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

Solicitation

NUMBER	PAGE
PTR14016	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
LAURA HOOPER
304-558-2306

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
Sonny Merryman, Inc
PO Box 495
Rustburg VA 24588

SHIP TO
DIVISION OF PUBLIC TRANSIT
KANAWHA VALLEY REGIONAL TRANS
1550 FOURTH AVENUE
CHARLESTON, WV
25325 304-343-3840

DATE PRINTED: 12/23/2013
BID OPENING DATE: 01/09/2014 BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 1 THIS ADDENDUM IS ISSUED TO MODIFY THE ORIGINAL SOLICITATION PER THE ATTACHED DOCUMENTATION.		
0001	1	EA	557-15	1-25 MID-SIZE, MEDIUM LIGHT DUTY BUSES		
				****** THIS IS THE END OF RFQ PTR14016 ****** TOTAL:		

01/14/14 12:58:39PM
West Virginia Purchasing Division

SIGNATURE [signature] TELEPHONE 434-821-1000 DATE 1-9-14
TITLE Commercial Sales FEIN 54-0806-176 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

SOLICITATION NUMBER: PTR14016
Addendum Number: 1

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

Applicable Addendum Category:

[✓] Modify bid opening date and time

[✓] Modify specifications of product or service being sought

[✓] Attachment of vendor questions and responses

[ ] Attachment of pre-bid sign-in sheet

[ ] Correction of error

[ ] Other

Description of Modification to Solicitation:

To extend the Bid Opening date to January 9, 2014 at 1:30PM EST.

To distribute the Answers to the Technical Questions.

To provide an updated Pricing Page.

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.

Technical Questions/ Approved Equals on PTR14016

TECHNICAL QUESTIONS

Section 3.7.4 a
Requests approval of standard wheel size, Accuride 29001 22.5X7.50 10-HUB Pilot 5-Hand steel disc

Denied. WVDPT requests a smaller wheel and tire, such as the one specified for the class with the gasoline engine, appropriate for the GVWR.

Section 3.7.4 b
Request approval of our standard front & rear tires, Goodyear G661 HSA 255/70r22.5 16 ply radial.

Denied. WVDPT requests a smaller wheel and tire appropriate for the GVWR, such as the one specified for the class with the gasoline engine.

Section 3.8
Request approval for all wiring to be loomed and held in place by insulated clamps spaced every 24 inches on center. Our steel cage, floor, side walls, rear wall and roof are at a maximum on 24" centers

Approved, as long as wire is positioned so that vibratory wear will not compromise wire or insulation integrity.

Section 3.8.5a
Request approval for all wiring to be loomed and held in place by insulated clamps spaced every 24 inches on center. Our steel cage, floor, side walls, rear wall and roof are at a maximum on 24" centers

Approved, as long as wire is positioned so that vibratory wear will not compromise insulation.

Section 3.12.2
All wall cavities are filled with 1 1/2" block foam insulation. All cavities of the wheelchair and/or rear door structure are filled with 1" block foam insulation. The cavities of the roof structure are filled with expandable spray foam insulation. Foam-Control EPS meets or exceeds the requirements of ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation." Foam-Control EPS is monitored for Quality Control and Listed by Underwriters Laboratories Inc.

Approved.

Section 3.14.f
Request approval of freedman seating mid-high back seat width of 17.5 inches per passenger

Approved.

Section 3.14.f
Please accept 17.5" wide seats this is necessary to adhere to the required aisle width, Freedman does not offer an 18" wide seat, next available size is 19" which would not fit five across in the rear row

Accepted.

Section 3.17b
REQUEST APPROVAL OF OUR STANCHION ASSEMBLY AND TOP BARRIER Stanchion assemblies are constructed of 1 1/4" diameter 18 ga. stainless steel tubes and attached to structural members. Top barrier is 1/4" clear or smoke Plexiglass.

Accepted. Please secure post with a bolt and an acorn nut.

Section 3.18b
REQUEST APPROVAL OF OUR STANDARD PASSENGER WINDOWS. Side passenger windows are transit style top sliders with a 20% light transmitting tint. The window size is 46 ½"w x 32 ½"h / 1511 sq inches. An interior clamp ring and a bulb seal allow a water tight fit. Emergency egress windows are constructed in the same manner, but capable of being opened in an emergency situation. They feature a top hinge and heavy duty red handles which when released allow the window to open. Emergency windows are clearly labeled with instructions of operation in a visible location on window. The number of passengers designates the quantity. Filler windows are a 22 ½", or 20 ½"w x 32 ½"h fixed style window. Passenger windows have an AS-3 rating and are compliant with FMVSS 217. The rear emergency window is a fixed style egress window. The window size is 60"w x 22 ½"h with a 20% light transmitting tint and an AS-3 rating

Accepted. Please secure latches to window in a manner that will prevent them from being removed with normal wear.

Section 4.1.1
Overall length of 391" to accommodate passenger load

If I understand this correctly, the extended length of 391" is to accommodate the increased passenger capacity on Classes E (4.5) and F (4.6). If this is the case, this request is approved.

Section 4.1.1
Please accept an overall length of 356" for the base vehicle

Approved.

Section 4.4.1
Please accept an overall length of 356" for the base vehicle. Truck buses have a front engine compartment that protrudes from the fire wall forward and is longer than the flat nose bus when interior capacities are equal.

Approved.

Section 4.1.1 Request overall height of 129" (excluding roof hatch, etc.)

Accepted.

APPROVED EQUALS

Section 3.8.3a
Request approval of our standard exterior led lights. Soundoff signal brand led lights. Please see attached supporting information & warranty.

Brand Approved. No info attached, so all specifications and warranty info in RFQ supersedes any product information sheets.

Section 3.8.4c
Request approval of our standard interior led lights. Gufstafson brand led lights. Please see attached supporting information & warranty

Brand Approved. No info attached, so all specifications and warranty info in RFQ supersedes any product information sheets.

Section 3.12.1
Additionally, we ask that you approve one of our manufacturer's most current body structure specification below. Fully meets all FMVSS standards:
The body has a steel cage construction. When the sidewalls, floor, and roof are welded together, they form a strong, durable structure.
The sidewalls are constructed of 1.5" x 1.5" 16-gauge tubular steel studs and corner posts on maximum 48" centers. A 14-gauge, 1-1/2" x 2" tubular horizontal stringer is welded to the top of the studs. A 16-gauge Z-rail is welded to the studs at the bottom of the sidewall. The window corners are reinforced with corner gussets.
The roof consists of 1.5" x 1.5" 16-gauge tubular steel rafters installed on maximum 48" centers. The roof rafters are welded into two 16-gauge steel "U" shaped sidewall caps. The rafters, in conjunction with two 3" 16-gauge flat longitudinal stringers, form a "steel cage" type of construction.
The back wall has a 1.5" x 1.5" 16-gauge tubular steel frame, reinforced with 16-gauge "C" channel. A section of 16-gauge Z-channel is welded to the bottom of the back wall.
The floor frame is constructed of 11-gauge, 2"x2.8"x2" channel cross members, on maximum 34" centers, with an outer 14-gauge channel steel impact rail. 11-gauge, 4" flat steel is provided to support the floor track. The wheel wells consist of 14-gauge steel welded to the floor cross members. Any wheelchair tie downs are attached through 11-gauge 4" flat steel welded in the appropriate locations on the floor. The floor frame is secured to the chassis frame in accordance with the chassis manufacturer's requirements.
When the sidewalls, floor, and roof are welded together, they form a continuous "hoop" structure, which is extremely strong and durable
The body has a steel cage construction. When the sidewalls, floor, and roof are welded together, they form a strong, durable structure.
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Sidewalls, floor, and roof are welded together, to form a continuous "hoop" structure

Approved.

Section 3.12.6b
UNDERCOATING TECTYL 127CG Gray is a solvent cutback, thixotropic, gray pigmented corrosion preventive compound. The dry film is firm and non-tacky. TECTYL 127CG Gray provides excellent weathering and corrosion protection for industrial applications. TECTYL 127CG Gray is recommended for use in the transportation industry as an undercoating and sound deadener. Tectyl® 127CG possesses dielectric strength of 800 volts per dry mil of coating and can be applied between dissimilar metals to prevent galvanic corrosion. The underbody is sprayed with a tough, pliable, corrosion protectant material with sound-deadening properties in accordance with chassis manufacturer's guidelines

Tectyl is an approved equal

Section 3.14.k
Please accept the Bostrom T910 high back air suspension seat this is offered on the freightliner chassis. It is standard feature on their chassis and included in the OEM chassis warranty

Denied. The driver's comfort is an important feature and this model or equal has been selected.

Section 3.17a
REQUEST APPROVAL OF OUR STANDARD MODESTY PANEL AND TOP BARRIER
Top barrier is 1/4" clear or smoke Plexiglass. Modesty panels are constructed of gray Rontex (a fabric/carpet backer type of material) adhered to a 3/8" plywood panel & trimmed with metal C-channel on exposed edges. These panels are then mechanically fastened to stanchion assemblies in the vehicle. A modesty panel is standard aft of the entry door and aft of a front lift door. 96" wide body The panel aft of the entry is 19 ½"w x 21"h. The panel aft of the front lift is 18"w x 21"h.

Accepted. Please secure post with a bolt and an acorn nut.

Section 4.7
To meet gasoline engine requirement for this class of vehicle requires lowering GVWR to 19,500 lbs. Bus will built on the Ford F550 chassis with a 6.8L V10 gasoline engine. Neither Freightliner nor International currently offer a gasoline powered medium light duty chassis to build on.
Chassis specifications required for Class G if the Ford F550 is allowed:

☐☐Ford Super Duty Cutaway Chassis (F550)
☐☐Ford 6.8L Triton V-10 Triton Gasoline Engine
☐☐Front Chrome Bumper and Grill
☐☐Aerodynamic Sealed Beam Headlights
☐☐Engine Block Heater
☐☐Driver Air Bag
☐☐Front License Plate Bracket
☐☐Dual Rear Wheels
☐☐AM/FM/CD/MP3 with auxiliary input jack, clock, and 4 speakers
☐☐Inside Day/Night Rearview Mirror
☐☐Daytime Running Lights
☐☐GVWR's: 19,500 lbs on F550
☐☐Front and Rear Heavy Duty Shock Absorbers
☐☐Mono-Beam Front Axle with Coil Spring Suspension
☐☐Rear Axle Ratio: 4.88 w/ Gas engine
☐☐Front and Rear Stabilizer Bars
☐☐5 Speed TorqShift® Automatic Transmission with Automatic Overdrive & selectable Tow/Haul mode (6-Speed on Diesel)
☐☐In-Tank Transmission Oil Cooler w/ 5-Speed model; Auxiliary Transmission Cooler w/ 6-Speed model
☐☐OEM Driver Seat w/ Grey Cloth, Built-in Headrest & Reclining Back. (No arm rest, no adjustable lumbar, and no fabric re-cover option).
☐☐Dome Light with Dual Map Lights
☐☐Tilt Steering Wheel
☐☐Power Steering
☐☐Cruise Control
☐☐Fast Idle
☐☐Driver & Passenger Sun Visors
☐☐Engine Oil Pressure Gauge
☐☐Electronic Speedometer
☐☐4-Wheel ABS Hydraulic Disc Brakes with Hydro-Boost
☐☐40 Gallon Fuel Tank
☐☐Alternator: 157-Amps on Gas Engine (upgraded to 225 amps by Bus manufacturers)
☐☐Dual Batteries: Two (2) 750 CCA Batteries
☐☐Six (6) Tires: 225/70Rx19.5G All -Season
☐☐Steel Wheels Painted Grey
☐☐Front Tow Hooks
☐☐Front Mud Flaps
☐☐Glove Box with 12-volt Power Port
☐☐Storage Bins in Driver's Door
☐☐Engine Failsafe Mode for Low Coolant
☐☐50 State Emissions Package (Gas Engines meet 2010 emission levels)

Accepted, with the following exceptions:
The driver's seat needs to be the one that was specified, or equal.
A 40 gallon fuel tank is acceptable, but a 60 gallon is preferred.

Steel wheels are to be painted white.

4.12
Request approval of the Freightliner S2C rear air suspension, Airliner 23,000# rear suspension with chain clearance, dual air rear suspension leveling valves & rear swaybar

Accepted.

ADDITION/CLARIFICATION

Section 3.12.4.f
Please clarify if this is a front lift or rear lift model

Please strike "shall be located behind the rear wheels" from 3.12.4 f. This is a front lift only bus.

Section 3.14.J
Request clarification to requirement "j". Is the request for a double passenger seat with only one integrated child restraint position and one companion position or should both positions have the integrated child restraint? If only one integrated child restraint is required does the agency have a preference whether the ics position is located on the aisle side or window side of the seat?

WVDPT requests two child restraint seats.

Section 3.14.J
Calls for One Double Mid High to be a Double Child Restraint Seat. Clarification needed as to whether they are wanting a Restraint Seat and a Companion or Two Child Restraint Seats.

WVDPT requests two child restraint seats.

QUESTION
Would Purchasing and the Division of Public Transit consider establishing a **Class H** Category. This category would meet all the requirements of the modified Class G plus a hardened valve kit from Ford to facilitate the install of an 64 gas gallon equivalent CNG system that is both EPA and Carb certified. This request would be for up to (10) 500 class vehicles operated by KRT. This request is the result of recent CNG initiatives that are pending in the Capitol City.

4.8 Class H (Class C plus CNG fueling): Vehicles identified as Class H vehicles must meet the mandatory requirements listed in Section 3 and the mandatory requirements of Class C, with the exception that Class H vehicles must be driven by CNG fuel. **It is recommended that the vendor submit description, warranty information and literature information of chassis with gasoline engine with bid.**

Pricing Page:
Complete the form provided below.
Please note the awards may be made to multiple vendors.

Class	Item Description	Unit Price	Estimated	Extended Price
		Per Vehicle	Quantity	
A	Bus; Rear Air Suspension		10	
B	Bus; Rear Air Suspension; Extended length +4		10	
C	Bus; Rear Air Suspension; Extended length +8		10	
D	Bus; Automatic Tire Chain Device; full bus paint		5	
E	Bus; Automatic Tire Chain Device; Extended length +4; full bus paint		5	
F	Bus; Automatic Tire Chain Device; Extended length +8; full bus paint		5	
G	Bus; Automatic Tire Chain Device; full bus paint; gasoline engine		5	
H	Bus; Rear Air Suspension; Extended length +8; CNG		10	
			TOTAL	

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

PTR14016 | 1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
LAURA HOOPER
304-558-2306

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE

Sonny Merryman, Inc
PO Box 495
Rustburg VA 24588

SHIP TO
DIVISION OF PUBLIC TRANSIT
KANAWHA VALLEY REGIONAL TRANS

1550 FOURTH AVENUE
CHARLESTON, WV
25325 304-343-3840

DATE PRINTED
01/07/2014

BID OPENING DATE: 01/14/2014 BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 2		
				THIS ADDENDUM IS ISSUED TO MODIFY THE ORIGINAL SOLICITATION PER THE ATTACHED DOCUMENTATION.		
0001	1	EA		557-15		
				1-25 MID-SIZE, MEDIUM LIGHT DUTY BUSES		
				****** THIS IS THE END OF RFQ PTR14016 ****** TOTAL:		

SIGNATURE | TELEPHONE 434-821-1000 | DATE 1-9-14

TITLE Commercial Sales | FEIN 54-0806-176 | ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

SOLICITATION NUMBER: PTR14016
Addendum Number: 2

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

Applicable Addendum Category:

[✓] Modify bid opening date and time

[ ] Modify specifications of product or service being sought

[ ] Attachment of vendor questions and responses

[ ] Attachment of pre-bid sign-in sheet

[ ] Correction of error

[ ] Other

Description of Modification to Solicitation:

This addendum is to extend the BID OPENING date to January 14, 2014 at 1:30 PM EST.

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.

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

Solicitation

NUMBER	PAGE
PTR14016	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
LAURA HOOPER
304-558-2306

VENDOR
*709033659 434-821-1000
SONNY MERRYMAN INC
PO BOX 495

RUSTBURG VA 24588

SHIP TO
DIVISION OF PUBLIC TRANSIT
KANAWHA VALLEY REGIONAL TRANS

1550 FOURTH AVENUE
CHARLESTON, WV
25325 304-343-3840

DATE PRINTED
12/04/2013

BID OPENING DATE: 01/02/2014 BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	EA		557-15	136,448.00	136,448.00
1-25 MID-SIZE,MEDIUM LIGHT DUTY BUSES						

REQUEST FOR QUOTATION
(RFQ)

THE WEST VIRGINIA PURCHASING DIVISION, ON BEHALF OF THE WEST VIRGINIA DIVISION OF PUBLIC TRANSIT, IS SOLICITING BIDS FROM QUALIFIED VENDORS FOR AN "OPEN-END CONTRACT" TO PROVIDE 1-25 MID-SIZE, MEDIUM LIGHT DUTY BUSES PER THE ATTACHED SPECIFICATIONS.

****** THIS IS THE END OF RFQ PTR14016 ****** TOTAL: 136,448.00

* Per base specifications as included in section 3 of the bid documents *

SIGNATURE [signature] TELEPHONE 434-821-1000 DATE 1-9-14

TITLE Commercial Sales FEIN 54-0806-176 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Sonny Merryman INC.
VIRGINIA'S BUS COMPANY

January 8 2014

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

Dear Mrs. Hooper:

Thanks you for the opportunity to submit this bid in response to your Request for Quotation # PTR14016. We are offering the Startrans P/S2C.

