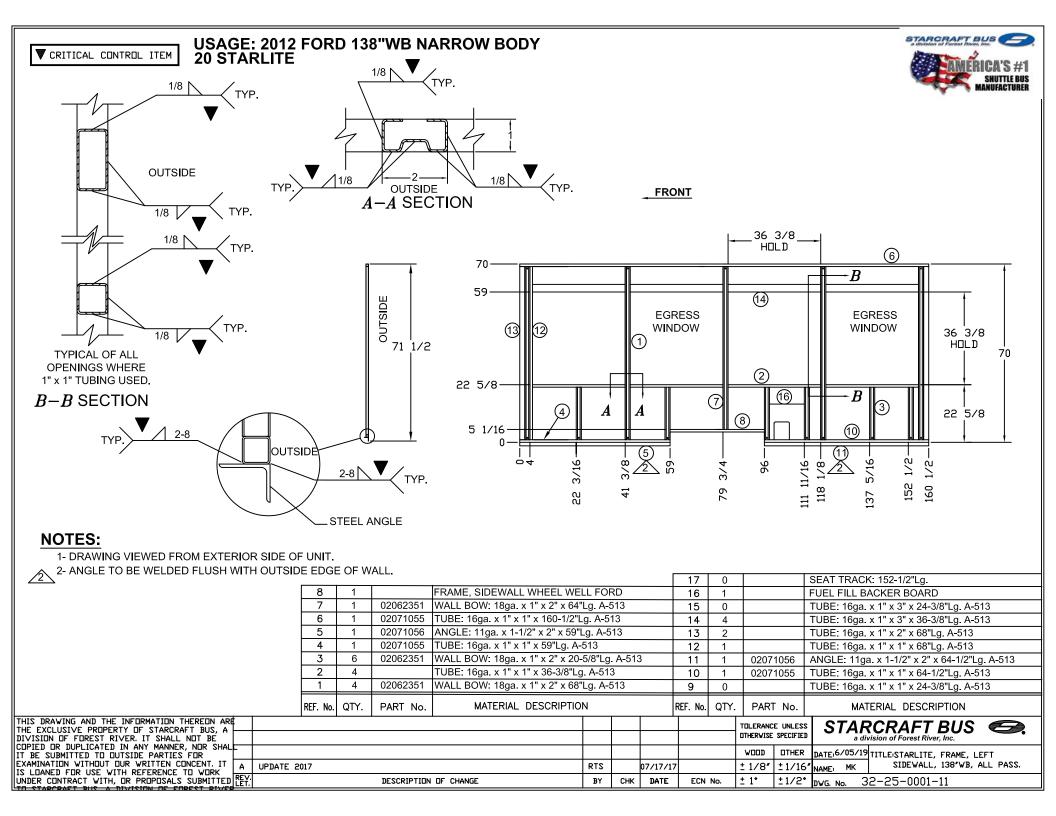
	Commercial Bus Comparison 2019											
	Starcra									arTrans Bus		
Model	Chassis	Prefix	Suffix	Model	Chassis	Prefix	Suffix	Model	Chassis	Prefix	Suffix	
Starlite	Ford E-350 Ford E-450	STL	В	Primetime	Ford E-350 Ford E-450	GPJ	Ρ	Candidate II	Ford E-350 Ford E-450	CBL	СТ	

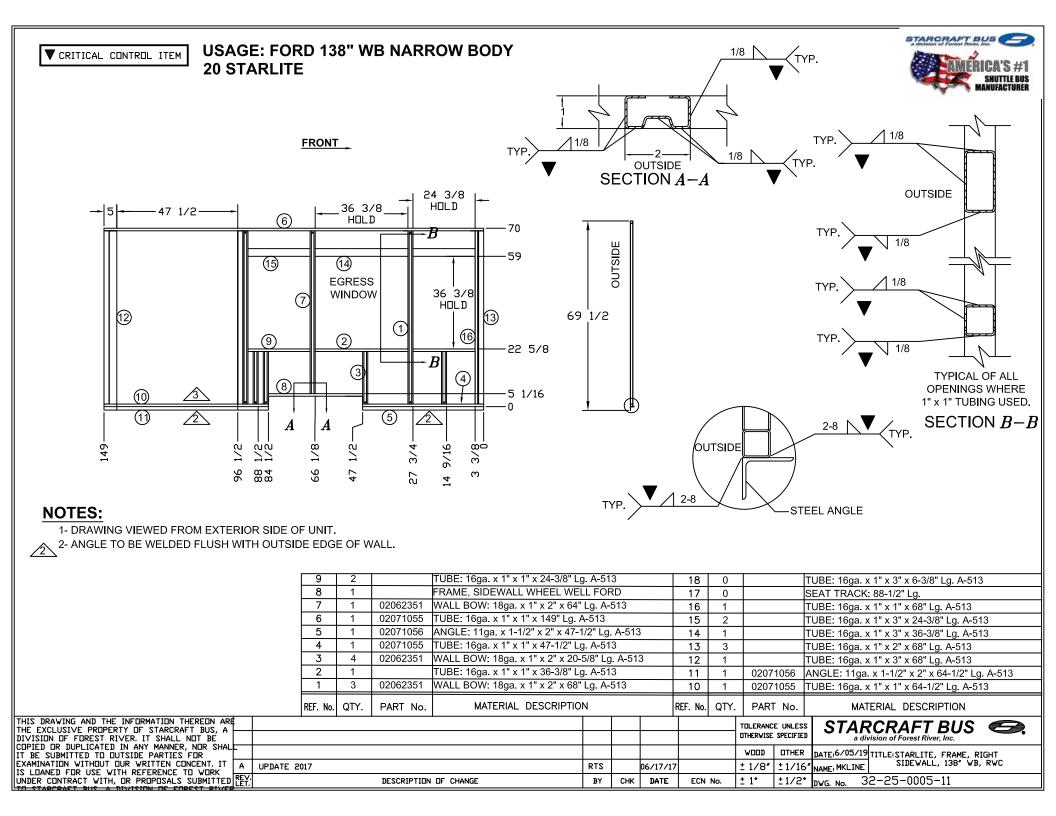
# ▼ CRITICAL CENTREL ITEM USAGE: FORD E-350 138" WHEEL BASE NARROW BODY

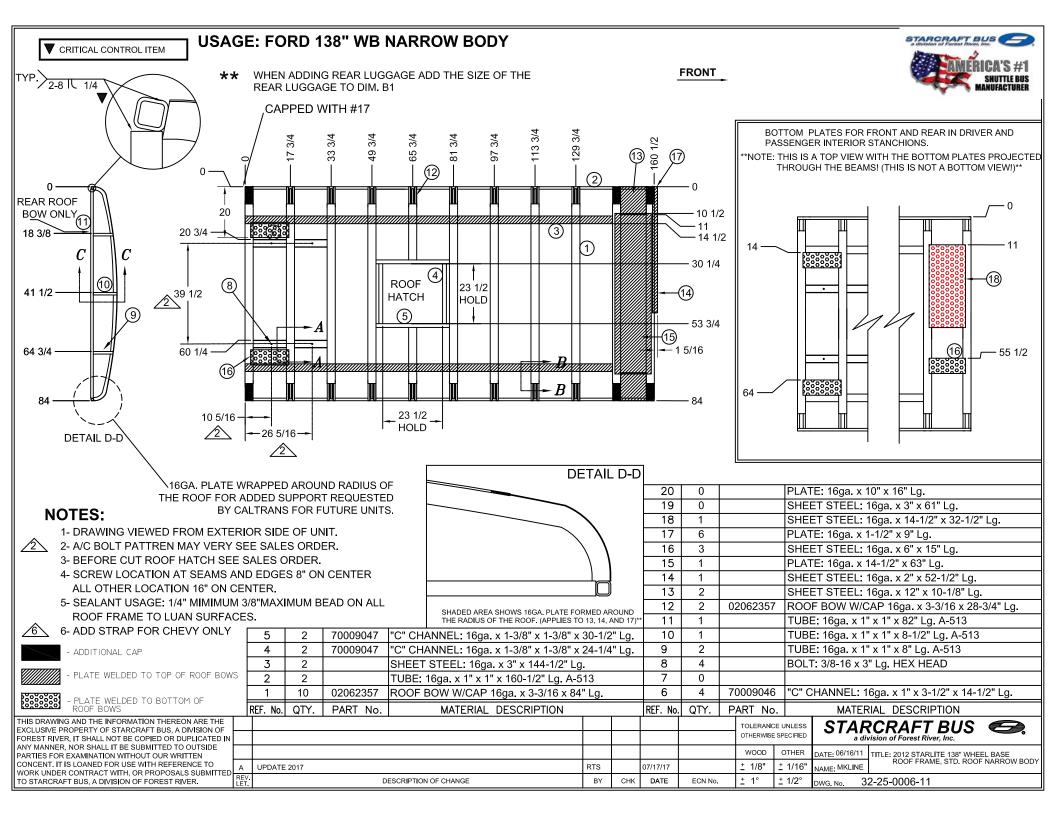




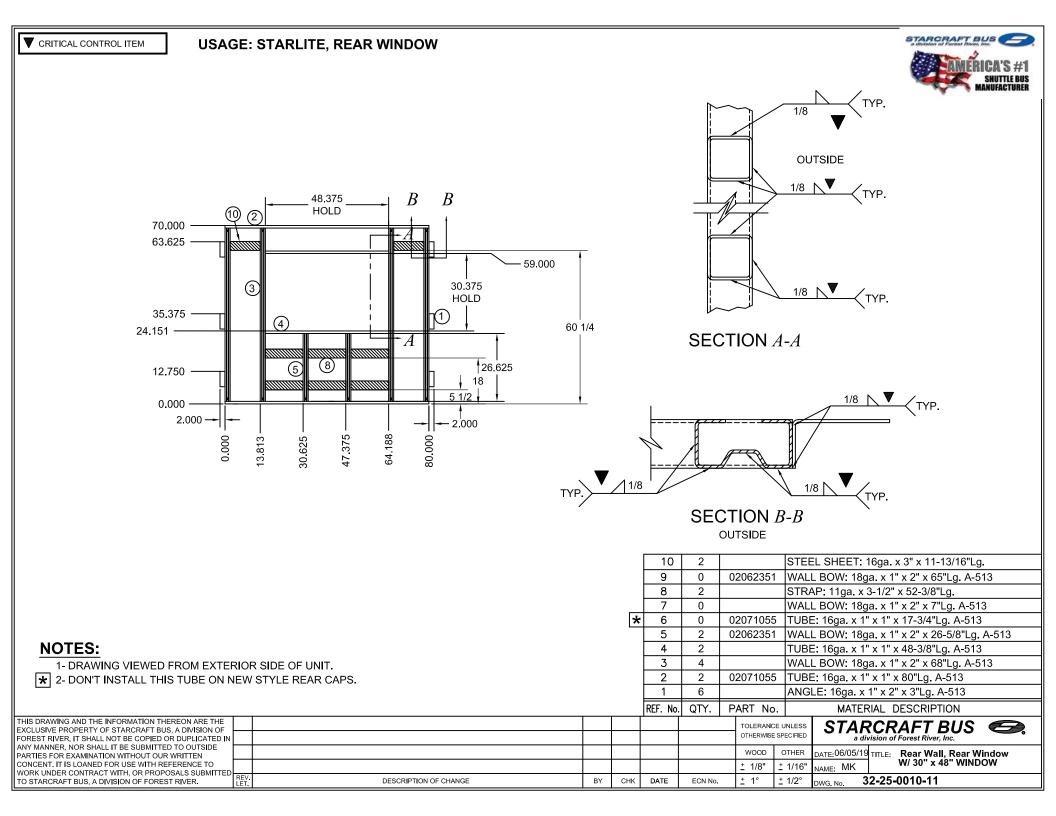




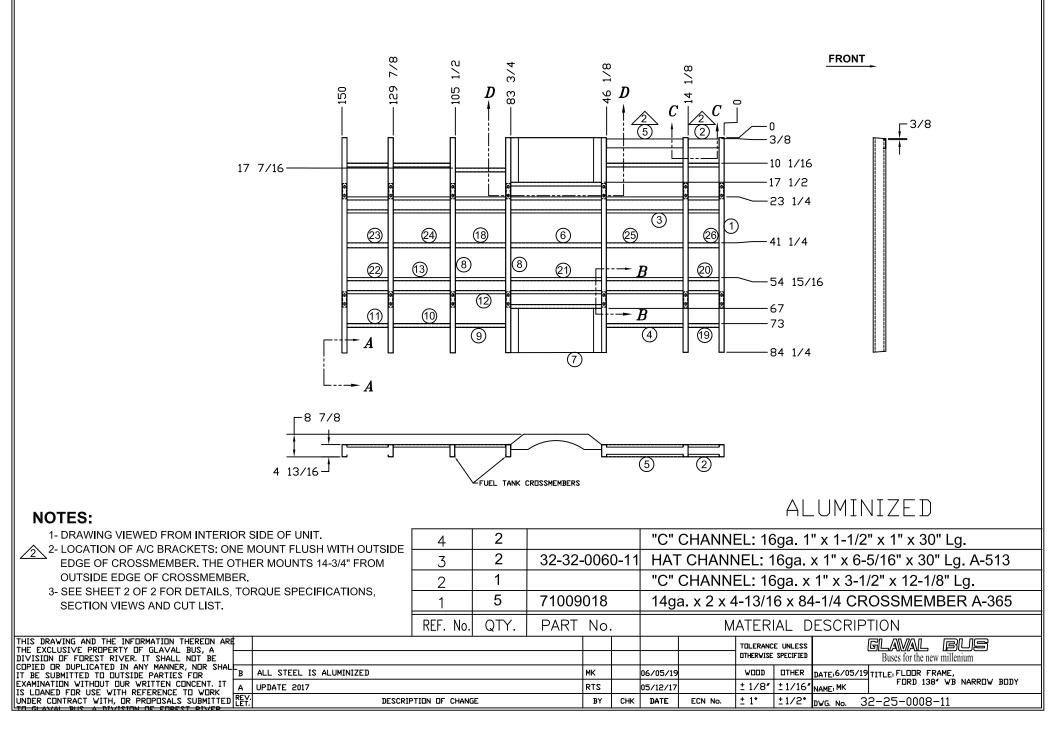


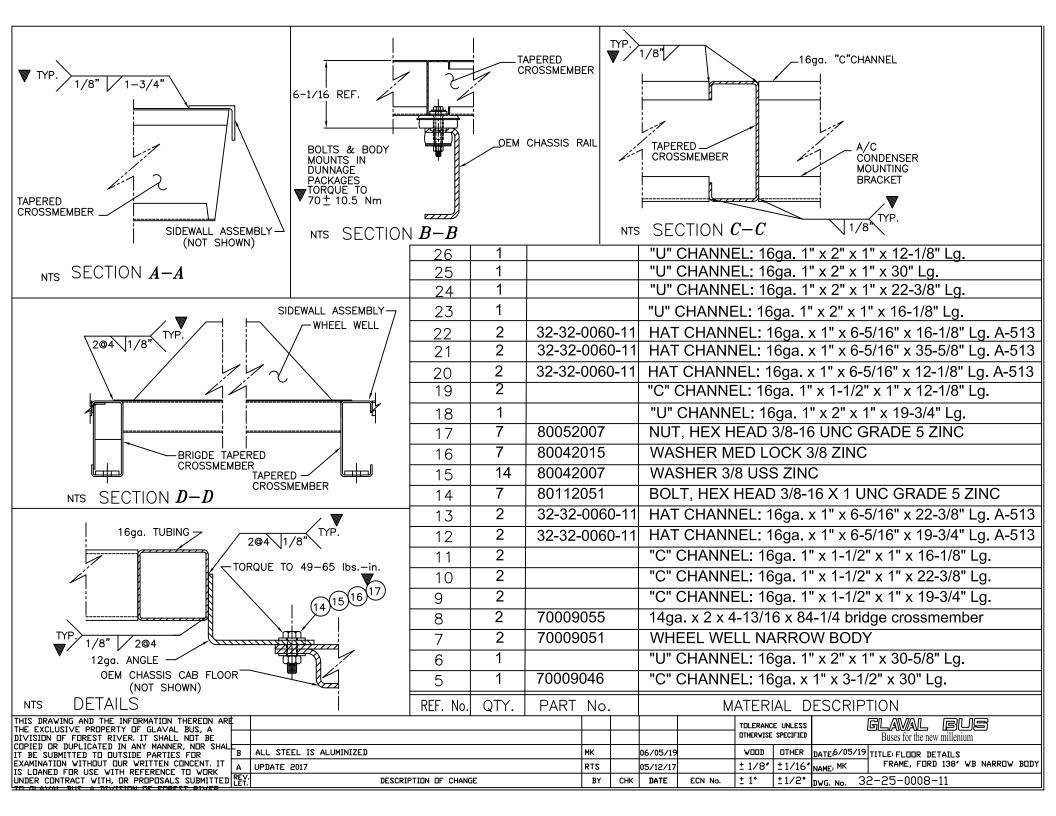


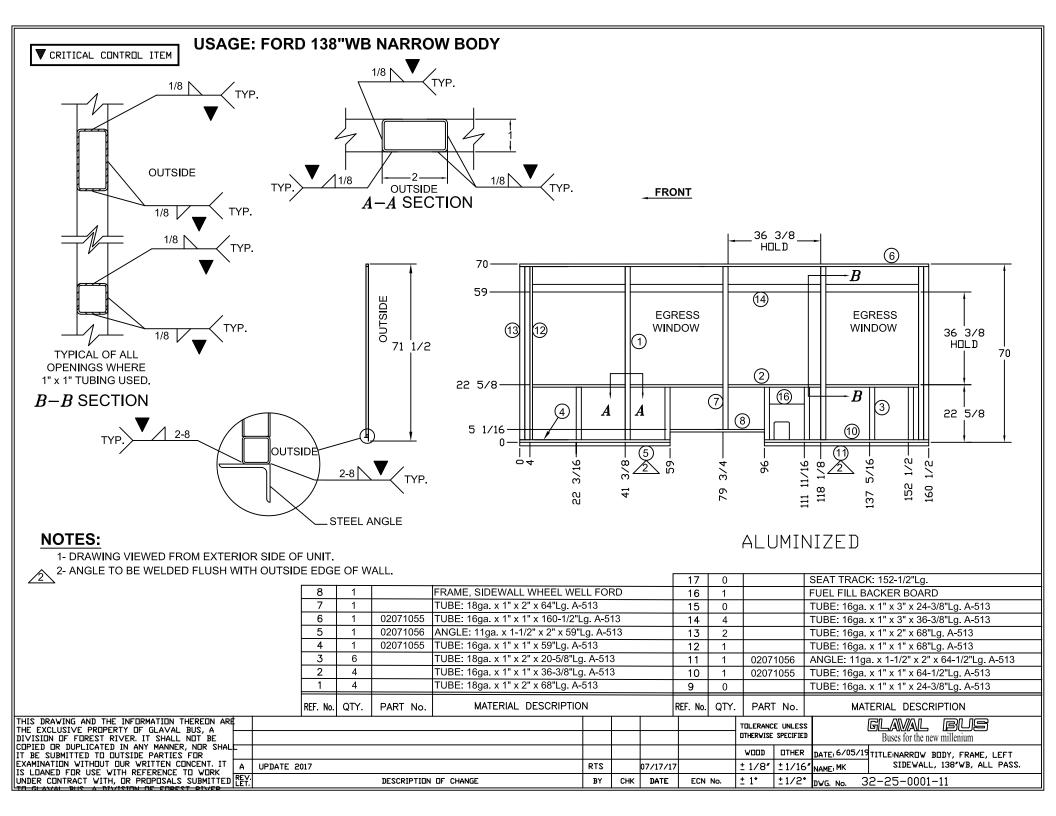
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A CAPPED ROOF BOW TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. TYP. 1/4 TYP.	STAS 5000 SEE N #5 SH 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2 C-C	EAL		CA'S #1 Shuttle Bus Nufacturer
BACKER PLATE 1/4 TYP. CAPPED ROOF BOW BACKER PLATE 1/4 TYP.	ACC 23022 SERIES ACC 23023 SERIES T/A-77 T/A-73	33-5/8         30           38         20           33-5/8         28-3/           18-1/4         59-1/           28-1/4         39-1/           33-5/8         28-3/           36-3/4         22-1/           31         34           30-3/4         34-1/           36         24           28-1/4         39-1/           28-1/4         39-1/           28-1/4         39-1/           28-1/4         39-1/           28-1/4         39-1/           36-3/8         23-3/	$\begin{array}{c cccc} 2 & 10 \\ 2 & 10 \\ 4 & 10 \\ 2 & 10 \\ 10 \\ 2 & 10 \\ 10 \\ 2 & 10 \\ 2 & 10 \\ 2 & 10 \\ 2 & 10 \\ 4 & 10 \end{array}$	12-1/4 14-3/4 14-3/4 10-3/8 9-1/2 12-1/4 11-5/8 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2 9-1/2
SECTION B-B         THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF STARCRAFT BUS, A DIVISION OF	EVAPORATOR MODEL TOLERANCE UNLESS STA	32-3/8 31-1/ <sup>,</sup> 28-3/16 39-5/ A-1 A-2 ARCRAFT	8 10 B-1 BUS	9-1/2 9-1/2 B-2
FOREST RIVER, IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONCENT. IT IS LOANED FOR USE WITH REFERENCE TO WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO STARCRAFT BUS, A DIVISION OF FOREST RIVER.     A     UPDATE 2017     RTS     06/17/17       REV. LET.     DESCRIPTION OF CHANGE     BY     CHK     DATE     ECN NO.	WOOD         OTHER         DATE: 06/16           ±         1/8"         ±         1/16"         NAME: MKD	138" W/B NA		OF FORD

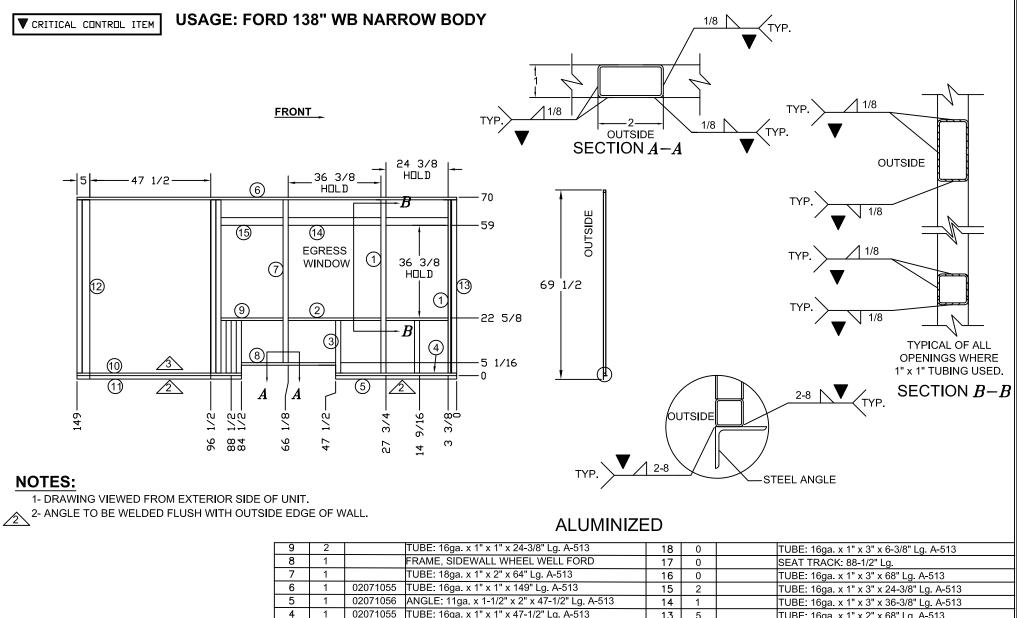


# ▼ CRITICAL CENTREL ITEM USAGE: FORD E-350 138" WHEEL BASE NARROW BODY

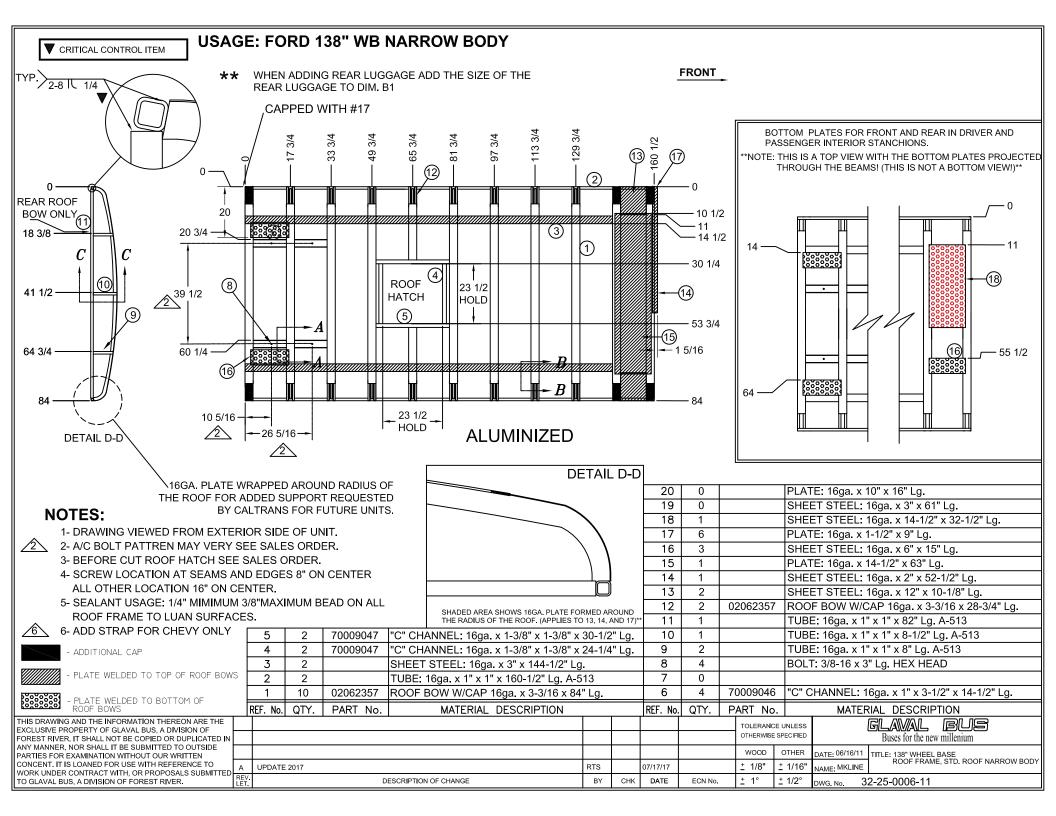








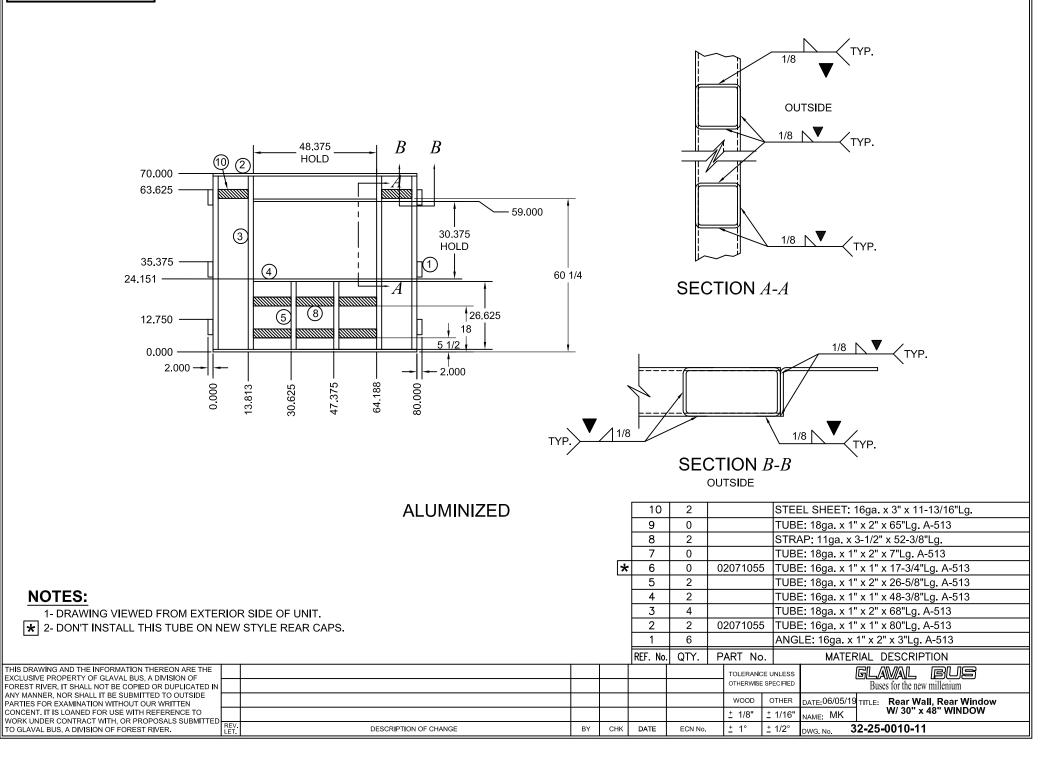
				8								ODE Toga XT XO XOO GO Eg XOTO
	4	1	02071055	TUBE: 16ga. x 1" x 1" x 47-1/2" L	g. A-51	3		13	5		Т	UBE: 16ga. x 1" x 2" x 68" Lg. A-513
	3	4		TUBE: 18ga. x 1" x 2" x 20-5/8" L	g. A-51	3		12	1		Т	UBE: 16ga. x 1" x 3" x 68" Lg. A-513
	2	1		TUBE: 16ga. x 1" x 1" x 36-3/8" L	<u> </u>	3		11	1	020710	)56 A	NGLE: 11ga. x 1-1/2" x 2" x 64-1/2" Lg. A-513
	1	1		TUBE: 16ga. x 1" x 1" x 68" Lg. A	-513			10	1	020710	)55 T	UBE: 16ga. x 1" x 1" x 64-1/2" Lg. A-513
	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTIO	N		F	REF. No.	QTY.	PART	No.	MATERIAL DESCRIPTION
THIS DRAWING AND THE INFORMATION THEREON ARE									1	DLERANCE	UNLESS	GLAVAL BUS
THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF FOREST RIVER. IT SHALL NOT BE				L						I I DLERANCE I THERWISE SP		GLAVAL BUS Buses for the new millenium
THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A							I			THERWISE SF	PECIFIED	Buses for the new millenium
THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO DUTSIDE PARTIES FOR EXAMINATION WITHOUT DUR WRITTEN CONCENT. IT A UPDATE 20 IS LIGANED FOR USE VITH DECEDENCE TO VORP	117				RTS		06/17/17			ITHERWISE SE	Pecified DTHER	
THE EXCLUSIVE PROPERTY OF GLAVAL BUS, A DIVISION OF FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO DUTSIDE PARTIES FOR	017		DESCRIPTION	DF CHANGE	RTS BY	СНК	06/17/17 DATE	ECN	:	THERWISE SA	PECIFIED DTHER 1/16"	Buses for the new millenium DATE:6/05/19 TITLE:NARROW BDDY, FRAME, RIGHT



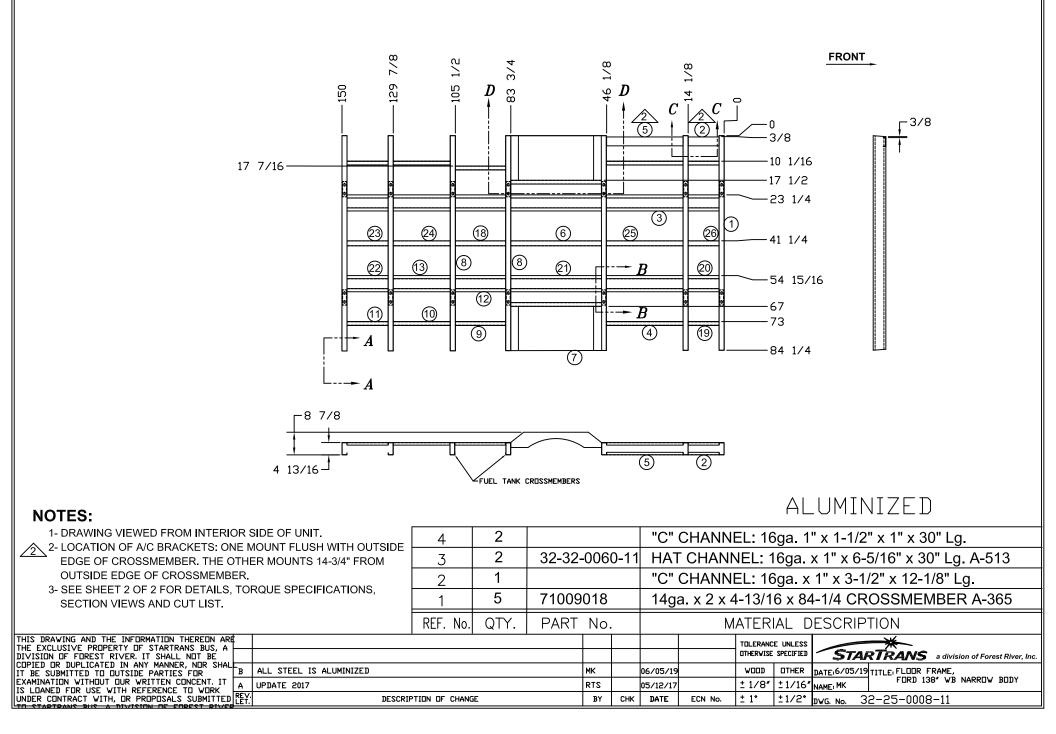
CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A CAPPED ROOF BOW TYP. TY	STASEAL 5000 SEE NOTE #5 SHEET 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2 C-C
BACKER PLATE 1/4 TYP. ALUMINIZED	T/A-71 NEW STYLE         33-5/8         30         10         12-1/4           ACC 23022 SERIES         38         20         10         14-3/4           ACC 23023 SERIES         33-5/8         28-3/4         10         14-3/4           T/A-77         18-1/4         59-1/2         10         10-3/8           T/A-73         28-1/4         39-1/2         10         9-1/2           T/A-71 OLD STYLE         33-5/8         28-3/4         10         12-1/4           T/A-70         36-3/4         22-1/2         10         11-5/8
CAPPED ROOF BOW	T/A-30         31         34         10         9-1/2           EM-14 & RE-29         30-3/4         34-1/2         10         9-1/2           EM-6 & RE-10         36         24         10         9-1/2           EM-3 & RE-30         28-1/4         39-1/2         10         16           RE-15 & RE-20         28-1/4         39-1/2         10         9-1/2           EM-1 & EM-2         28-1/4         39-1/2         10         9-1/2           EM-7 GEN 5         36-1/8         23-3/4         10         9-1/2           EM-2 GEN 5         32-3/8         31-1/16         10         9-1/2
Note: Section B-B         This drawing and the information thereon are the exclusive property of glaval bus, a division of forest raiver, it shall not be copied or duplicated in any manner, nor shall it be submitted to outside parties for examination without our written concent. It is loaned for use with reference to work under contract with, or proposals submitted to a submitted to grave and the parties of forest raiver.       Image: Contract of the parties of the p	EM-1 GEN 5         28-3/16         39-5/8         10         9-1/2           EVAPORATOR MODEL         A-1         A-2         B-1         B-2           TOLERANCE UNLESS OTHERWISE SPECIFIED         GLAWAL Buses for the new millenium         BUSE Buses for the new millenium           WOOD         OTHER         DATE: 06/16/11 138" WB NARROW BODY         TITLE:         FRAME, ROOF FORD 138" WB NARROW BODY