Should we receive an award for this solicitation, we will provide the material as outlined. The Startrans P/S2C will be constructed in Goshen, Indiana.

Because the 9100 ALX3 operator seat has not been tested for use in the Freightliner we are providing the Evolution G2ELP. We have provided seat specifications as part of the bid package.

Also addressed and included in the proposal are curb weights and warranty locations to be used to maintain vehicles.

We are if full understanding of training and will provide personnel to conduct training if we are the successful bidder. We have included "as-built" wiring schematics in our bid price. Also, as requested, we are offering schemes to match your existing fleets. The prices for the paint and graphics are included in our pricing.

Thank you again for this opportunity. Please call if you have questions.

Sincerely,

Chad Seals
Account Manager
West Virginia Public Transit Providers
800-533-1006 x352
434-821-4456
chad@sonnymerryman.com

REQUEST FOR QUOTATION **PTR14016 Mid-Size Medium Light Duty Transit Vehicles**

REQUIRED BID DOCUMENTATION CHECKLIST

Model Year: B 2015 Model: B P/32C

Manufacturer: Startrans

Mandatory Bid Forms-must be submitted with bid

- [✓] Bid form1 LOCATION(S) OF THE TECHNICAL SERVICE REPRESENTATIVE(S)
- [✓] Bid form2 CERTIFICATION FOR AIR POLLUTION
- [✓] Bid form3 DISADVANTAGED BUSINESS ENTERPRISE VENDORS/ MANUFACTURERS CERTIFICATION
- [✓] Bid form4 BUY AMERICA CERTIFICATION ROLLING STOCK
- [✓] Bid form5 FEDERAL MOTOR VEHICLE SAFETY STANDARDS CERTIFICATION
- [✓] Bid form6 U.S. COMPTROLLER'S DEBARMENT LIST CERTIFICATION
- [✓] Bid form6A CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
- [✓] Bid form7 VENDOR'S CERTIFICATION OF UNDERSTANDING AND ACCEPTANCE
- [✓] Bid form8 CERTIFICATION OF COMPLIANCE WITH FTA'S BUS TESTING REQUIREMENTS
- [✓] COPY OF RELEVANT BUS TESTING REPORT- 3.4 STURAA TEST- 7 Years; 3.12.1g Water Testing- details of process
- [✓] Bid form9 CERTIFICATION OF RESTRICTIONS ON LOBBYING
- [✓] Pricing page

Mandatory Documentation-must be submitted within 24 hours of request

Section Referenced	
B	No Debt Affidavit
B 3.5	Engine: ISB-07- provide description, warranty, and literature
B 3.5b	Water Separator and Fuel Filter- provide description, warranty, and Literature
B 3.5h	High Idle System- provide description, warranty, and literature
B 3.5i	Engine heating/cooling system- provide description, warranty, and Literature
A 3.6	Transmission- provide description, warranty, and literature
A 3.6.c	Transmission Cooling System- provide description, warranty, and literature
B 3.7.1a	Heavy Duty Brakes- provide description, warranty, and literature
B 3.7.3	Suspension System- provide description, warranty, and literature

B	3.7.4b	Tire Information- provide description, warranty, and literature
B	3.8	Electrical System- provide description, warranty, and literature
B	3.8.1	Alternator- specify the rectifier, method of installation, provide warranty and literature
B	3.8.2	Batteries- specify type and capacity
B	3.8.3d	Exterior Lights -LED Lights- provide description, warranty, and literature
A	3.8.3n	Strobe Light-provide description, warranty, and literature
B	3.8.3p	Truck Lite Products- provide description, warranty, and literature
B	3.8.4	Interior Lights- provide description/details
B	3.8.5b	Fuse box panel- provide description/details
B	3.8.6b	Rear Alarm- provide description, warranty, and literature
A	3.8.6d	Backup camera- provide description, warranty, and literature
B	3.9.1	Heating System- provide description, warranty and literature
B	3.9.1c	Auxiliary Heaters- provide description, warranty and literature
B	3.9.1d	Stepwell Heater- provide description, warranty and literature
A	3.9.2b	A/C Compressor- provide description, warranty and literature
A	3.9.2c	A/C Condenser Information- provide description, warranty and Literature
B	3.9.2g	Driver's Evaporator- provide description, warranty and literature
B	3.9.2j	A/C Hose System- provide description, warranty and literature
B	3.10	Roof Hatch- provide description, warranty and literature
B	3.11	Circulation Fan- provide description, warranty and literature
A	3.12.1	Body Construction- provide description of body construction including materials, methods of joining and assembling components or subassemblies and method of attachment of the body to the chassis, warranty and literature
B	3.12.2b	Provide proof that skirt panel seams below floorline will be placed only above wheel wells or adjacent to A/C skirt condenser

B	3.12.2h	Insulation- provide proof of insulation requirement per spec.
A	3.12.6 b	Description of the undercoating/rust proofing system, including warranty to be provided.
B	3.12.4c	Door Operating Mechanism- provide description/ details
B	3.12.5d	Sample of Flooring- provide color per specifications, warranty and literature
B	3.12.5e	Sample of Ribbed Flooring- provide color per specifications, warranty and literature
A	3.12.6b	Undercoating/Rust proofing- provide description, warranty, literature and application process
A	3.12.7	Bumpers- provide description, warranty and literature
A	3.13	Lift- provide details, model #, warranty and literature. Provide information and literature that lift will meet the NHTSA platform lift requirements.
B	3.13f	Interlock System- provide description, warranty and literature
A	3.14	Seating Diagram- provide proposed seating diagram
B	3.14a	Passenger Seats- provide details for all proposed including flip up seats and ABS Knee Saver backs
B	3.14c	Under Seat Retractor System- provide description, warranty, literature and FMVSS 210 Report Certification
B	3.14j	Child Restraint Seat- provide description, warranty and literature
A	3.14k	Driver's Seat- provide description, warranty and literature
B	3.15	Mobility Aid Securement- provide details of proposed system, warranty, and literature
B	3.19a	Exterior Mirrors- provide description, warranty and literature
B	3.21	Radio/Communication Installation procedures
B	3.22	Radio/CD Stereo- provide description, provide warranty and literature
B	3.24h	Security Camera System- provide description, warranty and literature
B	3.25a	Fixed Route Package- provide description, warranty and literature
B	3.25b	Control Panel Location- submit details

B	3.25d	PA System- provide description, warranty and literature
B	3.25e	Passenger Signaling System- provide description, warranty and literature
B	3.27a	Interior and Exterior Color Schemes- provide details of schemes available
A	3.27d	Paint Scheme- provide sample of vinyl chart to be used
B	4.1	Rear Air Suspension- provide description, warranty and literature
B	4.4.2	Automatic Tire Chain Device- provide description, warranty and literature
A	4.7	Chassis with Gasoline Engine-provide description, warranty and literature
B	5.2	Items in sections a-l provide proof of compliance
A	5.11.1	Warranty on completed vehicle
A	5.11.2	Warranty on Basic Vehicle Structure
C	5.11.3	Warranty Locations- A description of how and by whom warranty service will be provided in four (4) areas of WV to cover both Mechanical and body work. Provide vendor who will do warranty of both chassis and body, including bus body, air conditioning and wheelchair lifts. Four areas of WV include: Northern Panhandle, Eastern Panhandle Central WV and Southern WV
B	5.11.4	Warranty per specs on subsystems and components
A	6.1.2	Complete (2) bids in binder form – (1) Marked for WVDPT
A	9.3a	Complete Mechanical Description of Vehicle, its construction and equipment including manufacturer's model, model name and/or number and model year Include Warranty Information
A	9.3b	Proposed Floorplans
C	9.3 c	Curb Weight (empty weight and Gross Vehicle Weight Rating (GVWR) of vehicle
A	9.3f	Location of nearest depot which will furnish a complete supply of parts and components for the repair and maintenance of the vehicle to be supplied
C	9.3h	Location of assembly
B	9.3i	List of five users names, addresses and telephone numbers who have

been provided similar equipment

B 9.39 Training- submit letter of understanding to the terms in this section

Pricing Page:
Complete the form provided below.
Please note the awards may be made to multiple vendors.

Class	Item Description	Unit Price Per Vehicle	Estimated Quantity	Extended Price
A	Bus; Rear Air Suspension		10	
B	Bus; Rear Air Suspension; Extended length +4		10	
C	Bus; Rear Air Suspension; Extended length +8		10	
D	Bus; Automatic Tire Chain Device; full bus paint/three quarter paint		5	
E	Bus; Automatic Tire Chain Device; Extended length +4; full bus paint/three quarter paint		5	
F	Bus; Automatic Tire Chain Device; Extended length +8; full bus paint/three quarter paint		5	
G	Bus; Automatic Tire Chain Device; full bus paint/three quarter paint; gasoline engine		5	
			TOTAL	

destination to the Agency's designated location. Vendor shall include the cost of standard order delivery charges in its bid pricing/discount and is not permitted to charge the Agency separately for such delivery.

12.0 MISCELLANEOUS:

12.1 **No Substitutions:** Vendor shall supply only Contract Items submitted in response to the RFQ unless a contract modification is approved in accordance with the provisions contained in this Contract.

12.2 **Contract Manager:** During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: C. Chad Seals
Telephone Number: 1-800-533-1006 ext 352
Fax Number: 434-821-8203
Email Address: chad@sonnymerryman.com

12.3 **Federal funding for this project is being provided by the Federal Transit Administration through CFDA 20.500 for Sec 5309, CFDA 20.509 for Sec 5311 and CFDA 20.506 for Sec 5339 to cover 80% of the project cost.**

REQUIRED BID FORMS

The following certifications shall be properly **completed and furnished by the bidder as part of the bid.** Failure to submit any of these certifications **shall** deem the bid **non-responsive.**

A required documentation checklist has been provided for bidder's usage.

BID FORM #1: LOCATION(S) OF THE TECHNICAL SERVICE REPRESENTATIVE(S)
MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

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

Name: Brady Childress
Address: 5120 Wards Road
Evington VA 24550
Telephone: 434-821-1000

Name: Gerald Layne
Address: 5120 Wards Road
Evington VA 24550
Telephone: 434-821-1000

Name: _____
Address: _____
_____
Telephone: _____

Name: _____
Address: _____
_____
Telephone: _____

BID FORM #2: CERTIFICATION FOR AIR POLLUTION
MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

Pursuant to Section 8.4 of Part 1 of the Procurement, the Vendor certifies that the vehicles proposed:

☑ **ARE or**

_____**ARE NOT** (specify one)

in compliance with the regulations in 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 600 and the air pollution criteria established by the Environmental Protection Agency of the United States Government.

1/8/14

Date

Authorized Signature

Commercial Sales

Title

Sonny Merryman, Inc

Company Name

BID FORM #3: DISADVANTAGED BUSINESS ENTERPRISE VENDORS/ MANUFACTURERS CERTIFICATION-- MANDATORY BID FORM-- MUST BE SUBMITTED WITH BID

(Check appropriate statement)

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

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

1-8-14
Date

Shawn Styer
Authorized Signature

General Manager
Title

Supreme Corporation
Company Name

BID FORM #4: 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:

1/8/14
Date

Authorized Signature
Sonny Merryman, Inc
Company Name
C. Chad Seals
Name
Commercial Sales
Title

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

Date

Authorized Signature

Company Name

Name

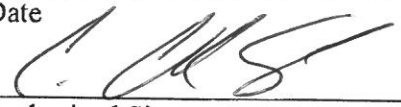
Title

BID FORM #5: FEDERAL MOTOR VEHICLE SAFETY STANDARDS CERTIFICATION
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.

1/8/14

Date



Authorized Signature

Commercial Sales

Title

Sonny Merryman, Inc

Company Name

BID FORM #6—U.S. COMPTROLLER'S DEBARMENT LIST CERTIFICATION
MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

Sonny Merryman, Inc hereby certifies that it

____**IS or**

☑ **IS NOT (specify one)**

included on the U.S. Comptroller General's Consolidated List of Persons or Firms Currently Debarred for Violations of Various Public Contracts Incorporating Labor Standards Provisions.

1/8/14
Date

Authorized Signature

Commercial Sales
Title

Sonny Merryman, Inc
Company Name

BID FORM #6-A: CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

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

Sonny Merryman, Inc _____ (COMPANY NAME) certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
5. 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),

Sonny Merryman, Inc _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

- Commercial Sales

Signature and Title of Authorized Official

BID FORM #7: VENDOR'S CERTIFICATION OF UNDERSTANDING AND ACCEPTANCE MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

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.

1/8/14

Date

Authorized Signature

Commercial Sales

Title

Sonny Merryman, Inc

Company Name

SPECIFICATION COMPLIANCE

NOTE: Please check 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.**

☑ 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.

REQUEST FOR QUOTATION **PTR14016 Mid-Size Medium Light Duty Transit Vehicles**

BID FORM #8: CERTIFICATION OF COMPLIANCE WITH FTA'S BUS TESTING REQUIREMENTS MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

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 regulation 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 2 CFR Part 1200.

1/8/14

Date

Authorized Signature

Commercial Sales

Title

Sonny Merryman, Inc

Company Name

BID FORM #9: CERTIFICATION OF RESTRICTIONS ON LOBBYING MANDATORY BID FORM-MUST BE SUBMITTED WITH BID

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

a. 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.
b. 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
c. The undersigned understands that the language of this certification shall be included in the award documents for all subawards 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) Sonny Merryman, Inc, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contractor understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

1/8/14
Date

Authorized Signature

Commercial Sales
Title

SAMPLE SEATING DIAGRAMS

SAMPLE SEATING DIAGRAMS

Sonny Merryman INC.

Virginia's Bus Company

IMPORTANT CONTACT INFORMATION

Mailing Address: P.O. Box 495, Rustburg, VA 24588
Shipping: 5120 Wards Road, Evington, VA 24550

• MAIN OFFICE:
TOLL FREE: (800) 533-1006
(434) 821-1000
FAX: (434) 821-8203
WEB: *www.sonnymerryman.com*

• SERVICE DEPARTMENT:
TOLL FREE (800) 533-1006
FAX: (434) 821-2131
Brady Childress, Director Customer Support
Ext. 332, *brady@sonnymerryman.com*
Pam Lawhorn, Service Administrator
Ext. 341, *pam@sonnymerryman.com*
Tim George, Service Team Leader
Ext. 353, *tim@sonnymerryman.com*

•WARRANTY:
Patty Webb, Warranty Administrator
Ext. 323, *patty@sonnymerryman.com*

• PARTS:
TOLL FREE: (800) 386-7278
FAX: (434) 821-2621
Gerald Layne, Parts Team Leader
Ext. 318, *gerald@sonnymerryman.com*

• BUSINESS:
June Wooten, Accounts Payable
Ext. 327, *june@sonnymerryman.com*

Hampton Roads Sales & Service Center
610 Woodlake Drive
Chesapeake, VA 23320
TOLL FREE: (866) 481-7211
(757) 361-9070, FAX (757) 361-9072
Reggie Lewis, Customer Support Manager
reggie@sonnymerryman.com

Northern Virginia Sales & Service Center
10149 Piper Lane
Bristow, VA 20136
TOLL FREE: (866) 470-0305
(703) 331-5516 –(703) 331-5517
FAX (703) 331-5518
Ken Lewis, Customer Support Manager
Kenlewis@sonnymerryman.com

Service Locations

- **Allied Freightliner LLC**
  1375 Route 52
  Kenova, WV 25530
  (304)453-6154
- **Mathney Motor Truck Company**
  4125 1st Ave.
  Nitro, WV 25143
  (304)769-5860
- **Matheny Motor Truck Company**
  50 Matheny Lane
  Mineral Wells, WV 26150
  (304)485-4418
- **Sonny Merryman Inc.**
  10149 Piper Lane
  Bristow, VA 20136
  (703)331-5516
- **Sonny Merryman Inc.**
  5120 Wards Road
  Lynchburg, VA 24550
  1-800-533-1006

STARTRANS BUS
LIMITED WARRANTY

WHAT IS THE PERIOD OF COVERAGE

The StarTrans Bus Limited Warranty Policy warrants each new product (except the Body Structure as herein defined) for a period of one (1) year or 12,000 miles whichever comes first. The period of coverage commences with the actual date of delivery of the vehicle to the product's first owner. Within the terms of the Policy, StarTrans agrees to repair or replace any defective part subject to the terms and/or limitations of this warranty agreement.

WARRANTY ON BODY STRUCTURE

The body structure of StarTrans buses is warranted for a period of five (5) years or 75,000 miles whichever comes first from the date of delivery to the product's first owner.

WHAT IS "BODY STRUCTURE"?

The body structure of StarTrans buses is defined as the floor, wall and roof structure but does not include any part of the automotive chassis as manufactured and prepared by the chassis manufacturer. Items not considered as body structure include but are not limited to the following: [a] Doors, [b] Roof vents, [c] Paint, [d] Bumpers, [e] Windows, [f] Gel coat cracks, [g] Interior wall coverings, [h] Rub rails, [i] Relays, [j] Switches, [k] Lights.

WHAT ARE THE LIMITATIONS OF THE STARTRANS WARRANTY POLICY?

StarTrans Bus retains the right to repair or replace at the company's discretion.

StarTrans Bus requires that all repairs performed under the terms of its limited warranty must be done at one of the StarTrans Bus dealers or at one of StarTrans Bus authorized service centers. In the event that the requirement presents an undue hardship on the owner, StarTrans Bus requires that the owner call the StarTrans Bus Factory Warranty Department and secure approval for the repair work to be done at a qualified repair station whose qualifications are mutually agreed upon by both the StarTrans Warranty Department and the vehicle owner.