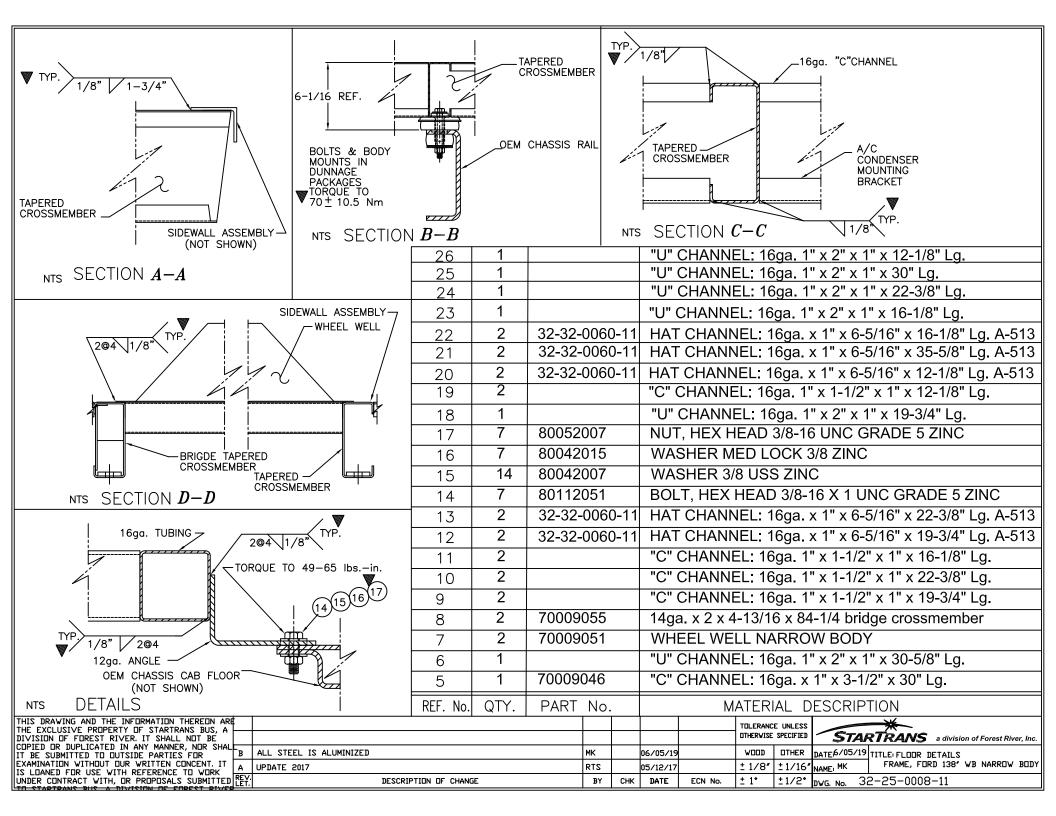
#### ▼ CRITICAL CONTROL ITEM

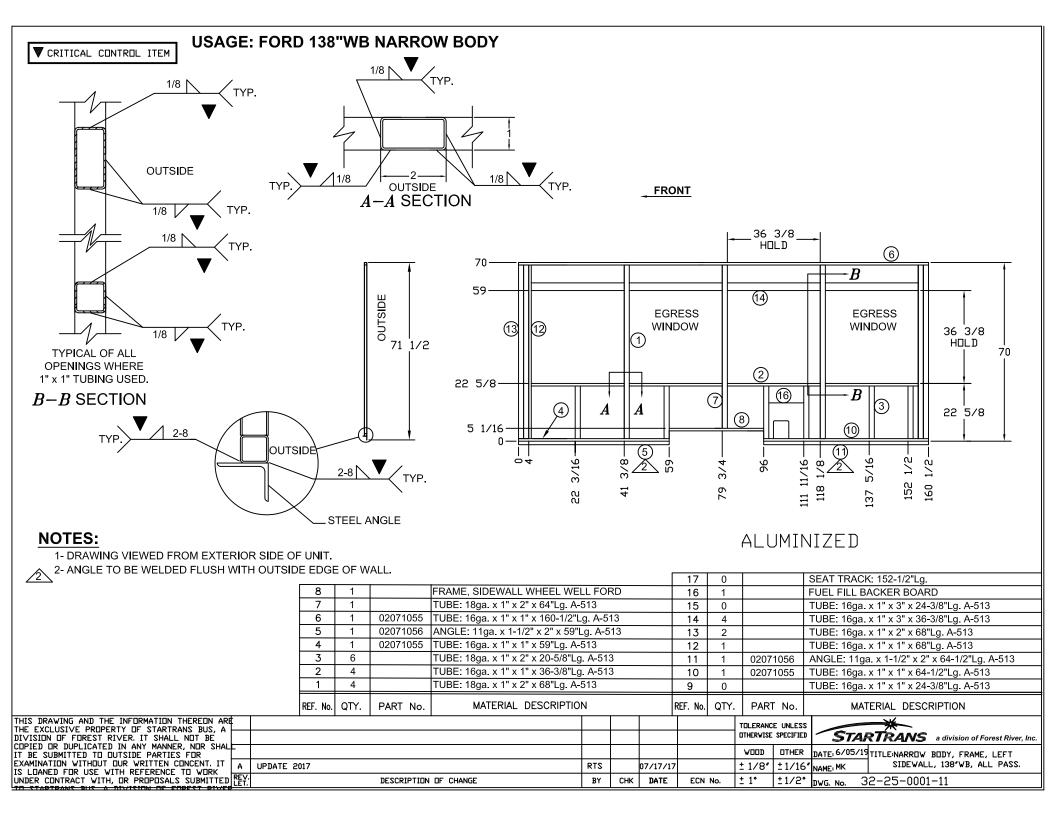
#### **USAGE: NARROW BODY, REAR WINDOW**

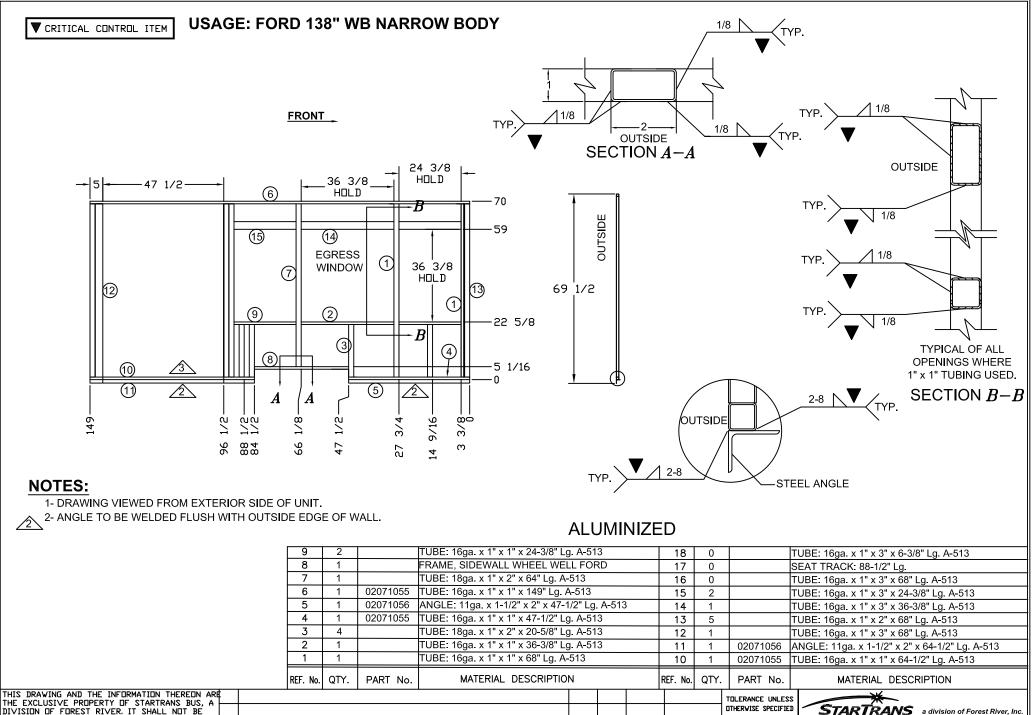


# ▼ CRITICAL CENTREL ITEM USAGE: FORD E-350 138" WHEEL BASE NARROW BODY









DIVISION OF FOREST RIVER. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO DUTSIDE PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONCENT. IT Α UPDATE 2017 IS LOANED FOR USE WITH REFERENCE TO WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED DESCRIPTION OF CHANGE

#### RTS ΒY СНК

06/17/17

DATE

ECN No.

DATE:6/05/19 TITLE:NARROW BODY, FRAME, RIGHT

32-25-0005-11

VODD

± 1/8"

± 1°

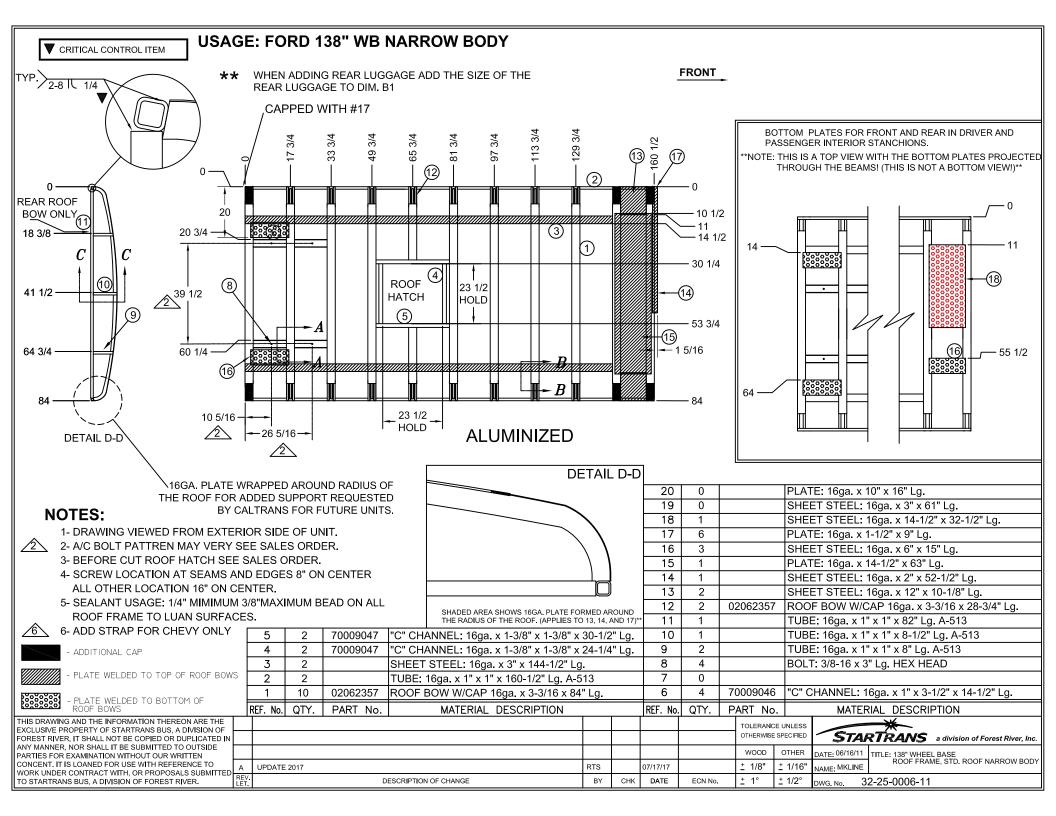
DTHER

±1/16"

±1/2\*

NAME: MKLINE

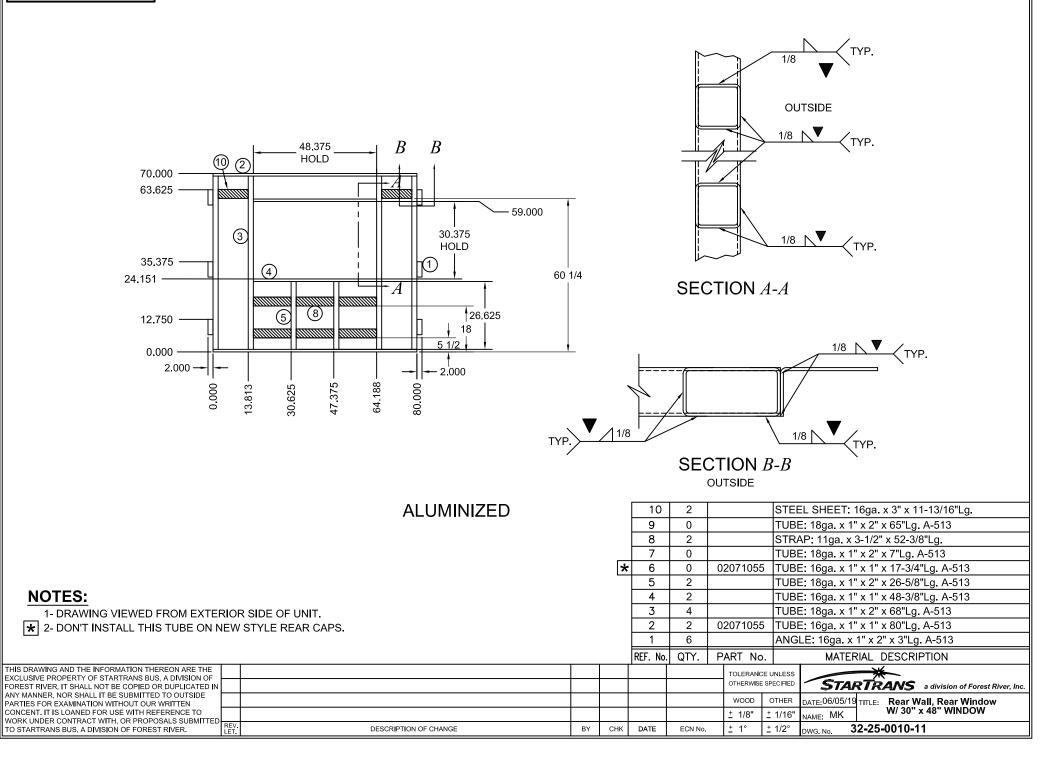
DVG. No.



CAPPED ROOF BOW CAPPED ROOF BOW "C" CHANNEL EVAPORATOR BOLT SECTION A-A CAPPED ROOF BOW TYP. 1/4 TYP. CAPPED ROOF BOW TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. 1/4 TYP. TYP. 1/4 TYP. TY	STASEAL 5000 SEE NOTE #5 SHEET 1 OF 2 5.2mm LUAN #10x1 WAFER HEAD PHILLIP RECESS. SEE NOTE #4 SHEET 1 OF 2 C-C
BACKER PLATE 1/4 TYP. ALUMINIZED	T/A-71 NEW STYLE         33-5/8         30         10         12-1/4           ACC 23022 SERIES         38         20         10         14-3/4           ACC 23023 SERIES         33-5/8         28-3/4         10         14-3/4           T/A-77         18-1/4         59-1/2         10         10-3/8           T/A-73         28-1/4         39-1/2         10         9-1/2           T/A-71 OLD STYLE         33-5/8         28-3/4         10         12-1/4           T/A-70         36-3/4         22-1/2         10         11-5/8
CAPPED ROOF BOW	T/A-30       31       34       10       9-1/2         EM-14 & RE-29       30-3/4       34-1/2       10       9-1/2         EM-6 & RE-10       36       24       10       9-1/2         EM-3 & RE-30       28-1/4       39-1/2       10       16         RE-15 & RE-20       28-1/4       39-1/2       10       9-1/2         EM-1 & EM-2       28-1/4       39-1/2       10       9-1/2         EM-7 GEN 5       36-1/8       23-3/4       10       9-1/2
N N N         SECTION B-B         THIS DRAWING AND THE INFORMATION THEREON ARE THE EXCLUSIVE PROPERTY OF STARTRANS BUS, A DMISION OF FOREST RIVER, IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONCENT. IT IS LOANED FOR USE WITH REFERENCE TO WORK UNDER CONTRACT WITH, OR PROPOSALS SUBMITTED TO DUPATE 2017       Image: Description of Change       Image: Description of Change       Image: Description of Change         TO STARTRANS BUS, A DIVISION OF FOREST RIVER.	EM-2 GEN 5         32-3/8         31-1/16         10         9-1/2           EM-1 GEN 5         28-3/16         39-5/8         10         9-1/2           EVAPORATOR MODEL         A-1         A-2         B-1         B-2           TOLERANCE UNLESS OTHERWISE SPECIFIED         STARTRANS         a division of Forest River, Inc.           WOOD         OTHER         DATE: 06/16/11         TITLE:         FRAME, ROOF FORD 138" WB NARROW BODY           ± 1%         ± 1/2°         DWG, No.         32-25-0006-11         VIENDAL

#### ▼ CRITICAL CONTROL ITEM

#### **USAGE: NARROW BODY, REAR WINDOW**



Nov-14-02 04:08pm From-



U.S. Department of Transportation Federal Transit Administration 400 Seventh St., S.W. Washington, D.C. 20590

November 14, 2002

Mr. Arthur Henderson National Sales Manager Starcraft Bus & Mobility P.O. Box 1903 2703 College Avenue Goshen, IN 46526

Dear Mr. Henderson:

This is in response to your letter dated October 31, 2002, in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulation (49 CFR Part 665) to the Starlite bus model manufactured by Starcraft. Your letter states that the Starlite is the "same" as the previously tested Allstar model, "except for the width," and you submitted a package of specifications and drawings in support of that assertion.

You have asked FTA to confirm your interpretation that the Starlite is part of the same family of vehicles as the Allstar, and thus does not require further testing.

FTA has reviewed your request and accompanying documentation and has determined that **no additional testing** will be required for Starcraft to offer the Starlite in the 5-year, 150,000-mile service life category. This determination is based on the following conclusions drawn from information submitted by Starcraft or contained in our files:

- The Starlite is smaller and lighter overall than the Allstar, but otherwise is constructed with substantially the same design, using the same materials, cross sections, support spacing, and construction methods. The method and location of the body-to-chassis attachments are substantially the same.
- Both the Allstar and Starlite are built on mass-produced chassis differing only in the wheelbase.
- The Allstar model has been fully tested at Altoona in the 5-year, 150,000-mile service life category (Report No. 9814-01-99).

For the reasons stated above, FTA considers the Starlite to be part of the Allstar family of vehicles. Due to the greater size and GVWR of the Allstar, the existing test of the Allstar satisfies testing requirements for smaller vehicles in the Allstar family of vehicles. We would not

expect to obtain substantially different or more adverse data from additional testing of the Starlite.

This determination is based on the changes detailed in your letter or mentioned above. Should you make any other changes to the vehicle, additional testing may be required. If you require any further assistance with this or other matters concerning bus testing, please feel free to contact me at the address above, or by e-mail (marcel.belanger@fta.dot.gov), fax (202-366-3765), or telephone (202-366-0725).

Sincerely,

Marcel Belanger Bus Testing Program Manager Office of Technology, TRI-20

O:\BUSTEST\Starcraft\Starcraft 103102 - Starlite.doc



U.S. Department of Transportation Federal Transit Administration 1200 New Jersey Avenue SE Washington, D.C. 20590

July 7, 2017

Larry Hall Director of Engineering Starcraft Bus, Division of Forest River, Inc. 2367 Century Drive Goshen, IN 46528

Dear Mr. Hall,

You sent letters to FTA dated November 7, 2014 and November 13, 2014 and an email dated December 2, 2014 in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulation (49 CFR Part 665) to Starcraft bus models being sold as Startrans bus models. In those letters, email and subsequent phone discussions you indicated that:

- Forest River Inc. has purchased the "Startrans" brand. As a result, Forest River intends to offer comparable Starcraft bus models branded as existing Startrans bus models and leverage the existing Startrans bus dealer network to deliver them to FTA grantees.
- The future Startrans bus models will be produced on the same production line as the comparable Starcraft bus models. All future StarTrans Bus models will be structurally the same as the Starcraft Bus model, but will cosmetically have the StarTrans Bus model body lines and badging.
- The remaining Startrans bus production runs to fulfill open contracts will be completed on the Startrans production lines. Once those are completed, all future Startrans bus models will be Starcraft products.
- Starcraft would like to use the existing Starcraft bus testing reports as evidence of satisfying the Bus Testing regulation for the future Startrans bus models built on the Starcraft production lines. The corresponding Starcraft bus model for each Startrans bus model is provided in the table below. The test report for the Starcraft Allstar is PTI-BT-0518. This report also covers the Starlite bus model which is a narrow body version of the Allstar. The test report for the Allstar XL is PTI-BT-0815.

<b>Existing Startrans Bus Model</b>	Corresponding Starcraft Bus Model
Senator II	Allstar
Chassis: Ford E-350/450 & GM 3500/4500	Chassis: Ford E-350/450 & GM 3500/4500
Senator II MFSAB	Allstar
Chassis: Ford E-350/450 & GM 3500/4500	Chassis: Ford E-350/450 & GM 3500/4500
Candidate II	Starlite
Chassis: Ford E-350/450	Chassis: Ford E-350/450
Senator II HD	Allstar XL
Chassis: Ford F-450/550	Chassis: Ford F-450/550

You asked FTA to determine if any testing would be required to offer the existing Starcraft bus models with the "Startrans" name as identified above. FTA reviewed your request and determined that the Starcraft Allstar, Starlite, and Allstar XL built on the Starcraft production line can be offered to FTA grantees as the Startrans Senator II, Senator II MFSAB, Candidate II, Senator II HD without any additional testing. You were advised that Starcraft should submit the latest comparable chassis test report that reflects the correct chassis, fuel type and fuel conversion supplier (if an alternative fuel conversion) and powertrain of the Startrans bus being offered to FTA grantees, in addition to submitting the applicable Starcraft test report (PTI-BT-0518 or PTI-BT-0815).

This revised letter is to confirm that Starcraft Starlite Transit is the same as the StarTran's Candidate II Transit. Similarly to your previous representation, both buses are built on the Ford Transit chassis on the same assembly line in the same manner and with the same materials. Bus Testing Report number LTI-BT-R1609 is applicable to both buses.

Existing Startrans Bus Model	<b>Corresponding Starcraft Bus Model</b>
Candidate II	Starlite
Chassis: Ford Transit	Chassis: Ford Transit

This determination is based on the changes outlined to FTA as stated above. Should you make any other changes to the bus models, additional testing may be required. If you require any further assistance with this or other matters concerning Bus Testing, I encourage you to consult the resources provided at www.transit.dot.gov/research-innovation/bus-testing. If you still have questions after checking this website, please feel free to contact me.

Sincerely.

Mar Bel

Marcel Belanger **Bus Testing Program Manager** Office of Technology, TRI-20 marcel.belanger@dot.gov 202-366-0725

O:\TRI\BUSTEST\Starcraft\Starcraft-122116 - Starcraft Starlite Transit and StarTran Candidate II Transit.docx

## **STURAA TEST**

# 7 YEAR

## 200,000 MILE BUS

### from

## STARCRAFT BUS, A DIVISION of FOREST RIVER INC.

# **MODEL ALLSTAR -25**

**FEBRUARY 2006** 

**PTI-BT-R0518** 



### The Pennsylvania Transportation Institute

201 Research Office Building (814 The Pennsylvania State University University Park, PA 16802

(814) 865-1891

### **Bus Testing and Research Center**

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

## TABLE OF CONTENTS

## <u>Page</u>

EXECUTIVE S	SUMMARY	. 3
ABBREVIATIC	)NS	. 5
BUS CHECK-I	Ν	6
1. MAINTAIN	ABILITY	
1.1 1.2 1.3	ACCESSIBILITY OF COMPONENTS AND SUBSYSTEMS SERVICING, PREVENTATIVE MAINTENANCE, AND REPAIR AND MAINTENANCE DURING TESTING REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS	19
	TY - DOCUMENTATION OF BREAKDOWN AND REPAIR	26
3. SAFETY - A	A DOUBLE-LANE CHANGE (OBSTACLE AVOIDANCE TEST)	28
	ANCE - AN ACCELERATION, GRADEABILITY, AND TOP	31
5. STRUCTUR	RAL INTEGRITY	
5.1	STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL SHAKEDOWN TEST	35
5.2 5.3	STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC	
5.4	TOWING TEST STRUCTURAL STRENGTH AND DISTORTION TESTS - DYNAMIC TOWING TEST	
5.5	STRUCTURAL STRENGTH AND DISTORTION TESTS - JACKING TEST	
5.6	STRUCTURAL STRENGTH AND DISTORTION TESTS	
5.7	- HOISTING TEST STRUCTURAL DURABILITY TEST	
	NOMY TEST - A FUEL CONSUMPTION TEST USING AN ATE OPERATING CYCLE	65
7. NOISE		
7.1 7.2	INTERIOR NOISE AND VIBRATION TESTS EXTERIOR NOISE TESTS	

Starcraft Bus, a Division of Forest River Inc. submitted a model Allstar-25, gasoline-powered 17 seat (including the driver) 25-foot bus, for a 7 yr/200,000 mile STURAA test. The odometer reading at the time of delivery was 529.0 miles. Testing started on December 6, 2005 and was completed on February 14, 2006. 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 December 14, 2005 and was completed on February 1, 2006.

The interior of the bus is configured with seating for 17 passengers including the driver + 1 wheelchair position. Free floor space will accommodate 10 standing passengers resulting in a potential capacity of 27 persons + 1 wheelchair position. At 150 lbs per person 600 lbs per wheelchair position, this load results in a measured gross vehicle weight of 13,950 lbs. The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 13,950 lbs. The middle segment was performed at a seated load weight of 12,500 lbs and the final segment was performed at a curb weight of 9,510 lbs. Durability driving resulted in no unscheduled maintenance and failures.

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 failures during the Structural Durability Test.

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 13.75 seconds.

The Shakedown Test produced a maximum final loaded deflection of 0.224 inches with a permanent set ranging between -0.003 to 0.005 inches under a distributed static load of 10,725 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. Water leakage observed during the test at the top of the rear door between the door and the door frame.

The test bus was not equipped with any type of tow eyes or tow hooks, therefore, the Static Towing Test was not performed. 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 8.8 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 6.39 mpg, 6.90 mpg, and 10.17 mpg respectively; with an overall average of 7.32 mpg.

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

## **STURAA TEST**

# 7 YEAR

## 200,000 MILE BUS

### from

## STARCRAFT BUS, A DIVISION of FOREST RIVER INC.

# **MODEL ALLSTAR -25**

**FEBRUARY 2006** 

**PTI-BT-R0518** 



### The Pennsylvania Transportation Institute

201 Research Office Building (814 The Pennsylvania State University University Park, PA 16802

(814) 865-1891

### **Bus Testing and Research Center**

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

## TABLE OF CONTENTS

## <u>Page</u>

EXECUTIVE S	SUMMARY	. 3
ABBREVIATIC	)NS	. 5
BUS CHECK-I	Ν	6
1. MAINTAIN	ABILITY	
1.1 1.2 1.3	ACCESSIBILITY OF COMPONENTS AND SUBSYSTEMS SERVICING, PREVENTATIVE MAINTENANCE, AND REPAIR AND MAINTENANCE DURING TESTING REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS	19
	TY - DOCUMENTATION OF BREAKDOWN AND REPAIR	26
3. SAFETY - A	A DOUBLE-LANE CHANGE (OBSTACLE AVOIDANCE TEST)	28
	ANCE - AN ACCELERATION, GRADEABILITY, AND TOP	31
5. STRUCTUR	RAL INTEGRITY	
5.1	STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL SHAKEDOWN TEST	35
5.2 5.3	STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC	
5.4	TOWING TEST STRUCTURAL STRENGTH AND DISTORTION TESTS - DYNAMIC TOWING TEST	
5.5	STRUCTURAL STRENGTH AND DISTORTION TESTS - JACKING TEST	
5.6	STRUCTURAL STRENGTH AND DISTORTION TESTS	
5.7	- HOISTING TEST STRUCTURAL DURABILITY TEST	
	NOMY TEST - A FUEL CONSUMPTION TEST USING AN ATE OPERATING CYCLE	65
7. NOISE		
7.1 7.2	INTERIOR NOISE AND VIBRATION TESTS EXTERIOR NOISE TESTS	

Starcraft Bus, a Division of Forest River Inc. submitted a model Allstar-25, gasoline-powered 17 seat (including the driver) 25-foot bus, for a 7 yr/200,000 mile STURAA test. The odometer reading at the time of delivery was 529.0 miles. Testing started on December 6, 2005 and was completed on February 14, 2006. 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 December 14, 2005 and was completed on February 1, 2006.

The interior of the bus is configured with seating for 17 passengers including the driver + 1 wheelchair position. Free floor space will accommodate 10 standing passengers resulting in a potential capacity of 27 persons + 1 wheelchair position. At 150 lbs per person 600 lbs per wheelchair position, this load results in a measured gross vehicle weight of 13,950 lbs. The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 13,950 lbs. The middle segment was performed at a seated load weight of 12,500 lbs and the final segment was performed at a curb weight of 9,510 lbs. Durability driving resulted in no unscheduled maintenance and failures.

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 failures during the Structural Durability Test.

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 13.75 seconds.

The Shakedown Test produced a maximum final loaded deflection of 0.224 inches with a permanent set ranging between -0.003 to 0.005 inches under a distributed static load of 10,725 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. Water leakage observed during the test at the top of the rear door between the door and the door frame.

The test bus was not equipped with any type of tow eyes or tow hooks, therefore, the Static Towing Test was not performed. 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 8.8 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 6.39 mpg, 6.90 mpg, and 10.17 mpg respectively; with an overall average of 7.32 mpg.

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

## 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
ТМ	-	track manager
TP	-	test personnel

## **TEST BUS CHECK-IN**

#### I. <u>OBJECTIVE</u>

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 Starcraft Bus, model Allstar-25. The bus has a front door, rear of the front axle, and a dedicated handicap entrance rear of the rear axle. Note: the test bus was not equipped with a handicap device. Power is provided by a gasoline-fueled, Ford Motor Co. model 6.8 L EFI V10 engine coupled to a Ford Motor Co. model Elec 5-spd AOD transmission.

The measured curb weight is 3,810 lbs for the front axle and 5,700 lbs for the rear axle. These combined weights provide a total measured curb weight of 9,510 lbs. There are 17 seats including the driver, 1 wheelchair position and room for 10 standing passengers bringing the total passenger capacity to 27 + 1 wheelchair position. Gross load is 150 lb x 27 = 4,050 lbs + 600 lbs (wheelchair position) = 4,650 lbs. At full capacity, the measured gross vehicle weight is 13,950 lbs.

## **VEHICLE DATA FORM**

Bus Number: 0518	Arrival Date: 12-6-05
Bus Manufacturer: Starcraft Bus	Vehicle Identification Number (VIN): 1FDXE45516HA98012
Model Number: Allstar-25	Date: 12-6-05
Personnel: S.C.	

WEIGHT:

### Individual Wheel Reactions:

Weights Front Axle		Middle Axle		Rear Axle		
(lb)	Right	Left	Right	Left	Right	Left
CW	1,970	1,840	N/A	N/A	2,930	2,770
SLW	2,180	2,080	N/A	N/A	4,170	4,070
GVW	2,370	2,250	N/A	N/A	4,750	4,580

Total Weight Details:

Weight (lb)	CW	SLW	GVW	GAWR
Front Axle	3,810	4,260	4,620	4,600
Middle Axle	N/A	N/A	N/A	N/A
Rear Axle	5,700	8,240	9,330	9,450
Total	9,510	12,500	13,950	GVWR: 14,050

### Dimensions:

Length (ft/in)	25 / 11
Width (in)	98
Height (in)	112
Front Overhang (in)	33
Rear Overhang (in)	88
Wheel Base (in)	190
Wheel Track (in)	Front: 68.3
	Rear: 78.0

Bus Number: 0518	Date: 12-6-05

## CLEARANCES:

Lowest Point Outside Front Axle	Location: Steering linkage	Clearance(in): 11.4
Lowest Point Outside Rear Axle	Location: Exhaust	Clearance(in): 11.2
Lowest Point between Axles	Location: Step	Clearance(in): 8.3
Ground Clearance at the center (in)	9.6	
Front Approach Angle (deg)	22.1	
Rear Approach Angle (deg)	9.5	
Ramp Clearance Angle (deg)	8.2	
Aisle Width (in)	17.1	
Inside Standing Height at Center Aisle (in)	92.2	

# BODY DETAILS:

Body Structural Type	Integral		
Frame Material	Steel		
Body Material	Aluminum, fiberglas	s & steel	
Floor Material	Plywood	Plywood	
Roof Material	Fiberglass		
Windows Type	□ Fixed	Movable	
Window Mfg./Model No.	Safety DOT 269 / ASE M180		
Number of Doors	<u>1</u> Front	<u>1</u> Rear	
Mfr. / Model No.	A & M Systems / 2133.1/213380		
Dimension of Each Door (in)	Front - 32.6 x 81.5 Rear – 45.6 x 70.0		
Passenger Seat Type	Cantilever	■ Pedestal	□ Other (explain)
Mfr. / Model No.	Freedman Seating Co. / Mid-Back Double		
Driver Seat Type	□ Air	□ Spring	■ Other (Cushion)
Mfr. / Model No.	Freedman Seating Co. / Hi-Back		
Number of Seats (including Driver)	17		

Bus Number: 0518
------------------

Date: 12-6-05

### BODY DETAILS (Contd..)

Free Floor Space ( ft <sup>2</sup> )	16.4
Height of Each Step at Normal	Front 1. <u>10.0 2.9.6 3.10.1</u> 4. <u>N/A</u>
Position (in)	Middle 1. <u>N/A</u> 2. <u>N/A</u> 3. <u>N/A</u> 4. <u>N/A</u>
	Rear 1. <u>N/A</u> 2. <u>N/A</u> 3. <u>N/A</u> 4. <u>N/A</u>
Step Elevation Change - Kneeling (in)	N/A

### ENGINE

i	I	
□ C.I.	Alternate Fuel	
■ S.I.	Other (explain)	
Ford Motor Co. / 6.8 L EFI V10		
■ Front	□ Rear	□ Other (explain)
Gasoline	□ CNG	Methanol
Diesel	□ LNG	□ Other (explain)
55 gals		
■ Injected □ Carburetion		
Ford Motor Co. / 6.8 L EFI V10		
N/A		
Ford Motor Co. / 6.8 L EFI V10		
Motorcraft / 3GF		
14.4 / 110		
N/A		
N/A		1
■ Electrical	Pneumatic	□ Other (explain)
Visteon / AY05J2		
	<ul> <li>S.I.</li> <li>Ford Motor Co. / 6.8</li> <li>Front</li> <li>Gasoline</li> <li>Diesel</li> <li>55 gals</li> <li>Injected</li> <li>Ford Motor Co. / 6.8</li> <li>N/A</li> <li>Ford Motor Co. / 6.8</li> <li>Motorcraft / 3GF</li> <li>14.4 / 110</li> <li>N/A</li> <li>Electrical</li> </ul>	<ul> <li>S.I.</li> <li>Other (explain)</li> <li>Ford Motor Co. / 6.8 L EFI V10</li> <li>Front</li> <li>Rear</li> <li>Gasoline</li> <li>CNG</li> <li>CNG</li> <li>Diesel</li> <li>LNG</li> <li>55 gals</li> <li>Injected</li> <li>Carburetion</li> <li>Ford Motor Co. / 6.8 L EFI V10</li> <li>N/A</li> <li>Ford Motor Co. / 6.8 L EFI V10</li> <li>Motorcraft / 3GF</li> <li>14.4 / 110</li> <li>N/A</li> <li>N/A</li> <li>Electrical</li> <li>Pneumatic</li> </ul>

Bus Number: 0518

Date: 12-6-05

TRANSMISSION

Transmission Type	□ Manual	Automatic	
Mfr. / Model No.	Ford Motor Co. / Elec 5-spd AOD		
Control Type	Mechanical Electrical Other		
Torque Converter Mfr. / Model No.	Ford Motor Co. / Elec 5-spd AOD		
Integral Retarder Mfr. / Model No.	N/A		

#### SUSPENSION

Number of Axles	2		
Front Axle Type	Independent	Beam Axle	
Mfr. / Model No.	Ford Motor Co. / T	win I-Beam	
Axle Ratio (if driven)	N/A		
Suspension Type	■ Air	□ Spring	□ Other (explain)
No. of Shock Absorbers	2		
Mfr. / Model No.	Motorcraft / C259	Y2	
Middle Axle Type	Independent	Beam Axle	
Mfr. / Model No.	N/A		
Axle Ratio (if driven)	N/A		
Suspension Type	□ Air	□ Spring	□ Other (explain)
No. of Shock Absorbers	N/A		
Mfr. / Model No.	N/A		
Rear Axle Type	Independent	■ Beam Axle	
Mfr. / Model No.	Dana / Full Floatin	ng Dana 10.5H-D	
Axle Ratio (if driven)	4.56	-	
Suspension Type	□ Air	Spring	□ Other (explain)

No. of Shock Absorbers	2
Mfr. / Model No.	Motorcraft / C260Y1

Bus Num	ber: 0518	Date: 12-6-05	
WHEELS 8	TIRES		
Front	Wheel Mfr./ Model No.	Ford / 8-Hole Disc, 16 x 6.0 Steel	
	Tire Mfr./ Model No.	Michelin LTX / LT225/75R 16	
Rear	Wheel Mfr./ Model No.	Ford / 8-Hole Disc, 16 x 6.0 Steel	
	Tire Mfr./ Model No.	Michelin LTX / LT225/75R 16	

### BRAKES

Front Axle Brakes Type	□ Cam	□ Cam ■ Disc □ Other (explain)		
Mfr. / Model No.	TRW / na			
Middle Axle Brakes Type	□ Cam	Disc	□ Other (explain)	
Mfr. / Model No.	N/A			
Rear Axle Brakes Type	□ Cam ■ Disc □ Other (explain)			
Mfr. / Model No.	Kelsey Hayes / na			
Retarder Type	N/A			
Mfr. / Model No.	N/A			

### HVAC

Heating System Type	□ Air	■ Water	□ Other
Capacity (Btu/hr)	35,000		
Mfr. / Model No.	Ford Motor Co. / na		
Air Conditioner	■ Yes □ No		
Location	Dash & Interior ceiling		
Capacity (Btu/hr)	55,000		
A/C Compressor Mfr. / Model No.	Ford / O.E.M.		

# STEERING

Steering Gear Box Type	Hydraulic gear

Mfr. / Model No.	Ford / 6C22 3504 AA
Steering Wheel Diameter	15.0
Number of turns (lock to lock)	4.0

Bus Number: 0518	Date: 12-6-05

### 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: Windows Doors	Number: 3 1

### CAPACITIES

Fuel Tank Capacity (units)	55 gals
Engine Crankcase Capacity (gallons)	1.5
Transmission Capacity (gallons)	4.4
Differential Capacity (gallons)	2.1
Cooling System Capacity (quarts)	8.2
Power Steering Fluid Capacity (gallons)	Not available.

#### **VEHICLE DATA FORM**

Bus Number: 0518

Date: 12-6-05

### List all spare parts, tools and manuals delivered with the bus.

Part Number	Description	Qty.
Michelin LTX M/S LT225/75R 16	Tires/wheels	6
XC2Z-2C026-BB	Brake rotors	2
FBUZ-1102-DA	Brake rotors	2
FA-1769	Air filter	1
FD-4606	Fuel water separator	1
FL-2016	Oil filter	1
AT-164-G F5UZ-18125-A	Shock absorber	2
AT-163-G F5UZ-18124-B	Shock absorber	2
FT-145	Transmission filter	1
FT-144	Screen assembly	1
BR1276 YU2Z-2V200-BA	Brake pads	1
1C3Z-2001-BA	Brake pads	1
2006 E-Series 6C2J19G219GA	Owner's guide	1
NA	Allstar Owner Manual	1
NA	Trans/Air owner manual	1

## **COMPONENT/SUBSYSTEM INSPECTION FORM**

Bus	Number:	0518
Dus	number.	0010

Date: 12-6-05

Subsystem	Checked	Comments
Air Conditioning Heating and Ventilation		
Body and Sheet Metal		
Frame		
Steering		
Suspension		
Interior/Seating		
Axles		
Brakes		
Tires/Wheels		
Exhaust		
Fuel System		Gasoline.
Power Plant		
Accessories		
Lift System		Not equipped with a handicap device.
Interior Fasteners		
Batteries		

# **CHECK - IN**



# STARCRAFT BUS MODEL ALLSTAR-25



# 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.

# ACCESSIBILITY DATA FORM

Bus Number: 0518

Date: 2-9-06

Component	Checked	Comments
ENGINE :		
Oil Dipstick		
Oil Filler Hole		
Oil Drain Plug		
Oil Filter		
Fuel Filter		
Air Filter		
Belts		
Coolant Level		
Coolant Filler Hole		
Coolant Drain		
Spark / Glow Plugs		
Alternator		
Diagnostic Interface Connector		
TRANSMISSION :		
Fluid Dip-Stick		
Filler Hole		Fill through dip tube.
Drain Plug		
SUSPENSION :		
Bushings		
Shock Absorbers		
Air Springs	N/A	
Leveling Valves	N/A	
Grease Fittings		

## ACCESSIBILITY DATA FORM

Bus Number: 0518

Date: 2-9-06

Component	Checked	Comments
HVAC :		
A/C Compressor		
Filters		
Fans		
ELECTRICAL SYSTEM :		
Fuses		
Batteries		
Voltage regulator		Internal.
Voltage Converters	N/A	
Lighting		
MISCELLANEOUS :		
Brakes		
Handicap Lifts/Ramps	N/A	
Instruments		
Axles		
Exhaust		
Fuel System		
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 1) SCHEDULED MAINTENANCE Starcraft Bus 0518

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
12-21-05	1,185	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-06-06	2,375	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-13-06	4,131	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-18-06	5,137	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-24-06	6,407	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-31-06	7,404	P.M. / Inspection Fuel Economy Prep	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
02-01-06	7,500	P.M. / Inspection	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:

ITEM	PRODUCT CODE	TEXACO DESCRIPTION
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. <u>TEST OBJECTIVE</u>

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, no additional components were removed for repair or replacement.

At the end of the test, the remaining items on the list were removed and replaced. The transmission assembly took 4.0 man-hours (two men 2.0 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.

Subsystem	Replacement Time
Transmission	4.00 man hours
Wiper Motor	0.50 man hours
Starter	0.50 man hours
Alternator	0.50 man hours
Batteries	1.00 man hours

### REPLACEMENT AND/OR REPAIR FORM

# 1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS



# TRANSMISSION REMOVAL AND REPLACEMENT (4.00 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 (0.50 MAN HOURS)



# BATTERY REMOVAL AND REPLACEMENT (1.00 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) <u>Class 1: Physical Safety</u>. A failure that could lead directly to passenger or driver injury and represents a severe crash situation.
- (b) <u>Class 2: Road Call</u>. 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) <u>Class 3: Bus Change</u>. 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) <u>Class 4: Bad Order</u>. 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 classification of repairs according to subsystem is intended to emphasize those systems which had persistent minor or more serious problems. The bus submitted for testing encountered no failures during the Structural Durability Test.

# 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: 0518	Date: 2-2-06
Personnel: B.S., S.C. & T.S.	

Temperature (°F): 35	Humidity (%): 93
Wind Direction: Calm	Wind Speed (mph): Calm
Barometric Pressure (in.Hg): 29.91	

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 sa	afe profile was		
maintained through all portions of testing.			
Comments of the tire/ground contact patch: Tire/ground contact w	as maintained		
through all portions of testing.			

3. SAFETY



**RIGHT - HAND APPROACH** 



# **LEFT - HAND APPROACH**

## 4. PERFORMANCE - AN ACCELERATION, GRADEABILITY, AND TOP SPEED TEST

#### 4-I. <u>TEST OBJECTIVE</u>

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

#### 4-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-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 13.75 seconds.

## PERFORMANCE DATA FORM

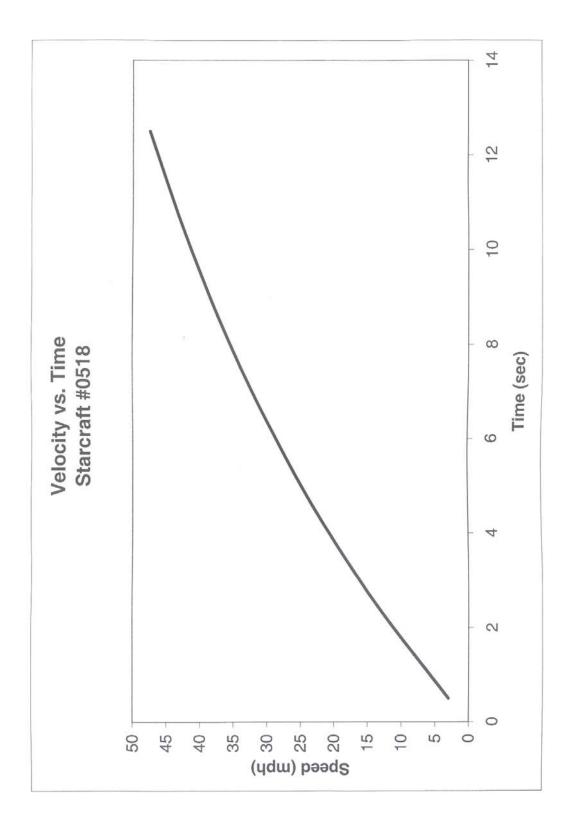
Bus Number: 0518		Date: 2-2-06	
Personnel: B.S., S.C. & T.S.			
Temperature (°F):	37	Humidity (%): 93	
Wind Direction: Ca		Wind Speed (mph):	Calm
Barometric Pressu	ıre (in.Hg): 29.91		
Air Conditioning co	ompressor-OFF	Checked	
Ventilation fans-O	N HIGH	Checked	
Heater pump moto	or-Off	Checked	
Defroster-OFF		Checked	
Exterior and interio	or lights-ON	Checked	
Windows and doo	rs-CLOSED	Checked	
	ACCELERATION, GRA	ADEABILITY, TOP SPI	EED
	Counter Clockwise F	Recorded Interval Time	s
Speed	Run 1	Run 2	Run 3
10 mph	2.02	2.15	1.90
20 mph	3.77	4.24	3.84
30 mph	5.99	6.24	5.87
40 mph	9.68	9.84	9.43
Top Test Speed(mph) 50	14.09	14.40	14.20
Clockwise Recorded Interval Times			
Speed	Run 1	Run 2	Run 3
10 mph	2.11	2.17	2.08
20 mph	3.88	4.14	3.86
30 mph	6.08	6.07	6.08
40 mph	9.36	9.28	9.30
Top Test Speed(mph) 50	13.42	13.08	13.33

#### 0518.ACC

#### PERFORMANCE SUMMARY SHEET

BUS MANUFACTURER BUS MODEL		BUS NUMBER TEST DATE	
TEST CONDITIONS	:		
TEMPERATURE (DEG WIND DIRECTION WIND SPEED (MPH) HUMIDITY (%) BAROMETRIC PRESS	URE (IN. HG) :	calm .0 93 29.9	
VEHICLE SPEED		AVERAGE TIME (SEC)	
(МРН)	CCW DIRECTION	CW DIRECTION	TOTAL
10.0 20.0 30.0 40.0 50.0	2.02 3.95 6.03 9.65 14.23	2.12	2.07 3.96 6.06 9.48 13.75
TEST SUMMARY :			
VEHICLE SPEED (MPH)	TIME (SEC)	ACCELERATION (FT/SEC^2)	MAX. GRADE (%)
$ \begin{array}{r} 1.0\\ 5.0\\ 10.0\\ 15.0\\ 20.0\\ 25.0\\ 30.0\\ 35.0\\ 40.0\\ 45.0\\ 50.0\\ \end{array} $	.16 .85 1.76 2.76 3.85 5.05 6.38 7.87 9.54 11.45 13.64	8.9 8.3 7.7 7.1 6.4 5.8 5.2 4.7 4.1 3.6 3.1	28.6 26.8 24.6 22.4 20.3 18.3 16.4 14.6 12.9 11.2 9.7

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.



## 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

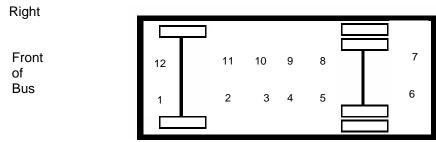
This test was performed based on a maximum passenger capacity of 27 people including the driver and one wheelchair position. The resulting test load is  $(27 \times 375 \text{ lb}) = 10,125 \text{ lb} + 600 \text{ lbs}$  (wheelchair position) = 10,725 lbs. The load is distributed evenly over the passenger 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 0.224 inches at reference point 9. The maximum permanent deflection after the final loading sequence ranged from -0.003 inches at reference point 6 to 0.005 inches at reference points 1, 4 and 12.

#### STRUCTURAL SHAKEDOWN DATA FORM

Bus Number: 0518	Date: 12-13-06
Personnel: D.L., E.L., K.D. & S.C.	Temperature (°F): 65
Loading Sequence: ■ 1 □ 2 □ 3 (check one) Test Load (lbs): 10,725	

### Indicate Approximate Location of Each Reference Point



Left

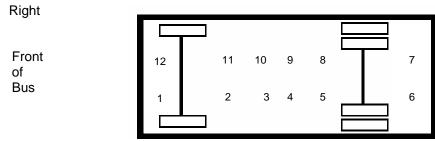
## Top View

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	085	085	015	015
2	0	.119	.119	.012	.012
3	0	.221	.221	.052	.052
4	0	.232	.232	.039	.039
5	0	.205	.205	.024	.024
6	0	066	066	011	011
7	0	015	015	021	021
8	0	.277	.277	.068	.068
9	0	.269	.269	.045	.045
10	0	.244	.244	.045	.045
11	0	.123	.123	.028	.028
12	0	009	009	011	011

#### STRUCTURAL SHAKEDOWN DATA FORM

Bus Number: 0518	Date: 12-13-05
Personnel: D.L., E.L., T.S. & S.C.	Temperature (°F):
Loading Sequence: □ 1 ■ 2 □ 3 (check one) Test Load (lbs): 10,725	

### Indicate Approximate Location of Each Reference Point



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	015	086	071	020	.005
2	.012	.120	.108	.015	.003
3	.052	.228	.176	.056	.004
4	.039	.233	.194	.044	.005
5	.024	.205	.181	.027	.003
6	011	061	050	008	003
7	021	010	.011	023	.002
8	.068	.285	.217	.070	.002
9	.045	.269	.224	.047	.002
10	.045	.245	.200	.046	.001
11	.028	.124	.096	.032	.004
12	011	010	.001	016	.005

# 5.1 STRUCTURAL SHAKEDOWN TEST



DIAL INDICATORS IN POSITION BUS LOADED TO 2.5 TIMES GVL (10,725 LBS)

# 5.2 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION

### 5.2-I. <u>TEST OBJECTIVE</u>

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 during the test at the top of the rear door between the door and the door frame. The results of this test are indicated on the following data forms.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	■ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	□ 6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	□ 6 in higher	□ 6 in lower

	Comments
■ Windows	No deficiencies.
Front Doors	No deficiencies.
<ul> <li>Rear Doors</li> </ul>	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special</li> <li>Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies.
<ul> <li>Service Doors</li> </ul>	No deficiencies.
■ Body	No deficiencies.
	1

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	■ 6 in higher	□ 6 in lower
Right front	□ 6 in higher	□ 6 in lower
Right rear	□ 6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	6 in higher	□ 6 in lower

	Comments
Windows	No deficiencies.
Front Doors	No deficiencies.
Rear Doors	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies.
<ul> <li>Service Doors</li> </ul>	No deficiencies.
<ul> <li>Body</li> </ul>	No deficiencies.
	1

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	■ 6 in higher	□ 6 in lower
Right rear	6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	□ 6 in higher	□ 6 in lower

	Comments
■ Windows	No deficiencies.
Front Doors	No deficiencies.
Rear Doors	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special</li> <li>Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies.
<ul> <li>Service Doors</li> </ul>	No deficiencies.
■ Body	No deficiencies.
	1

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	■ 6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	6 in higher	□ 6 in lower

Comments
No deficiencies.
No deficiencies.
Leak at top between door and door frame.
No deficiencies.
No deficiencies.
Not equipped with a handicap device.
No deficiencies.
No deficiencies.
No deficiencies.

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	□ 6 in higher	□ 6 in lower
Right rear	□ 6 in higher	□ 6 in lower
Left rear	■ 6 in higher	□ 6 in lower
Right center	□ 6 in higher	□ 6 in lower
Left center	□ 6 in higher	□ 6 in lower

	Comments
■ Windows	No deficiencies.
Front Doors	No deficiencies.
Rear Doors	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special</li> <li>Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies.
<ul> <li>Service Doors</li> </ul>	No deficiencies.
■ Body	No deficiencies.
	1

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	□ 6 in higher	□ 6 in lower
Left rear	6 in higher	■ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	□ 6 in higher	□ 6 in lower

Comments
No deficiencies.
No deficiencies.
Leak at top between door and door frame.
No deficiencies.
No deficiencies.
Not equipped with a handicap device.
No deficiencies.
No deficiencies.
No deficiencies.

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	6 in higher	■ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	6 in higher	□ 6 in lower

	Comments
■ Windows	No deficiencies.
Front Doors	No deficiencies.
<ul> <li>Rear Doors</li> </ul>	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special</li> <li>Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies.
<ul> <li>Service Doors</li> </ul>	No deficiencies.
■ Body	No deficiencies.
	1

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	■ 6 in lower
Right rear	6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	6 in higher	□ 6 in lower

Comments
No deficiencies.
No deficiencies.
Leak at top between door and door frame.
No deficiencies.
No deficiencies.
Not equipped with a handicap device.
No deficiencies.
No deficiencies.
No deficiencies.

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	□ after
Left front	6 in higher	■ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	6 in higher	□ 6 in lower

Comments
No deficiencies.
No deficiencies.
Leak at top between door and door frame.
No deficiencies.
No deficiencies.
Not equipped with a handicap device.
No deficiencies.
No deficiencies.
No deficiencies.

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

Bus Number: 0518	Date: 12-14-05
Personnel: T.S., E.L., D.L. & S.C.	Temperature(°F): 65

Wheel Position : (check one)		
All wheels level	□ before	■ after
Left front	6 in higher	□ 6 in lower
Right front	6 in higher	□ 6 in lower
Right rear	□ 6 in higher	□ 6 in lower
Left rear	6 in higher	□ 6 in lower
Right center	6 in higher	□ 6 in lower
Left center	□ 6 in higher	□ 6 in lower

	Comments
■ Windows	No deficiencies.
Front Doors	No deficiencies.
<ul> <li>Rear Doors</li> </ul>	Leak at top between door and door frame.
Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
<ul> <li>Handicapped Device/ Special</li> <li>Seating</li> </ul>	Not equipped with a handicap device.
<ul> <li>Undercarriage</li> </ul>	No deficiencies
<ul> <li>Service Doors</li> </ul>	No deficiencies.
<ul> <li>Body</li> </ul>	No deficiencies.

Windows/ Body Leakage	No deficiencies.
<ul> <li>Steering Mechanism</li> </ul>	No deficiencies.

# **5.2 STRUCTURAL DISTORTION TEST**



# LEFT REAR WHEEL SIX INCHES LOWER



# LEFT FRONT WHEEL SIX INCHES HIGHER

# 5.3 STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC TOWING TEST

#### 5.3-I. <u>TEST OBJECTIVE</u>

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 test bus submitted for testing was not equipped with any type of tow eyes or tow hooks, therefore, the Static Towing Test was not performed.

## 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: 0518	Date: 2-13-06
Personnel: T.S. & S.C.	

Temperature (°F): 32	Humidity (%): 59
Wind Direction: NW	Wind Speed (mph): 8
Barometric Pressure (in.Hg): 30.05	

### 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: None noted.

General Comments: No problems were encountered with the tow or towing

interface.

# 5.4 DYNAMIC TOWING TEST



# **TOWING INTERFACE**

## 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 8.8 inches to 20.1 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	15.3"
Rear axle – one tire flat	20.1"
Rear axle – two tires flat	17.7"

# JACKING TEST DATA FORM

Bus Number: 0518	Date: 12-7-05
Personnel: E.L. & D.L.	Temperature (°F): 68

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	17.3 " I 15.3 " D	11.2 " I 9.3 " D	None noted.
Left front	17.3 " I 15.3 " D	11.3 " I 9.3 " D	"
Right rear—outside	20.2 " I 20.1 " D	11.4 " I 11.2 " D	"
Right rear—both	20.2 " I 17.7 " D	11.4 " I 8.9 " D	"
Left rear—outside	20.3 " I 20.1 " D	11.4 " I 11.1 " D	"
Left rear-both	20.3 " I 17.7 " D	11.4 " I 8.8 " 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 comment	s of any deformat	ion or difficulty dur	ing jacking:

## 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.

## HOISTING TEST DATA FORM

Bus Number: 0518	Date: 12-12-05
Personnel: T.S. & S.C.	Temperature (°F): 66

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 7,500 miles; approximately 5,000 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 3,000 miles with the bus operated at GVW. The second segment will consist of approximately 1,500 miles with the bus operated at SLW. The remainder of the test, approximately 3,000 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 December 14, 2005 and was conducted until February 1, 2006. The first 3,000 miles were performed at a GVW of 13,950 lbs. and completed on January 6, 2006. The next 1,500 mile SLW segment was performed at 12,500 lbs and completed on January 16, 2006, and the final 3,000 mile segment was performed at a CW of 9,510 lbs and completed on February 1, 2006.

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. The test bus encountered no failures during the Structural Durability Test.

## STARCRAFT - TEST BUS #0518 MILEAGE DRIVEN/RECORDED FROM DRIVERS= LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
12/12/05 TO 12/18/05	496.00	74.00	570.00
12/19/05 TO 12/25/05	801.00	138.00	939.00
12/26/05 TO 01/01/06	0.00	0.00	0.00
01/02/06 TO 01/08/06	703.00	309.00	1012.00
01/09/06 TO 01/15/06	889.00	875.00	1764.00
01/16/06 TO 01/22/06	972.00	728.00	1700.00
01/23/06 TO 01/29/06	1139.00	180.00	1319.00
01/30/06 TO 02/05/06	0.00	196.00	196.00
TOTAL	5000.00	2500.00	7500.00

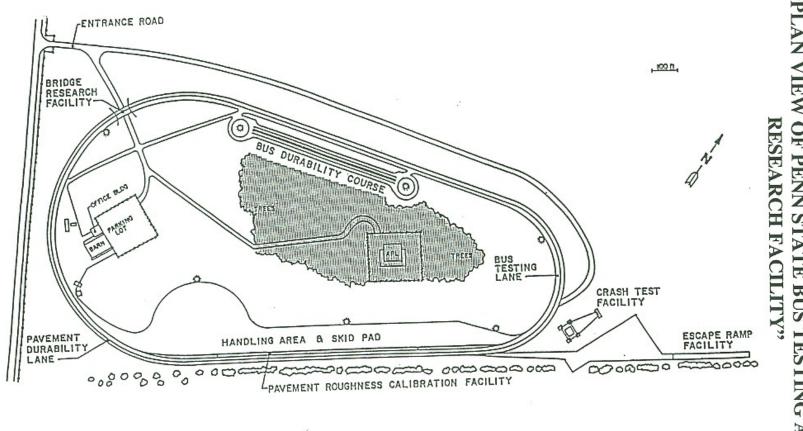
Table 4. Driving Schedule for Bus Operation on the Durability Test Track	Table 4.	Driving	Schedule	for Bus	Operation	on the	Durability	Test Track
--	----------	---------	----------	---------	-----------	--------	------------	------------

M	onday through Frida	у
	HOUR	ACTION
Shift 1	midnight	D
	1:40 am	С
	1:50 am	В
	2:00 am	D
	3:35 am	С
	3:45 am	В
	4:05 am	D
	5:40 am	С
	5:50 am	В
	6:00 am	D
	7:40 am	С
	7:50 am	F
Shift 2	8:00 am	D
	9:40 am	С
	9:50 am	В
	10:00 am	D
	11:35 am	С
	11:45 am	В
	12:05 pm	D
	1:40 pm	С
	1:50 pm	В
	2:00 pm	D
	3:40 pm	С
	3:50 pm	F
Shift 3	4:00 pm	D
	5:40 pm	С
	5:50 pm	В
	6:00 pm	D
	7:40 pm	С
	7:50 pm	В
	8:05 pm	D
	9:40 pm	С
	9:50 pm	В
	10:00 pm	D
	11:40 pm	C
	11:50 pm	F

STANDARD OPERATING SCHEDULE

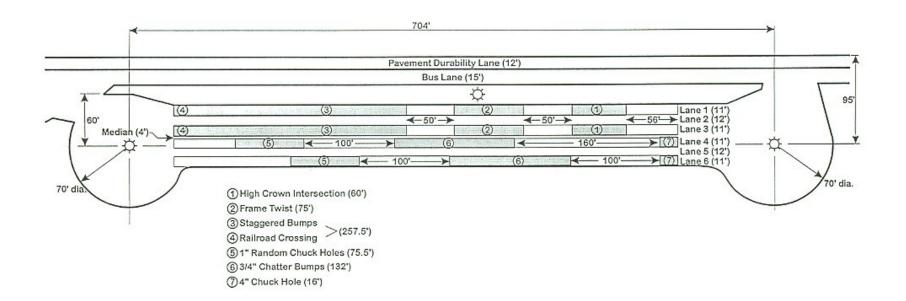
B--Break

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



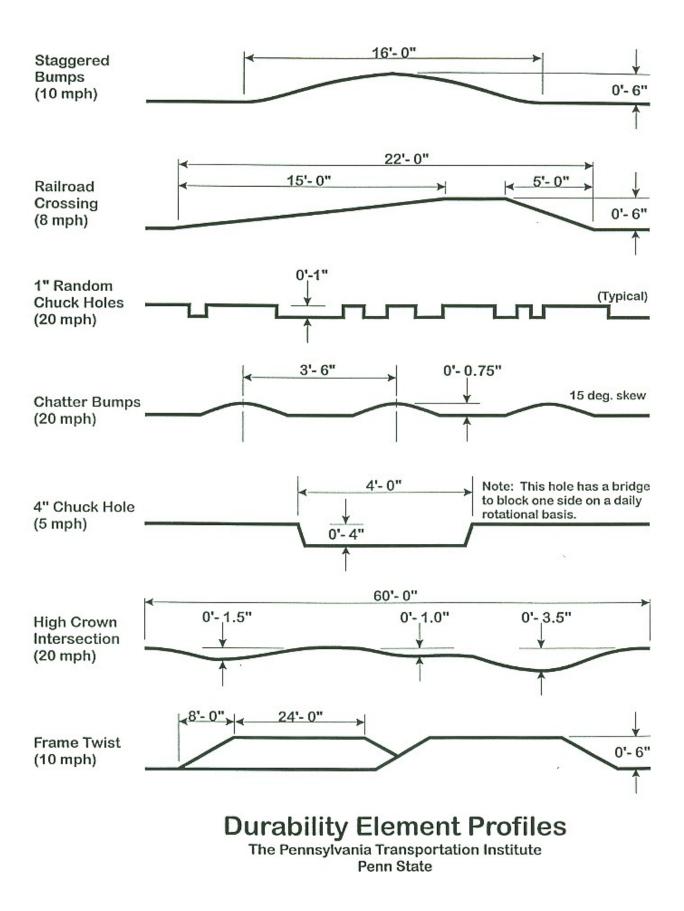
BUS TESTING AND RESEARCH TEST TRACK UNIVERSITY PARK, PA

"PLAN VIEW OF PENN STATE BUS TESTING AND



# Plan View Vehicle Durability Test Track

The Pennsylvania Transportation Institute Penn State



## 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  $\forall 4$  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

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

**FEo**<sub>mi/lb</sub> = Observed fuel economy = <u>miles</u> lb of fuel 2.) Convert the observed fuel economy to miles per gallon [mpg] by multiplying by the specific gravity of the test fuel Gs (referred to water) at 60EF and multiply by the density of water at 60EF

FEompg = FEcmi/lb x Gs x Gw
where Gs = Specific gravity of test fuel at 60EF (referred to water)
Gw = 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.

where

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

Combining steps 1-3 yields

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/BTUx10<sup>6</sup>.

Eq = Energy equivalent of converting mpg to mile/BTUx $10^6$ .

 $Eq = ((mpg)/(H))x10^{6}$ 

### 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 EF). These combine to give a fuel economy in miles per lb. The energy equivalent  $(mile/BTUx10^6)$  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.

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

FEo<sub>mi/scf</sub> = Observed fuel economy = <u>miles</u> 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/ft<sup>3</sup>).

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.

**FEO**<sub>mi/lb</sub> = FEo / Gm

where Gm = Density of test fuel at standard conditions

3.) Convert the observed fuel economy (FEomi/lb) to an energy equivalent of (miles/BTUx10<sup>6</sup>) by dividing the observed fuel economy (FEomi/lb) by the heating value of the test fuel at standard conditions.

 $Eq = ((FEomi/lb)/H)x10^{6}$ 

where

Eq = Energy equivalent of miles/lb to mile/BTUx10<sup>6</sup> H = Volumetric heating value of test fuel at standard conditions

### 6-III. DISCUSSION

This is a comparative test of fuel economy using unleaded gasoline fuel with a heating value of 20,025.0 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 127,700.0 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 – 6.39 mpg, ART – 6.90 mpg, and COM – 10.17 mpg. Average fuel consumption at idle was 4.10 lb/hr (0.65 gph).