StarTrans Bus requires that all warranty work performed under the terms of this limited warranty that exceeds Two Hundred Dollars ($200.00) in value whether in diagnostic time or in actual labor and/or parts repair, said requested warranty must be approved by

the StarTrans Bus Warranty Department BEFORE WORK IS DONE. The StarTrans Bus Warranty Department is located in Goshen, Indiana, and the department's phone numbers are as follows: (574) 642-0810 or (574) 7642-0096.

If the subject vehicle has been previously used in dealer demonstration service beyond four thousand (4,000) miles / one year or as a dealer rental unit, the mileage accrued in the previous service above four thousand (4,000) miles / one year is to be counted toward the twelve thousand (12,000) mile limit and one (1) year warranty, or in the case of the body structure, seventy-five thousand (75,000) miles or five (5) year's warranty.

WARRANTY CLAIM SUBMITTAL

Warranty claims shall be submitted within sixty (60) days of authorization. Any claims submitted sixty (60) days following the authorization date shall not be warrantable.

WHAT VOIDS STARTRANS LIMITED WARRANTY?

The following will void the StarTrans Limited Warranty Policy provisions:

- Damage to product caused by an accident involving the vehicle,
- Product failure caused by improper servicing,
- Product failure caused by customer negligence (not exercising good care and responsible routine maintenance) Example: fluids being checked and maintained regularly,
- Product failure caused by customer misuse, or abuse.
- Damage to product caused by freezing, flooding, fire or any other occurrence that may be termed an "Act of God."

WHAT IS NOT COVERED BY STARTRANS LIMITED WARRANTY POLICY?

The following are not covered by the StarTrans Limited Warranty:

- Automotive chassis as received from the chassis manufacturer,
- Wheel chair lifts and lock assemblies,
- Automotive air conditioners and heaters (OEM),
- Tires,
- Batteries,
- Air conditioners and heaters (ADD ON),
- Automotive cruise control,
- Audio systems,
- Add-on suspension systems,
- Alternators and regulators,
- Seats and seating.

The manufacturers of these specific component parts offer a national network of service centers fully qualified to handle customer needs.
StarTrans Bus will not undertake warranty responsibility for normal maintenance items and adjustments past thirty (30) days: Included are such maintenance items as (a) door adjustments, (b) lights, (c) relays, (d) switches, (e) any dealer, service center, or owner installed equipment.

StarTrans Bus will not undertake responsibility to any purchaser of its products for any undertaking or representation of warranty made by dealers selling its products beyond those solely expressed herein.

StarTrans Bus shall not assume any responsibility for lost time, inconvenience, expense for gasoline, towing, telephone, travel, lodging, loss or damage to personal property or loss of revenues, or the cost of a replacement vehicle.

The StarTrans Bus Limited Warranty as stated herein and any implied warranties that may be expressed by StarTrans Bus are limited to one (1) full year or twelve thousand (12,000) miles, whichever occurs first, after the actual date of delivery by the vehicle's FIRST OWNER. Body structure as defined herein is limited to five (5) years or seventy-five thousand (75,000) miles, whichever occurs first, after the actual date of delivery to the vehicle's FIRST OWNER. The StarTrans Limited Warranty extends to the original retail purchaser and is NOT TRANSFERABLE. Original purchaser means the first retail purchaser purchasing the StarTrans bus product from a StarTrans Bus Dealer.

The StarTrans Bus Limited Warranty is applicable to any product registered and normally used within the United States and Canada ONLY.

With the exception of "body structure" as defined herein, which has a different stated warranty, the limited warranty applicable to your product is for the duration of twelve thousand (12,000) miles, or for the duration one one (1) full year after initial date of delivery, whichever occurs first. StarTrans Bus is required by law to maintain records pertaining to the original owner of each StarTrans Bus product. It is desirable for the warranty starting date to be registered properly at the StarTrans factory within ten (10) days after the delivery date. A warranty and or pre-delivery registration page is enclosed with each new product owner's manual package. The selling dealer SHALL send this registration and or pre-delivery registration page to the factory at the time of your purchase. The absence of this registration and or pre-delivery page in no way changes your StarTrans Bus Limited Warranty. However, you will be required at some future date should you need service attention under the StarTrans Limited Warranty to show proof of the date of purchase.

STARTRANS
A SUPREME CORPORATION COMPANY

ADDENDUM TO WARRANTY POLICY

StarTrans Bus warrants the paint on the vehicle for one (1) year from the date of purchase.

ADDENDUM TO DEALER

While at authorized dealer's retail establishment, the bus shall be maintained in an excellent condition with special attention to the external and internal aesthetics of the unit as well as the overall operation of the vehicle while waiting the sale of the vehicle .

WHAT WILL YOU DO TO KEEP THE WARRANTY IN EFFECT?

You will perform reasonable and necessary maintenance to the unit in accordance with StarTrans Bus direction and recommendations. Owners and operators should pay particular attention to the warning and instruction labels provided by StarTrans Bus.

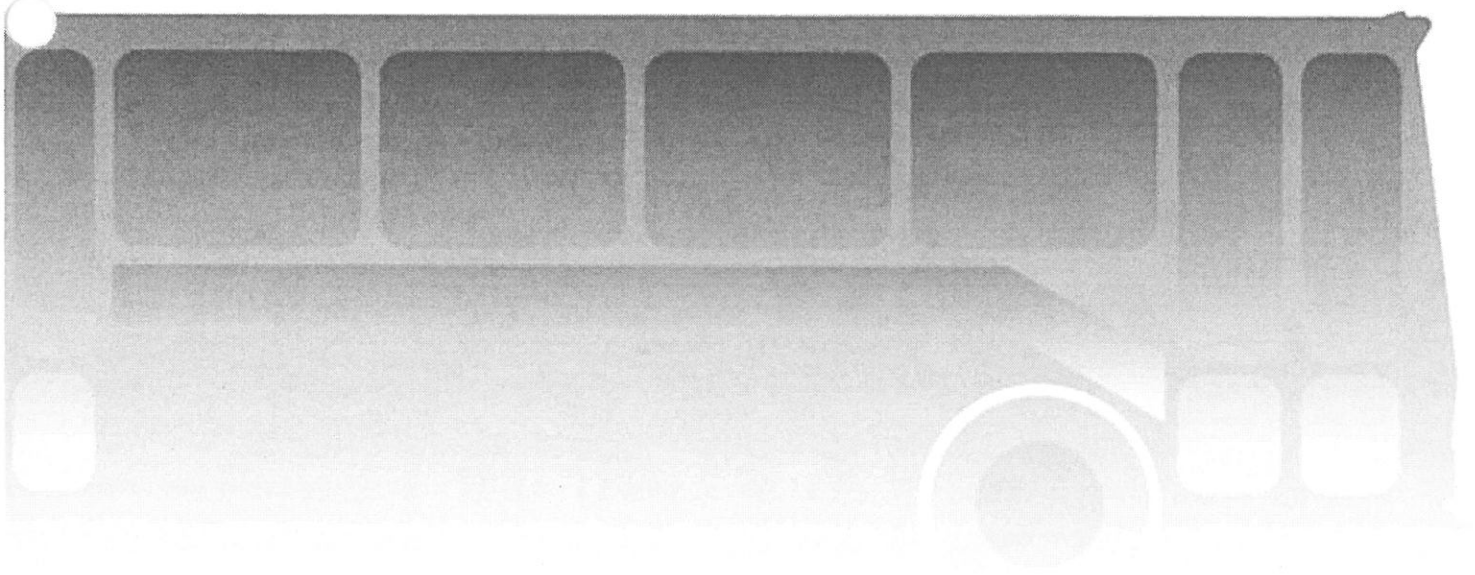
WHAT OTHER CONDITIONS OR LIMITATIONS APPLY TO THIS WARRANTY?

This limited warranty excludes transportation to and from the dealer or manufacturer to get warranty services. The limited warranty policy also excludes loss of time or loss of use, lost revenues, salaries or commissions, lodging, towing charges, bus fares, car rentals, and gasoline expense. Also excluded are telephone charges, inconvenience or other incidental damages.

This limited warranty excludes the cost of repairing or replacing other property that is damaged because of an alleged defect in the unit as well as other consequential damage. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusions may not apply to you.

Cummins Warranty

All Engines
Worldwide
All Bus
(Except U.S./Canada Diesel Powered School Buses)



Coverage

Products Warranted

This warranty applies to new diesel, LPG, compressed or liquid natural gas fueled engines sold by Cummins and delivered to the first user on or after January 1, 1999, that are used in all bus categories worldwide (except U.S./Canada diesel powered school buses) (Engine).

Base Engine Warranty

The Base Engine Warranty covers any failures of the Engine which result, under normal use and service, from a defect in material or factory workmanship (Warrantable Failure). This coverage begins with the sale of the Engine by Cummins and ends two years after the date of delivery of the Engine to the first user.

Engine aftertreatment components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under the Base Engine Warranty.

Extended Major Components Warranty

The Extended Major Components Warranty applies to all except B and ISB series Engines and covers Warrantable Failures of the engine cylinder block, camshaft, crankshaft, connecting rods and Cummins fan clutch (Covered Parts).

Bushing and bearing failures are not covered.

This coverage begins with the expiration of the Base Engine Warranty and ends three years or 300,000 miles (482,804 kilometers) or 10,800 hours of operation, whichever occurs first, after the date of delivery of the Engine to the first user.

Emission Warranty

Additional coverage is outlined under the Emission Warranty.

These warranties are made to all Owners in the chain of distribution and Coverage continues to all subsequent Owners until the end of the periods of Coverage.

Cummins Responsibilities

During The Base Engine Warranty

Cummins will pay for all parts and labor needed to repair the damage to the Engine resulting from a Warrantable Failure.

Cummins will pay for the lubricating oil, antifreeze, filter elements, belts, hoses and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

Cummins will pay reasonable costs for towing a vehicle disabled by a Warrantable Failure to the nearest authorized repair location. In lieu of towing expenses, Cummins will pay reasonable costs for mechanics to travel to and from the location of the vehicle, including meals, mileage, and lodging, when the repair is performed at the site of the failure.

During The Extended Major Components Warranty

Cummins will pay for the repair or, at its option, replacement of the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner Responsibilities

During The Base Engine Warranty

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items replaced during warranty repairs unless such items are not reusable due to the Warrantable Failure.

During The Extended Major Components Warranty

Owner is responsible for the cost of all labor needed to repair the Engine, including the labor to remove and reinstall the engine. When Cummins elects to repair a part instead of replacing it, Owner is not responsible for the labor needed to repair the part.

Owner is responsible for the cost of all parts required for the repair except for the defective Covered Part and any Covered Part damaged by a Warrantable Failure of the defective Covered Part.

Owner is responsible for the cost of lubricating oil,

antifreeze, filter elements and other maintenance items replaced during the repair.

During The Base Engine and Extended Major Components Warranties

Owner is responsible for the operation and maintenance of the Engine as specified in the applicable Cummins Operation and Maintenance Manuals. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the applicable warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Except for Engines disabled by a Warrantable Failure during the Base Engine Warranty, the Owner must also deliver the Engine to the repair facility. Locations in the United States and Canada are listed in the Cummins United States and Canada Sales and Service Directory.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Engine repairs and for "downtime" expenses, fines, cargo damage, all applicable taxes, all business costs, and other losses resulting from a Warrantable Failure.

Limitations

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or catalytic reagent or by water, dirt or other contaminants in the fuel, catalytic reagent or oil.

This warranty does not apply to accessories which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans, air conditioning compressors, clutches, filters, transmissions, torque converters, vacuum pumps, power steering pumps and air compressors.

Excessive oil consumption for B series engines is covered for the duration of the coverage or 100,000 miles (160,935 kilometers) or 7,000 hours from the date of delivery of the Engine to the first user, whichever of the three occurs first. Before a claim for excessive oil consumption will be considered, Owner must submit adequate documentation to show that consumption exceeds Cummins published standards.

Failures of belts and hoses supplied by Cummins are covered for the first year from the date of delivery of the Engine to the first user.

Parts used to repair a Warrantable Failure may be new Cummins parts, Cummins approved rebuilt parts, or repaired parts. Cummins is not responsible for failures resulting from the use of parts not approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining coverage hereunder.

Cummins Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THESE WARRANTIES AND THE EMISSION WARRANTY SET FORTH HEREINAFTER ARE THE SOLE WARRANTIES MADE BY CUMMINS IN REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or country to country.

Emission Warranty

Products Warranted

This emission warranty applies to new diesel, LPG, compressed or liquid natural gas fueled engines marketed by Cummins that are used in the United States* in vehicles designed for transporting persons or property on a street or highway. This warranty applies to Engines delivered to the first user on or after January 1, 1999.

Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built and equipped so as to conform at the time of sale by Cummins with all U.S. Federal emission regulations

applicable at the time of manufacture and that it is free from defects in material or factory workmanship which would cause it not to meet these regulations within the longer of the following periods: (A) Five years or 100,000 miles (160,935 kilometers) of operation, whichever occurs first, as measured from the date of delivery of the Engine to the first user, or (B) The Base Engine Warranty.

If the vehicle in which the Engine is installed is registered in the state of California, a separate California Emission Warranty also applies.

Limitations

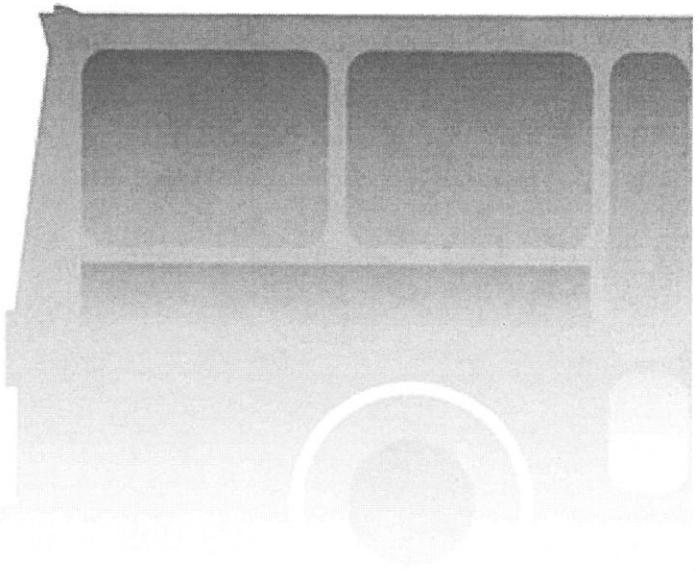
Failures, other than those resulting from defects in material or factory workmanship, are not covered by this warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine. Cummins is also not responsible for failures caused by incorrect oil, fuel or catalytic reagent or by water, dirt or other contaminants in the fuel, oil or catalytic reagent.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all applicable taxes, all business costs, and other losses resulting from a Warrantable Failure.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

* United States includes American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Puerto Rico, and the U.S. Virgin Islands.



Cummins Inc.
Box 3005
Columbus, IN 47202-3005
U.S.A.

Bulletin 3381278
Printed in U.S.A. Rev. 01/06

NEW PRODUCT WARRANTY

Allison Transmission.

PARTICIPATING OEM SALES
DISTRIBUTOR SALES

LIMITED WARRANTY ON NEW ALLISON AUTOMATIC TRANSMISSIONS USED IN SHUTTLE & OTHER BUS APPLICATIONS–EXCEPT TRANSIT, SCHOOL BUS, INTERCITY BUS, or MOTORHOME

Allison Transmission, Inc. will provide for repairs or replacement, at its option, during the warranty period of each new Allison transmission listed below that is installed in a Bus, other than School Bus, Transit Bus, Intercity Bus, or Motorhome in accordance with the following terms, conditions, and limitations.

WHAT IS COVERED

- **WARRANTY APPLIES** — This warranty is for new Allison transmission models listed below installed in a Bus, other than School Bus, Transit Bus, Intercity Bus, or Motorhome and is provided to the original and any subsequent owner(s) of the vehicle during the warranty period.
- **REPAIRS COVERED** — The warranty covers repairs or replacement, at Allison Transmission's option, to correct any transmission malfunction resulting from defects in material or workmanship occurring during the warranty period. Needed repairs or replacements will be performed using the method Allison Transmission determines most appropriate under the circumstances.
- **TOWING** — Towing is covered to the nearest Allison Transmission Distributor or authorized Dealer only when necessary to prevent further damage to your transmission.
- **PAYMENT TERMS** — Warranty repairs, including parts and labor, will be covered per the schedule shown in the chart contained in section "APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE."
- **OBTAINING REPAIRS** — To obtain warranty repairs, take the vehicle to any Allison Transmission Distributor or authorized Dealer within a reasonable amount of time and request the needed repairs. A reasonable amount of time must be allowed for the Distributor or Dealer to perform necessary repairs.
- **TRANSMISSION REMOVAL AND REINSTALLATION** — Labor costs for the removal and reinstallation of the transmission, when necessary to make a warranty repair, are covered by this warranty.
- **WARRANTY PERIOD** — The warranty period for all coverages shall begin on the date the transmission is delivered to the first retail purchaser, with the following exception:

  Demonstration Service –A transmission in a new truck or bus may be demonstrated to a total of 5000 miles (8000 kilometers). If the vehicle is within this limit when sold to a retail purchaser, the warranty start date is the date of purchase. Normal warranty services are applicable to the demonstrating Dealer. Should the truck or bus be sold to a retail purchaser after these limits are reached, the warranty period will begin on the date the vehicle was first placed in demonstration service and the purchaser will be entitled to the remaining warranty.

APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE

APPLICABLE MODELS	WARRANTY LIMITATIONS (Whichever occurs first)		ADJUSTMENT CHARGE TO BE PAID BY THE CUSTOMER	
	Months	Transmission Miles Or Kilometers	Parts	Labor
B 210, B 220, B 300, B 400, B 500	0–24	No Limit	No Charge	No Charge
1000 Series, 2000 Series, 2400 Series	0–36	No Limit	No Charge	No Charge
1000 PTS, 2100 PTS, 2200 PTS, 2350 PTS, 2500 PTS, 2550 PTS, 3000 PTS	0–36*	0–100,000 m 0–160 000 km	No Charge	No Charge

* Effective July 2006, the Allison transmission in your vehicle may be covered by additional extended coverage, dependent on the Original Equipment Manufacturer (OEM) which manufactured your vehicle. **This additional coverage requires continued use of an Allison Approved TES 295 automatic transmission fluid and genuine Allison filters.** Please consult your OEM Dealer or authorized Allison Transmission Distributor or Dealer for specific information.

WHAT IS NOT COVERED

- **DAMAGE DUE TO ACCIDENT, MISUSE, or ALTERATION** — Defects and damage caused as the result of any of the following are not covered:
  - — Flood, collision, fire, theft, freezing, vandalism, riot, explosion, or objects striking the vehicle;
  - — Misuse of the vehicle;
  - — Installation into unapproved applications and installations;
  - — Alterations or modification of the transmission or the vehicle, and
  - — Damage resulting from improper storage (refer to long-term storage procedure outlined in the applicable Allison Service Manual)
  - — Anything other than defects in Allison Transmission material or workmanship

  NOTE: This warranty is void on transmissions used in vehicles currently or previously titled as salvaged, scrapped, junked, or totaled.

- **CHASSIS, BODY, and COMPONENTS** — The chassis and body company (assemblers) and other component and equipment manufacturers are solely responsible for warranties on the chassis, body, component(s), and equipment they provide. Any transmission repair caused by an alteration(s) made to the Allison transmission or the vehicle which allows the transmission to be installed or operated outside of the limits defined in the appropriate Allison Installation Guideline is solely the responsibility of the entity making the alteration(s).

- **DAMAGE CAUSED by LACK of MAINTENANCE or by the USE of TRANSMISSION FLUIDS NOT RECOMMENDED in the OPERATOR'S MANUAL** — Defects and damage caused by any of the following are not covered:
  - — Failure to follow the recommendations of the maintenance schedule intervals applicable to the transmission;
  - — Failure to use transmission fluids or maintain transmission fluid levels recommended in the Operator's Manual.

- **MAINTENANCE** — Normal maintenance (such as replacement of filters, screens, and transmission fluid) is not covered and is the owner's responsibility.

- **REPAIRS by UNAUTHORIZED DEALERS** — Defects and damage caused by a service outlet that is not an authorized Allison Transmission Distributor or Dealer are not covered.

- **USE of OTHER THAN GENUINE ALLISON TRANSMISSION PARTS** — Defects and damage caused by the use of parts that are not genuine Allison Transmission parts are not covered.

- **EXTRA EXPENSES** — Economic loss and extra expenses are not covered. Examples include but are not limited to: loss of vehicle use; inconvenience; storage; payment for loss of time or pay; vehicle rental expense; lodging; meals; or other travel costs.

- **"DENIED PARTY" OWNERSHIP** — Warranty repair parts and labor costs are not reimbursed to any participating or non-participating OEMs, dealers or distributors who perform warranty work for, or on behalf of, end users identified by the United States as being a "denied party" or who are citizens of sanctioned or embargoed countries as defined by the U.S. Department of Treasury Office of Foreign Assets Control. Furthermore, warranty reimbursements are not guaranteed if the reimbursement would be contrary to any United States export control laws or regulations as defined by the U.S. Department of Commerce, the U.S. Department of State, or the U.S. Department of Treasury.

OTHER TERMS APPLICABLE TO CONSUMERS AS DEFINED by the MAGNUSON-MOSS WARRANTY ACT

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.
Allison Transmission does not authorize any person to create for it any other obligation or liability in connection with these transmissions.
ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO THESE TRANSMISSIONS IS LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. PERFORMANCE OF REPAIRS AND NEEDED ADJUSTMENTS IS THE EXCLUSIVE REMEDY UNDER THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (SUCH AS, BUT NOT LIMITED TO, LOST WAGES OR VEHICLE RENTAL EXPENSES) RESULTING FROM BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.**

** Some states do not allow limitations on how long an implied warranty will last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

OTHER TERMS APPLICABLE TO OTHER END-USERS

THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE ALLISON TRANSMISSION MODELS LISTED ABOVE AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALLISON TRANSMISSION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH SUCH TRANSMISSIONS. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTY.

QUESTIONS

If you have any questions regarding this warranty or the performance of warranty obligations, you may contact any Allison Transmission Distributor or Dealer or write to:

Allison Transmission, Inc.
P.O. Box 894
Indianapolis, IN 46206-0894
Attention: Warranty Administration PF-9

Form SE0614EN (201112)

Freightliner Customer Chassis Corporation (FCCC)

Bus Cab and Chassis—Commercial Coverage

Coverage		
Description	**Time**[1]	**Distance**[1]
Basic Vehicle	3 Years	50,000 mi/80 500 km
Battery	1 Year	100,000 mi/161 000 km
Brightwork	6 Months	Unlimited
Corrosion	6 Months	Unlimited
Cab Corrosion/Perforation	3 Years	50,000 mi/80 500 km
Cab Structure	3 Years	50,000 mi/80 500 km
Crossmembers	5 Years	100,000 mi/161 000 km
Diesel Emission 2010[2]	5 Years	100,000 mi/161 000 km
Drivetrain	3 Years	36,000 mi/58 000 km
Frame Rails	5 Years	100,000 mi/161 000 km
Paint	1 Year	100,000 mi/161 000 km
Paint, Chassis	6 Months	Unlimited
Towing/Roadside Assistance[3]	1 Year	Unlimited

[1]Time or distance, whichever comes first
[2]Applies to vehicles equipped with EPA 2010 compliant diesel engines.
[3] Up to a maximum of $450 per occurrence

Warranty Statement & Warranty Coverage Descriptions follow on page two of this document.

Warranty Coverage Exclusions

Warranty Statement

1.00 NEW VEHICLE COVERAGE

The following section outlines Company standard warranty coverages for all Company vehicles, apparatus or chassis or cabs sold and domiciled in the USA (50 states and Washington, D.C.), Puerto Rico, and Canada. This information is also included in the Operator's Maintenance and Owner's Warranty Information Booklet.

1.01 NEW VEHICLE LIMITED WARRANTY

Under this New Vehicle Limited Warranty ("Warranty"), Company warrants that each new vehicle will be free from defects in material and workmanship that occur under normal use within the applicable warranty period, subject to certain limitations and exclusions as specified in this document.

This Warranty covers all components and parts unless specifically covered by other warranties or otherwise excluded by this document.

1.02 LIMITATIONS

This Warranty does not apply to vehicles that are sold or domiciled outside of the United States (50 states and Washington, D.C.), Puerto Rico, or Canada.

This Warranty does not apply to engines, Allison or Twin Disc transmissions, tires, or other components or parts that are not manufactured by Company and that are warranted directly by their respective manufacturers. With respect to the foregoing, Company makes no warranty whether express, implied, statutory or otherwise including, but not limited to, any warranty of merchantability or fitness for a particular purpose.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF ANY KIND WHETHER WRITTEN, ORAL, OR IMPLIED INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY SPECIFICALLY EXCLUDES ANY OTHER WARRANTIES OR CONDITIONS PROVIDED FOR BY LAW, WHETHER STATUTORY OR OTHERWISE.

COMPANY'S SOLE OBLIGATION UNDER THIS WARRANTY SHALL BE TO REPAIR OR REPLACE, IN COMPANY 'S SOLE DISCRETION, ANY DEFECTIVE COMPONENT OR PART. SUCH REPAIR OR REPLACEMENT SHALL BE WITHOUT COST TO PURCHASER WHEN PERFORMED WITHIN THE APPLICABLE WARRANTY PERIOD (TIME, DISTANCE, OR HOUR LIMIT, WHICHEVER OCCURS FIRST).

Purchaser must notify Company within the applicable warranty period, of any failure of the vehicle to comply with this Warranty and Purchaser must, at Purchaser's expense, promptly return the vehicle to an authorized Dealer for inspection and repair or replacement of any defect in material or workmanship occurring within the applicable warranty period.

The vehicle must be maintained and serviced according to the prescribed schedules outlined in the Driver's/Operator's and Maintenance Manuals. Receipted bills and other evidence that required maintenance and service have been performed are required by Company as a condition of this Warranty.

After the Company's obligations under this Warranty expire, all liabilities of Company to Purchaser under this Warranty shall terminate. Repairs made under this Warranty do not constitute an extension of the original Warranty period for the vehicle or for any specific component or part.

To the extent that any provision of this Warranty contravenes the law of any jurisdiction, such provision shall be inapplicable in such jurisdiction, and the remainder of the warranty shall not be affected.

1.03 PURCHASER'S EXCLUSIVE REMEDY

THIS WARRANTY SHALL BE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AGAINST COMPANY, WHETHER IN CONTRACT, UNDER STATUTE (INCLUDING STATUTORY PROVISIONS AS TO CONDITIONS AS TO QUALITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF GOODS SUPPLIED PURSUANT TO THE CONTRACT OF SALE), WARRANTY, TORT, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY.

1.04 LIMITATION OF LIABILITY

COMPANY'S LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE COST TO REPAIR OR REPLACE, IN COMPANY'S SOLE DISCRETION, THE DEFECTIVE COMPONENT OR PART THAT IN NO EVENT SHALL EXCEED THE FAIR MARKET VALUE OF THE VEHICLE AT THE TIME THE DEFECT IS DISCOVERED.

IN NO EVENT SHALL COMPANY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, INJURIES TO PERSONS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR ANTICIPATED PROFITS, OR LOSS OF VEHICLE USE.

Coverage Descriptions

Axles
Coverage includes all factory-installed steer axles; drive axles; tag axles; and pusher axles. *Excludes any axle installed by a dealer or body builder.*

Drive Axle(s)
Coverage includes axle housing, carrier assembly, differential assembly, power divider, axle shafts, and gaskets and seals. *Excludes suspension and torque rod brackets, tie rod ends, wheel end equipment, wiring, yokes, and attaching hardware.*

Pusher Axle
A pusher axle is a non-driven, weight-bearing axle that can be raised when not required to bear a portion of the load. Since the pusher axle can be of many different configurations, warranty coverage includes all components included in the individual build specification of each individual application.

Steer Axle
Coverage includes I-beam, steering knuckles, differential on drive steer axle, spindles, kingpins, kingpin bearings and steering arms. *Excludes wheel end equipment, tie rod ends, steering linkage components, kingpin bushings, and king pin seals.*

Tag Axle
A tag axle is a non-driven, continuous weight-bearing axle. Since the tag axle can be of many different configurations, warranty coverage includes all components included in the individual build specification of each individual application.

Battery
Only Freightliner LLC's private brand-label (Alliance Brand Parts), Mopar (Sterling Bullet only), and Furukawa (STL360 Model only) batteries will be warranted. *Any other brand of battery is excluded from Company coverage. Claims for all other brands must be submitted directly to the supplier. Warranty coverage includes the battery assembly only.*

Basic Body
Coverage includes body emergency lighting and controls; hinged and rollup compartment doors; body trim; body lighting and controls; body electrical systems.

Basic Chassis
Coverage includes all factory-installed components of the vehicle/chassis that are not excluded elsewhere in the warranty, or by special agreement or described as having a different time, or distance or hours, or listed separately on each new vehicle warranty coverage chart.

Basic Vehicle
Coverage includes all factory-installed components of the vehicle/chassis that are not excluded elsewhere in the warranty, or by special agreement or described as having a different time or distance, or listed separately on each new vehicle warranty coverage chart.

Body Electrical
Coverage includes body wiring harness(es) only.

Body Structure
Coverage includes compartments and body panels; hinged compartment doors; fire pump closure; body frame and sub-frame, if applicable. *Excludes surface corrosion caused by chips or scratches.*

Body Structure and Corrosion
Coverage includes compartments and body panels; hinged compartment doors; fire pump closure; body frame and sub-frame, if applicable. *Excludes surface corrosion caused by chips or scratches.*

Brightwork
Coverage includes all factory-installed components with chrome, polished aluminum, or polished stainless steel surfaces. *Excludes any damage to bumper, backside of bumpers, and concealed or inner surfaces.*

Cab Corrosion/Perforation
Coverage is limited to rust-through or perforation of the cab and integral sleeper structure and sleeper box (if applicable) due to corrosion from within. *Excludes all conditions of rust or corrosion that has not resulted in rust-through or perforation as well as surface rust or corrosion caused by non-adhesion. Excludes any damage to the paint such as chips or scratches.*

Cab Structure
Coverage includes cab and integral sleeper structural components, structural components of factory installed sleeper boxes (if applicable), sheet metal panels, doors, and hoods. *Excludes all bolt-on components including door and hood hinges, latches, guides, and other mounting hardware.*

Corrosion
Coverage provides warranty against corrosion to any metal or metal alloy part of the vehicle. Rust or corrosion to specific components and/or caused by certain conditions are excluded from all Company warranty coverage and will not be paid under Basic Vehicle, Cab Structure, Cab Corrosion, or Aftermarket Parts Warranty.

Exclusions to corrosion warranty include, but are not limited to, the following:

- Corrosion caused by general rust (for example, rust on the unfinished backside of a bumper)
- Surface rust caused by chips or scratches in the paint or chrome surfaces
- Corrosion caused by high-pressure washing, severe wash solutions, cleaning solvents, detergents, compounds
  Corrosion caused by salinity in the environment or corrosive salts and/or chemicals used on the road surface.
  Corrosion caused by acid rain or other industrial fallout
- Corrosion due to improper prevention measures during storage or use
- Corrosion or rust on tone rings, rotors or drums (rotor exclusion does not apply to hydraulic discs with Magna-Coat Rotors)
- Corrosion due to environmental damage (including ocean spray); airborne fallout (includes chemicals, tree sap, etc.), or other atmospheric conditions or other acts of nature
- Corrosion due to improper use, misuse or abuse, negligence, including improper or insufficient maintenance

Cowl Corrosion/Perforation
Coverage is limited to rust-through or perforation of the cowl due to corrosion from within. *Excludes all conditions of rust or corrosion that have not resulted in rust-through or perforation as well as surface rust or corrosion caused by non-adhesion. Excludes any damage to the paint such as chips or scratches.*

Cowl Structure
Coverage includes cowl structural components, sheet metal panels, and hood. *Excludes all bolt-on components including hood hinges, latches, guides, or other mounting hardware.*

Crossmembers
Coverage includes crossmembers, gussets, and huck-mounting bolts that attach gussets to crossmembers and gussets/crossmembers to frame rails. *Excludes any bolt-on item attached with either conventional or huck bolts.*

Driveline
Coverage includes driveshaft tubing, U-joints, yokes, support bearings, and splines.

Drivetrain
Coverage includes transmission, (except Allison transmissions) steer axle(s), drive axle(s), and transfer case. *Excludes tag axle(s), pusher axle(s), driveline, and U-joints.*

Frame Rails
Coverage is limited to breaking or cracking of factory installed frame rails, frame rail liners, frame rail extensions, and any item(s) factory welded to them. *Excludes all bolt-on items regardless if attached with conventional or huck bolts.*

Glider
An incomplete vehicle which may be ordered with or without engine and or major drive train components; warranty coverage includes all components as specified in the specific build specification.

Off Road On-Site Assistance
Coverage is exclusively available for off road vehicles that are prohibited from use on public streets. If this coverage is provided, it will be specifically included in the coverage table as a separate category. Coverage includes on-site assistance and/or equipment transportation to the nearest authorized repairing location for a Daimler Trucks North America LLC warrantable repair.

Paint (Body, Cab, & Cowl)
Paint coverage excludes lack-of gloss issues on vehicles painted with low gloss colors; the underside of hoods and roof and side mounted air fairings; and any damages to the paint or painted surface such as chips and scratches.

Body Paint
Coverage includes all factory-painted exterior body surfaces. Warranted against orange peel; peeling/ delaminating; cracking or checking; or loss of gloss due to cracking, checking or hazing.

Cab Paint
Coverage includes all factory-painted exterior surfaces (except those included in chassis paint coverage). Warranted against orange peel; peeling or delaminating; cracking or checking; or loss of gloss due to cracking, checking or hazing.

Cowl Paint
Coverage includes all factory-painted exterior surfaces of cowl structure (except those included in chassis paint). Warranted against orange peel; peeling or delaminating; cracking or checking; or loss of gloss due to cracking, checking or hazing.

Paint, Chassis *(Chassis Paint)*
Coverage includes all factory painted surfaces on frame rails, crossmembers/gussets, front and rear bumpers, suspension components, power train components, drivelines, fuel tanks, air tanks, wheel end equipment, tool boxes, battery boxes, access steps, and attaching brackets and hardware. Warranted against peeling or non-adhesion. *Excludes U-joints and any damages to the paint or painted surface such as chips and scratches.*

Towing/Roadside Assistance
Coverage includes roadside assistance or towing (to the nearest authorized repair location) for a Daimler Trucks North America LLC warrantable repair in a vehicle-down situation that prevents the safe and lawful operation of the vehicle. If this coverage is provided, it will be specifically included in the coverage table as a separate category.