## FUEL ECONOMY PRE-TEST MAINTENANCE FORM

Bus Number: 0518	Date: 1-30-06	SLW (lbs): 12,500
Personnel: T.S., E.L. & D.L.		

FUEL SYSTEM	ОК	Date	Initials			
Install fuel measurement system		1/30/06	T.S.			
Replace fuel filter		1/30/06	T.S.			
Check for fuel leaks		1/30/06	T.S.			
Specify fuel type (refer to fuel analysis)	Gasoli	Gasoline				
Remarks: None noted.						
	T					
BRAKES/TIRES	ОК	Date	Initials			
Inspect hoses		1/30/06	T.S.			
Inspect brakes		1/30/06	T.S.			
Relube wheel bearings		1/30/06	T.S.			
Check tire inflation pressures (mfg. specs.)		1/30/06	T.S.			
Remarks: None noted.						
COOLING SYSTEM	ОК	Date	Initials			
Check hoses and connections		1/30/06	D.L.			
Check system for coolant leaks		1/30/06	D.L.			
Remarks: None noted.						

# FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 0518	Date: 1-30-06				
Personnel: T.S., E.L. & D.L.					
ELECTRICAL SYSTEMS	ОК	Date	Initials		
Check battery		1/30/06	T.S.		
Inspect wiring		1/30/06	T.S.		
Inspect terminals		1/30/06	T.S.		
Check lighting		1/30/06	T.S.		
Remarks: None noted.					
		1			
DRIVE SYSTEM	ОК	Date	Initials		
Drain transmission fluid		1/30/06	D.L.		
Replace filter/gasket		1/30/06	E.L.		
Check hoses and connections		1/30/06	D.L.		
Replace transmission fluid		1/30/06	E.L.		
Check for fluid leaks		1/30/06	E.L.		
Remarks: None noted.					
		r			
LUBRICATION	ОК	Date	Initials		
Drain crankcase oil		1/30/06	E.L.		
Replace filters		1/30/06	D.L.		
Replace crankcase oil		1/30/06	T.S.		
Check for oil leaks		1/30/06	E.L.		
Check oil level		1/30/06	T.S.		
Lube all chassis grease fittings		1/30/06	E.L.		
Lube universal joints		1/30/06	E.L.		
Replace differential lube including axles		1/30/06	D.L.		
Remarks: None noted.					

FUEL ECONOMIT PRE-TEST MA				ge sj
Bus Number: 0518	Date: 1-3	30-06		
Personnel: T.S., E.L. & D.L.				
EXHAUST/EMISSION SYSTEM		OK	Date	Initials
Check for exhaust leaks			1/30/06	T.S.
Remarks: None noted.				
ENGINE		OK	Date	Initials
Replace air filter			1/30/06	E.L.
Inspect air compressor and air system		N/A	1/30/06	E.L.
Inspect vacuum system, if applicable			1/30/06	D.L.
Check and adjust all drive belts			1/30/06	E.L.
Check cold start assist, if applicable		N/A	1/30/06	E.L.
Remarks: None noted.				
	T			
STEERING SYSTEM		OK	Date	Initials
Check power steering hoses and connectors	;		1/30/06	E.L.
Service fluid level			1/30/06	E.L.
Check power steering operation			1/30/06	E.L.
Remarks: None noted.				
		OK	Date	Initials
Ballast bus to seated load weight			1/30/06	T.S.
TEST DRIVE		ОК	Date	Initials
Check brake operation			1/30/06	T.S.
Check transmission operation			1/30/06	T.S.
Remarks: None noted.				

### aga 2) **—**1 - -. B.A. /... .... . . . .

## FUEL ECONOMY PRE-TEST INSPECTION FORM

Bus Number: 0518 Personnel: T.S. & S.C.	Date: 1-31-06	
PRE WARM-UP		If OK, Initial
Fuel Economy Pre-Test Maintenance Form i	s complete	T.S.
Cold tire pressure (psi): Front <u>80</u> Middle <u>N/A</u>	Rear <u>80</u>	T.S.
Tire wear:		T.S.
Engine oil level		T.S.
Engine coolant level		T.S.
Interior and exterior lights on, evaporator fan	i 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. S installed in front of bus and accessible to TE	S.C. & T.S.	
Bus is loaded to SLW		T.S.
WARM-UP		If OK, Initial
Bus driven for at least one hour warm-up		S.C.
No extensive or black smoke from exhaust		S.C.
POST WARM-UP		If OK, Initial
Warm tire pressure (psi): Front <u>80</u> Middle <u>N/</u>	T.S.	
Environmental conditions Average wind speed <12 mph and maximu Ambient temperature between 30°F(-1C°) a Track surface is dry Track is free of extraneous material and cle interfering traffic	T.S.	

Bus Number: 05	18	Manufact	Manufacturer: Starcraft			Date: 1-31-06		
Run Number: 1		Personne	l: B.S., T.S. & S	.C.				
Test Direction:	CW or ■CCW	Temperat	ure (°F): 38		Humidity (%	6): 61		
SLW (lbs): 12,50	0	Wind Spe	ed (mph) & Dire	ction: 12/WNW	Barometric	Pressure (in.I	Hg): 29.80	
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Load Cell Reading (lb)		Fuel Used (lbs)	
	Start	Finish		Start	Start	Finish		
CBD #1	0	8:20	8:20	5.5	0	1.95	1.95	
ART #1	0	3:54	3:54	4.5	0	1.74	1.74	
CBD #2	0	8:25	8:25	4.5	0	1.82	1.82	
ART #2	0	3:59	3:59	4.5	0	1.70	1.70	
CBD #3	0	8:21	8:21	4.5	0	1.88	1.88	
COMMUTER	0	5:51	5:51	4.0	0	2.37	2.37	
Total Fuel = 11.46 lbs								
20 minute idle : Total Fuel Used = 1.36 lbs								
Heating Value = 20,025.0 BTU/LB         Comments: None noted.								

Bus Number: 05 <sup>°</sup>	18	Manufact	Manufacturer: Starcraft			Date: 1-31-06		
Run Number: 2		Personne	l: B.S., T.S. & S	.C.				
Test Direction:	CW or □CCW	Temperat	ure (°F): 38		Humidity (%	6): 61		
SLW (lbs): 12,50	0	Wind Spe	ed (mph) & Dire	ction: 12/WNW	Barometric	Pressure (in.I	Hg): 29.80	
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Load Cell Reading (Ib)		Fuel Used (lbs)	
	Start	Finish		Start	Start	Finish		
CBD #1	0	8:45	8:45	4.0	0	1.82	1.82	
ART #1	0	3:57	3:57	4.0	0	1.68	1.68	
CBD #2	0	8:25	8:25	3.5	0	1.88	1.88	
ART #2	0	3:56	3:56	3.5	0	1.80	1.80	
CBD #3	0	8:24	8:24	3.5	0	1.87	1.87	
COMMUTER	0	6:06	6:06	3.5	0	2.40	2.40	
Total Fuel = 11.45 lbs								
20 minute idle : Total Fuel Used = N/A lbs								
Heating Value = 20,025.0 BTU/LB         Comments: None noted.								

Bus Number: 05	18	Manufact	Manufacturer: Starcraft			Date: 2/1/06		
Run Number: 3		Personne	l: B.S., T.S. & S	.C.	·			
Test Direction:	□CW or ■CCW	Temperat	ure (°F): 36		Humidity (%)	): 65		
SLW (lbs): 12,50	)0	Wind Spe	ed (mph) & Dire	ction: 5/SSW	Barometric F	Pressure (in.H	g): 29.96	
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Load Cell Reading (lb)		Fuel Used (lbs)	
	Start	Finish		Start	Start	Finish		
CBD #1	0	8:51	8:51	4.0	0	1.87	1.87	
ART #1	0	3:53	3:53	4.0	0	1.77	1.77	
CBD #2	0	8:33	8:33	4.0	0	1.89	1.89	
ART #2	0	3:55	3:55	4.0	0	1.76	1.76	
CBD #3	0	8:36	8:36	4.5	0	1.93	1.93	
COMMUTER	0	6:05	6:05	4.5	0	2.39	2.39	
Total Fuel = 11.61 lbs								
20 minute idle : Total Fuel Used = N/A lbs Heating Value = 20,025.0 BTU/LB								
Comments: None noted.								

Bus Number: 05'	18	Manufact	Manufacturer: Starcraft			Date: 2-1-06		
Run Number: 4		Personne	l: B.S., T.S. & S	.C.				
Test Direction:	CW or □CCW	Temperat	ure (°F): 36		Humidity (%)	): 65		
SLW (lbs): 12,50	0	Wind Spe	ed (mph) & Dire	ction: 5/SSW	Barometric F	Pressure (in.H	g): 29.96	
Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Load Cell Reading (lb)		Fuel Used (lbs)	
	Start	Finish		Start	Start	Finish		
CBD #1	0	8:38	8:38	3.5	0	1.94	1.94	
ART #1	0	3:59	3:59	4.5	0	1.81	1.81	
CBD #2	0	8:37	8:37	5.5	0	1.92	1.92	
ART #2	0	3:55	3:55	5.5	0	1.76	1.76	
CBD #3	0	8:36	8:36	4.5	0	1.93	1.93	
COMMUTER	0	5:58	5:58	5.0	0	2.35	2.35	
Total Fuel = 11.71 lbs								
20 minute idle : Total Fuel Used = 1.37 lbs								
Heating Value = 20,025.0 BTU/LB								
Comments: Non	e noted.							

0518.FUL				
FUEL	ECONOMY	SUMMARY	SHEET	

BUS MANUFACTURER :Sta BUS MODEL :All	ircraft star-25	BUS NU TEST D	MBER :0518 ATE :1/31/06
FUEL TYPE SP. GRAVITY HEATING VALUE Standard Conditions Density of Water	GASOLINE .7512 20025.00 BTU 60 deg F and 8.3373 lb/ga	/Lb 14.7 psi llon at 60 deg	F
CYCLE TOTAL FUEL TO USED (Lb)	)TAL MILES FU M	EL ECONOMY /Lb(Measured)	FUEL ECONOMY MPG(Corrected)
Run # :1, CCW CBD 5.65 ART 3.44 COM 2.37 TOTAL 11.46	5.73 3.82 3.82 13.37	1.01 1.11 1.61 1.17	6.42 7.03 10.20 7.38
Run # :2, CW CBD 5.57 ART 3.48 COM 2.40 TOTAL 11.45	5.73 3.82 3.82 13.37	1.03 1.10 1.59 1.17	6.51 6.95 10.07 7.39
Run # :3, CCW CBD 5.69 ART 3.53 COM 2.39 TOTAL 11.61			6.37 6.85 10.11 7.29
Run # :4, CW CBD 5.79 ART 3.57 COM 2.35 TOTAL 11.71	5.73 3.82 3.82 13.37	.99 1.07 1.63 1.14	6.26 6.77 10.28 7.22
IDLE CONSUMPTION First 20 Minutes Data Average Idle Consumpt	a : 1.36 Lb	Last 20 Minut	
RUN CONSISTENCY: % Di Run 1 : .8 Run			e of total fuel used Run 4 : -1.3
SUMMARY Average Idle Consumpt Average CBD Phase Cor Average Arterial Phas Average Commuter Phas Overall Average Fuel Overall Average Fuel	tion isumption se Consumption	: .65 G/Hr : 6.39 MPG : 6.90 MPG : 10.17 MPG	

## 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 48..0 dB(A); ranging from 47.1 dB(A) at the rear passenger seats to 50.9 dB(A) at the driver's seat. 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 69.4 dB(A) at the front passenger seats to 71.7 dB(A) at the rear passenger seats. The overall average was 71.0 dB(A). The interior ambient noise level for this test was 38.6 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: 0518	Date: 2/8/06		
Personnel: T.S. & S.C.			
Temperature (°F): 33	Humidity (%): 67		
Wind Speed (mph): Calm	Wind Direction: Calm		
Barometric Pressure (in.Hg): 30.10			
Initial Sound Level Meter Calibration: - che	ecked by: S.C.		
Interior Ambient Noise Level dB(A): < 34.0	Exterior Ambient Noise Level dB(A): 45.1		
Microphone Height During Testing (in): 48.0			

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	50.9
Front Passenger Seats	47.6
In Line with Front Speaker	47.8
In Line with Middle Speaker	47.6
In Line with Rear Speaker	47.2
Rear Passenger Seats	47.1

Final Sound Level Meter Calibration: 

checked by: S.C.

Comments: All readings taken in the center aisle.

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

Bus Number: 0518	Date: 2-2-06		
Personnel: B.S., S.C. & T.S.			
Temperature (°F): 37	Humidity (%): 93		
Wind Speed (mph): Calm	Wind Direction: Calm		
Barometric Pressure (in.Hg): 29.91			
Initial Sound Level Meter Calibration: - che	ecked by: S.C.		
Interior Ambient Noise Level dB(A): 38.6	Exterior Ambient Noise Level dB(A): 53.2		
Microphone Height During Testing (in): 48.0			

Measurement Location	Measured Sound Level dB(A)	
Driver's Seat	71.5	
Front Passenger Seats	69.4	
Middle Passenger Seats	71.5	
Rear Passenger Seats	71.7	

Final Sound Level Meter Calibration: 

Checked by: S.C.

Comments: All readings taken in the center aisle.		

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

Bus Number: 0518	Date: 2-2-06
Personnel: B.S., S.C. & T.S.	
Temperature (°F): 37	Humidity (%): 93
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 29.91	

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 51.6 dB(A), the average test result obtained while accelerating from a constant speed was 73.2 dB(A) on the right side and 73.0 dB(A) on the left side.

When accelerating from a standstill with an exterior ambient noise level of 53.7 dB(A), the average of the results obtained were 72.7 dB(A) on the right side and 71.4 dB(A) on the left side.

With the vehicle stationary and the engine, accessories, and air conditioning on, the measurements averaged 48.0 dB(A) at low idle, 56.2 dB(A) at high idle, and 67.1 dB(A) at wide open throttle. With the accessories and air conditioning off, the readings averaged 0.5 dB(A) higher at low idle, 0.8 dB(A) higher at high idle, and 0.3 dB(A) higher at wide open throttle. The exterior ambient noise level measured during this test was 50.9 dB(A).

## EXTERIOR NOISE TEST DATA FORM Accelerating from Constant Speed

Bus Number: 0518	Date: 2-2-06		
Personnel: B.S., S.C. & T.S.			
Temperature (°F): 41	Humidity (%): 85		
Wind Speed (mph): 5	Wind Direction: SW		
Barometric Pressure (in.Hg): 29.91			
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: S.C.			
Initial Sound Level Meter Calibration:  Checked by: S.C.			
Exterior Ambient Noise Level dB(A): 51.6			

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	72.6	1	73.2
2	72.4	2	72.7
3	73.0	3	72.5
4	73.2	4	72.6
5	73.1	5	72.7
Average of two highest actual noise levels = 73.2 dB(A)		Average of two highest actual noise levels = 73.0 dB(A)	

Final Sound Level Meter Calibration Check: 
• checked by: S.C.

Comments: None noted.

## EXTERIOR NOISE TEST DATA FORM Accelerating from Standstill

Bus Number: 0518	Date: 2-2-06		
Personnel: B.S., S.C. & T.S.			
Temperature (°F): 41	Humidity (%): 85		
Wind Speed (mph): 5	Wind Direction: SW		
Barometric Pressure (in.Hg): 29.91			
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: S.C.			
Initial Sound Level Meter Calibration:  Checked by: S.C.			
Exterior Ambient Noise Level dB(A): 53.7			

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	72.4	1	71.3
2	72.9	2	71.4
3	72.1	3	71.0
4	72.5	4	71.3
5	72.4	5	71.2
Average of two highest actual noise levels = 72.7 dB(A)		Average of two highest actual noise levels = 71.4 dB(A)	

Final Sound Level Meter Calibration Check: 
• checked by: S.C.

Comments: None noted.

# EXTERIOR NOISE TEST DATA FORM

# Stationary

Bus Number: 0518		Date: 2-2-06	Date: 2-2-06	
Personnel: B.S., S.C. & T.S.				
Temperature (°F): 41		Humidity (%): 85	Humidity (%): 85	
Wind Speed (mph): 5		Wind Direction: SW	1	
Barometric Pressure (i	n.Hg): 29.91			
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: S.C.				
Initial Sound Level Me	ter Calibration: ■ cł	necked by: S.C.		
Exterior Ambient Noise	e Level dB(A): 50.9			
Accessories and Air Conditioning ON				
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)	
	=	Measured	Measured	
Low Idle	703	47.8	48.2	
High Idle	2,050	54.3	58.1	
Wide Open Throttle	3,602	67.0	67.2	
	Accessories and	Air Conditioning OFF		
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)	
		Measured	Measured	
Low Idle	750	48.0	49.0	
High Idle	2,153	54.7	59.3	
Wide Open Throttle	3,651	66.9	67.8	
Final Sound Level Meter Calibration Check:   checked by: S.C.				
Comments: None noted.				

# 7.2 EXTERIOR NOISE TESTS



# **TEST BUS UNDERGOING EXTERIOR NOISE TESTING**



Filename:	Report.0518.doc			
Directory:	E:			
Template:	C:\Documents and Settings\vnocek\Application			
Data\Microsoft\T	emplates\Normal.dot			
Title:	5			
Subject:				
Author:	Sondra Hoover			
Keywords:				
Comments:				
Creation Date:	2/20/2006 10:52:00 AM			
Change Number:	2			
Last Saved On:	2/20/2006 10:52:00 AM			
Last Saved By:	PTI			
Total Editing Time:	1 Minute			
Last Printed On:	3/6/2007 10:41:00 AM			
As of Last Complete Printing				
Number of Pages	: 102			
Number of Word	s: 14,310 (approx.)			
Number of Chara	cters: 70,410 (approx.)			



2367 CENTURY DRIVE ' GOSHEN, INDIANA 46528 ' 1.800.348.7440

Page 1 of 3

Starcraft Bus, StarTrans Bus, Glaval Bus, Eldorado Bus, Champion Bus, Elkhart Coach- Commercial Product Only

/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.

	nforms to all applicable U.S Federal Motor Vehicle Safety Stan	dards 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.

Page 2 of 3

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: Dalettas	Date: 01/04/2022

Title: Compliance and Customer Service Manager



#### **Summary of Warranties**

**Ford E450 Cutaway Chassis Engine, Transmission, Drive Axle, Brake System** See document titled 7.12.2 Ford Warranty

**Bus Body Bumper to Bumper** See document titled 7.12.2, 7.12.3, 7.12.5 Glaval Limited warranty

**Basic Body Structure Integrity** See document titled 7.12.2, 7.12.3, 7.12.5 Glaval Limited warranty

**Wheelchair Lift System** Five Year Limited Warranty

**All Add On Components** Two Years, Unlimited Miles



#### **Warranty Provider Locations**

Fleetpride 3204 Maccorkle Ave SW, South Charleston, WV 25303

Matheny Motors 50 Matheny Lane Mineral Wells, WV 26150

Matheny Motors 4125 1<sup>st</sup> Ave Nitro, WV 25143

Matheny Motors 1375 US Rt 52 Kenova, WV 25530

#### **2023 FORD E-SERIES CUTAWAY**

# **TECHNICAL SPECIFICATIONS**



#### **BODY** High-strength C-section, steel frame Construction/materials Body-on-frame Body style Ohio Assembly Plant, Avon Lake, Ohio Final assembly location **DRIVETRAIN** Front-engine, rear-drive Layout **ENGINES** 7.3-liter premium V8 (standard) 7.3-liter economy V8 (optional) 90-degree V8, single in-block cam 90-degree V8, single in-block cam Configuration Cast iron block, aluminum heads Cast iron block, aluminum heads Block/head material Displacement 7.3 liters (445 cubic inches) 7.3 liters (445 cubic inches) 4.22 x 3.97 4.22 x 3.97 Bore x stroke Compression ratio 10.5:1 10.5:1 Valvetrain Pushrod and rocker arms, two valves per cylinder Pushrod and rocker arms, two valves per cylinder Recommended fuel 87 octane 87 octane Sequential multiport electronic Sequential multiport electronic Fuel delivery Electronic Electronic Engine control system Intake manifold Naturally aspirated, tuned intake Naturally aspirated, tuned intake Dyno certified horsepower 350 @ 3,900 rpm 300 @ 3,750 rpm 468 lb.-ft. @ 3,900 rpm 425 lb.-ft. @ 3,250 rpm Dyno certified torque **Oil-life monitor** Oil-minder system Oil-minder system **ELECTRICAL**

Alternator	Standard 210-amp, optional 240-amp, or optional dual 240-amp/157-amp
Battery group	12-volt; 750-CCA 78-amp/hr

#### **TRANSMISSION**

Configuration	Aluminum 6-speed with two overdrive speeds and tow/haul; auxiliary cooler
Gear ratios:	
First	3.974:1
Second	2.318:1
Third	1.516:1
Fourth	1.149:1
Fifth	0.858:1
Sixth	0.674:1
Reverse	-3.128:1



**FORD E-SERIES** 

#### **CHASSIS SPECIFICATIONS**

Front suspension	Twin I-beam independent with computer-selected coil springs and stabilizer bar
Rear suspension	Multileaf single-stage leaf springs/solid axle and stabilizer bar (DRW only)
Front and rear shocks	Heavy-duty gas-pressurized
Steering	Recirculating ball, power-assisted

#### BRAKES

Туре	Power four-wheel vented discs, ABS, traction control
Front (rotor diameter)	13.58 inches (345 millimeters)
Rear (rotor diameter)	13.58 inches (345 millimeters)

#### WHEELS

Туре	Steel
Size	16 inches
Number of studs	Eight
Bolt-circle diameter	6.5 inches

#### EXTERIOR DIMENSIONS (INCHES UNLESS OTHERWISE NOTED)

	138-inch wheelbase E-350 SRW	158-inch wheelbase E-350 SRW	138-inch wheelbase E-350 DRW	158-inch wheelbase E-350 DRW	176-inch wheelbase E-350 DRW	<mark>158-inch</mark> wheelbase E-450 DRW	176-inch wheelbase E-450 DRW
Overall length	241.1	261.1	241.1	261.1	261.1	261.1	261.1
Overall width	79.4	79.4	94.9	94.9	94.9	94.9	94.9
Rear track	72.1	72.1	75.4	75.4	75.4	77.7	77.7
Cab, rear to rear axle	80	100	80	100	118	100	118
Rear axle to end of frame	68.5	68.5	68.5	68.5	50.5	68.5	50.5
Front overhang	34.6	34.6	34.6	34.6	34.6	34.6	34.6

#### **INTERIOR DIMENSIONS**

	E-350/E-450 Cutaway
First row headroom	42 inches
First row shoulder room	68.1 inches
First row hip room	65.6 inches
First row maximum legroom	42.1 inches



#### **PASSENGER AND FUEL CAPACITIES**

	E-350 SRW, DRW	E-450 DRW
Seating capacity	Two (one optional)	Two (one optional)
Fuel capacity	40 gallons (55 optional)	55 gallons (40 optional)

#### **PAYLOAD PACKAGE SELECTOR (LBS.)**

	Engine	GCWR	GVWR	Payload
E-350 SRW 138-inch wheelbase	7.3-liter economy	13,000	10,050	5,100
E-350 SRW 138-inch wheelbase	7.3-liter premium	18,500	10,050	5,100
E-350 DRW 138-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,270
E-350 DRW 138-inch wheelbase	7.3-liter premium	18,500	11,500	6,270
E-350 SRW 158-inch wheelbase	7.3-liter economy	13,000	10,050	5,030
E-350 SRW 158-inch wheelbase	7.3-liter premium	18,500	10,050	5,030
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000	12,500	7,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	12,500	7,210
E-350 DRW 176-inch wheelbase	7.3-liter economy	13,000/17,000	12,500	7,200
E-350 DRW 176-inch wheelbase	7.3-liter premium	18,500	12,500	7,200
E-450 DRW 158-inch wheelbase	7.3-liter economy	18,000	14,000	8,480
E-450 DRW 176-inch wheelbase	7.3-liter premium	22,000	14,200/14,500	8,680/8,980

#### WARRANTY

Bumper to bumper:	Three years/36,000 miles
Powertrain:	Five years/60,000 miles
Safety restraint system:	Five years/60,000 miles
Corrosion (perforation only):	Five years/unlimited miles
Roadside assistance program:	Five years/60,000 miles



**FORD E-SERIES** 



### **GLAVAL BUS WARRANTY**

#### 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 one (1) year from the date of first delivery or 12,000 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 five (5) years from the date of first delivery or 100,000 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.

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: 877.258.1391 Fax: 574.970.6815



## Trans/Air Manufacturing Corporation Limited Warranty FTA Funded Vehicles 36 Month (Unlimited Mileage)

Subject to the conditions and limitations set forth below, for a period of thirty six (36) months (with unlimited mileage) starting at the date of delivery to the End User and with proper registration documentation, Trans/Air Manufacturing Corporation (Trans/Air) warrants to the original owner, if still the user, that each manufactured system/component will be free from defects in factory workmanship and materials when used and maintained in accordance with the recommended procedures. Trans/Air will furnish new or remanufactured replacements parts and cover the cost of repair labor for thirty six (36) months following delivery in accordance with the current Trans/Air flat rate labor schedule when performed at an authorized Trans/Air Service Center. This is the End User's sole and exclusive remedy.

THIS IS TRANS/AIR'S SOLE WARRANTY AND IT IS FURNISHED IN LIEU OF ANY AND ALL OTHER WARRANTIES. TRANS/AIR MAKES NO OTHER EXPRESS OR IMPLIED WARRANTIES WHATSOEVER. NO WARRANTY OF MERCHANTIABILITY AND NO WARRANTY OF FITNESS FOR PARTICULAR PURPOSE IS MADE BY TRANS/AIR.

#### **Conditions and Limitations**

- 1) In order for a thirty six (36) month system warranty to apply, the customer must purchase the evaporator(s), condenser(s), compressor(s), piping kits, electrical kits, mount kits and refrigeration hose from Trans/Air. If the full system is not purchased from Trans/air, the thirty six (36) month warranty applies to Trans/Air supplied evaporators and condensers only. All compressors, piping kits, and electrical kits purchased outside of a full system, will be considered a service part and will carry a 180 day warranty. All mount kits purchased outside of a full system, and used on a Trans/Air system, will be considered a service part and will carry a 180 day warranty. All mount kits purchased outside of a full system, and used on a Trans/Air system, will be considered a service part and will carry a 180 day warranty. All mount kits purchased outside of a full system other than Trans/Air, will carry no warranty. All other components supplied by Trans/Air are covered by standard parts warranty (see #4 below). Extended warranty coverage may be purchased from Trans/Air at the time of purchase of the unit or system. Correction of a failure under this warranty does not extend the warranty beyond the standard thirty six (36) month warranty period.
- 2) Service parts are warranted for a 180 day period from the date of sale or until the expiration of the original equipment warranty, whichever is later. (Compressors are warranted for 1 year) If required, parts covered by warranty must be returned to Trans/Air's factory in Dallastown, PA, by specified carrier freight prepaid, within standard Return Goods Authorization procedures, for evaluation, in order for Trans/Air to authorize any warranty claim.
- 3) Trans/Air will be responsible for the costs of repairs or replacement covered by warranty only if performed at an authorized Trans/Air Service Center. The Service Center is responsible for effecting repairs or replacement during the warranty period in accordance with current Trans/Air warranty procedures. A customer requesting service at a location other than an approved Service Center, or one requesting overtime, shall be responsible for all additional warranty repair expenses in excess of the flat rate allowed. Trans/Air is not responsible for towing charges.
- 4) If the customer has not properly registered the Trans/Air system, the Service Center is not authorized to render warranty services without charge. All information on the warranty registration from must be completed in its entirety and returned to Trans/air to activate the warranty.



- 5) Trans/Air does not warrant the installation of Trans/Air products unless installed by Trans/Air or an authorized Trans/Air Turnkey installation facility. In the cases of installation related failures, which are not covered by warranty Trans/Air specifically is not responsible for failures attributable to inadequate provision by the installer of structural support or inadequate provision of electrical requirements.
- 6) This warranty does not apply in cases of a failure of Trans/Air product which is attributable to improper evacuation procedures, or the introduction of non-approved refrigerant oil, additives, or other contaminants into the system.
- 7) This warranty does not apply in cases of failure of Trans/Air product, which is attributable to failure of the end user to perform or provide preventative maintenance in accordance with Trans/Air's guidelines. Examples include, but are not limited to, failure to properly maintain belt tension, clean condenser coils, replace evaporator filters, maintain electrical systems to provide proper voltage to components, or check and tighten hardware or fittings, which may have loosened due to vibration. (See Trans/Air Preventive Maintenance Schedule)
- 8) This warranty does not apply to loss of refrigerant or any damage caused by loss of refrigerant unless directly attributable to the failure of a Trans/Air product which, at the time of the failure, was under warranty.
- 9) Trans/Air reserves the right to make changes in design or improvements to its products or parts thereof, without obligation to make or install of such changes or improvements on existing units or upon products covered by this warranty.
- 10) If Trans/Air makes a product improvement program available to the End User, Trans/Air reserves the right to limit the duration of the programs unless it is safety related. Expenses incurred in completing said product improvements after the closing date of the program are the responsibility of the End User.
- 11) Trans/Air's warranty shall not apply in the case of damage incurred during shipment, accidental damage, abuse, misuse, act of nature, or if the serial number is missing, or to any product which, in the sole opinion of Trans/Air, has been installed, altered or repaired in a manner affecting the efficiency or performance of the unit or inconsistent with Trans/Air's written procedures.
- 12) This warranty applies only within the boundaries of the whole United States, its territories, and Canada. For other available coverage that may be purchased, contact Trans/Air.

TRANS/AIR'S LIABILITY TO THE PURCHASER FOR DAMAGES FROM ANY CAUSE WHATSOEVER AND REGARDLESS OF THE FORM (S) OF ACTION, WHETHER IN CONTACT OR TORT, INCLUDING NEGLIGENCE OR OTHERWISE, SHALL BE LIMITED TO THE VALUE OF REPAIRS TO OR REPLACEMENT OF THE DEFECTIVE COMPONENTS DURING THE WARRANTY PERIOD, AS THE EXCLUSIVE REMEDY, AND STRAIGHT TIME LABOR CHARGES AS OUTLINED IN ITS CURRENT WARRANTY PROCEDURE MANUAL AND FLATE RATE LABOR SCHEDULE. IN NO EVENT SHALL TRANS/AIR BE LIABLE WHATSOEVER FOR ANY PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR FOR LOST PROFITS OR OTHER COMMERCIAL LOSSES FROM ANY CAUSE WHATSOEVER, WHETHER OR NOT TRANS/AIR HAS RECEIVED NOTICE OF THE POSSIBILITY OR CERTAINTY OF SUCH DAMAGES OR LOSSES. TRANS/AIR WILL NOT BE LIABLE FOR ANY LOSS OCCURING BECAUSE THE EQUIPMENT IS OUT OF SERVICE. NO ACTION OR PROCEEDING ARISING OUT OF, FOR BREACH OF, OR IN ANY MANNER RELATING TO THIS WARRANTY MAY BE BROUGHT BY ANYONE AFTER SIX (6) MONTHS FROM NOTIFICATION TO TRANS/AIR OF AN IN-WARRANTY FAILURE.





# **Creative Care Owner's Guide**

### **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 and we will do our best to meet your expectations. With nearly 40 years of listening to our customers' needs and delivering vehicles within their budget, we are the nation's largest bus dealership. We have a dedicated nationwide network of Parts, Service, Warranty, and Customer Care departments to ensure that we continue to meet 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**

Our customer care department is here to respond to your inquires or concerns about your vehicle purchase. Customer care is available to help resolve any issue that may arise over the serviceable life of your vehicle. Customer 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 departments welcomes our customers vehicles for any maintenance or service-related concerns. 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 Service@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 you concerns. Our warranty department will ensure that all your warrantable concerns are corrected to the manufacturer standards. To reach your warranty department please call 1.800.326.2877 or email Warranty@CreativeBusSales.com

Our staff is standing by, please do not hesitate to contact us!

### Warranty Procedure Dealer Warranty Statement

Warranty restitution can only be applied to repairs made if proper procedures are followed and it is determined that the issue is covered under the chassis, body, or component warranty.

**Before** any work is performed on your vehicle, please contact our warranty department at Warranty@CreativeBusSales.com so that they can assist. The following information will be needed in order to determine warranty coverage.

- Make
- Model
- VIN Number
- Mileage

#### **Chassis Warranty Items**

Contact your local chassis dealer and/or contact Creative Bus Sales for assistance in locating your local chassis dealer.

#### **Bus Warranty Items**

Contact Creative Bus Sales

Note: Failure to follow this procedure may result in the denial of any future vehicle warranty claims.

### About Your 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 the 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 Creative warranty team. No repairs are authorized to be completed for warranty purposes until the warranty team 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 warrantable concern, your Warranty Administrator will discuss with you the best way to get you 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 our facility please contact Warranty@CreativeBusSales.com and our team will be happy to assist you in locating a authorized warranty repair facility near your area.

If the issue you are experiencing is OEM (Ford, Chevy, Dodge) related 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.

#### 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 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.

#### 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.

# About Your Warranty — FAQs (Continued)

**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: 1.800.385.4357

If the failure is related to the after market body side of the bus, towing is not covered.

What should 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.

## Service Department



With numerous service locations across the U.S., Creative Bus Sales is equipped to accommodate all your bus servicing needs rapidly and efficiently. Our bus service bays are equipped with the newest state-of-the-art equipment to service your light, medium, and heavy-duty vehicles. Combined with our extensively trained and certified service technicians, you can count on Creative Bus Sales to provide the highest level of service and reliability.