Transfer Case Assembly
Coverage includes housing and all internally lubricated parts.

Transmission
Coverage includes housing and all internally lubricated parts, electric/air shift/control units, valves, gaskets, and seals. Excludes broken synchronizer pins, PTOs, transfer case(s), airlines, gauge senders, yoke(s), clutch and clutch control components including clutch brake. *Excludes Allison automatic transmissions and Twin Disc Automatic Transmissions.*

Wheel End Equipment
Coverage includes brake components, wheels, hubs, drums, rotors, wheel seals/ bearings, slack adjustors, and attaching hardware.

Freightliner Custom Chassis Commercial Bus Standard Warranty

BUS CHASSIS (EXCEPT SCHOOL BUS)	1 Year or12,000 mi/19 500 km	2 Years or 24,000 mi/39 000 km	3 Years or36,000 mi/58 000 km	5 Years or100,000 mi/161 000 km
Basic Chassis Warranty—Urban Transit Unless excluded elsewhere in the warranty or described as having longer time and distance limitations, all components of the basic chassis are covered under the basic chassis time and distance limitations. Includes: drivelines and U-joints. **Batteries are warranted for 1 year or 100,000 miles (161 000 kilometers).**				
Drivetrain Components—Urban Transit Drive axles (differential assemblies, axle shafts, and axle housings); steering axle (beam, spindles, kingpins, and kingpin bearings); and steering arm. Excludes: drivelines and U-joints. **Engine and transmission warranties are covered by component manufacturers.**				
Basic Chassis Warranty—Shuttle, Demand/Response, Charter/Tour Unless excluded elsewhere in the warranty or described as having longer time and distance limitations, all components of the basic chassis are covered under the basic chassis time and distance limitations. Includes: drivelines and U-joints. **Batteries are warranted for 1 year or 100,000 miles (161 000 kilometers).**				
Drivetrain Components—Shuttle, Demand/Response, Charter/Tour Drive axles (differential assemblies, axle shafts, and axle housings); steering axle (beam, spindles, kingpins, and kingpin bearings); and steering arm. Excludes: drivelines and U-joints. **Engine and transmission warranties are covered by component manufacturers.**				
Frame Rails and Crossmembers				
Includes frame rails, attaching crossmembers, and gussets due to breaking or cracking.				
Towing/Roadside Assistance - 1 year/unlimited mileage (Up to maximum US $450 per occurrence)				
Engine: Cummins ISB – 2 years/unlimited mi, MBE900 – 3 years/150,000 mi, Caterpillar C7 – 3 years/150,000 mi **Transmission: Allison 1000/2100/2200/3000 PTS – 3 years/unlimited mi, Allison B300 – 2 years/unlimited mi**				

BUS CHASSIS (EXCEPT SCHOOL BUS)	1 Year or12,000 mi/19 500 km	2 Years or 24,000 mi/39 000 km	3 Years or36,000 mi/58 000 km	5 Years or100,000 mi/161 000 km

CHASSIS EXTENDED COVERAGE

BASIC VEHICLE COVERAGE (WAH):

Basic Vehicle coverage provides extended protection for these key components and systems:

- Climate Control System
  Covers complete heat and air conditioning system, including electrical components, lines, wiring, ambient air temperature sensor, and receiver dryer.
- Auxiliary HVAC Systems (excludes ParkSmart system and batteries)
- Cooling System
- Suspension – Front & Rear
- Steering System
- Starter & Alternator
  Covers starter motor, starter solenoid, alternator, and mounting brackets
- Drivelines
- Chassis Wiring & Connectors
- Gauges & Switches
- Charge Air Cooler
- Air System
- Braking System
- Interior Components
- Factory Installed Accessories

Note: Coverage includes all factory-installed components of the vehicle not specifically excluded elsewhere in the warranty, or by special agreement, or described as having a different time, distance, or hours. See section 1 of the warranty manual for a complete list of exceptions and exclusions. Also excluded are components warrantied directly by the component manufacturer. Batteries are not included in basic vehicle coverage.

CLIMATE CONTROL (WAM):

Covers complete heat and air conditioning system, including electrical components, lines, wiring, ambient air temperature sensor, receiver dryer, and Auxiliary HVAC Systems (if equipped). Excludes Parksmart system and batteries.

PARKSMART (WBE):

Covers ParkSmart system including Nite Battery Separator & Module-Intercon. Excludes batteries, instrument clusters, maintenance system charging, and refrigerant loss due to loose fittings.

COOLING SYSTEM (WAD):

Covers radiator core, radiator tanks, radiator gaskets, surge tanks, cooling fan, fan hub o-ring, fan clutch & solenoid, and mounting brackets and braces.

CHASSIS EXTENDED COVERAGE

STARTER/ALTERNATOR (WAB):

Covers starter motor, starter solenoid, alternator, and mounting brackets.

STEERING (WAC):

Covers steering or rack-and-pinion gear box, and power steering pump. Excludes seals.

SUSPENSION – FRONT & REAR (WAE):

Covers steel springs, spring hanger brackets, axle mounting u-bolts, shackles and pins, and torque rods. Excludes bearings.

WIRING COMPLETE (WA2):

Covers all factory installed electrical harnesses and electrical components including Cab, Chassis, SAM Cab & SAM Chassis wiring, as well as SAM Cab and SAM Chassis modules.

CAB/HOOD (WAQ):

Covers cab, exterior visor structural components, sheet metal panels, doors, hood, rust through or perforation to cab due to corrosion from within, and paint for peeling and separation. Also covers water intrusion to cab due to design-related or assembly-related issues.

AXLES – FRONT & REAR (WAL):

Includes: front axle beam, spindles, kingpins and kingpin bearings, drive-differential assemblies and all internally lubricated parts, axle shafts and housings. Excludes: drivelines, input and output shaft seals, tie rod ends, rear axle attachments such as hubs, wheel seals and wheel bearings. Note: subject to manufacturer's published vocational warranty and applications.

TOWING (WAG):

Covers $550 per occurrence for towing or roadside assistance for a defect in material and workmanship of a component that prevents the safe and lawful operation of the vehicle. If towing is associated with a DTNA warrantable failure, towing charges must be filed on the same claim.

Your satisfaction is our #1 goal. If you have any questions or concerns, or are unsatisfied with the service you are receiving, follow these steps:

1. Contact your Sales Representative or Service Advisor at your selling/servicing dealership.

2. If your inquiry or concern remains unresolved, contact the Sales Manager, Service Manager or Customer Relations Manager.

3. If you require assistance or clarification on Ford Motor Company policies or procedures, please contact the Ford Customer Relationship Center.

In the United States:	**In Canada:**
Ford Motor Company Customer Relationship Center P.O. Box 6248 Dearborn, MI 48121 1-800-392-3673 (FORD) (TDD for the hearing impaired: 1–800-232-5952) www.customersaskford.com	Customer Relationship Centre Ford Motor Company of Canada, Limited P.O. Box 2000 Oakville, Ontario L6J 5E4 1–800-565-3673 (FORD) www.ford.ca
In Asia-Pacific Region, Sub-Saharan Africa, U.S. Virgin Islands, Central America, the Caribbean, and Israel:	**In Puerto Rico:**
Ford Motor Company Ford Export Operations Attention: Customer Relations 1555 Fairlane Drive Fairlane Business Park #3 Allen Park, MI 48101 Telephone: (313) 594-4857 For customers in Guam, the Commonwealth of the Northern Mariana Islands (CNMI), America Samoa, and the U.S. Virgin Islands, please feel free to call our Toll-Free Number: (800) 841-FORD (3673) Fax: (313) 390-0804 E-mail: expcac@ford.com	Ford International Business Development, Inc. P.O. Box 11957 Caparra Heights Station San Juan, PR 00922-1957 Telephone: (800) 841-FORD (3673) Fax: (313) 390-0804 E-mail: prcac@ford.com www.ford.com.pr
In Middle East:	
Ford Middle East Customer Relationship Center P.O. Box 21470 Dubai, United Arab Emirates Telephone: 971-4-3326084 Toll-free Number for the Kingdom of Saudi Arabia: 800 8971409 Local Telephone Number for Kuwait: 24810575 Fax: 971-4-3327299 E-mail: menacac@ford.com www.me.ford.com	

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1. Introduction

Ford Motor Company and your selling dealer thank you for selecting one of our quality products. Our commitment to you and your vehicle begins with quality protection and service.

When you need warranty repairs, your selling dealer would like you to return to it for that service, but you may also take your vehicle to another Ford Motor Company dealership authorized for warranty repairs. Certain warranty repairs require special training though, so not all dealers are authorized to perform all warranty repairs. That means that, depending on the warranty repair needed, the vehicle may need to be taken to another dealer. If a particular dealership cannot assist you, then contact the Customer Relationship Center at 1-800-392-3673.

This booklet explains in detail the warranty coverages that apply to your 2014-model car or light truck. If you bought a previously owned 2014-model vehicle, you are eligible for any remaining warranty coverages.

Ford Motor Company provides the **Emissions Defect Warranties** and **Emissions Performance Warranties** which cover your emissions control systems, and **Noise Emissions Warranty** which applies only to medium/heavy duty trucks over 10,000 pounds Gross Vehicle Weight Rating (pages 17-32).

2. Important information you should know

IF YOU NEED CUSTOMER ASSISTANCE

Your Ford Motor Company dealer is available to assist you with all your automotive needs. Please follow the procedures outlined on the front page of this booklet.

In addition, if you are an eligible U.S. owner, you may use - at no cost - the services of the BBB AUTO LINE program. For details, see Better Business Bureau (BBB) AUTO LINE program, page 34 or call 1-800-955-5100.

KNOW WHEN YOUR WARRANTY BEGINS

Your **Warranty Start Date** is the day you take delivery of your new vehicle or the day it is first put into service (for example, as a dealer demonstrator), whichever occurs first.

CHECK YOUR VEHICLE

We try to check vehicles carefully at the assembly plant and the dealership, and we usually correct any damage to paint, sheet metal, upholstery, or other appearance items. But occasionally something may slip past us, and a customer may find that a vehicle was damaged before he or she took delivery. If you see any damage when you receive your vehicle, notify your dealership within one week.

MAINTAIN YOUR VEHICLE PROPERLY

Your glove compartment contains an **Owner's Manual** which indicates the scheduled maintenance required for your vehicle. Proper maintenance guards against major repair expenses resulting from neglect or inadequate maintenance, may help increase the value you receive when you sell or trade your vehicle, and is important in allowing your vehicle to comply with applicable emissions standards.

It is your responsibility to make sure that all of the scheduled maintenance is performed and that the materials used meet Ford engineering specifications. Failure to perform scheduled maintenance as specified in the Owner's Manual will invalidate warranty coverage on

parts affected by the lack of maintenance. Make sure that receipts for completed maintenance work are retained with the vehicle and confirmation of maintenance work is always entered in your **Owner's Manual**.

Your Ford or Lincoln dealership, or Ford or Lincoln Auto Care Service Center, has factory-trained technicians who can perform the required maintenance using genuine Ford parts. The dealership looks forward to meeting your every service need to maximize your satisfaction with your vehicle.

WHO PAYS FOR WARRANTY REPAIRS?

You will not be charged for repairs covered by any applicable warranty during the stated coverage periods, unless specifically stated elsewhere in this guide.

Some states have mandated alternate time coverage periods for parts of your vehicle (e.g. seatbelts).

Some states and/or local governments may require a tax on a portion of warranty repairs. Where applicable law allows, the tax must be paid by you, the owner of the vehicle.

During the Bumper to Bumper Warranty period, dealers may receive instructions to provide no-cost, service-type improvements - not originally included in your Owner's Manual - intended to increase your overall satisfaction with your vehicle.

Sometimes Ford may offer a special adjustment program to pay all or part of the cost of certain repairs beyond the terms of the applicable warranty. Check with your dealer or call 1-800-392-3673 to learn whether any adjustment program is applicable to your vehicle. Please have your vehicle identification number available.

DO WARRANTIES APPLY IN OTHER COUNTRIES?

The **New Vehicle Limited Warranty** and the **Emissions Warranties** described in this booklet apply to your vehicle if:

- it was originally purchased through the Ford Export Operations Military Sales Program; or
- it was originally sold or leased by Ford Motor Company or one of its dealers in the United States or U.S. Federalized Territories, and it was originally registered/licensed and operated in the United States, U.S. Federalized Territories, or Canada.

If you meet either of these two requirements, you do have warranty coverage when you travel with this vehicle outside the United States, U.S. Federalized Territories, or Canada. In some cases, however, you may have to pay the servicing Ford dealer in a foreign country or U.S. Federalized Territory for a repair that is covered under the U.S. warranty. If this happens, be sure to save the paid repair order or invoice. You should present this document to a U.S. Ford Motor Company dealer for warranty refund consideration. Refer to www.Ford.com for additional customer assistance reference information.

3. The New Vehicle Limited Warranty for your 2014-model vehicle

LIMITATIONS AND DISCLAIMERS

All of the warranties in this booklet are subject to the following limitations and disclaimers:

The warranties in this booklet are the only express warranties applicable to your vehicle. Ford does not assume or authorize anyone to assume for it any other obligation or liability in connection with your vehicle or these warranties. No person, including Ford employees or dealers, may modify or waive any part of these warranties.

Ford and its dealers reserve the right to make changes in or additions to vehicles built or sold by them at any time without incurring any obligation to make the same or similar changes or additions to vehicles previously built or sold.

Ford and its dealers also reserve the right to provide post-warranty repairs, conduct recalls, or extend the warranty coverage period for certain vehicles or vehicle populations, at the sole discretion of Ford. The fact that Ford has provided such measures to a particular vehicle or vehicle population in no way obligates Ford to provide similar accommodations to other owners of similar vehicles.

As a condition of these warranties, you are responsible for properly using, maintaining, and caring for your vehicle as outlined in your Owner's Manual. Ford recommends that you maintain copies of all maintenance records and receipts for review by Ford.

Ford and your dealer are not responsible for any time or income that you lose, any inconvenience you might be caused, the loss of your transportation or use of your vehicle, the cost of rental vehicles, fuel, telephone, travel, meals, or lodging, the loss of personal or commercial property, the loss of revenue, or for any other incidental or consequential damages you may have.

Punitive, exemplary, or multiple damages may not be recovered unless applicable law prohibits their disclaimer.

You may not bring any warranty-related claim as a class representative, a private attorney general, a member of a class of claimants or in any other representative capacity.

Ford shall not be liable for any damages caused by delay in delivery or furnishing of any products and/or services.

You may have some implied warranties. For example, you may have an implied warranty of merchantability (that the car or light truck is reasonably fit for the general purpose for which it was sold) or an implied warranty of fitness for a particular purpose (that the car or light truck is suitable for your special purposes), if a special purpose was specifically disclosed to Ford itself not merely to the dealer before your purchase, and Ford itself not just the dealer told you the vehicle would be suitable for that purpose.

These implied warranties are limited, to the extent allowed by law, to the time period covered by the written warranties, or to the applicable time period provided by state law, whichever period is shorter.

These implied warranties do not apply at all if you use your vehicle for business or commercial purposes. In addition, the implied warranty of fitness for a particular purpose does not apply if your vehicle is used for racing, even if the vehicle is equipped for racing.

The warranties contained in this booklet and all questions regarding their enforceability and interpretation are governed by the law of the state in which you purchased your Ford vehicle. Some states do not allow Ford to limit how long an implied warranty lasts or to exclude or limit incidental or consequential damages, so the limitation and exclusions described above may not apply to you.

NOTE: This information about the limitation of implied warranties and the exclusion of incidental and consequential damages under the NEW VEHICLE LIMITED WARRANTY also applies to the EMISSIONS WARRANTIES described on pages 17-31.

Ford participates in the BBB AUTO LINE warranty dispute resolution program. You may contact BBB AUTO LINE by calling 800-955-5100.

You are required to submit your warranty dispute to the BBB AUTO LINE before exercising rights or seeking remedies under the Federal Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 et seq. To the extent permitted by the applicable state "Lemon Law", you are also required to submit your warranty dispute to the BBB AUTO LINE before exercising any rights or seeking remedies under the "Lemon Law". If you choose to seek remedies that are not created by the Magnuson-Moss Warranty Act or the applicable state "Lemon Law," you are not required to first use BBB AUTO LINE to resolve your dispute – although the program is still available to you.

For more information regarding the BBB AUTO LINE program, see page 34 of this booklet.

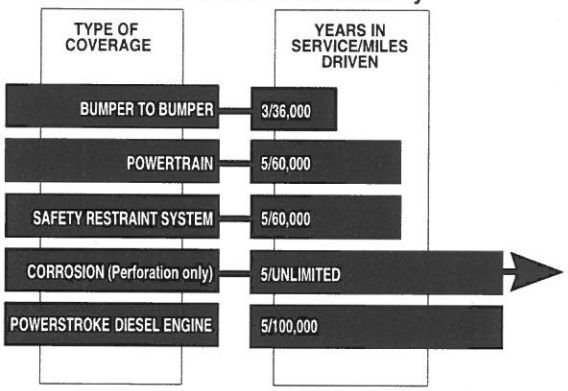
QUICK REFERENCE: WARRANTY COVERAGE

This chart gives a general summary of your warranty coverage provided by Ford Motor Company under the **New Vehicle Limited Warranty.** Please refer to the description of warranty coverage for more specific information.