#### Creative Bus Sales offers:

- OEM Factory Trained Technicians / ASE Certified
  - Ford / GM / IC / ARBOC / Starcraft / ENC
  - Braun & Ricon Lift
  - TransAir / Valeo / ACT
- Preventive Maintenance / Warranty / Advanced Repairs
  - Preventive Maintenance
  - State and Federal Inspections
  - Warranty Services
  - A/C Service & Repairs
  - Alignment
  - Engine Overhaul
- Remote & Onsite Service & Warranty Repairs
- Maintenance Plans
  - Monthly / Annual Plans Available
  - Parts Delivery & Mobile Service

### Service Department — FAQs

Who do I call if one of my buses needs maintenance, repair, an option installed, or some other service? Call our toll-free Customer Care number at 1.844.374.8915

#### What kinds of service work can I expect Creative Bus Sales Service Facility to perform?

We are fully prepared to meet your bus service needs. We are experts in installing special options like wheelchair lifts, wheelchair securement, air conditioners, and roof vents. We can, also, provide service as it relates to chassis and body repair.

Our service facility can meet your extremely important routine maintenance functions, ensuring all warranty prerequisites are met.

If you need major repairs, like engine work, transmission or brake repairs, we will make sure your bus is operational as soon as possible.

#### How long will it take to get my bus repaired?

Of course, the length of time necessary to repair your bus will depend on the type of repair necessary, its severity, and the availability of parts.

It is the goal of Creative Bus Sales to expedite repairs. Once an assessment has been made, we will be able to give a more accurate estimate of repair time.

#### What can I expect to pay?

Our service department rates are both reasonable and competitive. Each job will be evaluated so that you receive the level of service needed to best accommodate the repair. We provide written estimates upon request.

#### What kind of warranty do I receive on the service work performed?

Our standard policy is to provide a 30-day warranty covering parts and labor on any service work we perform. Any other arrangements for specialized services need to be agreed upon in writing prior to the work being performed.

## Don't Forget

Creative Bus Sales has a wide range of offerings to help you in all stages of bus ownership. Please contact Creative Care (1.844.374.8915 | CreativeCare@CreativeBusSales.com) if you're interested in any of the additional services listed below.

#### Mobile Repair Team Service

Our mobile service is available through most of our full service locations. Our quick mobile response vehicles are fully equipped for on-site repairs. This new service provides the same reliable maintenance service currently offered by Creative Bus Sales but at your location.

#### **Graphics Packages**

Wrap your bus in custom graphics and promote your brand's visibility. Creative Bus Sales can coordinate the work to your exact needs and specifications. Your bus will leave our facility completely decked out with your logo and branding.

#### Graphics Services Available:

- New Vehicle Graphics
- Re-branding Current Vehicles
- Graphic Design / Installation / Project Management

#### **Green Alternative Systems**

Green Alternative Systems is the largest Ford Recognized Qualified Vehicle Modifier (QVM) Alternative Fuel Program Installer in North America, with multiple dedicated facilities that focus on the installation and up-fitting of Compressed Natural Gas (CNG) and Propane fuel conversion systems for fleet customers.

#### Why Green Alternative Systems?

- Over 10,000 vehicles converted to alternative fuels
- Ford QVM's Largest Alternative Fuel Participant
- Propane, Natural Gas, and Electric
- Tier One Supplier to Multiple OEM's
- CNG Fuel System Inspections
- Certified Alternative Fuel Technicians
- Natural Gas / Propane / Bi-Fuel / Electric

# **Contact Information**

Creative Bus Sales	Phone	909.465.5528
(Chino, CA Corporate Headquarters)	Fax	909.465.5529
	Website	CreativeBusSales.com
Creative Care	Phone	1.844.374.8915
	Fax	909.465.5529
	Email	CreativeCare@CreativeBusSales.com
Service Department	Phone	1.800.326.2877
	Fax	909.465.5529
	Email	Service@CreativeBusSales.com
Parts Department	Phone	888.993.5040
	Fax	909.993.5766
	Email	Parts@CreativeBusSales.com
Warranty	Phone	1.800.326.2877
	Fax	909.465.5529
	Email	Warranty@CreativeBusSales.com
Corporate Management Team	Toll Free	800.326.2877

Our staff is standing by, please do not hesitate to contact us!



#### **BID FORM #1**

#### MANDATORY BID FORM -- MUST BE SUBMITTED WITH BID

in the State of	the Technical Service Representative(s) and parts distribution center(s) closest West Virginia.		
	Location(s) of the technical service representative(s).		
Name:	Creative Bus Sales, Inc Indiana		
Address:	9365 Counselors Row, Suite 112, Indianapolis, Indiana, 46240		
	Contact: Matt Mashuda - Transit Bus Sales		
Telephone:	412-922-0184		
Name:	Creative Bus Sales, Inc Georgia		
Address:	1926 Hyannis Court, College Park, Georgia, 30337		
-	Contact: Carl Henderson - Eastern Service Manager		
Telephone:	844-374-8915		
	Location(s) of parts distribution center(s).		
Name:	Creative Bus Sales, Inc Indiana		
Address:	57475 County Road, Elkhart, Indiana, 46517		
Telephone:	877-686-9448		
Name:	Creative Bus Sales, Inc Parts Distribution Warehouse		
Address:	3832 E. Roeser, Phoenix, Arizona, 85040		
Telephone:	888-993-5040		

Revised 10/27/14

······

#### **REQUIRED BID DOCUMENTATION CHECKLIST**

Model Year: 2024 Ford Model: Glaval PrimeTime	
Mandatory Bid Forms – must be submitted with bid:	
■ Bid Form #1: Locations of Technical Service Representatives and Parts Distribution Centers	
Bid Form #2: Certification for Air & Water Pollution	
Bid Form #3: Disadvantaged Business Enterprise Vendors/Manufacturers Certification The vendor shall also supply with bid FTA TVM DBE Goal Concurrence for the Current Fiscal Year Approval Letter.	
✓ Bid Form #4: Buy America Certification Rolling Stock Should the Vendor be declared responsive and low bid, pursuant to Pre- Award and Post Delivery Audit Requirements, the Division will require the Vendor to submit documentation (with the bid or prior to any award) that lists:	
1) Component and sub-component parts of the rolling stock to be purchased identified b manufacturer of the parts, their country of origin and cost: and	
2) The location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.	
Bid Form #5: Federal Motor Vehicle Safety Standards Certification Vendor shall also supply with bid a breakdown of FMVSS standards to be mo with proposed vehicle.	et
Bid Form #6: U.S. Comptroller's Debarment List Certification	
Bid Form #7: Certification of Primary Participant Regarding Debarment, Suspension, and Other Responsibility Matters	
Bid Form #8: Vendor's Certification of Understanding and Acceptance	
Bid Form #9: Certification of Restrictions on Lobbying	
Bid Form #10: Certification of Compliance with FTA's Vehicle Testing Requirements A copy of the vehicle testing report (if available) shall be included with the bid.	
$\checkmark$ Exhibit A Pricing Page (8)	



#### Training

Creative Bus Sales understands and is prepared to meet the training requirements as outlined in section 3.43.1.

If any further information is needed, please contact Mike Wilson at mikew@creativebussales.com.



CRFQ DMT2300000010 138" Wheelbase Dual Rear Wheel (DRW) Narrow Body Cutaway Vehicle

13.2.1 References

Tri River Transit 753 Marconi Drive Hamlin, WV 25523 (304) 824-2944

Buckwheat Express 108 Senior Center Drive Kingwood, WV 26357 (304) 329-0464

Berkeley Senior Services 217 North High Street Martinsburg, WV 25404 (304) 263-8873

Heart 2 Heart Volunteers Inc. 667 Stone Shannon Road Wheeling, WV 26003 (304) 277-4657

Logan-Mingo Area Mental Health Inc. 300 Prosperity Lane Logan, WV 25601 (304) 792-7130



# I, Mac Warner, Secretary of State of the State of West Virginia, hereby certify that

CREATIVE BUS SALES, INC.

a corporation formed under the laws of California filed an application to be registered as a foreign corporation authorizing it to transact business in West Virginia. The application was found to conform to law and a "Certificate of Authority" was issued by the West Virginia Secretary of State on December 01, 2016.

I further certify that the corporation has not been revoked by the State of West Virginia nor has a Certificate of Withdrawal been issued to the corporation by the West Virginia Secretary of State.

Accordingly, I hereby issue this Certificate of Authorization

# **CERTIFICATE OF AUTHORIZATION**



Validation ID:5WV55\_S32CW

Given under my hand and the Great Seal of the State of West Virginia on this day of

September 23, 2020

Mac Warner

Secretary of State

Notice: A certificate issued electronically from the West Virginia Secretary of State's Web site is fully and immediately valid and effective. However, as an option, the issuance and validity of a certificate obtained electronically may be established by visiting the Certificate Validation Page of the Secretary of State's Web site, https://apps.wv.gov/sos/businessentitysearch/validate.aspx entering the validation ID displayed on the certificate, and following the instructions displayed. Confirming the issuance of a certificate is merely optional and is not necessary to the valid and effective issuance of a certificate.



CRFQ DMT2300000010 138" Wheelbase Dual Rear Wheel (DRW) Narrow Body Cutaway Vehicle

#### LOCATION OF CONVERSION:

Glaval Bus 2367 Century Drive Goshen, IN 46528

Activities:

Chassis receipt from Ford

The complete assembly of the bus on the chassis including all components and subsystems.

# **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 - 60p.s.i. That equates to 300 gallons per minute pushed through the spray heads, or the equivalent of a 24 inchper-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.

2367 Century Drive, Goshen, IN 46528 PH: 574-262-2212 FAX: 574-642-4389





Gateway

# High Idle and Shift Interlock System



- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- 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



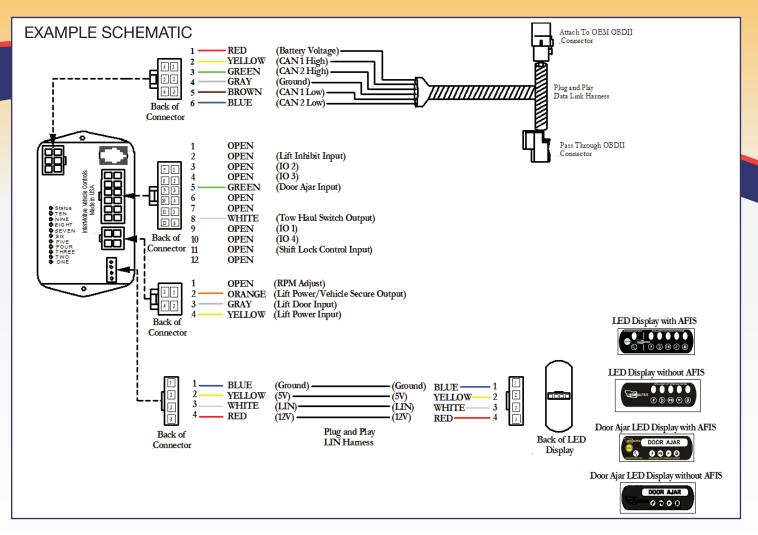
- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- 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.



(775) 831-2002





SPECIFICATIONS	
Number of Inputs	Five inputs (lift inhibit, door ajar, shift lock, lift door and RPM adjust)
Number of Outputs	Four configurable outputs, plus one lift power/vehicle secure output and one tow haul switch output
Current Draw	~120 mA
Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

# www.InterMotive.net

REV\_AD U.S. Patent #9,469,261







# LEADING THE INDUSTRY IN REAR VISION SAFETY

**STSK4750B** 

rosco

**STSK4750B KIT COMPONENTS:** MONITOR: STSM244 CAMERA: STSC130B HARNESSES: STSH349 (49FT BLACK), STSH130 (ADAPTER HARNESS)

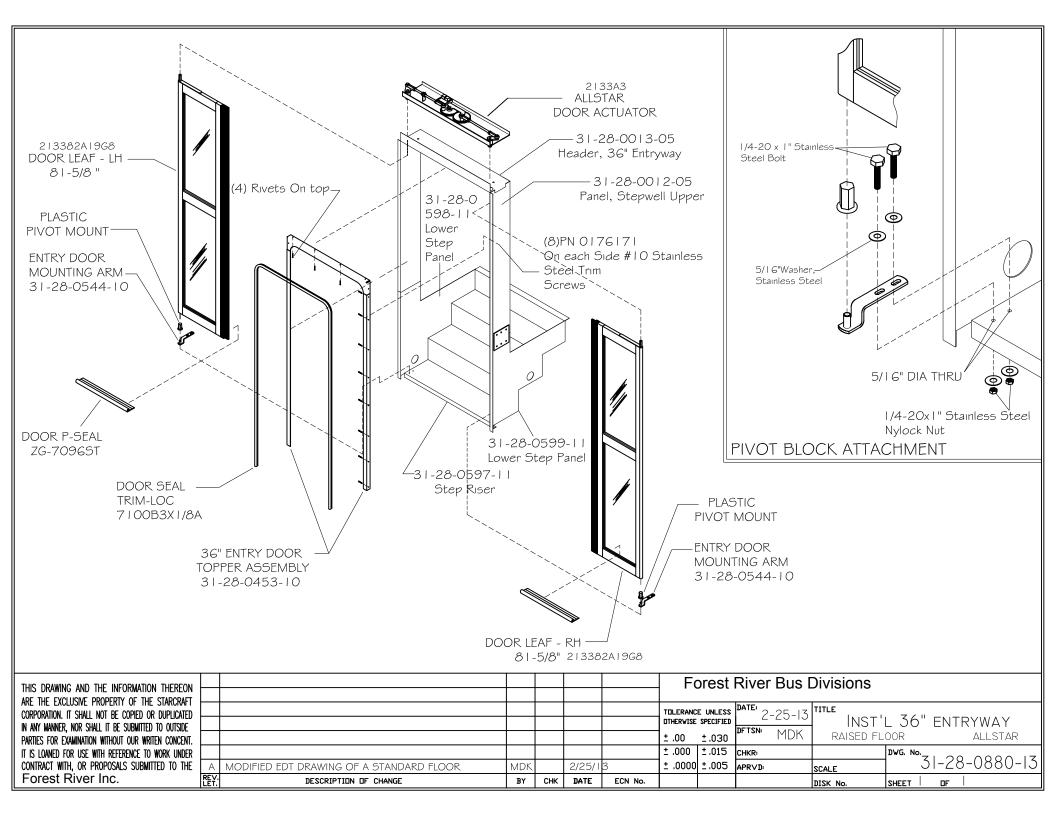
Forest River, Inc. bus manufacturing companies will be the industry's first to offer a rear backup safety camera as standard equipment on every bus in 2019... Setting the safety tone and trend in the commercial and school bus market.

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 MONI		STSC130	B CAMERA SPECS
SCREEN SIZE	7"	TV LINES	420 TVL
RESOLUTION	800*480 pixels	FIELD OF VIEW (DIAGONAL)	150°
MONITOR BRIGHTNESS	700cd/m2	MINIMUM ILLUMINATION	0.2 LUX
NUMBER OF CAMERA INPUTS	1	DUST/WATER RATING	IP69K
INPUT FORMAT	13-pin	POWER SUPPLY	12 Vdc
VIEWING ANGLES	L/75°, R/75°, UP/60°, DOWN/60°	OPERATING TEMPERATURE	-22°F to 140°F -30°C TO 65℃
SHOCK RATING	2G		
VIBRATION RATING	6G	- Herein	
POWER SUPPLY	12 ~ 32 VDC		
OPERATING TEMPERATURE RANGE	-4°F to 158°F -20°C to 70°C		1-800-227-2095



ROSCOVISION.COM | ROSCOMIRRORS.COM INFO@ROSCOVISION.COM 90-21 144TH PLACE JAMAICA NEW YORK 11435





The Industry Leader in **Bus Doors and Actuators** 

#### About

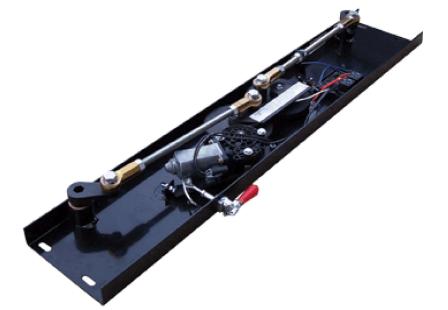
### **Electric Door Actuators**



Support Resources

Service Request

Suggestions



#### **Product Features**

- ▲ Low-profile design
- ▲ Powder-coated base plate
- ▲ Plated push rods
- Permanently lubricated pivot points
- ▲ <u>Motor Control PC Board</u>
- ▲ <u>Proprietary, heavy-duty motor</u>
- ▲ <u>Available remote control</u>
- ▲ 1-year warranty
- ▲ New! Optional Auto Reopen Switch

#### **Harmony of Movement**

- ▲ Our design produces completely <u>perpendicular door opening</u>--always.
- ▲ Forward door opens first and closes last--always.
- ▲ No need to rely on spring-loaded push-pull rods--ever.

#### Secure Closing

- ▲ Our design ensure an unequalled, strong closing.
- ▲ The actuator will reliably hold the door shut, even at highway speeds.

#### Serviceability

- J The reliability of the design,
- ▲ together with the ease-of-access,
- ▲ and the documentation tools we provide,
- work together to create unparalleled serviceability.

## Maintenance

Minimal periodic maintenance of this product is recommended. The frequency varies, of course, by climate and use. Periodically **inspect** the entire mechanism.

As a rule, **lubricate** all moving parts on a semi-annual basis using a white, lithium, aerosol grease.

## **Support Documentation**

DOC00066, A&M Systems Header Option Chart and Details (pdf, 326 KB)

Parts Lists

■ Model 1000E Family (pdf, 1.10 MB) Model 1100E Family (pdf, 1.08 MB) <u>⊿Model 1200E Family</u> (pdf, 1.08 MB) <u>Model 1300E Family</u> (pdf, 1.08 MB) <u>⊿Model 1400E Family</u> (pdf, 1.08 MB) <u>Model 1500E Family</u> (pdf, 1.08 MB) <u>Model 1600E Family</u> (pdf, 1.08 MB) Model 2100E Family (pdf, 1.10 MB) <u>Model 2100.1E Family</u> (pdf, 346 KB) Model 2200E Family (pdf, 1.08 MB) Model 2300E Family (pdf, 1.08 MB) Model 2400E Family (pdf, 1.18 MB) Model 2729.X Family (pdf, .81 MB) Model 2800E Family (pdf, 1.08 MB) <u>⊿Model 2800.1E Family</u> (pdf, 1.00 MB) Model <u>3000E Family</u> (pdf, 362 KB) <u>Model 3400E Family</u> (pdf, 1.08 MB) <u>Model 3500E Family</u> (pdf, 931 KB) <u>→Model 3501E (pdf, 461 KB)</u> <u>Model 3600E Family</u> (pdf, 1.43 MB) ▲<u>Model 4000E Family</u> (pdf, 679 KB) Model 4400E Family (pdf, 678 KB) Model 5142E Family (pdf, 834 KB) <u>Model 5300E Family</u> (pdf, 637 KB) <u>Model 5500E Family</u> (pdf, 362 KB) Model 6200E Family (pdf, 535 KB) \*\*\*NEW - PC Board and Wires Chart (pdf, 171 KB) ▲ <u>Assembly & Rigging Instructions (pdf, 98 KB)</u> Replacements Actuator Arm Replacement (pdf, 21 KB) <u>Emergency Release Lever Replacement</u> (pdf, 21 KB) Forward Gear Replacement (pdf, 21 KB) Motor Replacement (pdf, 20 KB) ✓ PC Board Replacement, Quick Check<sup>™</sup> Enabled (pdf, 21 KB) PC Board Replacement, Standard (pdf, 21 KB) **⊿** Troubleshooting Motor Control PC Board with Auto Reopen (pdf, 10 KB) ▲ <u>Simplified Schematic</u> (pdf, 75 KB) ▲ <u>Wireless remote option flyer</u> (pdf, 158 KB)



Note: You need Adobe Acrobat Reader to open or

or view pdf formatted documents. Acrobat Reader

is available free from Adobe. Click here to get it.



The Industry Leader in **Bus Doors and Actuators** 

About

## **Door Leaves**

- Products
- Support Resources
- Service Request

Suggestions





## **Product Features**

- J Jistinctive door leaf design
- ▲ <u>Key-lock joint</u>
- ▲ Corrosion resistance through use of aluminum, stainless steel, and zinc plating
- **I** <u>Torque arm</u> on upper hinge
- ▲ Tempered glass
- ✓ Tough, clear coat, anodized finish (204 R1 rated)
- ▲ <u>Radiused edge</u> for clean mating to seal
- Ambidextrous! (Use in either forward or aft position)

## **Harmony of Movement**

- ✓ Our design produces completely <u>perpendicular door opening</u>--always.
- ▲ Forward door opens first and closes last--always.
- ▲ No need to rely on spring-loaded push-pull rods--ever.

## **Secure Closing**

- ▲ Our design ensure an unequalled, strong closing.
- ▲ The actuator will reliably hold the door shut, even at highway speeds.

## Serviceability

- J The reliability of the design,
- ▲ together with the ease-of-access,
- ▲ and the documentation tools we provide,
- ▲ work together to create unparalleled serviceability.

## **Support Documentation**

- <u>DOC00065, A&M Systems Door Option Chart and Details.pdf</u> (pdf, 1128 KB)
- ▲ <u>Glass Replacement</u> (pdf, 20 KB)
- ▲ <u>Door Parts List</u> (pdf, 262 KB)
- ▲ <u>D.O.T. Window Retention Certification</u> (pdf, 912 KB)



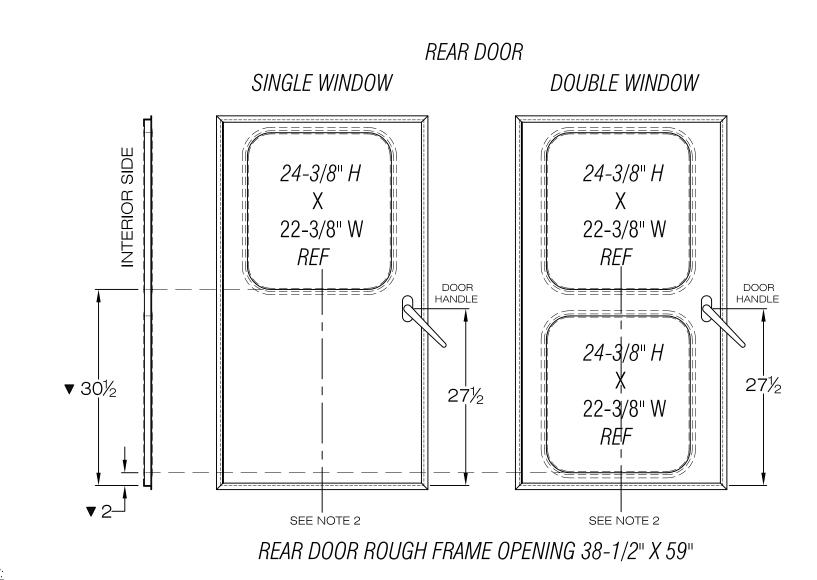
Note: You need Adobe Acrobat Reader to open or

or view pdf formatted documents. Acrobat Reader

is available free from Adobe. Click here to get it.

Home | About | Products | Support Resources | Service Request | Suggestions

Questions or problems regarding this web site should be directed to <u>webmaster@anmsystems.com</u>. Copyright © 2006 A&M Systems, Inc. All rights reserved.



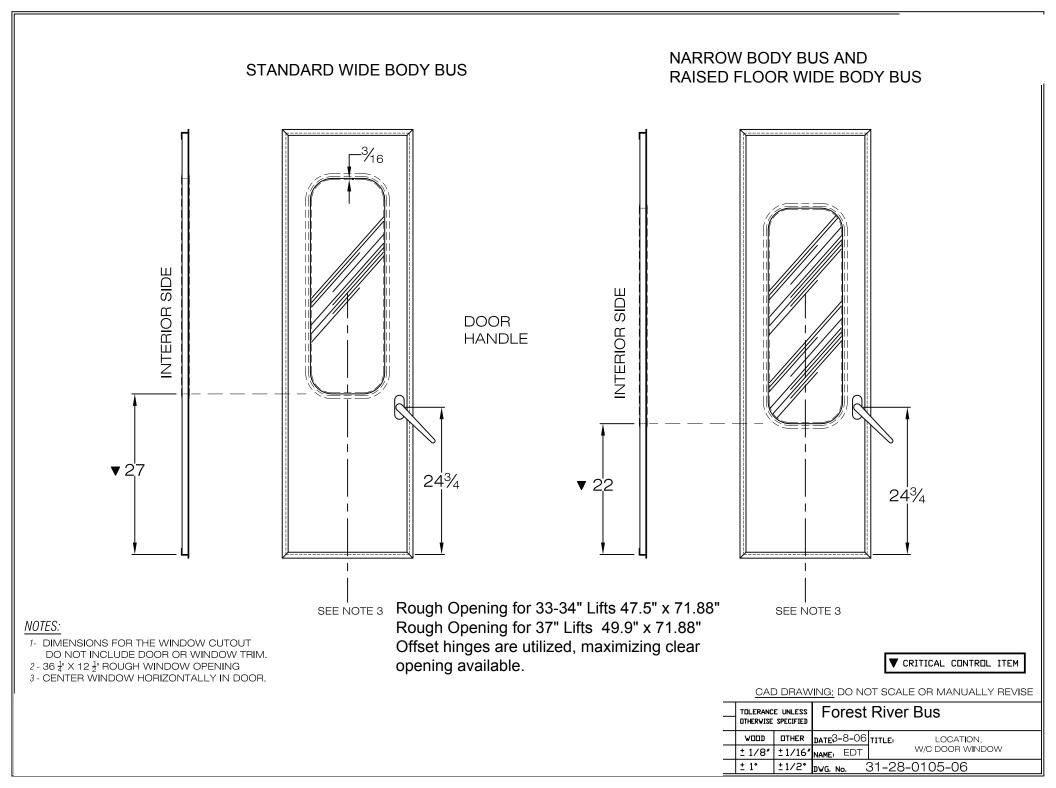
NOTES:

- 1- DIMENSIONS FOR THE WINDOW CUTOUT DO NOT INCLUDE DOOR OR WINDOW TRIM.
- 2 CENTER WINDOW HORIZONTALLY IN DOOR.
- 3 TWO (2) PANELS ARE REQUIRED FOR W/C DOOR.

#### ▼ CRITICAL CONTROL ITEM

CAD DRAWING: DO NOT SCALE OR MANUALLY REVISE

	TOLERANC OTHERWISE		Forest River Bus			
]	VOOD			TITLE: LOCATION, RR DR		
		±1/16″		WINDOW		
	± 1*	±1/2*	<u>рwg, No, 37-28-0108-06</u>			







Gateway

## High Idle and Shift Interlock System



- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- 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



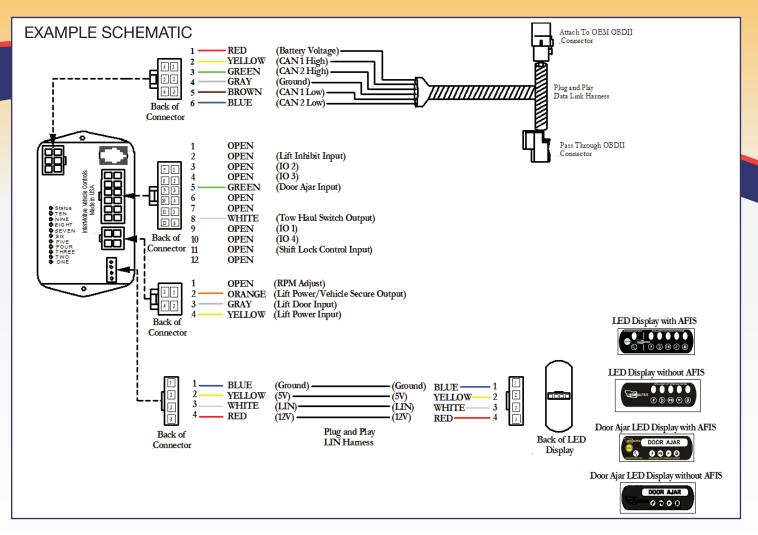
- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- 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.



(775) 831-2002





SPECIFICATIONS	
Number of Inputs	Five inputs (lift inhibit, door ajar, shift lock, lift door and RPM adjust)
Number of Outputs	Four configurable outputs, plus one lift power/vehicle secure output and one tow haul switch output
Current Draw	~120 mA
Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

## www.InterMotive.net

REV\_AD U.S. Patent #9,469,261

## **HEAVY DUTY ENERGY ABSORBING BUMPERS**



**PROTECTS VEHICLE IN LOW SPEED IMPACTS** 





SAFETY Protects vehicle from damage in low speed collisions



**EXTREME TEMP** Specified on buses in extreme climates



CORROSION RESISTANT

harsh elements and road

Withstands years of

chemicals





Available in various widths

and custom end trims

WARRANTY 1 year

**OPTIONS** 

- **Outer Skin Can be Painted to Match or Compliment the Vehicle**
- **Two piece construction offers** exchangeable symmetrical halves
- **Less Parts Reduces Inventory** • **Requirements and Cost**
- Widths Available from 96" to 102

13501 S Ridge Dr. • Charlotte, NC 28273 • Tel: 800 . 951 . 7867 • Fax: 704 . 889 . 2760 • sales@smiglobal.net WWW.SMIGLOBAL.NET NCL-7.2-6006 | Rev A | 6-18-15 | ISO 9001 Certified

## MEDIUM DUTY ENERGY RANSPEC **ABSORBING BUMPERS**



**PROTECTS VEHICLE IN LOW SPEED IMPACTS** 





SAFETY Protects vehicle from damage in low speed collisions



**EXTREME TEMP** Specified on buses in



extreme climates

CORROSION RESISTANT

harsh elements and road

Withstands years of

chemicals





Available in various widths and custom end trims

WARRANTY 1 year

**OPTIONS** 

- **Two Piece Construction offers Exchangeable - Symmetrical** Halves
- **Fewer Parts Reduces Inventory Requirements and Cost**
- Less Weight = Higher Fuel • Efficiency
- Widths available 80" to 96"

13501 S Ridge Dr. • Charlotte, NC 28273 • Tel: 800 . 951 . 7867 • Fax: 704 . 889 . 2760 • sales@smiglobal.net W W W . S M I G L O B A L . N E T NCL-7.2-6006 | Rev A | 6-18-15 | ISO 9001 Certified



## CENTURY SERIES NCL1000-2 WHEELCHAIR LIFTS

## THE ONE-STOP-SHOP FOR ALL YOUR MOBILITY TRANSPORTATION NEEDS

Since 1963, BraunAbility<sup>®</sup> has been the trusted industry leader. Our wheelchair accessible vehicles and lifts are designed to meet your specific needs, with performance, safety, and reliability that will keep your fleet up and running day after day, year after year. With the most diverse product portfolio of any mobility vehicle company in the industry, BraunAbility delivers the right solution to every commercial mobility need.

## NCL1000-2 CENTURY SERIES WHEELCHAIR LIFT

## **STANDARD FEATURES**

#### • 1,000-pound lifting capacity

- NHTSA-compliant
- Fully automatic FMVSS 403-compliant lift, operated by an attendant
- Interfaces with OEM interlocks
- · Long-lasting LED lift-mounted lights
- Side or rear door application\*
- Platform options up to 37" wide
- Floor to ground lift heights up to 48"
- Made in the USA

\* Vehicle suspension dynamics affect body roll and FMVSS 404 platform tilt allowance. Before selecting a lift with a 1000# rated capacity, ensure this load does not induce excessive platform tilt.

## SAFETY FEATURES

- Locking mechanical Inboard Barrier (IB), powder coated yellow for safety and high visibility, prevents operation if occupied
- Visual and audible warnings alert both passengers and attendants to unsafe conditions
- Interlocked gas spring activated outer barrier
- Dual handrails for security and convenience
- · Pump design prevents platform folding when occupied

## **EASE OF USE FEATURES**

- · Hand-held control box with illuminated functions
- Durable redesigned baseplate reduces lift weight, and allows for quicker and easier service
- Bridging feature permits the wheelchair user to board the lift from sidewalks
- · Equipped with an adjustable anti-rattle feature
- Lift-Tite<sup>™</sup> system stows the lift platform securely while the vehicle is in transit
- Pump module with removable cover offers easy access to all components
- Integrated back-up pump

## **BRAUNABILITY'S UNRIVALED SERVICE**

Every BraunAbility® commercial mobility product comes with our team of commercial mobility experts. They will work to find the ideal mobility transportation solution, no matter the requirements, complexity, or scale. And after you make a purchase, they will continue to work just as hard to offer you all the service and repair support you need.

## The NC1000-2 Century Series Wheelchair Lift from BraunAbility

With dual hydraulic lift arms, and a design that has withstood the test of time, the Century Series offers all the benefits and quality of a BraunAbility wheelchair lift in a streamlined, economical package. The simplified electrical system offers trouble-free operation, while the nonhydraulic spring-loaded outer barrier keeps the wheelchair safely and securely on the wheelchair lift platform throughout the lifting cycle. In addition to all these standard features, the NCL1000-2 also comes equipped with an increased lifting capacity of 1000 pounds.



The NCL1000-2 Century Series also features new and improved inboard barriers, baseplates, vertical channels, and lower parallel arms for a more rigid and stable ride.

BraunAbility offers several models of the Century 2 Wheelchair Lift to address the right application, including usable platforms of 33" x 51", 34" x 51", 34" x 54", as well as 37" x 51" and 37" x 54". The models also vary based on the placement of the front or rear pump module, the lifting capacity (1,000 pounds), and the overall floor-to-ground lift height (up to 48"). The Century 2 Wheelchair Lift is available with or without the handrail belt. See your BraunAbility dealer or braunability.com for lift models available for your specific application.