For each type of coverage, the chart shows two measures:

- years in service
- miles driven

Your New Vehicle Limited Warranty



The measure that occurs first determines how long your coverage lasts. For example: Your Bumper to Bumper Coverage lasts for three years - unless you drive more than 36,000 miles before three years elapse. In that case, your coverage ends at 36,000 miles.

For more details on coverage, see:

➡ **What is Covered?** (pages 8-12)
➡ **What is Not Covered?** (pages 12-15)

WHAT IS COVERED?

Your NEW VEHICLE LIMITED WARRANTY gives you specific legal rights. You may have other rights that vary from state to state. Under your New Vehicle Limited Warranty if:

- your Ford vehicle is properly operated and maintained, and

- was taken to a Ford dealership for a warranted repair during the warranty period,

then authorized Ford Motor Company dealers will, without charge, repair, replace, or adjust all parts on your vehicle that malfunction or fail during normal use during the applicable coverage period due to a manufacturing defect in factory-supplied materials or factory workmanship.

This warranty does not mean that each Ford vehicle is defect free. Defects may be unintentionally introduced into vehicles during the design and manufacturing processes and such defects could result in the need for repairs. For this reason, Ford provides the New Vehicle Limited Warranty in order to remedy any such defects that result in vehicle part malfunction or failure during the warranty period.

The remedy under this written warranty, and any implied warranty, is limited to repair, replacement, or adjustment of defective parts. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Ford, through its authorized dealers, is willing and able to repair, replace, or adjust defective parts in the prescribed manner. Ford's liability, if any, shall in no event exceed the cost of correcting manufacturing defects as herein provided and upon expiration of this warranty, any such liability shall terminate.

Conditions that are not covered by the New Vehicle Limited Warranty are described on pages 12-15. When making warranty repairs on your vehicle, the dealer will use Ford or Motorcraft parts or remanufactured or other parts that are authorized by Ford, at the discretion of Ford or the Ford dealership.

Nothing in this warranty should be construed as requiring defective parts to be replaced with parts of a different type or design than the original part, so long as the vehicle functions properly with the replacement part. Moreover, Ford and its authorized dealers are entitled to a reasonable time and a reasonable number of attempts within which to diagnose and repair any defect covered by this warranty.

In certain instances, Ford may authorize repairs at other than Ford dealer facilities.

Two separate warranties apply to tires on your new vehicle. The New Vehicle Limited Warranty covers tire defects in factory supplied material or workmanship for 100% of labor costs and on a pro rata adjustment basis for parts. (See the reimbursement schedule below).

For vehicles within the New Vehicle Limited Warranty time in service and mileage coverage period, defective tires will be replaced on a pro rata adjustment basis according to the following mileage-based Reimbursement Schedule:

MILES DRIVEN	PERCENT OF PARTS COVERED BY FORD
1-12,000	100%
12,001-24,000	60%
24,001-36,000	30%

The tire manufacturer also provides you with a separate tire warranty that may extend beyond the New Vehicle Limited Warranty coverage. You will find the manufacturer's tire warranty with the owner literature supplied with your vehicle. You have the option of having a tire warranty repair performed by the tire manufacturer's authorized service center. If you go to a tire service center for a repair covered by the New Vehicle Limited Warranty, you may be charged a prorated amount for wear or other charges. If so, you should present your paid invoice detailing the nature of the charges to any Ford Motor Company dealership for refund consideration. When making warranty repairs on your vehicle, the dealer will use Ford or Motorcraft parts or remanufactured or other parts that are authorized by Ford. In certain instances, Ford may authorize repairs at other than Ford dealer facilities. Tire replacements under warranty will be made with the same brand and model as originally equipped with the vehicle unless the same brand and model is no longer available, in which case a tire of the same brand, size, load, speed and tread type will be used. In some circumstances, Ford may authorize another brand and/or model to substitute for the original brand and model, even if still available.

Normal tire wear or damage is not reimbursable. See page 14 for details of what is not covered.

Extended warranty coverage periods are available for certain vehicle parts and conditions. Specifically,

(1) Your vehicle's Powertrain components are covered for five years or 60,000 miles, whichever occurs first. The extended coverage applies to the **Engine:** all internal lubricated parts, cylinder block, cylinder heads, electrical fuel pump, electronic engine control unit, engine mounts, flywheel, injection pump, manifold (exhaust and intake), manifold bolts, oil pan, oil pump, seals and gaskets, thermostat, thermostat housing, timing chain cover, timing chain (gears or belt), turbocharger/supercharger unit, valve covers, water pump;

Transmission: all internal parts, clutch cover, seals and gaskets, torque converter, transfer case (including all internal parts), transmission case, transmission mounts; **Front-Wheel Drive:** axle shafts, bearings (front and rear), center support bearing, drive shafts, final drive housing (including all internal parts), hubs-automatic front locking (four-wheel drive), locking rings (four-wheel drive), seals and gaskets, universal and constant velocity joints; **Rear-Wheel Drive:** axle shafts, bearings (front and rear), center support bearing, drive axle housing (including all internal parts), drive shaft, propeller shafts, retainers, supports, seals and gaskets, universal and constant velocity joints.

(2) Your vehicle's safety belts and air bag Supplemental Restraint System (SRS) are covered for an extended Safety Restraint Coverage Period, which lasts for five years or 60,000 miles, whichever occurs first.

(3) Your vehicle's body sheet metal panels are covered for an extended Corrosion Coverage Period, which lasts for five years, regardless of miles driven. The extended warranty coverage only applies if a body sheet metal panel becomes perforated due to corrosion during normal use due to a manufacturing defect in factory-supplied materials or factory workmanship. For damage caused by airborne material (environmental fallout) where there is no factory-related defect involved and therefore no warranty – our policy is to provide free repair of paint damage due to the airborne material for 12 months or 12,000 miles, whichever occurs first.

(4) Your vehicle's direct injection diesel engine and certain engine components are covered during the PowerStroke Diesel Engine Coverage Period, which lasts for five years or 100,000 miles, whichever occurs first. The following parts are covered during this extended coverage period: the engine, cylinder block, heads and all internal parts, intake and exhaust manifolds, timing gear, harmonic balancer, valve covers, oil pan and pump, water pump, fuel system (excluding fuel lines, fuel tank and frame mounted fuel conditioning module sometimes referred to as the frame mounted pump/filter/water separator), high pressure lines, gaskets and seals, glow plugs, turbocharger, two-stage turbocharger assembly, turbocharger actuator, powertrain control module, engine control module, high pressure fuel injection pump assembly, electronic driver unit, injectors, injection pressure sensor, fuel rail pressure sensor, high pressure oil regulator, exhaust back pressure regulator and sensor,

exhaust pressure sensor, manifold pressure sensor, intake air temperature sensor, crankshaft position sensor, camshaft position sensor, accelerator switch.

NOTE: Some components may also be covered by the Emissions Warranties. For more information, see pages 17-31.

If you own or lease a 2014-model Next Generation Police Interceptor Vehicle (NGPI), refer to the Warranty Addendum Card that was given to you when you took delivery of your vehicle for further explanation of Amendments to the New Vehicle Limited Warranty. The Warranty Addendum applies only the NGPI vehicles delivered in the State of Florida.

WHAT IS NOT COVERED UNDER THE NEW VEHICLE LIMITED WARRANTY?

Damage Caused By:

- accidents, collision or objects striking the vehicle (including driving through a car wash)
- theft, vandalism, or riot
- fire or explosion
- using contaminated or improper fuel/fluids
- customer-applied chemicals or accidental spills
- driving through water deep enough to cause water to be ingested into the engine
- misuse of the vehicle, such a driving over curbs, overloading, racing or using the vehicle as a permanent stationary power source

Damage Caused by Alteration or Modification

The New Vehicle Limited Warranty does not cover any damage caused by:

- alterations or modifications of the vehicle, including the body, chassis, or components, after the vehicle leaves the control of Ford Motor Company
- tampering with the vehicle, tampering with the emissions systems or with the other parts that affect these systems (for example, but not limited to exhaust and intake systems)
- the installation or use of a non-Ford Motor Company part (other than a certified emissions part) or any part (Ford or non-Ford) designed

for off-road use only installed after the vehicle leaves the control of Ford Motor Company, if the installed part fails or causes a Ford part to fail. Examples include, but are not limited to lift kits, oversized tires, roll bars, cellular phones, alarm systems, automatic starting systems and performance-enhancing powertrain components or software and performance "chips"

Damage Caused by Use and/or the Environment

The New Vehicle Limited Warranty does not cover surface rust, deterioration and damage of paint, trim, upholstery, and other appearance items that result from use and/or exposure to the elements. You, as the owner, are responsible for these items. Some examples are:

- dings, dents
- cuts, burns, punctures or tears
- road salt
- tree sap, bird and bee droppings
- windstorm, lightening, hail
- earthquake
- freezing, water or flood
- stone chips, scratches (some examples are on paint and glass)
- windshield stress cracks. However, limited coverage on windshield stress cracks will be provided for the first 12 months or 12,000 miles (which ever occurs first), even though caused by use and/or exposure to the elements.

Maintenance/Wear

The New Vehicle Limited Warranty does not cover: (1) parts and labor needed to maintain the vehicle; and (2) the replacement of parts due to normal wear and tear. You, as the owner, are responsible for these items. See your Owner's Manual. Some examples of maintenance and normal wear are:

- oil changes
- oils, lubricants, other fluids
- oil/air filters
- tire rotation/inflation
- cleaning/polishing
- clutch linings
- wiper blades*
- wheel alignments and tire balancing*
- brake pad/lining*

* Ford will replace or adjust certain maintenance items when necessary, free of charge during a limited period:

- Wiper blade replacements will be provided during the first six months in service, regardless of miles driven.
- Wheel alignments and tire balancing will be provided during the first 12 months or 12,000 miles in service, whichever occurs first.
- Brake pad/lining replacements will be provided during the first 12 months or 18,000 miles in service, whichever occurs first.

SYNC Hands-Free Communications and Entertainment System

If your vehicle is equipped with SYNC, the New Vehicle Limited Warranty does not cover repairs under certain conditions. Some examples include:

- Loss of personal recording media, software or data
- Failure to provide proper installation environment
- Damage caused by:
  - abnormal use such as insertion of foreign objects, fluid spillage
  - unauthorized modification to alter functionality or capability
  - computer or internet viruses, bugs, worms, Trojan Horses, cancelbots
  - installation of unauthorized software, peripherals and attachments
  - unauthorized, unapproved and/or incompatible repairs, upgrades and modification
  - the defective function of your cellular phone or digital media device (i.e., inadequate signal reception by the external antenna, viruses or other software problems)

Tire Wear or Damage

The New Vehicle Limited Warranty does not cover normal wear or worn out tires. Tires will not be replaced (unless required by a warranty repair) for wear or damage including:

- tire damage from road hazard such as cuts, snags, bruises, bulges, puncture, and impact breaks
- tire damage due to under or over inflation, tire chain use, racing, spinning (as when stuck in snow or mud), improper mounting or dismounting, or tire repair

Other Items or Conditions Not Covered

The New Vehicle Limited Warranty does not cover:

- vehicles that have had the odometer disconnected, altered, or inoperative for an extended period of time with the result that the actual mileage cannot be determined
- vehicles that have ever been labeled or branded as dismantled, fire, flood, junk, rebuilt, reconstructed, or salvaged; this will void the New Vehicle Limited Warranty
- vehicles that have been determined to be a total loss by an insurance company; this will void the New Vehicle Limited Warranty
- converted ambulances that are not equipped with the Ford Ambulance Prep Package, see important information about ambulance conversions (page 36)
- Aftermarket parts or components, sometimes installed by Ford Motor Company or an authorized Ford dealership, may not be covered by the New Vehicle Limited Warranty. Any damage caused to Ford components due to the failure of aftermarket parts (other than a certified emissions part) is not covered.

4. In addition ...

ROADSIDE SERVICE ASSISTANCE (UNITED STATES, PUERTO RICO, AND U.S. VIRGIN ISLANDS)

Your vehicle is covered by the complimentary Ford Roadside Assistance Program (unless you are driving a daily rental unit). Under this program, Ford will cover:

- Towing to the nearest Ford Motor Company dealership, or towing to your selling dealership if within 35 miles
- Flat tire change (vehicle must have useable spare)
- Fuel delivery (limited to two occurances in a 12-month period up to 2 gal. gas, 5 gal. diesel)
- Jump starts
- Lock-out assistance (replacement key cost is customer responsibility)
- Winching (vehicle must be within 100 feet of a paved or county-maintained road)

The Roadside Assistance Program is separate from the New Vehicle Limited Warranty. It begins at the warranty start date and lasts for five years or 60,000 miles (whichever occurs first). If you need towing beyond the five years or 60,000 miles (whichever occurs first) period, Ford can arrange roadside assistance and charge your credit card. If the reason for the vehicle disablement is later found to be covered by another Ford warranty, Ford will provide a refund for the tow charge under the other warranty, through the dealership.

For emergency roadside assistance, call 1-800-241-3673, 24 hours a day, 365 days a year.

Ford Rental cars (FRCS) that must be towed because a covered repair has failed during the warranty coverage period, Ford will cover towing to the nearest Ford Motor Company dealership.

Ford Motor Company reserves the right to modify or discontinue Roadside Assistance at any time. Certain restrictions apply to Roadside Assistance benefits. Call 1-800-241-3673 for further details.

REFERENCES

- City of Danville
  998 South Boston Rd
  Danville, VA. 24540
  Contact: Mark Adleman
  (434) 799-5110
- Fredericksburg Regional Transit
  1400 Jefferson Davis Hwy
  Fredericksburg, VA. 22401
  Contact: Wendy Kimball
  (540)372-1222 Ext.207
- Roger Williams University
  Bristol, RI
  Contact: Ely Barkett
  (401)254-3008
- Gaullaudet University
  800 Florida Ave. NE
  Washington, DC 20002
  Contact: Linda Raye
  (202)528-3134

Below are the Curb Weights for each floor plan submitted;

Floor Plan Drawing #SM-D22: Front 6,339, Rear 7,352, Total 13,692.
Floor Plan Drawing #SM-D22-02: Front 6,350, Rear 7,445, Total 13,796.
Floor plan Drawing #SM-D22-03: Front 6,781, Rear 7,286, Total 14,062.
Floor plan Drawing #SM-D22-04: Front 5,521, Rear 8,522, Total 14,044.

GVWR are in the chassis specs.

Small, Women and Minority (SWaM) Vendors Search

<< Return to the SWaM Vendors Search

Search by **company name = merryman**
The following result(s) sorted by company name.

Total 1 search result(s)

SWaM Type	SWaM Cert#	Expiration Date	Company Name/Mailing Address	Pcard	Description of Services
S	9485	10-01-2016	SONNY MERRYMAN,INC Doing Business As: P O BOX 495 RUSTBURG, VA 24588 Contact: FLOYD MERRYMAN Phone: (434)821-1200 Fax: (434)821-8203	N	NIGP Code and Description SALES AND SERVICE

Note

- MS or WS in the SWaM Type column indicates the business also has small business certification.
- Before printing, ensure that your browser print setup is set to landscape.

Expiration date with * indicates that business is pending for recertification.
Expiration date with ** indicates that business currently has 'Provisionally Approved' status. The Department of Minority Business Enterprise (DMBE) must receive all required supporting documents 15 days prior to the expiration date to allow processing or the certification will automatically expire.
Company name with *** indicates that business is a "Service Disabled Veteran owned" business.

1-1 of 1

SUPREME	SYSTEM FORM Noise Control Verification	
REVISION: A	Form: FQC 034	DATE EFFECTIVE: 01/06/2014

BODY #	
VIN#	

This form confirms that exterior noise produced by the vehicle does not exceed (86) dba inside the unit. Verification is done using a max hold sound level meter. Supreme's standard Noise Control Testing (NCT) is a stagnate verification and is not meant to give evidence of road or pass-by noise levels.

Setup:
E brake on, transmission in neutral, engine at maximum rated RPM

Testing:
Take readings 4' from the floor in the following areas:

Cab: Driver area _____ dba

Mid: Center area _____ dba

Rear: 2' from rear wall _____ dba

Noise Control Testing By	Date

SUPREME	SYSTEM FORM Water Test Verification Certificate	
REVISION: 03	Form: FQC 005	DATE EFFECTIVE: 12/3/2012

CUSTOMER	
BODY #	
VIN#	
TEST DATE	

This certificate verify's this vehicle has passed Supreme standard water testing. Supreme standard water testing practices consist of continuous leak free test. These tests are performed at the Supreme Corporation water testing facility by trained and qualified Quality Assurance water test personnel.

TEST TIME PERFORMED 10MINS. ☐ 15MINS. ☐
(CHECK APPROPRIATE TIME)

Water Test Verification Performed By:

Note: Supreme water testing verification ensures that all vehicles being released to Supreme customers have been tested and that test verified leak free. Any modifications to the Supreme bus body either intentional or unintentional once a vehicle has been released by Supreme may have adverse effects on these test results. Supreme water test verification only applies to body structure added by Supreme or OEM modifications made by Supreme.

Note: OEM cab chassis and windows will be tested and verified prior to vehicle release but Supreme assumes no liability for OEM chassis water defects.