## 🗮 MADE IN THE USA

631 West 11th Street • Winamac, IN 46996 (574) 946-6153 | 1-800-THE-LIFT www.braunability.com/commercial

All illustrations, descriptions and specifications in this brochure are based on the latest product information at the time of publication. BraunAbility reserves the right to make changes at any time without notice. © 2019 The Braun Corporation 405245





Gateway

## High Idle and Shift Interlock System



- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- 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



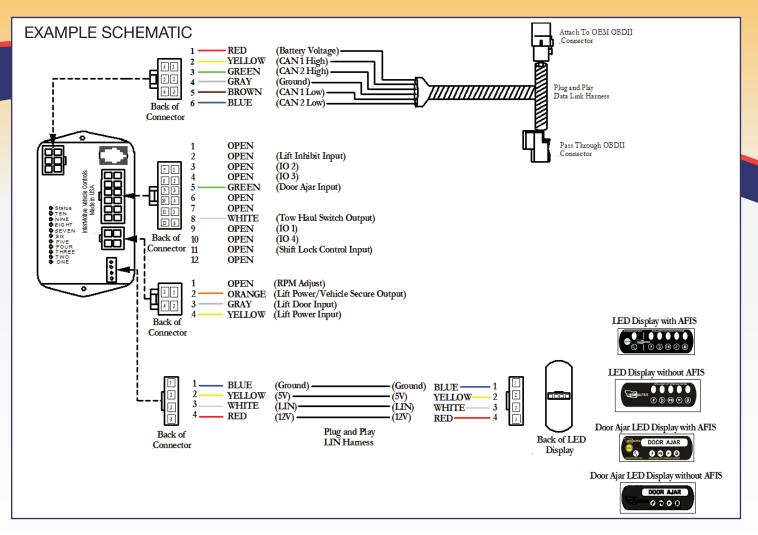
- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- 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.



(775) 831-2002





SPECIFICATIONS	
Number of Inputs	Five inputs (lift inhibit, door ajar, shift lock, lift door and RPM adjust)
Number of Outputs	Four configurable outputs, plus one lift power/vehicle secure output and one tow haul switch output
Current Draw	~120 mA
Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

## www.InterMotive.net

REV\_AD U.S. Patent #9,469,261



# **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. Industry exclusive 2 year, unlimited mileage, limited warranty

Constructed of corrosion-resistant powder-coated galvannealed steel

Flexible mounting pattern (optional channels available to attach condenser to vehicle stringer in lieu of standard floor mounting) Stainless steel housing option is also available (Stainless Steel SMC2S pictured below)

 Image: State of the state

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



10" weather-proof condenser fans provide maximum air flow



Lightweight microchannel coils increase condenser efficiency and require less refrigerant

# School & Commercial Bus Climate Control Design | Manufacture | Install | Service

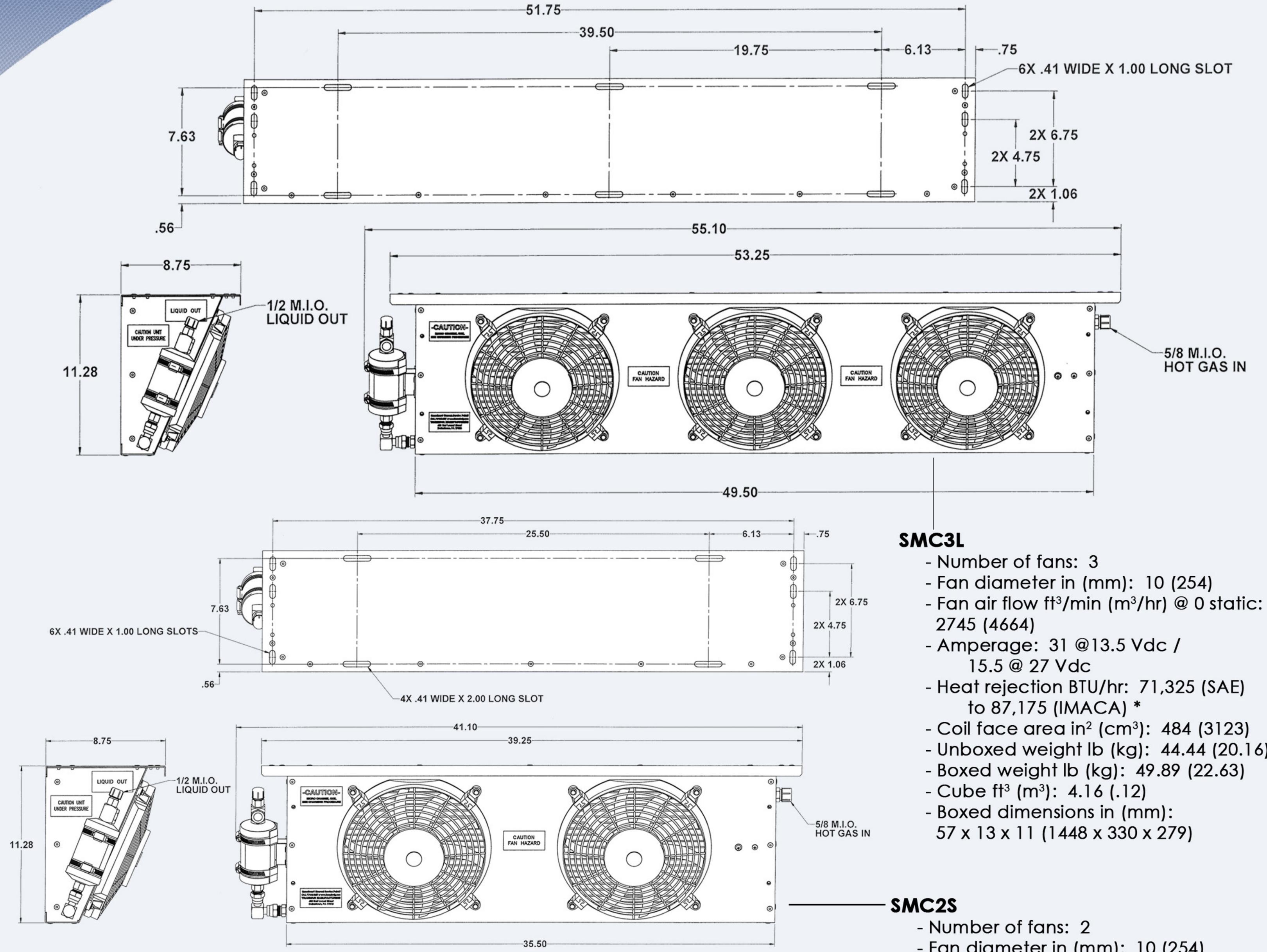


Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing world class climate control products and services to the bus and commercial vehicle markets.

LIT-SMC2013-042414



# **SMC Condensers**



# 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 in<sup>3</sup>

# Fan Motor Assembly (SMC2S & SMC3L)

- Low profile surface mount

# 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

- Coil face area in<sup>2</sup> ( $cm^3$ ): 484 (3123)
- Unboxed weight lb (kg): 44.44 (20.16)
- Boxed weight lb (kg): 49.89 (22.63)

- Fan diameter in (mm): 10 (254)
- Fan air flow ft<sup>3</sup>/min (m<sup>3</sup>/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  $in^2$  (cm<sup>3</sup>): 363 (2342)
- Unboxed weight lb (kg): 33.82 (15.33)
- Boxed weight lb (kg): 38.58 (17.50)
- Cube ft<sup>3</sup> (m<sup>3</sup>): 3.09 (.09)
- Boxed dimensions in (mm):

- Closed permanent magnet motor with ball bearings

# Sight Glass (SMC2S & SMC3L)

- Moisture indicator
- Visible from outside of vehicle

# combination and rating conditions used

## 43 x 13 x 11 (1092 x 330 x 279)

- Specifications subject to change without notice
- All measurements in standard
- Contact Trans/Air for more information

## 480 East Locust Street, Dallastown, PA USA 17313 717-246 2627 | 800-673-2446 | Fx: 717-244-7088

# www.transairmfg.com

# **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 galvannealed 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)



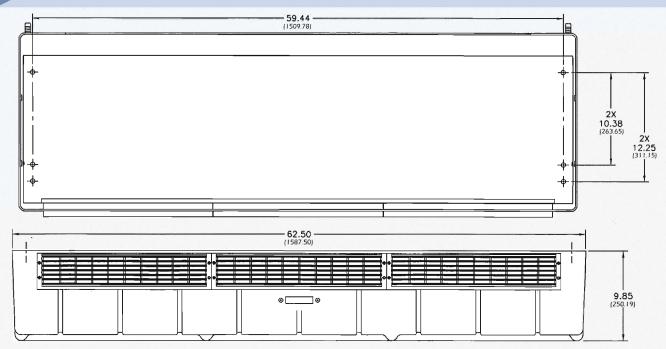
## School & Commercial Bus Climate Control Design | Manufacture | Install | Service



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 Assemlies**

- (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 in<sup>2</sup> (cm<sup>2</sup>): 204 (1316)
- 3/8 in enhanced copper tubing
- Fins: 0.006 in raised lance, 10 FPI
- (3) Row

480 East Locust Street, Dallastown, PA USA 17313

## 20.66 (524,76) m

#### Electrical

- Color coded in fire retardant loom
- Low and high pressure swtiches

#### **Expansion Valve**

- (2) 4 Ton externally equalized thermostatic type

### **Available Options**

- Metal cover for use with with OEM installation - Heat coil used with positive isolator valve.
- Isolator valve and heater hose not inlcuded. 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

717-246 2627 | 800-673-2446 | Fx: 717-244-7088

## www.transairmfg.com

## **TECHNICAL DATA SHEET**

## **COMPONENT SPECIFICATIONS**

## ProAir 435 / 445 / 465 Low Profile Heaters

Where a smaller height is required and high heat is of utmost importance the 435,445 and 465 Low Profile auxiliary heaters deliver maximum BTUs with outstanding CFMs.

Features: Long Life Motor, 3 Year Warranty, Standard Plug-In on Harness and Filter Option Available

## 435 /445 Heater Performance

35,000 Btu/hr 435 Heater and 45,000 Btu/hr 445 Heater Capacity

## **Power Requirement**

12 Volts DC Draw is 5.0 Amps @ 13.5 Volts

Air Flow 313 CFM @ 0 static Pressure

Weight 8 Lbs. 435 Heater 9 Lbs. 445 Heater

**Physical Size** W 10.25"x H 7.5"x D 9.5"



## **465 Heater Performance**

65,000 Btu/hr Heating Capacity

## **Power Requirement**

12 Volts DC Draw is 10.0 Amps @ 13.5 Volts

Air Flow 640 CFM @ 0 static Pressure

Weight

15 Lbs.

**Physical Size** W 21"x H 7.5"x D 9.5"



Warranty

ProAir systems are covered by an industry-leading two-year warranty. Complete terms are outlined in our Warranty Statement, Consult ProAir for detailed information.







## INTRODUCTION .....

#### STEP 1: PREPARATION & INSPECTION.....

1.1 Storage & Handling	
1.2 Subfloor preparation	
1.3 Floorcovering inspection	
1.4 Adhesive selection	

## STEP 2: ROLL LAYOUT & CUTTING.....

2.1 Cutting to vehicle size .....

2.2 Pre-cut shipsets .....

## STEP 3: ADHESIVES & INSTALLATION .....

3.1 Tarabus Self-Adhesive .....3.2 Water-based acrylic adhesives .....3.3 Neoprene/Contact adhesives .....

STEP 4: LOGOS & INSTALLATION .....

## STEP 5: HOT WELDING PROCESS FOR FLAT, COVER

5.1 Treatment of seams using hot welding process ......
5.2 Hot welding tools ......
5.3 Hot welding process .....

STEP 6: CLEANING (refer to Tarabus Cleaning Guid

ANNEX: TARABUS RECOMMENDED TOOL LIST ......

	4
	5
	5 5 5
	6
	-
	<b>7</b> 7 7 7
	8
D & VERTICAL AREAS	
de) 1	
1	12



## INTRODUCTION

Tarabus floorcoverings are designed to meet all global transportation industry requirements. To obtain optimum performance from Tarabus floorcoverings follow carefully our installation recommendations.

Important: failure to install Gerflor Transport products correctly will affect the product guarantee.

#### PRODUCT LIABILITY

Gerflor shall not be liable for any injury, loss or damage, whether direct, indirect, special, incident or consequential. arising out of the furnishing of, the use of, or any inability to use the Tarabus materials provided there trom. The remedies of the purchaser set forth herein are exclusive, and the liability of Gerflor with respect to any sale or anything done in connection therewith, whether in contract, in tort, negligence, under any warranty or otherwise, shall not, except as expressly provided herein, exceed the cost of replacement of Tarabus materials upon which such liability is based. Buyers assume all risks and liability for damage to persons or property resulting from buyer's use of the material.

## **STEP 1: PREPARATION & INSPECTION**

## ■ 1.1 - STORAGE & HANDLING

- Tarabus flooring must be stored and installed at a temperature in between 15° and 30°Celsius.
- Tarabus flooring should not be exposed to water during transportation, storage, during and after installation. Thus, rolls should be stored in a protected environment (especially protected from rain and snow)
- Rolls (NT and MK backing) should be stored vertically. to reduce appearance of pressure marks. Rolls with NT backing can also be stored horizontally, individually on a foam insert.
- Rolls should be transported by use of a hand truck or with a fork lift.
- Relax the floorcovering by laying the pieces flat for 24 hours before installation

#### ■ 1.2 - SUBFLOOR PREPARATION

#### 1.2.1 - Subfloor preparation

For all types of subfloors make sure surfaces are clean, smooth, flat, dry and free from contamination. Cleaning of the subfloor should be in accordance with the vehicle manufacturers Standard Operating Procedure.

All cleaning products used should be compatible with the surface being cleaned.





## 1.2.2 - Vehicle inspection

Before installation, carry out a vehicle inspection. Check the subfloor is properly fixed and flat according the subfloor manufacturer recommendations.



## **TARABUS**

**Gerflor** 



Storage



Handling

#### 1.2.3 - Timber subfloors

The subfloor panels should be securely fixed in place as per the specifications of individual vehicle manufacturers. All joints between panels should be sanded and filled to ensure a smooth transition.

#### 1.2.4 - Metal subfloors

The subfloor panels should be securely fixed in place as per the specifications of individual vehicle manufacturers.

Degrease and in case of corrosion abrade the metal floors. All joints between panels should be sanded and filled to ensure a smooth transition.

## ■ 1.3 - FLOORCOVERING INSPECTION

- See Label Description.
- Check product, colour, and batch reference before installation. Use the same batch throughout the vehicle.
- For traceability purposes, the batch number should be kept.

HMN 2X24
NEF: M79E — 0764 Descin - Dateira - Caleura / Caleur NATURE
Let N° / Patch N° : 2A60578 2A00672245
Q == 24 ML Q Z 2 M Q == 48 M2
Mei 126 KG
NO COURS DE LA REPUBLIQUE - BREZ VILLEMBANKE CERKE TEL : NA 72 85 10 80

TTP ST//RS LW 2X24 6451 CORSAIRE 10146451 /T014451	G
SERIE BATCH 7701083	
2,00 M	
24.00 M 26.26 Yd 48.00 M2 57.46 sq Yd	
V2411 E 9272 C 2265 mm 11.334	H



### ■ 1.4 - ADHESIVE SELECTION

- Choosing the correct adhesive will ensure that the installed materials will perform as expected in service.
- You can find below recommended generic adhesives. For any adhesive not validated by Gerflor, it is the responsability of the customer and adhesive manufacturer to ensure compatibility with subfloor and material.

RECOMMENDED ADHESIVE	APPLICATION	SUBSTRATES	FLEXIBILITY (grade from 1 to 5)	<b>BOND STRENGTH</b> (grade from 1 to 5)	DRYING TIME	REPOSITIONING
TARABUS SELF-ADHESIVE	Preapplied	All substrates	5	4	0 hour	Yes with care
WATER-BASED ACRYLIC	Subfloor only	Absorbant (not vertical)	5	4	12 hours	Yes up to 20/30 min.
NEOPRENE/CONTACT	Subfloor & Backing	All substrates	4	4	5-15 min (flash-off)	Yes with care

Gerflor will not accept responsability for any occurence where secondary additives or chemicals have been mixed with the primary adhesive. In such case, written confirmation from adhesive manufacturer should be provided.

## **STEP 2: ROLL LAYOUT & CUTTING**

### ■ 2.1 - CUTTING TO VEHICLE SIZE

Review the floor plan for the individual vehicle, establish the direction that the pieces will be installed in and define any weld position. Lay out the floorcovering on a clean, dry and flat working area. A template can be used to avoid cutting errors.

To optimize the installation process: Pre-cut and Pre-welded kits can be produced specifically to the individual requirements of the client. Please ask your sales representative for more information.

- Mark the lines to be cut-off or use a pattern as a template. Use a Delphin knife (E6000002) and a straight edge for cutting the material.
- Whether the material is to be installed flat or coved up the side of the vehicle Gerflor recommends that a minimum of 5 cm extra material is allowed on each end (10 cm overall) to ensure the piece is long enough and can be trimmed comfortably.
- When Joining Factory Edges Leave a gap of 1 ± 0.5 mm maximum.
- Cut seams using any of the following methods:
- Overlap and trace,
- Underscribe (recess scriber method)

When installing designs of a geometric nature, it is important to ensure that the material is installed straight. Particular attention should be paid to release cuts on external corners when trimming the waste for positioning. Failure to not cut the material as close as possible to the base of the external angle may cause deformation of the design. This is due to excess material being forced around the base on the external corner. When making release cuts or removing excess waste, always cut the material from the backside.

## 2.2 - PRE-CUT SHIPSETS

Gerflor in-house cutting department is able to supply pre-cut pieces to specific dimensions from plans supplied by the customer





## **STEP 3: ADHESIVES & INSTALLATION**

We propose 3 types of installation process depending on the adhesive solution.

## 3.1 - TARABUS SELF-ADHESIVE

- In case of rolls, cut the flooring to the area size.
- Lay out the floor into the car.
- Fold back one half.
- Use a hooked blade (E7520001) to cut the protective layer from the underside floor covering. Take care not to damage the floorcovering backing.



- Pull off the protective layer from the exposed half area
- Position the material into the targeted location and make sure the air is expelled out towards the edges.
- Repeat steps 3 to 6 to the remaining half.
- The material can be welded immediately.

#### ■ 3.2 - WATER-BASED ACRYLIC ADHESIVES

Follow the adhesive manufacturer's instructions regarding subfloor types, correct trowel/blade size, open times, temperature and humidity conditions.

- Cut the flooring to the size required.
- Fold back the flooring halfway.
- Apply the adhesive to the subfloor. Use the recommended trowel and blade (Aluquick Spreader E6130001).
- Allow the adhesive to tack off (this will vary depending on temperature and subfloor absorbency).
- Place flooring into adhesive and smooth manually then use a pressure-roller.
- Repeat this process with the other half.
- Follow the manufacturer's guidelines for waiting times for welding and foot traffic.

#### ■ 3.3 - NEOPRENE/CONTACT ADHESIVES

Follow the adhesive manufacturer's instructions regarding subfloor types, correct trowel/blade size, open times, temperature and humidity conditions.

- Cut the flooring to the size required.
- Lay out the flooring face down onto a flat working area.
- Apply adhesive to subfloor and to the back of the flooring. Adhesive can be applied by spray, trowel, or roller.
- Allow the adhesive to flash off and become touch dry.
- Position floor product on adhesive and roll thoroughly to ensure right contact with subfloor.
- The material can be repositioned with care.
- The material can be welded immediately.

With any adhesive system used to install the floorcovering, Gerflor always recommend the use of a cork press (E6640001) or cork broom (E6640002) to ensure a good initial contact and the expulsion of any air from beneath the product. On completion of the installation, the whole floor area should be rolled in the length and the width of the vehicle with a pressure-roller of 50 kg (E6320001).



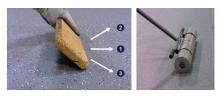
Delphin knife

P/N: E6000002











## **STEP 4: LOGOS & INSTALLATION**

For complete watertightness, subfloor protection and high in-service performance Gerflor recommends the use of our laminate backed logos. It can be installed with self-adhesive backing or traditional glue. TIP: Have a look at our Youtube video: Tarabus Implantation Logo - YouTube

Note: the logo on laminate backing should not be folded or rolled.









• Position and mark where the pre-cut logo will be located.



• Using a pressure roller, roll around the edge of the logo to identify its position Recommended tool: Internal angle roller [E6600001]

• Carefully follow the scribed line with

the knife. This will provide a clean

line between logo and material.





• Cut the waste from above the logo so that the main flooring material overlaps the logo by 5 cm max, leaving a 1 mm space all around. Recommended tool: Delphin knife (E6000002).



• Use a Linea Groover to create the groove between logo and main material. You may use our Triangular Groover to refine the aroove. Recommended tools: Linea Groover (E8060001), Triangular Groover (E8000004).



• Once the logo is in place, press it with a cork press, install the floorcovering over the installed logo, and press it too, to optimize adhesion Recommended tools: Cork press (E6640001) or Cork broom (E6640002)



• Using a recess scriber. Scribe around the logo while the pin in the scriber transfers and marks the surface of the main flooring material. Recommended tool: Recess Scriber (F8220002)



• Hot weld the logo to the main flooring material using CR50. Recommended tools: Welding Gun Leister Triac'S (E8090002). Anti-Glaze Rapid Nozzle 4-5mm (E8100002)



Gerflor



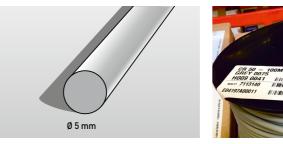
 Using the Mozart 2 in 1 Trimming Knife, with the 0.7 mm spacer, carry out the first trim of the weld cord. Do not carry out the second trim until the weld is completely cold. Recommended tool: Mozart 2 in 1 Trimming Knife (E8300002).

## **STEP 5: HOT WELDING PROCESS FOR FLAT, COVED & VERTICAL AREAS**

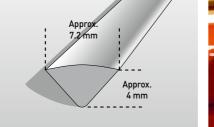
### ■ 5.1 - TREATMENT OF SEAMS USING HOT WELDING PROCESS

Hot Welding should only be completed after full cure of the adhesive. In case of self-adhesive, the welding can be completed right after the installation.

CR50 by Gerflor: Tarabus flat weld



#### CA72 by Gerflor: Tarabus corner weld





TARABUS

• As final step, you may use a pressure-roller of 50 kg (E6320001) to optimize adhesion (rolling in the length and in the width).

• When installing self-adhesive flooring around a logo, before installing the flooring, cover the installed logo with a scrap piece of lining paper and secure at the perimeter with masking tape. This stops the selfadhesive layer sticking to the logo.





## **INSTALLATION GUIDELINES**

## 5.2 - HOT WELDING TOOLS

You can find below the recommended hot welding tools, divided into the 3 welding steps:

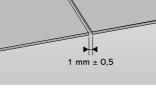
STEP	TOOL	PART NUMBER	
GROOVING	LINEA GROOVER	E8060001	
	ANTI-GLAZE RAPID NOZZLE 4-5 MM (flat weld)	E8100002	
WELDING	CA72 SPEED NOZZLE WITH WHEEL (corner weld)	E8100008	( AL
	HOT WELDING GUN LEISTER TRIAC-S 220 V	E8090002	
TRIMMING	MOZART 2 IN 1 TRIMMING KNIFE	E8300002	

#### ■ 5.3 - HOT WELDING PROCESS

TIP: have a look at our YouTube video. Hot Welding - Installation Guideline

#### 5.3.1 - Preparation

- Ensure that the gap between the adjoining sections of the flooring to be elded does not exceed 1 ± 0.5 mm.
- Seams must be grooved and clear of debris before welding.
- Ensure the nozzle is clear of debris.
- Turn on the gun adjusting the temperature dial to between 4.5 & 5 and leave to heat for 5 minutes before use.



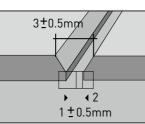
Tips: Test a weld on a small piece of waste flooring before starting welding in the vehicle. Weld rod should fuse without burning.

#### 5.3.2 - Grooving

Various tools are available to produce a good quality and consistent groove. Gerflor recommends the Linea Groover (E8060001)

It's necessary to groove 2/3<sup>rds</sup> thickness of the wearlayer and to have a gap between the edges of  $1 \pm 0.5$  mm. On the top, the gap after grooving is  $3 \pm 0.5$  mm.





#### 5.3.3 - Welding

- For flat welding, use a CR50 welding rod.
- Cut the colour matching weld cord to the required length.



For corner weld, use a CA72 welding rod.

• Cut the colour matching weld cord to the required length. • Hold the Hot Welding Gun Leister Triac-S (E8090002) with an angle that allows the rod to cover the base of the corner and combine with constant pressure and speed as you progress along the weld. We recommend the use of our Speed Nozzle with wheel (E8100008)



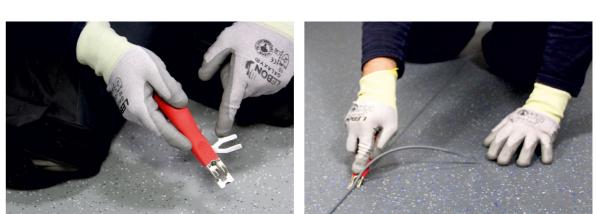
## 5.3.4 - Trimming

Trimming the weld cord should be completed in two stages.

action will allow the weld cord to contract and relax.

Retract the 0.7 mm spacer.

WELD IS COMPLETELY COLD.



For finishes, move aside the trimming guide. Don't forget to regularly change the blade.







• Hold the Hot Welding Gun Leister Triac-S (E8090002) at an upright angle and combine with constant pressure and speed as you progress along the weld. We recommend the use of our Anti-Glaze Rapid Nozzle 4-5 mm (E8100002).



• Trim the weld while still warm using the Mozart 2 in 1 trimming knife (E8300002) with the 0.7 mm spacer in place. This

## • Trim the remaining weld to produce a neat flush finish. THIS PROCESS SHOULD ONLY BE COMPLETED WHEN THE



## **INSTALLATION GUIDELINES**

## STEP 6: CLEANING (refer to Tarabus Cleaning Guide)

For further information, please contact your sales rep. For technical advice please contact: <u>andrew.sedman@gerflor.com</u> (or <u>loyde.cordero@gerflorusa.com</u> for US).

## **ANNEX: TARABUS RECOMMENDED TOOL LIST**

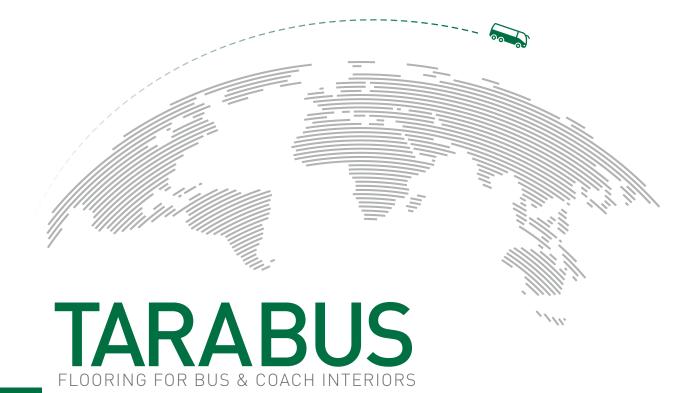
PART NUMBER	DESCRIPTION		GENERAL INSTALLATION	WELDING	LOGO	SELF-ADHESIVE
E8360001	LEISTER CARRYING CASE					
E6000002	DELPHIN KNIFE (1 unit)	ret l	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
E7510003	100 STRAIGHT BLADES		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
E7520001	100 HOOKED BLADES	$( \circ \circ \circ \circ \circ )$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
E6600001	INTERNAL ANGLE ROLLER		$\checkmark$		$\checkmark$	$\checkmark$
E6640001	CORK PRESS with rounded edges 300 x 120 x 250 mm		$\checkmark$		$\checkmark$	$\checkmark$
E8000004	TRIANGULAR GROOVER			$\checkmark$	$\checkmark$	
E8060001	LINEA GROOVER	$\mathbf{\mathbf{A}}$		$\checkmark$		
E8300002	MOZART 2 IN 1 TRIMMING KNIFE			$\checkmark$		
E8600001	WIRE BRUSH FOR NOZZLE DUCT			$\checkmark$		
E8100008	CA72 SPEED NOZZLE WITH WHEEL	( AL		$\checkmark$		
E8100002	ANTI-GLAZE RAPID NOZZLE 4-5 mm			$\checkmark$		
E8090002	HOT WELDING GUN LEISTER TRIAC-S 220 V	A Down		$\checkmark$	$\checkmark$	

		OPTION	AL			
PART NUMBER	DESC	RIPTION	GENERAL INSTALLATION	WELDING	LOGO	SELF-ADHESIVE
E3060001	CARPET CLAW	A A A A A A A A A A A A A A A A A A A	$\checkmark$			$\checkmark$
E6150004	CONVEX RULER 210 x 8 cm FLEXIBLE STEEL		$\checkmark$	$\checkmark$		$\checkmark$
E6130001	ALUQUICK SPREADER		$\checkmark$		$\checkmark$	
E6310001	SPARE BLADE A1 280 mm (10 units)	A1	$\checkmark$		$\checkmark$	
E6310003	SPARE BLADE A2 280 mm (10 units)	A2	$\checkmark$		$\checkmark$	
E8220002	RECESS SCRIBER		$\checkmark$		$\checkmark$	$\checkmark$
E6640002	CORK BROOM BALAI LIEGE	8-30	$\checkmark$		$\checkmark$	$\checkmark$
E6320001	PRESSURE-ROLLER (50 kg)	<u> </u>	$\checkmark$		$\checkmark$	$\checkmark$
E8610001	BALL PRESSURE SHAFT Ø 13 mm			$\checkmark$		
E8100001	PUSH FIT NOZZLE HOLDER NOZZLE 4-5 mm	S		$\checkmark$		
E8110002	RAPID NOZZLE MUSHROOM SH. ROD			$\checkmark$		
E8100009	ROLLER TURBO NOZZLE			$\checkmark$		
E8000001	ROUNDED GROOVER			$\checkmark$	$\checkmark$	
E8190001	SPARE BLADES (10 units) for Rounded Groover			$\checkmark$	$\checkmark$	
E8320001	TRIMMING GUIDE	5		$\checkmark$		
E8040001	SPARE BLADES MOZART (5 units)	DE		$\checkmark$	$\checkmark$	
E8080001	TRIMMING GOUGE + 1 BLADE	0		$\checkmark$		
E8300003	QUARTER MOON TRIMMING KNIFE			$\checkmark$		
E8330001	LEATHER POUCH - 1/4 MOON KNIFE			$\checkmark$		
E8120001	2 ROUNDED BLADES 6 mm			$\checkmark$		
E8120003	2 FLAT BLADES			$\checkmark$		
E8120004	2 POINTED BLADES			$\checkmark$		

<sup>12</sup> TARABUS

TARABUS





43, Boulevard Garibaldi 69170 Tarare - France Tel.: +33 4 74 05 40 00 Fax: +33 4 74 05 06 83 **Email: tarabus@gerflor.com** www.tarabusbygerflor.com







## **TARABUS NT Specification Sheet**

## Product description and composition:

• The flooring shall be specially designed for buses.

• The flooring shall be flexible PVC flooring in 2.25 mm thickness, composed of a compact plasticized wear layer.

• The wear layer shall contain inlaid silicon carbide particles to improve slip resistance.

• The wear layer shall not contain aluminium oxide particles or quartz granules to prevent from maintenance and cleaning issues.

- The wear layer shall not contain fillers (fillers<5phr).
- The design shall be inlaid through the whole thickness of the wear layer.

• The intermediate layer of the flooring shall be made of a glass fibre grid, providing outstanding dimensional stability:  $\leq 0.2\%$  according to EN 434.

• The flooring shall have a special textile backing designed for public transport vehicles, to enable bonding with acrylic glues onto plywood substrates or plywood with phenolic film substrates or aluminium.

- The flooring shall not crack and no white line shall appear when bended by 180 degrees.
- The welding rods shall be manufactured by the flooring manufacturer to enable a perfect weld.

## **Environment:**

- The flooring shall be free from heavy metals (Lead, Cadmium, Barium, Tin, Chromium...).
- The flooring shall be free from DEHP plasticizer.
- The manufacturer of the floor covering must be in possession of a valid ISO 14001 certificate.

## Technical characteristics:

- Fire class: the flooring material shall conform to the European Directive 95/28/EC
- Fire class: the flooring material shall conform to the FMVSS/CMVSS 302
- Fire class: the flooring shall have been tested to UTAC ST 18502/1 (Type A) and ISO 3795/76 (0mm/mn)
- Fire class: the flooring shall obtain CRF>0.50 W/cm2 when tested according to NFPA 253 ASTM E648

• The manufacturer of the floor covering must be in possession of a valid quality systems certificate, showing compliance with ISO 9001.

## Installation:

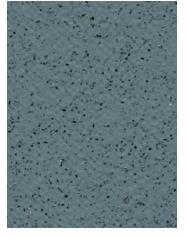
• All joints must be welded using a hot welding gun and PVC welding rods. To ensure the right watertightness of the flooring system, no sealant shall be used between 2 flooring sheets.