SUPREME

Water Test

DATE: _____ UNIT NUMBER: _____

TEST BY: _____ TEST TRIPS: _____ TOTAL: _____ SHIP DATE: _____

KEY CODE

1. Roadside Window
2. Curbside Window
3. Trans Area
4. Fuel Fill
5. Drivers Radius
6. Rear of entry door
7. W/C doors
8. W/C shrouds
9. Roof Hatch
10. Rear Window
11. Clearance Lights.
12. Rear Door
13. Other
14. W/C Drip Rail
15. Kick Panel
16. Destination Sign
17. Ground Plane
18. Windshield Area

CODE	LEAK DESCRIPTION	INT.	MIN.	1ST REPAIR	INT.	MIN.	2ND REPAIR

FQC 015 Rev: 00 (12/5/2012)

VERIFIED LEAK FREE AFTER 15 MINS CONTINUOUS TESTING: _____

2.10 Picturing the Vehicle: Follow the picture check list contained in the traveler to ensure all required images are captured. All special options installed on the vehicle should be captured during the picture process. Pictures will be uploaded to the Doc View system once vehicle has been released for shipping. These pictures will be utilized by customer service and maintained as an, as built visual work record of the vehicle. If items are repaired or replaced that alter the pictured record, those pictures will need to be re-taken prior to the vehicles release.

3. Road Test Audit

3.1 Fuel System: Verify the fuel intake system by fueling the unit with 5 gallons of fuel. If the order indicates more fuel is to be added do so at this time. Be aware of the way the unit accepts the fuel and check the ground beneath the fuel fill for any signs of leakage.

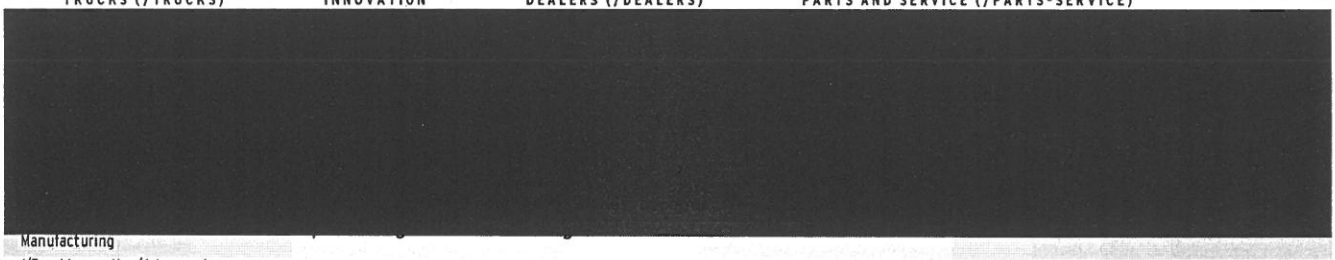
3.2 Vehicle Weight: Weigh the vehicle and compare the weight of unit to the weight analysis paper which is found in the order prior to the travelers. The "go no go" criteria for vehicle weight will be located on the weight analysis sheet. If the vehicle exceeds the weight on the weight analysis sheet note it on the "Stop Ship" form. Vehicles that exceed the weight analysis sheet weight by more than 3% require senior management approval prior to release.

3.3 Leak Test: Leak testing the vehicle: consists of 15 minutes under a continues flow of water to simulate a steady rain. Special attention should be made to the window and door areas of the vehicle to ensure there is no water penetration in these areas. Water may on occasion enter the vehicle through structural voids as well example: marker lights, RVL body seams, transition body to cab structures etc. Structural leaks may not immediately be apparent while the test is being performed and may only surface once the vehicle is driven. For this reason the leak test should be performed prior to the road test. Record any leaks on the coded water test sheet and return the unit to the appropriate department for repair. All leak repairs must be verified by performing a verification leak test. It is un- acceptable to release any vehicle that has not been verified LEAK FREE.

3.4 Road testing the vehicle: Verify all road test criteria have been met by following the check list included in the road test portion of the traveler. Examples of verifications made during the road test include. Windshield wipers, horn, rear heaters (High & Low), rear evap. (High,Med.&Low),dash A/C and heat,Towhaul/overdive, Cruise control, Heated and remote mirrors, PA/radio's. Chassis performance should also be observed and verified during the road test. Alignment, brakes, steering, dash gauges, vibrations, abnormal noises etc. Note: Always check the following prior to entering public roads during a road test.

3.4.1. Check all exterior lighting for operation.
3.4.2. Verify mirrors have been adjusted properly.
3.4.3. Verify proper license plate and DOT tags on the unit.
3.4.4. Fasten your seatbelt.

3.5 After the road test is complete sign the travelers in the appropriate location for verification. If defects were noted during the road tests list them on the stop ship and return to the appropriate department for repairs.



Manufacturing (/TruckInnovation/Advanced-Manufacturing)

Clean Drive Technologies (/TruckInnovation/Clean-Drive-Technologies)

Emissions Technology (/TruckInnovation/Clean-Drive-Technologies/Emissions-Technology)

Detroit Connect (/TruckInnovation/Detroit-Connect)

Advanced Engineering (/TruckInnovation/Advanced-Engineering)

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Find Dealer (/Dealers/)

Request Quote (/About-Us/Contact-Us/Dealer-Contact/)

Estimate Payment (/Financing/Payment-Calculator/)

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SCR: The Simple Choice

Engines using SCR treat NOx emissions outside of the engine, allowing them to perform more efficiently with reduced EGR. The end result is an engine that provides great performance, great fuel economy and meets the EPA 2010 regulations.

WHAT IS SCR TECHNOLOGY?

SCR emissions technology is designed to bring medium- and heavy-duty diesel emissions to EPA 2010 standards.

Your Freightliner truck is equipped with a Detroit (or Cummins) exhaust gas recirculation (EGR) engine.

After the exhaust leaves the engine, it runs through a diesel oxidation catalyst and a diesel particulate filter to remove soot and particulate matter.

Then the exhaust is combined with diesel exhaust fluid (DEF), sent through a final SCR catalyst to remove NOx, and finally, water and nitrogen are released into the air.

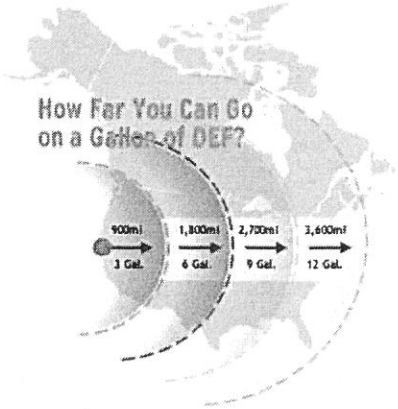
SCR: Better for Business

Freightliner Trucks chose Selective Catalytic Reduction (SCR) emissions technology because it increases the efficiency of the engine's performance, thereby optimizing fuel economy by up to 5%*. Combine that with its ease of use, and you have the best solution for today's trucking.

With over 2,500 DEF distribution locations in North America, combined with the fact that a driver can go over 7,500 miles on a single tank of DEF, running out should never be an issue.

If you want to learn more about the benefits of SCR, please visit TruthAboutSCR.com.

** Compared to 2007 DDC engine*



SCR: Proven on the Pavement

(/Trucks/Models/Cascadia/)
Cascadia (/Trucks/Models/Cascadia/)

The Cascadia is one of the most fuel-efficient Class 8 trucks on the road. When you combine that with the enhanced fuel economy of an SCR system, you get even more out of your investment. Every new Cascadia comes standard equipped with an SCR system, regardless of which engine you choose. So whether you drop in a Detroit DD13®, DD15® or DD16® or a Cummins ISX, you're ready to get rolling down the road, well into the future.

(/Trucks/Models/Coronado/)

Coronado (/Trucks/Models/Coronado/)

With classic styling and the fuel efficiency you've come to expect from Freightliner Trucks, the Coronado will turn heads while you turn a profit. The Coronado was built off-road tough but with the fuel economy you want for your on-highway needs. And since every new truck comes with SCR built in, it's ready to keep on driving for years to come.

(/Trucks/Models/M2112/)

M2 (/Trucks/Models/M2112/)

Our premier medium-duty truck —the M2— can handle all of your vocational needs. The M2 product line comes with an SCR-equipped engine from Cummins, or with a BlueTec SCR-equipped DD13® engine from Detroit. If you're going across town or across the street, the M2 gives you the strength and versatility you need to help your business Run Smart.

(/Trucks/Models/M2112/)

SD - Severe Duty (/Trucks/Severe-Duty-Trucks/)

Our newest product line, the 108SD (/Trucks/Models/108SD/), 114SD (/Trucks/Models/114SD), and the 122SD (/Trucks/Models/122SD), are designed to serve the most rugged applications called for in severe-duty vocational segments. Developed specifically for tough service demands and close-quarters duty in tight urban settings, every new SD truck comes equipped with SCR built in to enhance fuel economy, increase performance and help your business Work Smart.

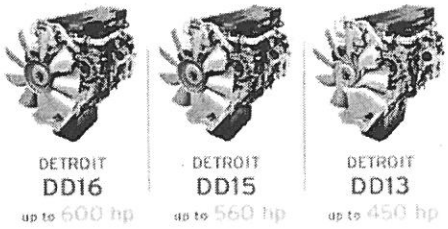
BLUETEC

Detroit BlueTec SCR Emissions Technology (/Trucks/Components/Engines/Detroit-Engines/)

BlueTec emissions technology is the name of Detroit's SCR emission system. BlueTec has been used by Daimler in Europe since 2005, and on more than 200,000 trucks. Detroit has more than 20 million miles of testing in North America with BlueTec emission technology. One thing about BlueTec that you won't find anywhere else is their 1-Box solution. This proprietary setup keeps your diesel oxidation catalyst, diesel particulate filter and SCR catalyst all in one place, which increases fuel economy by lowering engine backpressure.

Every DD13, DD15 and DD16 from Detroit is equipped with BlueTec emissions technology.

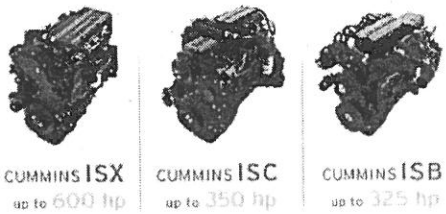
To learn more about Detroit BlueTec emissions technology, please visit EPA 2010 at Detroit. (http://www.demanddetroit.com/emissions/epa2010/)



(/Trucks/Components/Engines/Detroit-Engines/)

Cummins SCR Technology (/Trucks/Components/Engines/Cummins-Engines/)

Cummins' SCR solution consists of a highly capable base engine with cooled EGR, along with the Cummins Aftertreatment System that incorporates the Cummins Particulate Filter and Cummins Selective Catalytic Reduction Catalyst. The Cummins Aftertreatment System combined with its engine line-up (ISB6.7, ISL and ISX15) offers some great benefits for customers including better fuel economy, excellent performance, improved throttle response and better reliability compared to 2007 engines.



(/Trucks/Components/Engines/Cummins-Engines/)

Federal Motor Vehicle Safety Standards

The following is a brief summary of all applicable **FMVSS Title 49 (Federal Motor Vehicle Safety Standards)** of which Supreme Buses complies. Supreme Corporation, 2581 East Kercher Road Goshen, IN 46528.

Definitions: **OEM** Original Equipment Manufacturer
FSM Final Stage Manufacturer

FMVSS 101 Control Location, Identification and Illumination

* This is certified by the OEM and the FSM does not alter these controls.

FMVSS 102 Transmission Shift Lever Sequence & Starter Interlock

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 103 Windshield Defrosting and Defogging System

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 104 Windshield Wiping and Washing System

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 105 Hydraulic Brake System

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 106 Brake Hoses

* This is certified by the OEM and the FSM does not alter their hoses.

FMVSS 107 Reflecting Surfaces

* This is certified by the OEM and the FSM does not alter their system. The add-on FSM control console is in compliance.

FMVSS 108 Lamps, Reflective Devices & Associated Equipment

* The devices installed by the OEM and the FSM meet all requirements.

FMVSS 111 Rearview Mirrors

* The mirrors added by the FSM meet all requirements.

FMVSS 112 Headlamp Concealment Devices

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 113 Hood Latch System

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 115 Vehicle Identification Number

* This is certified by the OEM and the FSM does not alter their numbers.

Federal Motor Vehicle Safety Standards

FMVSS 116 Hydraulic Brake Fluids

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 120 Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars

* This is certified by the OEM and the FSM does not alter their tires or rims.

FMVSS 124 Accelerator Controls

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 125 Warning Devices

* This is not a requirement of the OEM or FSM. This is a requirement the end user must meet.

FMVSS 205 Glazing Material (Windows)

* The windows supplied by the OEM and the FSM meet all requirements.

FMVSS 207 Seating Systems

* The seating supplied by the OEM and the FSM meet all requirements.

FMVSS 208 Occupant Crash Protection

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 209 Seat Belt Assemblies

* The seat belts supplied by the OEM and the FSM meet all requirements.

FMVSS 210 Seat Belt Assemblies Anchorages

* The seat belt assemblies' anchorages supplied by the OEM and the FSM meet all requirements.

FMVSS 217 Bus Window Retention and Release

* The windows installed by the FSM meet all requirements.

FMVSS 220 School Bus Rollover Protection

* This is a School Bus Standard

FMVSS 221 School Bus Body Joint Strength

* This is a School Bus Standard

FMVSS 301 Fuel System Integrity

* This is certified by the OEM and the FSM does not alter their system.

FMVSS 302 Flammability of Interior Materials

* The interior materials supplied by the OEM and the FSM meet all requirements.

Evolution G2ELP Driver Seats

Engineered to enhance your vehicle's design with maximum comfort and safety.

USSC's Evoultion G2ELP driver seats are ergonomically designed to help reduce day-to-day driver fatigue and stress. The structural integrity built into each seat greatly dampens erratic movements caused by varying road surfaces.

Design options give you a variety of custom seat choices catering to your immediate and long term needs.

Headrest

A 4-way adjustable headrest is built in.

Upholstery

Standard durable seat materials include black fabric inserts and vinyl boxing material.

Lumbar Support

Infinitely adjustable lumbar is operated by a rotational knob located on right-hand side of seat.

Back Recline

Seat backrest can easily be adjusted from 45 to 110 degree positions with left-hand side crescent handle.

Dymetrol® Active Suspension

Greatly enhances driver ride quality by dampening road vibrations.

EVOLUTION G2ELP

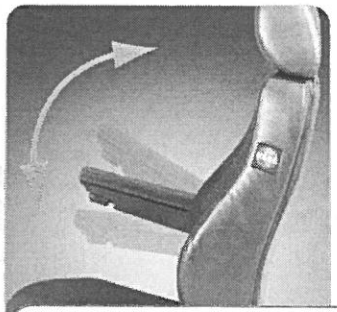
FREEDMAN SEATING COMPANY

Available through Freedman Seating Company
www.freedmanseating.com or call 773-524-2440

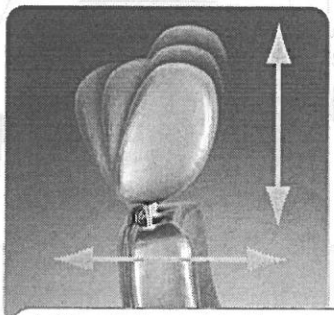
For more information visit us at
www.usscseating.com
or call 610.265.3610

USSC

EVOLUTION G2 ELP



Adjustable Armrest



4-Way Adjustable Headrest

Infinitely Adjustable Lumbar

Options For Convenience, Personalization and Longevity

Armrests	a right or left hand-molded front armrest adjusts relative to the backrest's position and can be flipped out of the way.
Upholstery	custom seat upholstery options available with customer specified material.