GERFLOR Transport Flooring - June 2009

## SIRIUS



6768 Griffon



6782 Dune



NT

NT

6451 Corsaire

NT



6727 Anthracite



## APOLLO

NT

NT



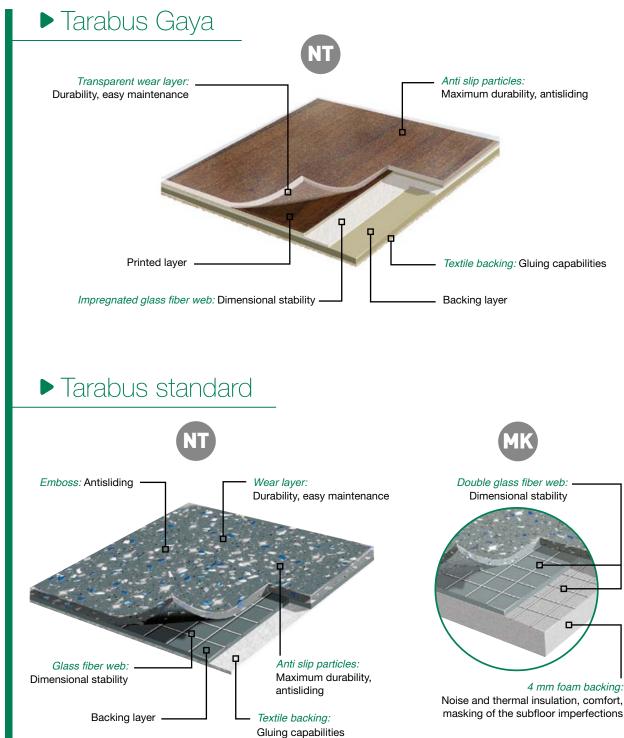
4776 Masan

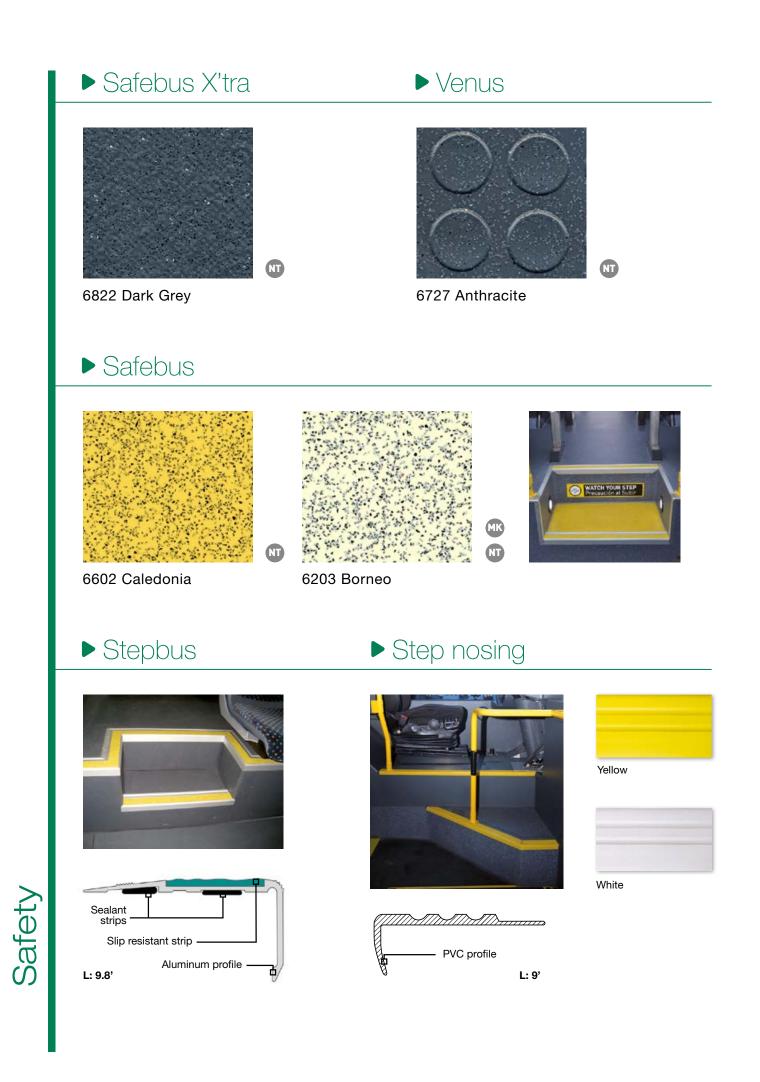


4479 Kilimanjaro



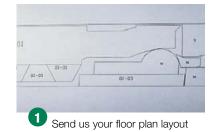
4517 Fuji







Pre-cut and pre-welded TARABUS floor covering system according to your drawings







• Advertising & Promotion

...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



## TARABUS LOGO

• Location for person with reduced mobility

for water resistance





## TARABUS PRODUCT WARRANTY

TO REGISTER YOUR PRODUCT WARRANTY under the terms of Gerflor's North America Limited Product Warranty, please complete the form below and mail to:

**Gerflor USA Inc** 595 Supreme Dr Bensenville 60106 IL USA.

I acknowledge having received and read GERFLOR's technical documents and specifications concerning the product warranty:

Product Type:

Roll numbers & Quantity (sq.yds/m<sup>2</sup>):

Installation Date:

Transit Authority:

Address:

State/Prov:

Zip/Postal Code:

OEM:

Address:

State/Prov:

Zip/Postal Code:

Represented by:\_

Signature:



## TARABUS FLOORCOVERINGS LIMITED WARRANTY AGREEMENT

#### Warranty Terms and Conditions

GERFLOR, as a manufacturer, expressly warrants that TARABUS floorcoverings for buses and coaches are conform to the technical data sheet in force at the time of delivery.

GERFLOR further expressly warrants that the wear layer of TARABUS floorcoverings shall be free from defects in material for **12 years (twelve years)** from the date of sale, provided such floorcoverings are exclusively subject to normal use and service, and are installed and maintained in accordance exactly with GERFLOR's recommendations that the buyer declares to be aware of.

The wear layer consists of the material above the glass fiber web in the floorcovering. GERFLOR expressly warrants that the glass fiber web will not appear in the floorcovering for **12 years (twelve years)** from the date of sale.

This entire warranty will become null and void if conditions of the subflooring and method of installation do not conform exactly to GERFLOR's specifications.

This entire warranty does not cover damage caused, in whole or in part, by conditions beyond the control of GERFLOR, including but not limited to:

- Use for which material is not designated.
- Fire, explosion, or natural disasters.
- Faulty installation
- Casualties
- Ordinary wear and tear
- Abuse
- Faulty design or construction of the vehicles.
- Failure of the adhesive to adhere to the subfloor because of presence of moisture.
- Fault in the subfloor.
- Failure of the welding



- Uneven wear of sections of the floorcovering.
- Alteration of the initial appearance of the floorcovering, particularly in high traffic areas exposed to extreme heavy wear.
- Damage caused by negligent or improper maintenance procedures and other causes not specified but beyond the control of GERFLOR.
- Fading or discoloration from sunlight or heat.
- Mechanical damages. burns, chemical soiling or damage due to clamp or inadequate cleaning, not recommended by GERFLOR.

The presence of moisture between the TARABUS and the subfloor shall be considered proof of subfloor failure or faulty design or construction.

This warranty will be applied only if the product is admitted to be the only cause of disorder.

The sole and exclusive remedy against GERFLOR arising from the purchase or use of TARABUS 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 –(colour shade between brand new material and existing one will be accepted by the owner)-. All other compensation of whatever nature will be excluded.

If the claim is accepted by GERFLOR, with respect to the warranty of the wear layer, for the first 2 (two) years from the date of sale, GERFLOR will supply the material, in replacement of defective one, free of charge. More than 2 (two) years from the date of sale, until the expiration of this express warranty of the wear layer, a depreciation of 7% (seven per cent) per year of the cost of supplied material will apply.

THE ABOVE EXPRESSED MANUFACTURER's WARRANTY SHALL BE THE **EXCLUSIVE** WARRANTY AND LIMITED TO THE THE QUALITY OF PRODUCT, AND GERFLOR MAKES NO OTHER WARRANTIES. GERFLOR EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANBILITY AND IMPLIED WARRANTIES OF FITNESS FOR А PARTICULAR PURPOSE.

WARRANTY AND LIABILITY LIMITS

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 TARABUS floorcoverings, attorney's fees, and any liability you may have with respect to any other person.



## TIME LIMIT FOR PLACING A CLAIM

To be admissible, all claims by means of this warranty contract must be carried out by **registered letter with return receipt** addressed to GERFLOR, at the address indicated at the top of this warranty contract, **accompanied by the purchase invoice** for the Product, within THIRTY DAYS following finding of irregularities and within the aforementioned warranty contract time limit. If any clauses of this Warranty Agreement conflicted with the law or a given jurisdiction, only said clause would be considered inapplicable, the remaining text of the Agreement remaining unaffected.

This Limited Warranty shall be governed and construed in accordance with the laws of the State of Illinois without regard to any choice of low principles: All disputes that may arise between You and GERFLOR relating in any way to this Limited Warranty Agreement, to the extent such disputes cannot be resolved by negotiation between You and GERFLOR, shall be decided by arbitration carried out in accordance with the Federal Arbitration Act and the Commercial Arbitration Rules of the American Arbitration Association. In the event of such a dispute, arbitration may be initiated by a request for arbitration by either party hereto addressed to the other party, and shall be completed within sixty (60) days of such request unless extended because of unavailability of an arbitrator or other events beyond the control either party. The arbitrator shall be chosen by mutual agreement of the parties and, in the event the parties cannot so agree, either party may file a written application to have the arbitrator designated by the American Arbitration Association. The arbitration proceeding shall take place in Chicago, Illinois or such other location as the parties shall agree and shall be conducted in accordance with the Commercial Arbitration, but subject to the terms of this Limited Warranty, any damages. The decision of the arbitrator shall be final and conclusive, both as to costs and the merits, and the parties agree that they shall be bound by this decision.





**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."

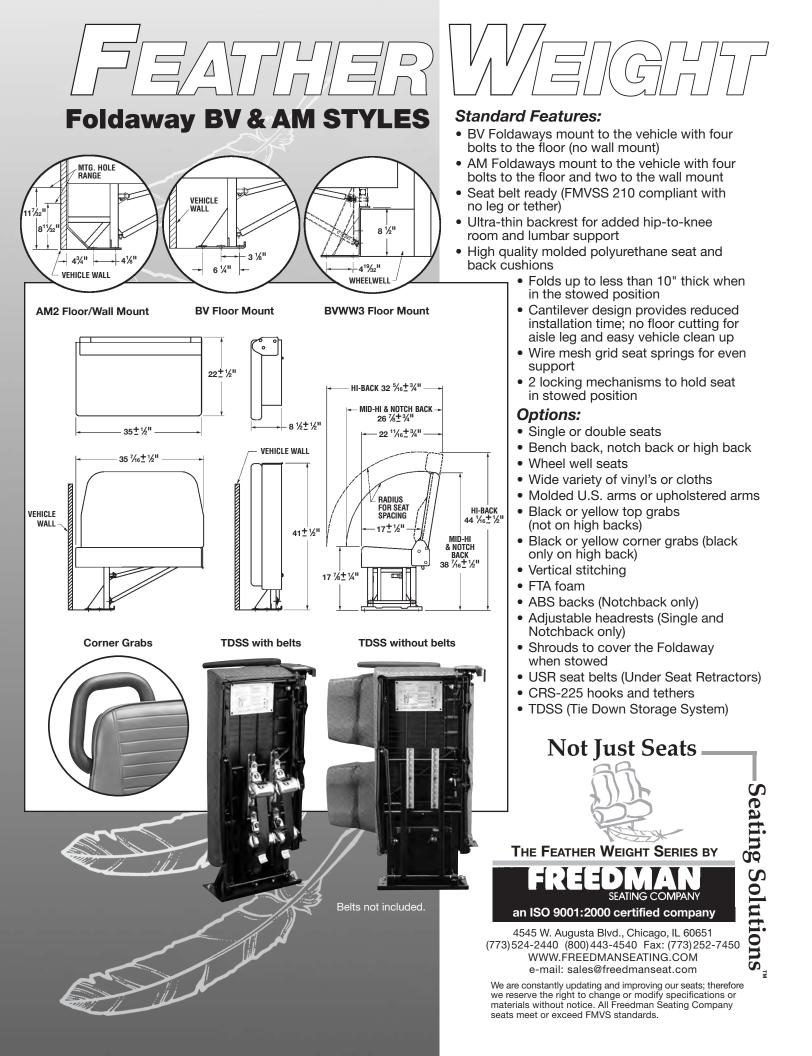


Seating Solutions<sup>\*\*</sup>

THE FEATHER WEIGHT SERIES BY

an ISO 9001:2000 certified company

Notch-Back, standard Bench-Back and High-Back are shown.



# MID-HI SEAT "ROCK SOLID"

FEATER



# 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 andsafety (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.** 

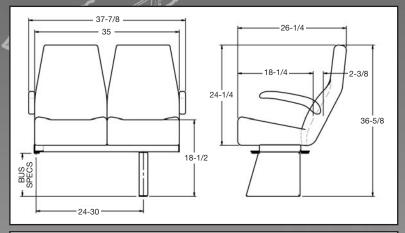


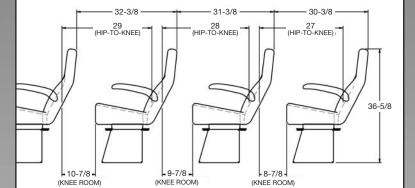
SEATING COMPANY

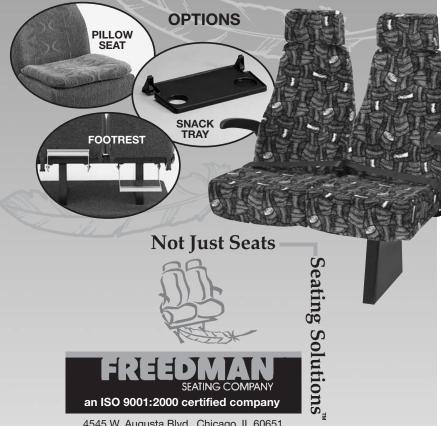
an ISO 9001:2000 certified company

Seating Solutions

# FEATHER WEIGHT MID-HI SEAT "ROCK SOLID"







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

# 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

# FREEDMAN SHIELD DRIVER SEATS

Shield Rigid Seat

LeMans Adjustable Arm

Shield Recliner Seat



NOW

AVAILABLE

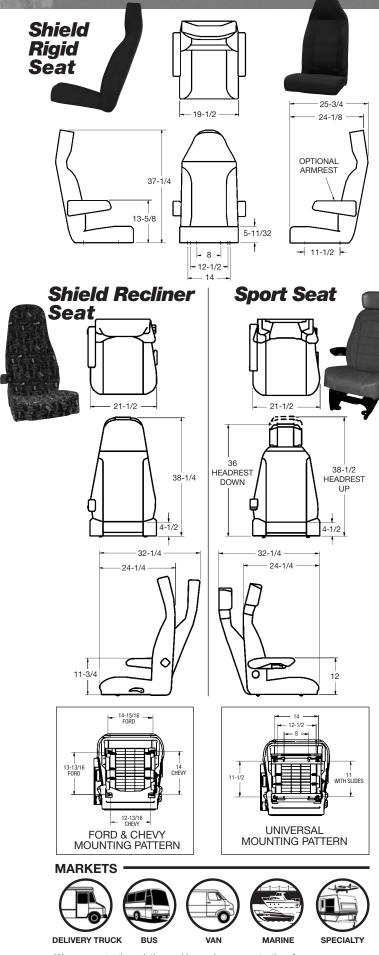
Sport Seat

Upgrade



–Seating Solutions<sup>\*\*</sup>

### FREEDMAN SHIELD DRIVER SEATS



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.

#### Shield Rigid Seat Standard features:

- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard Taller and wider headrest with decreased backset "Cushier" headrest for dynamic impact headrest absorption
- Automotive grade 4-spring seat flex-o-later for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions
- Universal mounting holes to fit Freedman Seating pedestals and most aftermarket bases

#### **Rigid Seat optional features:**

- Flip arms: US Arm, AMA upholstered or wide upholstered
- Mesh map pocket
  - Vertical stitching
- lumbar supportS3 Bio Cushions

4-position adjustable

- Fore/Aft slide tracks
- Wide array of fabrics and vinyls

#### Shield Recliner and Sport Seats Standard features:

- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard Taller and wider headrest with decreased backset "Cushier" headrest for dynamic impact headrest absorption
- Mesh map pocket
- Automotive grade 4-spring seat flex-o-later for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions
- Recliner Seat additional standard features:
- 4-position adjustable lumbar-LH lever (RH lever on copilot)
- RH Shield arm
- Heavy duty recliner mechanism
- Mounting brackets to fit Ford E-Series and Chevy cutaway seat delete bases

#### Recliner Seat optional features:

- Vertical stitching (not for Sport)
- Wide array of fabrics and vinyls
- FTA foam
- S3 Bio Cushions
- Universal mounting kit to fit Freedman Seating pedestals and aftermarket bases
- Fore/Aft slide tracks (not for Ford or Chevy seats), required for universal mounting

#### Sport Seat additional standard features:

- Infinitely adjustable 4-way lumbar (up/down and in/out)
- RH LeMans arm





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





#### Product Line: Options/Accessories



000

•••

#### HOME / SEAT ITEMS / OPTIONS/ACCESSORIES /

This website uses cookies to improve your experience. We'll assume you're ok with this, bu

opt-out if you wish. <u>Cookie settings</u> ACCEPT



The solution to your seat belt needs. Our system places the seat belts right where you expect them. No more belts falling to the floor, safety concerns, or maintenance hassles.

FMVSS/CMVSS Notice

California residents see Prop 65 WARNINGS.

#### **Standard Features**

- Designed to be FMVSS 210 compliant
- Works on forward-facing and existing Feather Weight frames
- Light weight and durable
- All belts are permanently kept in the correct position
- Belts stay off the floor

## **Find Your Local Representative**

>



# **RELATED SEATS & PRODUCTS**

This website uses cookies to improve your experience. We'll assume you're ok with this, bu

#### 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) Two (2) years

Cover Warranty is for defects in the material or sewing and is limited to replacement covers. It does not include labor:

- One (1) year for Level #1 in-stock FSC material and perforated vinyl
- Two (2) year for Level #3 in-stock FSC material and higher
- No warranty for COM (Customer Own/ supplied Material)

The warranty period begins at time of sales to customer or 180 days after shipment from the Freedman Seating Company's factory to the customer, whichever occurs first.

#### 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, 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 are 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 onsite 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 instructions, as well as recommended service intervals with each seat. 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.







= /

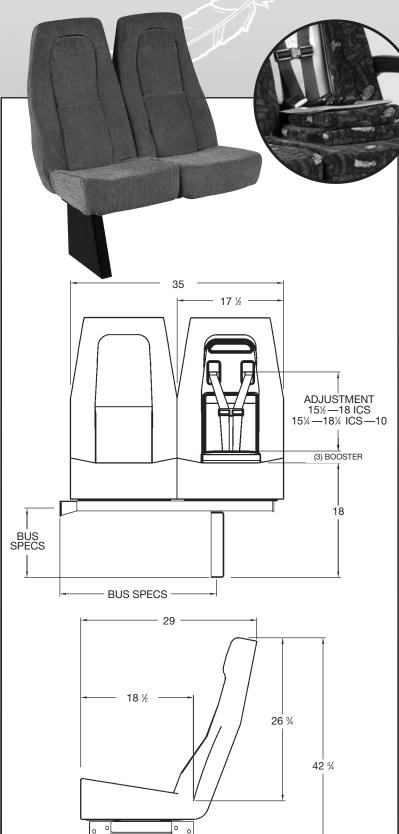
Δ



Also available the ICS-10, for children up to 10 years old.



# 



0

# (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
- Retrofitable; 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



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

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.

# MID-HI SEAT "ROCK SOLID"

FEATER



# 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.

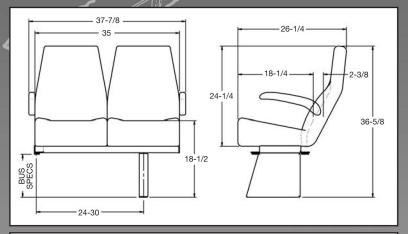
Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength andsafety (including 210 for seat belts). Less weight means one thing to bus builders and operators: they can get more passengers per bus. And when we say more passengers, **we mean more happy passengers.** 

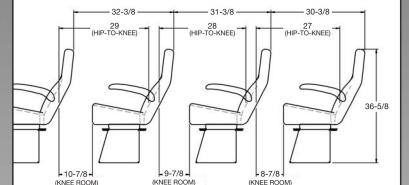


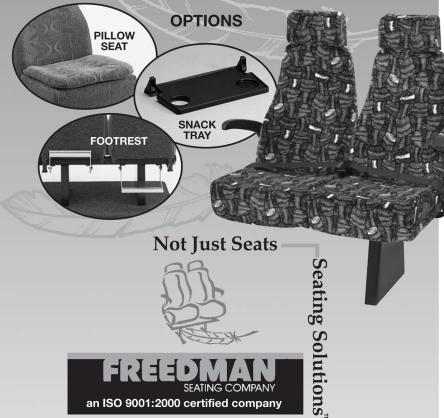
an ISO 9001:2000 certified company

-Seating Solutions™

# FEATHER WEIGHT MID-HISEAT "ROCK SOLID"







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

# 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

# **HIGH-BACK SEAT**



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**.

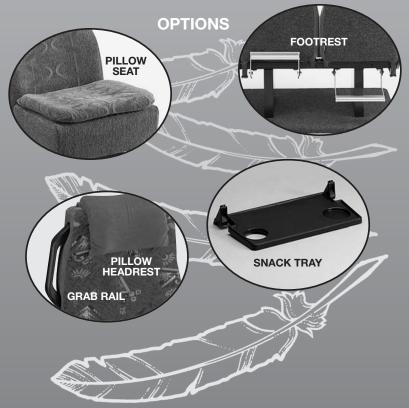


Seating Solutions



27-1/4 36-1/2 (W/2 U.S. ARMS) (RIGID) 35 23-1/4 6-1/2 17-1/2 (RECLINER) 197-1/4 18-1/2 42-1/4 10 ÷ Щ 18 BUS SPECS ÷ 24 - 30





Cross-country or cross-town, the Freedman Feather Weight High-Back gets you there in safety and comfort. The headrest actually cradles your head, and provides unrestricted viewing. The ultra-thin backrest gives out-standing 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 High-Back 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
- 17<sup>1</sup>/<sub>2</sub>" wide seat cushions
- 27¼" back height off the seat cushion, 42¼" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance–all Feather Weight seats are seat belt ready
- · Covers that can be removed and replaced easily and without the use of special tools

#### Feather Weight High-Back options include:

- Black molded U.S. Arms or upholstered flip-up armrests
- Side grab rail
- U.S.R.—Under
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Pillow headrests

- Seat Retractors 16" or 19" wide
  - seats available
  - Rear row guick disconnect
- CRS-225 hooks and tethers
- Side sliders
- Cup holders
- Seat belt loops



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

Taller and wider headrest with decreased backset.



The industry's preferred driver seat for truck and buses, including Ford & Chevy cutaways.

> Heavy duty recliner mechanism and 4-position adjustable lumbar support.

Optional Lemans Armrest

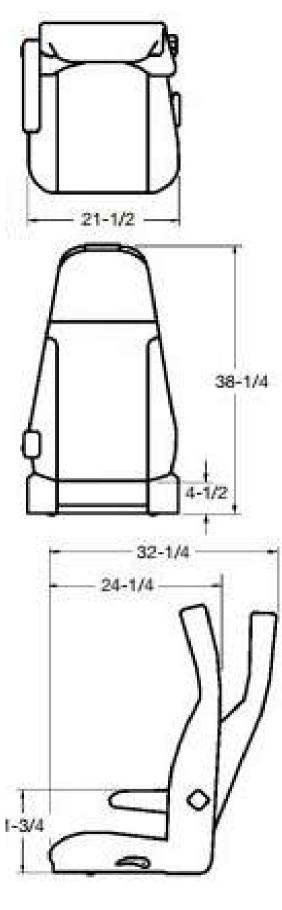
Automotive grade 4-spring seat flex-o-lator for even load support and long life.

# SHIELD DRIVER RECLINER

#### **COMMERCIAL BUS / DELIVERY TRUCK**

Shield driver seats are designed and tested to meet all applicable safety standards including 202A for superior head and neck support while providing superior comfort and style. The Shield recliner is the preferred driver seat for truck and buses, including 2011 and later Ford & Chevy cutaway buses. The Shield recliner mounts directly to the OEM base & slides on seat delete chassis.





# features

- Meets FMVSS 207/210/202a
- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard
- Taller and wider headrest with decreased backset
- 'Cushier' headrest for dynamic impact headrest absorption
- Automotive grade 4-spring seat flex-o-lator for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions
- 4-position adjustable lumbar support
- Heavy duty recliner mechanism
- Mounting brackets to fit Ford E-series and Chevy Cutaway seat delete bases
- Modified vinyl seat cover to accommodate substantial usage in the field.

# options

- Shield or Lemans armrest
- Mesh map pockets
- Vertical Stitching
- Choice of fabric or vinyl
- Fore/Aft slide tracks, required for universal mounting
- Heater (seat mounted controls)
- Flame Blocker D-90 encapsulated cover
- Mesh Map Pocket
- Adnik Height Adjustable Power Pedestal Slides
- Driver Skirt for Power Pedestal





4545 W. Augusta Blvd.,Chicago,IL 60651 (773) 524-2440 (800) 443-4540 Fax (773) 252-7450 freedmanseating.com | info@freedmanseating.com



Freedman Seating is committed to lessening our impact on the planet. For your convenience, materials are now available online to download at www.freedmanseating.com.



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

# $\mathsf{Q}\mathsf{R}\mathsf{T}\mathsf{-}\mathsf{3}\mathsf{60}^{\mathsf{R}}$

PREMIUM HEAVY-DUTY WHEELCHAIR RETRACTOR





#### Introducing the QRT-3 SERIES Wheelchair and Occupant Securement System

The first 4-point, heavy duty, fully automatic retractable tie-downs **built to withstand the higher loads of the WC18 standard** and be compatible with WC19 wheelchairs





Meets all requirements of the newest WC18 standards. Also compatible with WC19 Wheelchairs.

# WC18/WC19 at a Glance

As WC19 wheelchairs become increasingly popular, new higher standards have been recommended for wheelchair tie-downs to be fully compatible.

The revised RESNA WC18 standard for Wheelchair Tie-downs and Occupant Restraint Systems (WTORS) was instituted in 2015 and is now in effect. The most significant implication of the revised standard is that wheelchair tiedowns must be stronger. WC19 covers the design and testing of wheelchairs for use in passenger transportation, and it brings about much needed passenger protection as well as some challenges for WTORS manufacturers. These crash tested wheelchairs will feature lap belts that are integrally mounted onto the wheelchair frame, as opposed to relying on traditional WTORS equipment where the passenger belts are mounted separately. During a collision, this new dynamic produces loads on the WTORS up to 60% higher.

# An All-New Design from the Floor Up

Stronger than any previous retractor, QRT-360 utilizes innovative energy management designs and material technologies to deliver the system's full strength for maximum load capacity.

QRT-360 retractors achieve a surrogate wheelchair rating that meets the requirements of WC18 with an energyabsorbing steel frame, new high strength 58mm webbing with fine-adjust self tensioning, and 25 high-strength teeth. A re-engineered Positive Locking Interface contributes to the system's ability to secure extremely heavy loads.



#### A More Secure Connection, Every Time

With Q'STRAINT J-hook attachments, operators can achieve a secure attachment on virtually any wheelchair. An updated Positive Lock Indicator provides the operator with clear and certain visual confirmation that the retractor is locked and the vehicle is ready to go. Our patented design eliminates the guesswork when passenger safety is involved.

#### Automatic Tightening Increases Safety

Q'STRAINT's industry-leading self-tensioning system automatically tightens the straps to eliminate any slack created by small wheelchair movements. The belts continue to tighten during low-g vehicle movements, which reduce the potential for dangerous excursions in the event of a collision.

#### Automatic Release Makes it Easy to Use

Securement is simplified by the compact and ergonomically designed knob. Thanks to Q'STRAINT auto-release, operators and attendants can pull and secure the wheelchair hook in one step without having to press a release button.

#### Compatible with Most Vehicles and Chairs

Like other Q'STRAINT systems, the QRT-360 is compatible with the widest variety of wheelchairs and scooters.



#### WWW.QSTRAINT.COM/QRT360

© 2018 Q'STRAINT®. All Rights Reserved. Q'STRAINT®, Q'STRAINT® logo and QRT-360™ are registered trademarks of Q'STRAINT®, Inc.

#### **Q'STRAINT EUROPE**

72-76 John Wilson Business Park Whitstable, Kent, CT5 3QT United Kingdom Tel: +44 (0)1227 773035 Fax: +44 (0)1227 770035 Email: info@qstraint.co.uk

#### **Q'STRAINT AMERICA**

4031 NE 12th Terrace Oakland Park, FL 33334 Tel: 800-987-9987 Fax: 954-986-0021 Email: qstraint@qstraint.com

#### **Q'STRAINT AUSTRALIA**

Tramanco Pty Ltd. 21 Shoebury Street, Rocklea, Australia, QLD. 4106 Tel: +61 7 3892 2311 Fax: +61 7 3892 1819 Email: info@tramanco.com.au

# TRANSIGN<sup>®</sup>



The LED Destinator<sup>®</sup> 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<sup>®</sup> Signs are proudly made in Detroit, Michigan USA in full compliance with **the Buy America Act.** 

#### LED DESTINATOR<sup>™</sup> 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<sup>®</sup>, 281 Collier Road, Auburn Hills, Michigan 48326 Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930 www.transignllc.com

# TRANSIGN®

# 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 <sup>1</sup> / <sub>2</sub> x 63 <sup>1</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>2</sub> x 64 <sup>5</sup> / <sub>8</sub> x 2 <sup>3</sup> / <sub>8</sub>
LD16128	16 x 128	6 <sup>1</sup> / <sub>2</sub> x 50 <sup>1</sup> / <sub>2</sub>	9 ¼ <sub>2</sub> x 52 x 2 ¾ <sub>8</sub>
LD16112	16 x 112	6 <sup>1</sup> / <sub>2</sub> x 44 <sup>1</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>2</sub> x 45 <sup>3</sup> / <sub>4</sub> x 2 <sup>3</sup> / <sub>8</sub>
LD1696	16 x 96	6 ¼ x 37 1/8	9 <sup>1</sup> / <sub>2</sub> x 39 <sup>3</sup> / <sub>8</sub> x 2 <sup>3</sup> / <sub>8</sub>
LD1680	16 x 80	6 <sup>1</sup> / <sub>2</sub> x 31 <sup>5</sup> / <sub>8</sub>	9 ¼ x 33 x 2 ¾
LD1632	16 x 32	6 <sup>1</sup> / <sub>2</sub> x 12 <sup>3</sup> / <sub>4</sub>	9 ¼ x 14 x 2 ¾
LD12112	12 x 112	4 <sup>7</sup> / <sub>8</sub> x 44 <sup>1</sup> / <sub>8</sub>	8 x 45 <sup>3</sup> / <sub>4</sub> x 2 <sup>3</sup> / <sub>8</sub>
LD1280	12 x 80	4 <sup>7</sup> / <sub>8</sub> x 31 <sup>5</sup> / <sub>8</sub>	8 x 33 ¼ x 2 ¾
LD1232	12 x 32	4 <sup>3</sup> / <sub>4</sub> x 12 <sup>3</sup> / <sub>4</sub>	8 x 14 x 2 <sup>3</sup> / <sub>8</sub>
LD896	8 x 96	3 ¼ x 37 1⁄8	6 <sup>3</sup> / <sub>8</sub> x 39 <sup>3</sup> / <sub>8</sub> x 2 <sup>3</sup> / <sub>8</sub>
LD864	8 x 64	3 ¼ x 25 ¼	6 <sup>3</sup> / <sub>8</sub> x 26 <sup>3</sup> / <sub>4</sub> x 2 <sup>3</sup> / <sub>8</sub>

## 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

**Special** 

#### **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

Join Our Mailing List www.transignllc.com/subscribe



**Interior Passenger Information Sign** 

#### **LED Run Number Box**

- Steel enclosure
- ADA compliant
- Reliable LED's
- Multiple colors
- Automatic brightness
- 12 and 24 VDC

Transign®, 281 Collier Road, Auburn Hills, Michigan 48326 Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930 www.transignllc.com



©2019 Transign. Transign®, LED Destinator®, and EnCompass® are registered trademarks. All rights reserved.

#### ADA STOP REQUEST INFORMATION

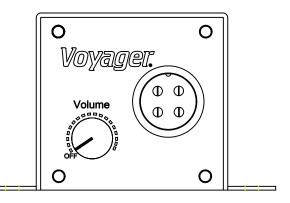


The ADA Occupant Stop Request Lights the Blue Side of the Sign and Signals Driver of an ADA Stop Request via Touch Tape Switches.

Ambulatory Stop Requests Light the Red Side of the Sign and Signals the Driver via Pull Cords.



# PA500 Owner's/Installation Manual



Universal Public Address System for use with Vehicle Radios

> Audiovox Specialized Applications,LLC 23319 Cooper Dr. Elkhart, IN 46514 1-800-688-3135 www.asaelectronics.com



Revision: B Date: 5/17/01





CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with the arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

# **Description:**

The PA system amplifier connects between the vehicle's radio and the installed speakers. When the Push to Talk Microphone is activated, the speakers are electrically disconnected from the radio and the microphone amplifiers are automatically connected for use with the same speakers. The microphone volume can be set using the volume control on the PA500.

# **Operation:**

The installed radio will operate normally. Use the radio's volume control to adjust the speaker volume. When the microphone is activated by the PTT (Push To Talk) switch, the speakers are automatically connected to the microphone amplifier. Microphone volume can be set using the control on the front face of the PA500. If the PA500 is installed in an enclosure, the volume level can be pre-set by the installer.

# **Installation Notes:**

# **Optional Product List:**

- Televisions	
AVT988 9' Color Television with Remote (12V)	AVT988
AVT1498 13" Color Television with Remote (12V)	AVT1498
VCP and DVD Players	
for use with TV's and LCD	
AVP7000 Video Cassette Player (12V)	AVP7000
AVP7285 Video Cassette Player (12V)	AVP7285
Single Disc DVD Player	DVD2101
Headphones	
Wireless Headphones	WHRF01
Headphones with Pivoting Earcup	HP175
Headphones with Volume Control on Cord	HP275
Studio Quality Headphones	HP375
Miscellaneous	<u>.                                    </u>
Remote Controls	Please Call
Wallmount Family Radio Service with 4 Handsets	FRS4WM
Replacement Handset	FRS100Y
12V Corded Vacuum	VAC21
Rechargeable Flashlight	AVF1
Window Mount TV Antenna	AN350
2-Amp Adapter for use with AVP7000/7285 VCP	0891436
4-Amp Adapter for use with AVT988 9" & AVT1498 13" TV	0891412
Wallmount Radios	
AM/FM Wallmount Manual Tune w/Cassette Player	AWM710
AM/FM Wallmount Electronic Tune w/Cassette Player	AWM820
AM/FM Wallmount Stereo w/CD Player	AWM930
Marine	
AM/FM Stereo with CD Player	MS1000
AM/FM Weatherband Stereo w/Cassette Player	MS407
AM/FM Stereo w/Cassette Player (Analog Tuner)	MS220
AM/FM Stereo w/Cassette Player (Analog Tuner)	MS306
Weatherproof Housing	MRH211
50 Watt 6 1/2" Speakers (White/Black)	AMS6
30 Watt 5" Speakers (White/Black)	AMS5
30 Watt 4" Speakers	AMS4
Marine Radio Antenna	AN125

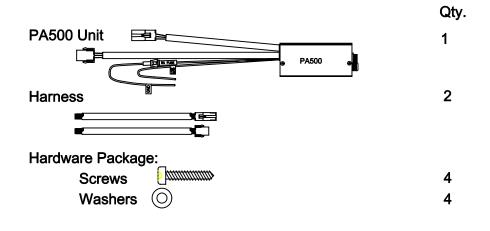
To order any of these products, please call 800-688-3135 OR

Visit our website at: www.asaelectronics.com

# **Manual Contents:**

Page
1
1
2
3
4-5
6
7
8-9
10
11
12
13

# **Package Contents:**



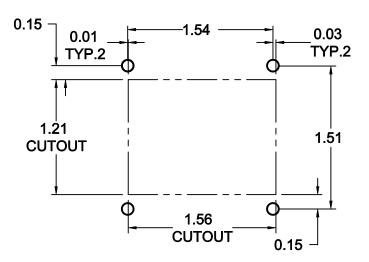
Manual

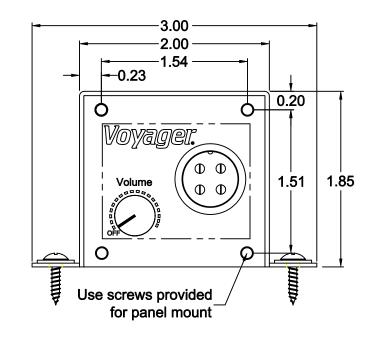


1

# **Panel Cutout (Optional Installation):**

The PA500 may also be mounted through a panel (as shown below). In this method, the microphone volume may be adjusted or turned on/off to meet the operator's preference.





# **Troubleshooting:**

Symptom	Possible Cause	Possible Solution
Has audio from radio but not PA500	- PA not turned on - Volume set too low on PA	- Turn PA on - Adjust volume of PA to higher level
	- In-line fuse blown - Input and output wired	- Check and replace in-line fuse - Reverse input and
	backwards	output wiring - Need to install
(With BVMB02) No audio,has popping sound on speakers	- Phantom PCB (P/N 8515245) not installed	Phantom PCB
High pitched squeal (feed back)	- Volume on PA set too high	-Turn volume on PA down
Hand held MIC keyed and gets	- Volume on PA set too high	- Turn volume on PA down
feed back	- Volume on MIC set too high	- Turn volume down on MIC
PA500 will not turn on, (does not have power)	- In-line fuse on PA blown	- Replace fuse

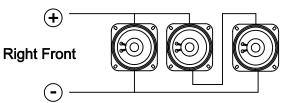
# **Specifications:**

22 Watts per channel, 4 ohm load
7 Amp Max.
100-10,000
3.08" x 1.85" x 4.0" (W x H x D)
15 oz.

# **Speaker Connections:**

3 Pair- 4 Ohm Speakers

Curb Side 6 Ohm Total Impedance

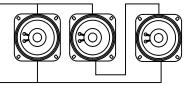


Driver Side 6 Ohm Total Impedance

Left Front

( - )

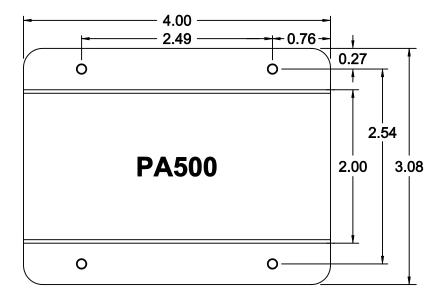
 $(\mathbf{+})$ 



Align Speakers with "+" on top and "-" on bottom as shown

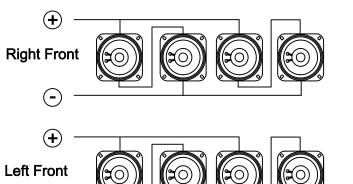
# **Optional Flange Mount Installation:**

The PA500 may also be mounted in a "blind" location, using the mounting holes on the flanges. In this case, the microphone volume must be pre-set by the installer prior to the completion of the installation. The 30 ft. microphone extension/adapter cable (P/N 1401035) or the 36" microphone extension/adapter cable (P/N 1401040), is to be used to allow connection of a PTT (Push To Talk) type microphone by the operator.



4 Pair- 4 Ohm Speakers

Curb Side 4 Ohm Total Impedance



Driver Side 4 Ohm Total Impedance

Align Speakers with "+" on top and "-" on bottom

# **Typical Wiring Connections:**

#### **INPUT NOTES:**

#### Radio to PA500

Wire Radio according to Manufacturer Spec.

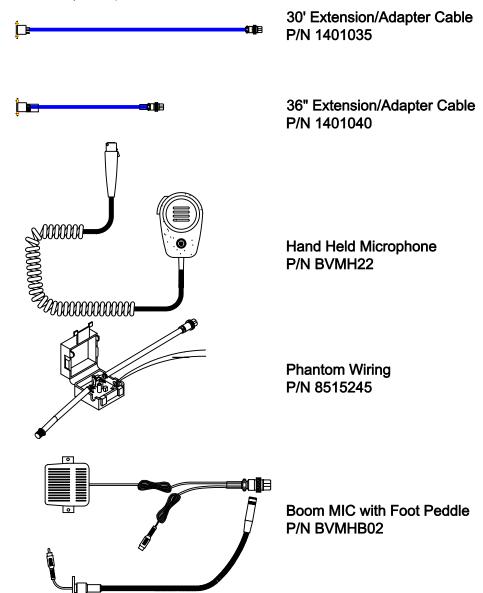
PA500 can accept any radio (up to 4 Channels).

Maintain appropriate load requirements. (4 ohm minimum suggested)

RA RF +	Gray	
RA RF -	Gray/Black	
RA LF +	White	
RA LF -	White/Black	
RA RR +	Violet	
RA RR -	Violet/Black	
RA LR +	Green	
RA LR -	Green/Black	

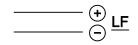
# **PA500 Applications con't.:**

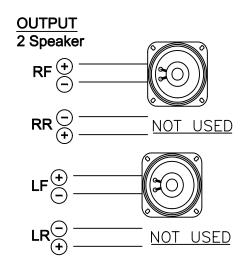
The PA500 may be used with the BVMH22 hand held microphone and either the 30' extension/adapter cable (P/N 1401035) or the 36" extension/ adapter cable(P/N 1401040). If the Boom MIC with Foot Peddle (P/N BVMH02) is used, the Phantom Wiring Harness (P/N 8515245) is required.



# **Optional Examples:**

INPUT 4 Wire





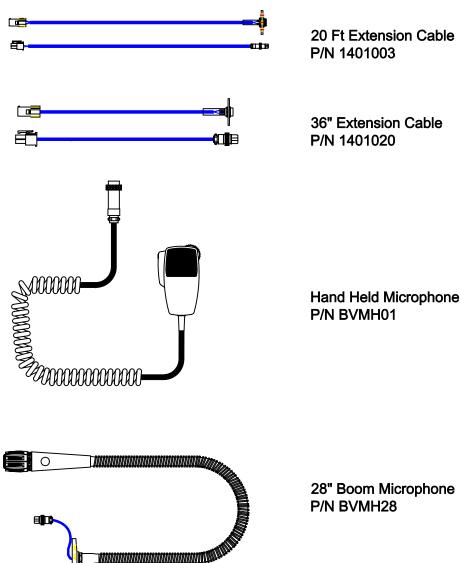
# **PA500 Applications:**

The PA500 may be used directly with the following microphones:

#### **BVMH01 Hand Held Microphone**

#### **BVMH28 Boom Microphone**

In applications which require remote mounting of the PA500, either the 20 foot extension/adapter (P/N 1401003) or the 36" extension/adapter cable (P/N 1401020) may be used



To PA500 Speakers

	SP RF +	
	SP RF -	
	SP LF +	
	SP LF -	
	SP RR +	
_	SP RR -	
	SP LR +	
_	SP LR -	

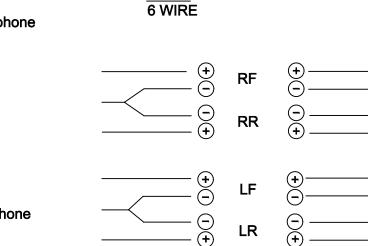
#### **OUTPUT NOTES:**

Do not ground any leads.

Do not tie output leads together.

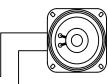
It is permissible to use only Front or **Rear Inputs and** Outputs in 2 speaker /4 Wire Systems





INPUT





## PA500 Wiring:

Wiring Chart for Radio and Speaker Connections

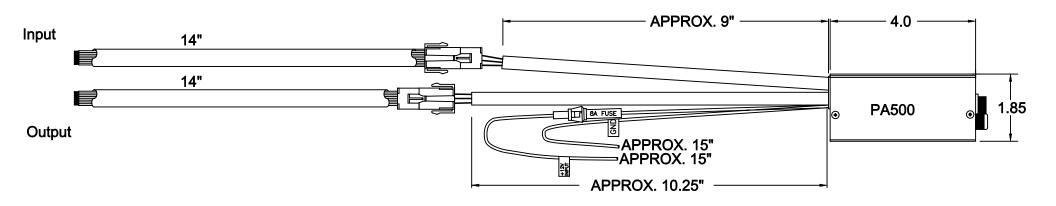
Wire Color	Speaker Connection
Gray	Right Front +
Gray/Black	Right Front -
White	Left Front +
White/Black	Left Front -
Violet	Right Rear +
Violet/Black	Right Rear -
Green	Left Rear +
Green/Black	Left Rear -

### Hardware Kit:

Quantity- Type 4- M5 x 13mm Philips PH Tapping Screw

#### 4-M3.5 Flat Washer





6

# BEACONS 3000 Series Strobe

4" High Model w/ clear lens is our standard option



#### REPLACE (x) AND (xx) IN ORDER NUMBER FOR PERSONALIZED SELECTIONS

#### Product Number: **3** (xx) **7**(x) (x) (x)

Watt Options:	1Ø = 10 Watt or 2Ø = 20 Watt
Flash:	7 = Double and Quad (included in product number)
Height Options:	L = Low, 4" Dome or H = High, 6" Dome
Mounting Options:	C = Flat/Pipe or M = Magnetic
LED Color/Dome Color Options:	A = Amber LEDs/Amber Lens C = White LEDs/Clear Lens

#### **Features**

- > Lens with UV inhibitor prevents sun fade
- > Rated to last 20,000+ hours
- > Advanced circuitry designed tolerate high vibration applications

# OCCESSORIES Branch Guard and Dust Cover (Beacon not included)



Branch Guards (6" shown)

4" Height **#PESB41BG4** 

6" Height **#PESB41BG6** 



#### **Dust Cover**

6" Height #E36ØDC6

#### **TECHNICAL SPECIFICATIONS**

FLASH PATTERNS	2 flash patterns - double or quad (user selectable)
TECHNOLOGY	Xenon Helix Strobe Tube
INPUT VOLTAGE	10-30 Vdc
CURRENT DRAW	10 Watts: 1 Amp @ 12 Vdc, 0.5 Amps @ 24 Vdc or 20 Watts: 2 Amps @ 12 Vdc,
	1 Amp @ 24 Vdc
OPERATING TEMPERATURE	-40° C to 50° C
DIMENSIONS	4" Dome with base: 4.75" (12 cm) H
	6" Dome with base: 6.7" (17 cm) H x 6.3" (16 cm) base diameter
MOUNTING	Permanent or Magnetic mount (polycarbonate lens and black base)
CERTIFICATIONS	SAE J 1318 Class 2 certified
WARRANTY	Two-year (strobe tube, one-year)

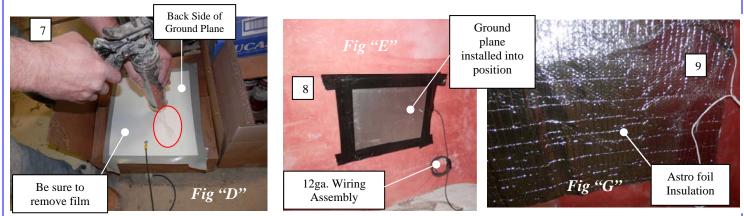
a division of Forest River, Inc.		Process Control Document	Form 751-01-18, Rev. B Updated: 08/29/2014	
Rev. B			1	No. 32-01-0006-19
Implementation: 004/05/2019		Title: FRONT CAP GROUND PLANE	Written by: Tim Smart	
Models Affected:	All	·	·	
Tools Necessary:		2"x 12" .063 Aluminum, Grinder, Duck Tape, Lucas Sealant, All-Purpose Total Pages: 01 ive, Caulk Gun, 31-28-1023-15 Ground Plane Print		

#### **Process:**

- 1. Begin process by locating ground plane location for installation.
- 2. Clean inside fiberglass cap from all debris with air hose.



- 3. Spray all-purpose adhesive to interior side of fiberglass cap were ground plane will be located.
- 4. Let adhesive tac up, apply 12ga. wire assembly to 12" aluminum ground plane with self-tapper. *Fig "B*"
  5. Apply all-purpose adhesive spray to backside all 4 outside edges of 12" aluminum.
- 6 Apply duct tape to backside all 4 outside edges of 12" aluminum.



- 7. Turn 12" aluminum over and apply lucas caulk to backside of ground plane. Fig "D"
- 8. Install ground plane as shown, run 12ga. wiring assembly to grounding plug in electrical box
- 9. Apply Astro foil insulation to front cap covering ground plane.
- 10. After cap installation a conduit w/ pull wire is ran from ground plane area down the B-pillar to behind the driver seat so a future antenna cable can be pulled through.
- 11. After completion of cab area, to complete this process circular access panel is installed in the cab ceiling immediately below the ground plane.

# Safe Fleet Transit & Coach Roof Hatches

Ventilator and Emergency Escape Hatches

Enhance your passenger comfort and safety with a hatch from the leader in bus safety equipment.

Safe Fleet roof hatches demonstrate over 40 years of proven performance and come in a wide variety of styles and configurations. Hatches are also customizable to meet your specific application needs. Each hatch features a low-profile design and meets all FMVSS and CMVSS regulations.



NEXT?

Adaptable Low profile design adapts to wide range of roof surfaces



Made in the USA Proudly manufactured in North Carolina with over 40 years of proven performance



#### High Strength

Constructed of high strength UV stable materials



#### Warranty

5 Year Manufacturer Warranty





The Safe Fleet – Transpec family of ventilators and escape hatches – designed to meet the wide-ranging needs of today's transit fleet.



#### **Dual Purpose Safety Vent**

The Dual Purpose Safety Vent is a combination roof ventilator/emergency exit that provides 5-position, fresh air ventilation and a simple release handle for emergency exit.

- Multi position fresh air vent
- Emergency exit
- Most popular model





#### **Glass Safety Vent**

The Safe Fleet Glass Roof Hatch is made of 4mm tempered glass with gray tint featuring an 18% light transmission and is also available in a motoriized version.

- Multi position fresh air vent
- Emergency exit
- Glass panel to allow natural light into the vehicle cabin





#### **Power Safety Vent**

The Power Safety Vent II provides all the features of the Dual-Purpose 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.

- Multi position fresh air vent
- Emergency exit
- High-capacity powered exhaust fan provides ventilation in the closed position





#### **Motorized Safety Vent**

The Motorized Safety Vent (MSV) is an electrically operated combination roof ventilator/emergency exit that provides fresh air ventilation as well as a simple release handle that allows the hatch to hinge open for emergency exit. The ventilation portion of the hatch is controlled by a simple switch contained within the driver's compartment of the vehicle on which it is installed.

- Multi position fresh air vent
- Emergency exit
- Allows the ventilation feature to be controlled from driver's seat

RETENTION HATCH AJAR MULTILINGUAL OUTSIDE ADHESIVE STATIC VENT COLORS RELEASE CABLE (1 or 2) ALARM SEALANT DECALS **STANDARD FEATURE & OPTIONS** T1070 Series Dual White. Light Gray, **Purpose Safety Vent II** Dark Gray, Black, Beige **T1670 Series Power** White. Light Gray, Safety Vent II Dark Gray, Beige **T2070 Series Motorized** White. Light Gray, Safety Vent II Dark Gray T2870 Series Glass White. Light Gray, **Roof Hatch** Dark Gray, Black





1245-SF-Hatch-BR-TR-091721

Copyright ©2021 Safe Fleet and its subsidiaries. All rights reserved. No part of this publication may be reproduced by any means without written permission from Safe Fleet. The information in this publication is believed to be accurate. However, Safe Fleet does not make any representation or warranty to that effect and does not assume responsibility for any consequences resulting from use of such information. Revisions or new editions of the publication may be issued (or not issued) in our discretion to incorporate such changes.

# Vulcan<sup>™</sup> 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 × 2, RS485 × 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<sup>™</sup>
- module with North American maps
- Includes GPSV1 antenna
- · Embeds GPS tracking information synchronized with recorded video footage

#### **GPS ANTENNA**

#### FIREPROOF BOX BACKUP

#### CELLULAR MODEM

Specifications, features and applications of use are subject to change without notice. V 4/2017



06/21/2017

MB#

# Z GUARD TM 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 % NVM by WT. Density Viscosity (after reduction with water) per Brookfield RVT #5 Spindle 20RPM Viscosity per #4 Zahn cup Mechanical Stability Heat Stability V.O.C. D.O.T. Flammability Rating pH Cryptometer/#2 Wedge, ASTM D1212 60 ° Gloss Sag (mils) Black Liquid 50 10.43 lb/gal

2500 26 sec. Excellent Excellent 0.00 lbs/gal >200q F 8.5 15 < 5 matt finish) >15

### Z TECHNOLOGIES CORPORATION

World Leaders In Corrosion Protection

26500 Lapitol Avenue, Redford, Michigan 48239-2597 Telephone (313) 937-0710 · Fax (313) 937-1470

9/12/2013



MB #LB005 V1

# 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 D1640 Dry-to-Handle at R.T., ASTM D1640 Pencil Hardness Flexibility 180° bend over conical mandral Salt Spray, ASTM B117, 1000 hours

Salt Fog Resistance (463PB-10-01), 240 hours.

- 500 F x 16 hours plus 240 hrs salf fog
  325 F x 16 hours plus 16 hours humidity. Salt Fog Resistance (WSS-M2P178-A), 240 hours.
- 662°F x 1 hour; 1°C water quench; plus 240 hrs salt fog.

Salt Water Immersion, 5% NaCl, 100° F, 96 Hours Detergent Immersion, 100° F, 48 Hours Gravelometer, ASTM D3170, -20° F Poultice, GM 998-5470, 20 cycles Q.U.V., ASTM G53, 3000 Hours Q.U.V., 100 Hours + Salt Spray, 336 Hours Q.C.T., 3000 Hours Humidity Resistance, ASTM D2247, 2000 Hours Sag resistance Impact (direct & reverse) ASTM D3281 Adhesion (FLTM B1 6-1 B) cross Hatch Scab corrosion resistance, 20 cycles APPLICATION 10 ± 2 minutes 20 ± 5 minutes 6B Pass Field, scribe, edge clean; slight blistering Pass (No rust) Pass (No rust) Pass (No rust, nor blisters)

Pass (#8-9 corrosion rating or <0.1% surface rust per ASTM D 610-95) Pass Pass Good(8A) Pass Pass Pass Pass Pass ≥5 mils 160/40 inch-1bs. 5A Pass Pass

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

26500 Capitol Avenue, Redford, Michigan 48239-2597 Telephone (313) 937-0710 · Fax (313) 937-1470

World Leaders in Corrosion Protection



06/21/2017

MB#

# Z GUARD TM 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 % NVM by WT. Density Viscosity (after reduction with water) per Brookfield RVT #5 Spindle 20RPM Viscosity per #4 Zahn cup Mechanical Stability Heat Stability V.O.C. D.O.T. Flammability Rating pH Cryptometer/#2 Wedge, ASTM D1212 60 ° Gloss Sag (mils) Black Liquid 50 10.43 lb/gal

2500 26 sec. Excellent Excellent 0.00 lbs/gal >200q F 8.5 15 < 5 matt finish) >15

### Z TECHNOLOGIES CORPORATION

World Leaders In Corrosion Protection

26500 Lapitol Avenue, Redford, Michigan 48239-2597 Telephone (313) 937-0710 · Fax (313) 937-1470

9/12/2013



MB #LB005 V1

# 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 D1640 Dry-to-Handle at R.T., ASTM D1640 Pencil Hardness Flexibility 180° bend over conical mandral Salt Spray, ASTM B117, 1000 hours

Salt Fog Resistance (463PB-10-01), 240 hours.

- 500 F x 16 hours plus 240 hrs salf fog
  325 F x 16 hours plus 16 hours humidity. Salt Fog Resistance (WSS-M2P178-A), 240 hours.
- 662°F x 1 hour; 1°C water quench; plus 240 hrs salt fog.

Salt Water Immersion, 5% NaCl, 100° F, 96 Hours Detergent Immersion, 100° F, 48 Hours Gravelometer, ASTM D3170, -20° F Poultice, GM 998-5470, 20 cycles Q.U.V., ASTM G53, 3000 Hours Q.U.V., 100 Hours + Salt Spray, 336 Hours Q.C.T., 3000 Hours Humidity Resistance, ASTM D2247, 2000 Hours Sag resistance Impact (direct & reverse) ASTM D3281 Adhesion (FLTM B1 6-1 B) cross Hatch Scab corrosion resistance, 20 cycles APPLICATION 10 ± 2 minutes 20 ± 5 minutes 6B Pass Field, scribe, edge clean; slight blistering Pass (No rust) Pass (No rust) Pass (No rust, nor blisters)

Pass (#8-9 corrosion rating or <0.1% surface rust per ASTM D 610-95) Pass Pass Good(8A) Pass Pass Pass Pass Pass ≥5 mils 160/40 inch-1bs. 5A Pass Pass

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

26500 Capitol Avenue, Redford, Michigan 48239-2597 Telephone (313) 937-0710 · Fax (313) 937-1470

World Leaders in Corrosion Protection

# **CERTIFICATION FOR AIR & WATER POLLUTION MANDATORY BID FORM – MUST BE SUBMITTED WITH BID**

The Vendor certifies that the vehicles proposed:

ARE  $\checkmark$  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.

2/9/2023

Date

Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

# DISADVANTAGED VEHICLE BUSINESS ENTERPRISE **VENDORS/ MANUFACTURERS CERTIFICATION**

# MANDATORY BID FORM - MUST BE SUBMITTED WITH BID

# (Check appropriate statement)

 $\checkmark$ 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.

2/9/2023

Date

Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

**Company Name** 

# BUY AMERICA CERTIFICATION ROLLING STOCK MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

# **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:

2/9/2023

Date	
5#D	
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

Revised 10/27/14

# FEDERAL MOTOR VEHICLE SAFETY STANDARDS CERTIFICATION

# MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

The vendor hereby certifies that it shall submit, as required by Title 49 of the CFR, Part 663 - Subpart D, it's 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.

2/9/2023
Date
SHDA
Authorized Signature
Government Bid Team Manager
Title

Forest River Bus, LLC

Company Name

Revised 10/27/14

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

# MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

Forest River Bus, LLC

hereby certifies that it

\_\_\_\_ IS or

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

2/9/2023

Date

Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

# MANDATORY BID FORM - MUST BE SUBMITTED WITH BID

# **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), 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.

Sovernment Bid Team Manager

Signature and Title of Authorized Official

# **BID FORM #9** MANDATORY BID FORM – MUST BE SUBMITTED WITH BID

# **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 truthfulne and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contracto understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

2/9/2023

Date

Authorized Signature

Government Bid Team Manager Title

# CERTIFICATION OF COMPLIANCE WITH FTA'S BUS TESTING REQUIREMENTS

The undersigned (Vendor/Manufacturer) certifies that the vehicle offered in this procurement complies with 49 U.S.C. 5318, as amended by MAP-21, and FTA regulations, "Bus Testing," 49 CFR Part 665.

The undersigned understands that misrepresenting the testing status of a vehicle acquired with Federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regula on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29.

2/9/2023

Date

Authorized Signature

Government Bid Team Manager

Title

Forest River Bus, LLC

Company Name

Revised 10/27/2014

# Pre-Award BUY AMERICA CERTIFICATION

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 20' 138"WB ON FORD E350	Glaval Bus		<u>74.78%</u>	<u>25.22%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	51.11%	
Rear/Front Bumper	Romeo	U.S.	0.66%	
Exterior Mirrors	ROSCO	U.S.	0.55%	
Rear Suspension	MorRyde	U.S.	0.96%	
A/C System	Trans Air	U.S.	5.54%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	0.42%	
Wheelchair Lift	Braun	U.S.	0.00%	
Wheelchair Restraints	Q'Straint	U.S.	0.00%	
Seating	Freedman	U.S.	9.22%	
DVR/NVR	AngelTrax	U.S.	1.42%	
Windows	Starquest Lippert	U.S.	0.99%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.96%	
Electical System	LGS Group	U.S.	1.53%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.63%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.78%	
		U.S.	0.00%	
		U.S.	0.00%	
		U.S.	0.00%	

### 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: FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE \$3.097.57

AUTHORIZED SIGN

**Government Bids** TITLE

2/9/2023 DATE

4.33%

# **Pre-Award BUY AMERICA CERTIFICATION**

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 20' 138" WB ON FORD E350	Glaval Bus		<u>76.62%</u>	<u>23.38%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	48.66%	
Rear/Front Bumper	Romeo	U.S.	0.63%	
Exterior Mirrors	ROSCO	U.S.	0.52%	
Rear Suspension	MorRyde	U.S.	0.91%	
A/C System	Trans Air	U.S.	5.28%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.50%	
Wheelchair Lift	Braun	U.S.	5.70%	
Wheelchair Restraints	Q'Straint	U.S.	0.57%	
Seating	Freedman	U.S.	6.84%	
DVR/NVR	AngelTrax	U.S.	1.35%	
Windows	Starquest Lippert	U.S.	0.95%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.91%	
Electical System	LGS Group	U.S.	1.46%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.60%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.75%	
		U.S.	0.00%	
		U.S.	0.00%	
		U.S.	0.00%	

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

<u>4.13%</u> <u>\$3,097.57</u>

AUTHORIZED SIGN

Government Bids

2/9/2023 DATE

# Pre-Award BUY AMERICA CERTIFICATION

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 20' 138" WB ON FORD E350	Glaval Bus		<u>77.06%</u>	<u>22.94%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	48.01%	
Rear/Front Bumper	Romeo	U.S.	0.62%	
Exterior Mirrors	ROSCO	U.S.	0.52%	
Rear Suspension	MorRyde	U.S.	0.90%	
A/C System	Trans Air	U.S.	5.21%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.48%	
Wheelchair Lift	Braun	U.S.	5.62%	
Wheelchair Restraints	Q'Straint	U.S.	1.12%	
Seating	Freedman	U.S.	7.66%	
DVR/NVR	AngelTrax	U.S.	1.34%	
Windows	Starquest Lippert	U.S.	0.93%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.90%	
Electical System	LGS Group	U.S.	1.44%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.59%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.74%	
		U.S.	0.00%	
		U.S.	0.00%	
		U.S.	0.00%	

### 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: FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE \$3.097.57

AUTHORIZED SIGN

**Government Bids** TITLE

2/9/2023 DATE

4.08%

# Pre-Award BUY AMERICA CERTIFICATION

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 22' 158" WB ON FORD E350	Glaval Bus		<u>77.52%</u>	<u>22.48%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	46.75%	
Rear/Front Bumper	Romeo	U.S.	0.61%	
Exterior Mirrors	ROSCO	U.S.	0.50%	
Rear Suspension	MorRyde	U.S.	0.88%	
A/C System	Trans Air	U.S.	5.07%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.44%	
Wheelchair Lift	Braun	U.S.	5.48%	
Wheelchair Restraints	Q'Straint	U.S.	1.63%	
Seating	Freedman	U.S.	9.40%	
DVR/NVR	AngelTrax	U.S.	1.30%	
Windows	Starquest Lippert	U.S.	0.91%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.87%	
Electical System	LGS Group	U.S.	1.40%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.57%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.72%	
		U.S.	0.00%	
		U.S.	0.00%	
		U.S.	0.00%	

### 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: FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE \$3.097.57

AUTHORIZED SIGN

**Government Bids** TITLE

2/9/2023 DATE

3.97%

# Pre-Award BUY AMERICA CERTIFICATION

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 20' 138" WB ON FORD E350	Glaval Bus		<u>73.25%</u>	<u>26.75%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	46.52%	
Rear/Front Bumper	Romeo	U.S.	0.60%	
Exterior Mirrors	ROSCO	U.S.	0.50%	
Rear Suspension	MorRyde	U.S.	0.87%	
A/C System	Trans Air	U.S.	5.04%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.43%	
Wheelchair Lift	Braun	U.S.	5.45%	
Wheelchair Restraints	Q'Straint	U.S.	0.54%	
Seating	Freedman	U.S.	6.54%	
DVR/NVR	AngelTrax	U.S.	1.29%	
Windows	Starquest Lippert	U.S.	0.90%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.87%	
Electical System	LGS Group	U.S.	1.40%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.57%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.71%	

### 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: FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE \$3.097.57

AUTHORIZED SIGN

**Government Bids** TITLE

2/9/2023 DATE

3.95%

# Pre-Award BUY AMERICA CERTIFICATION

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 20' 138" WB ON FORD E350	Glaval Bus		<u>73.25%</u>	<u>26.75%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	46.52%	
Rear/Front Bumper	Romeo	U.S.	0.60%	
Exterior Mirrors	ROSCO	U.S.	0.50%	
Rear Suspension	MorRyde	U.S.	0.87%	
A/C System	Trans Air	U.S.	5.04%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.43%	
Wheelchair Lift	Braun	U.S.	5.45%	
Wheelchair Restraints	Q'Straint	U.S.	0.54%	
Seating	Freedman	U.S.	6.54%	
DVR/NVR	AngelTrax	U.S.	1.29%	
Windows	Starquest Lippert	U.S.	0.90%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.87%	
Electical System	LGS Group	U.S.	1.40%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.57%	
Stanchion/Grab Rails	United Roll Form	U.S.	0.71%	

### 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: FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE \$3.097.57

AUTHORIZED SIGN

**Government Bids** TITLE

2/9/2023 DATE

3.95%

# **Pre-Award BUY AMERICA CERTIFICATION**

This certifies compliance with FTA Buy America Regulations set forth in 49 C.F.R. § 661.11 for each component that more than 70% of the subcomponents, by cost, are of U.S. origin/manufacture and is manufactured in the U.S. Manufacturer attests that the U.S. content of subcomponents, by cost is as indicated below.

			% U.S.	%FOREIGN
COMPONENT NAME	MANUFACTURER NAME		CONTENT	CONTENT
PRIMETIME 22' 158" WB ON FORD E350	Glaval Bus		<u>74.27%</u>	<u>25.73%</u>
		MFG	% OF	
SUBCOMPONENT NAME	MANUFACTURER NAME	LOCATION	TOTAL	
Chassis	Ford Motor Co.	U.S.	44.70%	
Rear/Front Bumper	Romeo	U.S.	0.58%	
Exterior Mirrors	ROSCO	U.S.	0.48%	
Rear Suspension	MorRyde	U.S.	0.84%	
A/C System	Trans Air	U.S.	4.85%	
Wheelchair/Rear Door(s)	Challenger Door	U.S.	1.38%	
Wheelchair Lift	Braun	U.S.	5.24%	
Wheelchair Restraints	Q'Straint	U.S.	1.56%	
Seating	Freedman	U.S.	9.13%	
DVR/NVR	AngelTrax	U.S.	1.24%	
Windows	Starquest Lippert	U.S.	0.87%	
Entry Door Header/Door Panels	A&M Systems	U.S.	0.84%	
Electical System	LGS Group	U.S.	1.34%	
Battery Box and Tray	MorRyde/Stoutco	U.S.	0.55%	
Stanchion/Grab Rails	United Roll Form	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: <u>3.81%</u> FINAL ASSEMBLY \$\$ NOT INCLUDED IN THE COSTS ABOVE <u>\$3,097.57</u>

AUTHORIZED SIGN

Government Bids

2/9/2023 DATE

Scott Defrees