FREEDMAN SEATING COMPANY

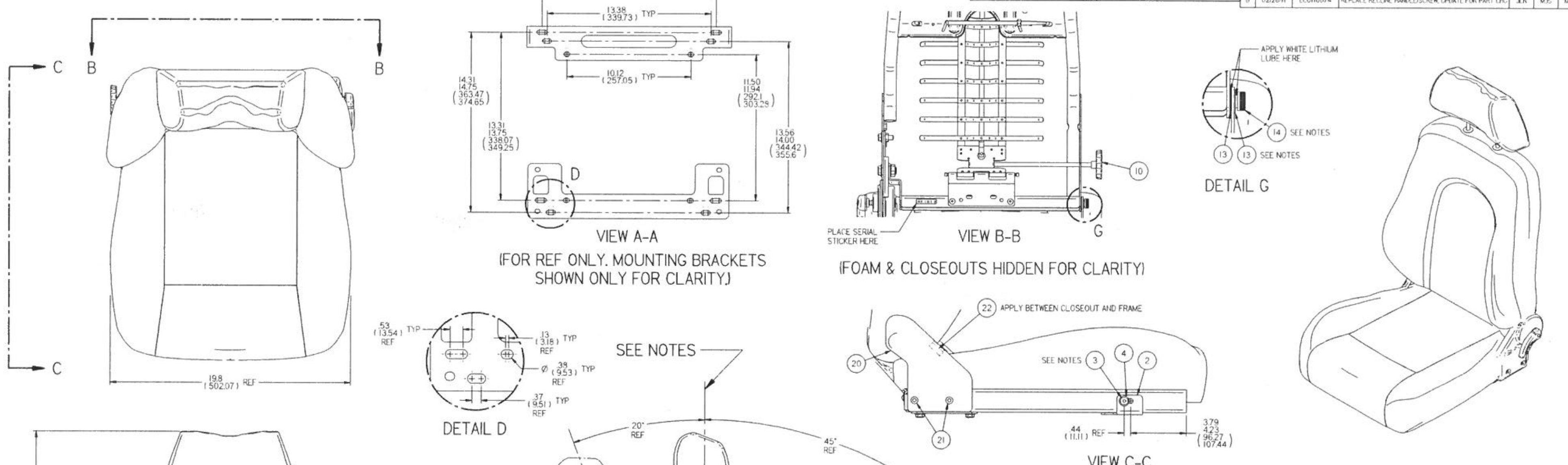
Available through Freedman Seating Company
www.freedmanseating.com or call 773-524-2440

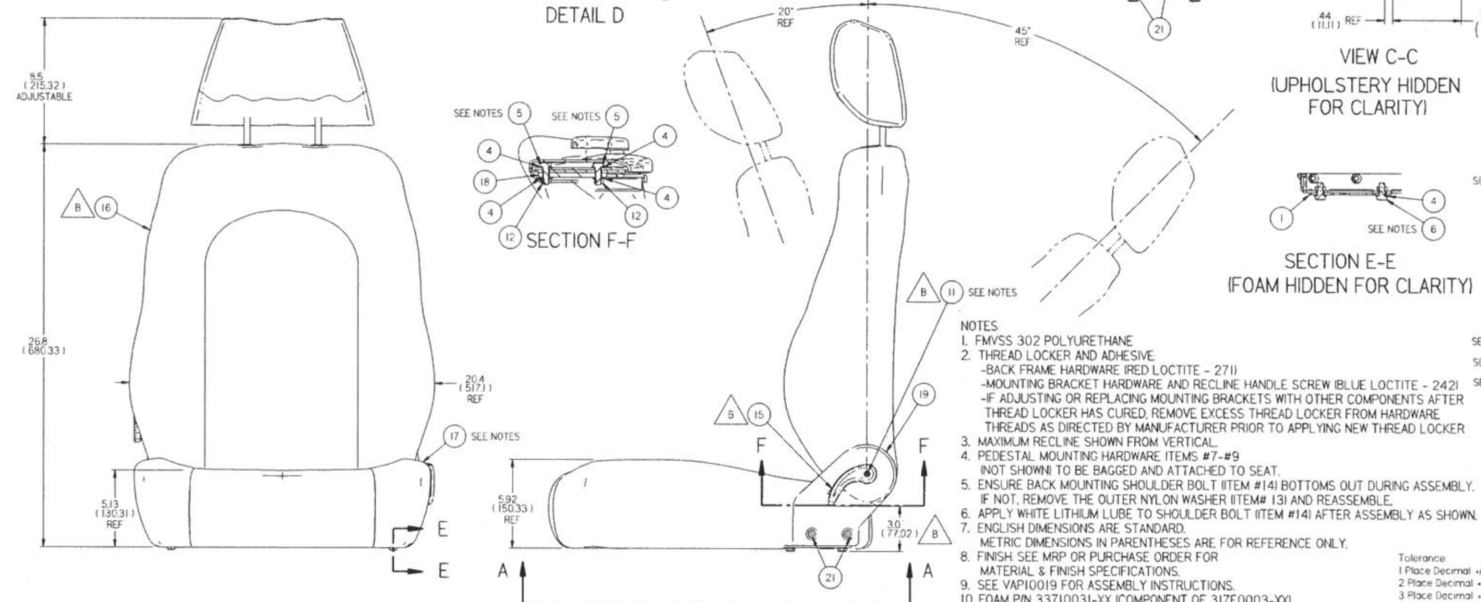
150 Gordon Drive
Exton, PA 19341 USA
Phone: 610.265.3610
www.usscseating.com

USSC

CUSTOMER:	PART NUMBER:

REV.	DATE	AUTH.	DESCRIPTION	BY	CHK'D	APP'D
A	01/19/11	ECO100658	RELEASE FOR PRODUCTION	JLN	JM	MCC
B	02/28/11	ECO110074	REPLACE RECLINE HANDLE/SCREW, UPDATE FOR PART CHG	JLN	MJS	MCC





NOTES:
1. FMVSS 302 POLYURETHANE
2. THREAD LOCKER AND ADHESIVE:
   - BACK FRAME HARDWARE (RED LOCTITE - 271)
   - MOUNTING BRACKET HARDWARE AND RECLINE HANDLE SCREW (BLUE LOCTITE - 242)
   - IF ADJUSTING OR REPLACING MOUNTING BRACKETS WITH OTHER COMPONENTS AFTER THREAD LOCKER HAS CURED, REMOVE EXCESS THREAD LOCKER FROM HARDWARE THREADS AS DIRECTED BY MANUFACTURER PRIOR TO APPLYING NEW THREAD LOCKER
3. MAXIMUM RECLINE SHOWN FROM VERTICAL.
4. PEDESTAL MOUNTING HARDWARE ITEMS #7-#9 (NOT SHOWN) TO BE BAGGED AND ATTACHED TO SEAT.
5. ENSURE BACK MOUNTING SHOULDER BOLT (ITEM #14) BOTTOMS OUT DURING ASSEMBLY. IF NOT, REMOVE THE OUTER NYLON WASHER (ITEM# 13) AND REASSEMBLE.
6. APPLY WHITE LITHIUM LUBE TO SHOULDER BOLT (ITEM #14) AFTER ASSEMBLY AS SHOWN.
7. ENGLISH DIMENSIONS ARE STANDARD. METRIC DIMENSIONS IN PARENTHESES ARE FOR REFERENCE ONLY.
8. FINISH: SEE MRP OR PURCHASE ORDER FOR MATERIAL & FINISH SPECIFICATIONS.
9. SEE VAP10019 FOR ASSEMBLY INSTRUCTIONS.
10. FOAM P/N 33710031-XX (COMPONENT OF 317E0003-XX) MADE ON PRODUCTION LINE FROM P/N 33710021-XX. SEE DWG 33710031-XX FOR DETAILS.

Tolerance:
1 Place Decimal +/-.5
2 Place Decimal +/-.13
3 Place Decimal +/-.060
Angular: +/- 3 Degrees

	ITEM	QTY	PART NUMBER	DESCRIPTION
	22	1	9904-000030-037	TAPE/FOAM/1/8"TX1.0"W/BLK/1" LONG
	21	4	61A02538	SCREW BUT HD\1/4-20X3/4/CS/M PATCH
	20	1	33020054-XX	CLOSEOUT/PIVOT/G2ELP/THERMO/RH
	19	1	33020051-XX	CLOSEOUT/RECLINE/G2ELP/THERMO/LH
	18	1	33000253-XX	BRACKET/STOP/ATWOOD RECLINE/45 DEG
SEE NOTES	17	1	317E0003-XX	CUSH/G2ELP/UPH
	16	1	311EN305-XX	BACK/G2ELP/HR/ML/RH KNOB/NO ARM/UPH
B	15	1	3302A025-23	HANDLE/CURVED/F55 DISCON/BLACK/LH
	14	1	61A03836	SCREW/SHOULDER/1/2 DIA X 3/8 LG/3/8-16 THD
	13	2	9902-500392-000	WASHER/BEGE/PLAS/.562ID/.04THK
	12	2	9906-000002-000	NUT HEX\5/16-18 GR 8 YZ
B	11	1	61A01938	SCREW/FLTHD/PHL/#10X.5/TYPEF/SS
	10	1	9903-060010-001	KNOB LUMBAR/MECH
SEE NOTES	9	4	9906-000001-001	SCREW HEX HD\5/16-18X1.25"/GR8YZ
SEE NOTES	8	4	9904-000010-000	SPACER SLIDE\3/8-16 HVY HEX
SEE NOTES	7	4	62A03113	NUT/CLIP/5/16-18/G2/SPRING STEEL/PO
	6	4	9906-000001-019	SCREW HEX HD\5/16-18X3/4 G8 YZ
	5	2	9906-000001-000	SCREW HEX HD\5/16-18 X 1.0" GR8 YZ
	4	14	9906-000017-000	WASHER FLAT\5/16\GR8\YZ
	3	2	9904-000002-007	SCREW BUT HD/SOC/5/16-18X3/4
	2	1	33000251-XX	BRKT/G2ELP/UNIVERSAL/FRONT
	1	1	33000249-XX	BRKT/G2ELP/UNIVERSAL/REAR

TITLE
G2ELP/NO ARMRESTS/UNIV BRKTS/UPH

MATERIAL
SEE BOM

USSC LLC
ENGINEERING DEPARTMENT
150 GORDON DRIVE
EXTON, PA 19341

PART NUMBER
G2ELP-DUNNN03-XX

SIZE D | DRAWN JLN | DATE 7/13/2010 | SHEET 1 OF 1 | REV B

P1A Air Suspension

P1A Low-Profile Air Suspension

An ideal safety/comfort enhancement when integrated with seat uppers.

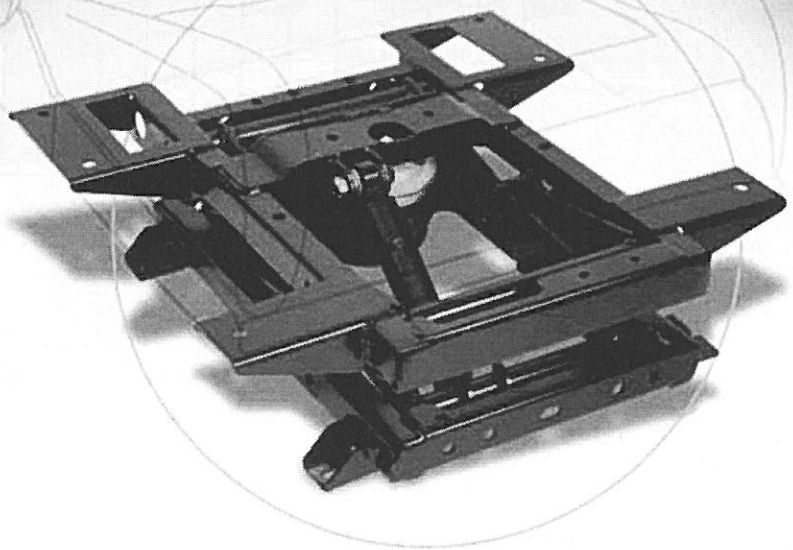
USSC's P1A air suspension systems are engineered to reduce the amount of G-force transferred to the body. The structural integrity built into each suspension greatly dampens erratic movements caused by varying road surfaces.

Features:

- **Height adjustment 2.75 inches**
- **Suspension mounts to various bolt patterns**
- **Easily adaptable to many seat uppers**

Options:

- **Protective bellows**
- **Fore/Aft adjustments**
- **Adjustable dampening**
- **Carbon steel riser**



FREEDMAN SEATING COMPANY

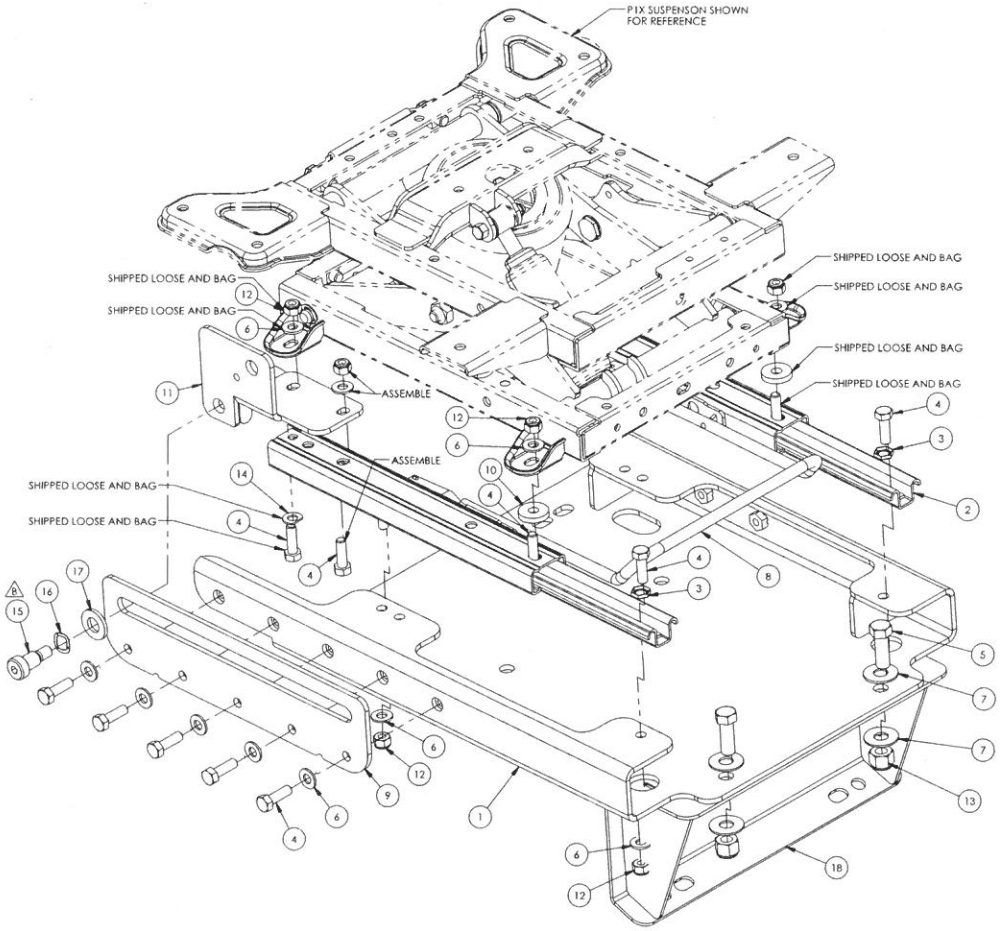
Available through Freedman Seating Company
www.freedmanseating.com or call 773-524-2440

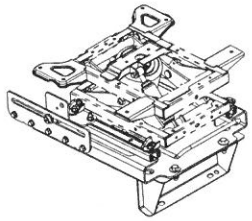
For more information visit us at
www.usscseating.com
or call 610.265.3610

USSC

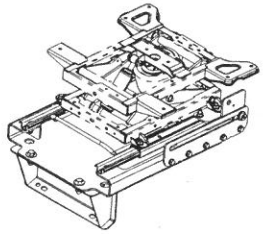
1100-33302001-XX C:\USSC Group Vault\Production\1100\1100-33302001-XX

REV.	DATE	ECO	DESCRIPTION	BY	CHK'D.	APP'D.
A	12/12/2012	ECO120422	RELEASE FOR PRODUCTION	EVW	JM	TJV
B	3/6/2013	ECO130099	CHG SHOULDER BOLT, WAS 61A05032	EVW	WM	MG





1100-33302001-XX LEFT HAND



1100-33302002-XX RIGHT HAND

NOTES :
- ENGLISH DIMENSIONS ARE STANDARD. METRIC DIMENSIONS IN PARENTHESES ARE FOR REFERENCE ONLY.
- ALL CRITICAL TO QUALITY DIMENSIONS ARE SHOWN IN AN INSPECTION BOX.
- THREAD LOCKER AND ADHESIVE
  - BASE SLIDE MOUNT BRACKET HARDWARE & Ø1/2" SHOULDER BOLT. (SEMI-PERMANENT - BLUE-242 OR EQUAL)
- LEFT HAND OR DRIVER'S BASE/BELT KIT SHOWN; RIGHT HAND/PASSENGER VERSION SYMMETRICALLY OPPOSITE. FOR RIGHT HAND/PASSENGER SIDE REPLACE BELT BRACKET (33200N49-XX) WITH 33200N50-XX.
- SUSPENSION TO SLIDE MOUNTING HARDWARE TO BE BAGGED AND SHIPPED WITH ASSEMBLY. (BAG ITEMS #4 (QTY 4), 6 (QTY 4), 10, 12 (QTY 4) AND ITEM 14.
- TORQUE SLIDE MOUNTING HARDWARE TO 11 FT.LBS.

	ITEM	QTY.	PART NUMBER	DESCRIPTION
	18	1	333B5001-XX	WELD/FRONT SUPPORT/FREIGHTLINER
	17	1	63A05014	WASHER/FLAT/.53IDX1.06ODX.12/GB/YZ
	16	1	63A05001	WASHER\WAVE\1/2 ID X 3/4" OD "
B	15	1	9904-000004-012	SCREW SHLD/1/2 DIAx5/8L/3/8-16/ALLOY
	14	2	9906-000017-002	WASHER FLAT\5/16\CUT\CZ
	13	2	62A04301	NUT LOCK\NYLON 7/16-20 GR8
	12	9	62A03103	NUT/NYLOK/5/16-18/GB/YZ
SEE NOTES	11	1	33200N49-XX	BRKT/WELD/BELT MNT/GM/DRV
	10	3	9904-000010-001	SPACER SLIDE/3/16"SHIM
	9	1	333BB247-XX	BRACKET/SLIDE/10"/REINFORCE/1.62"
	8	1	83P40001-XX	HANDLE SLIDE/P1X
	7	4	9906-000018-000	WASHER FLAT\PLATED\7/16\GR8Y/SAE
	6	14	9906-000017-000	WASHER FLAT\5/16\GR8\YZ
	5	2	9906-000014-000	SCREW HEX HD\7/16-20X1.25\GR8
	4	14	9906-000001-000	SCREW HEX HD\5/16-18 X 1.0"GR8 YZ
	3	4	9904-000011-000	NUT PAL/ 3/8
	2	1	9901-660091-000	SLIDE 9.45" (240mm)
	1	1	33302001-XX	BASE/FREIGHTLINER/WELD/2"/P1

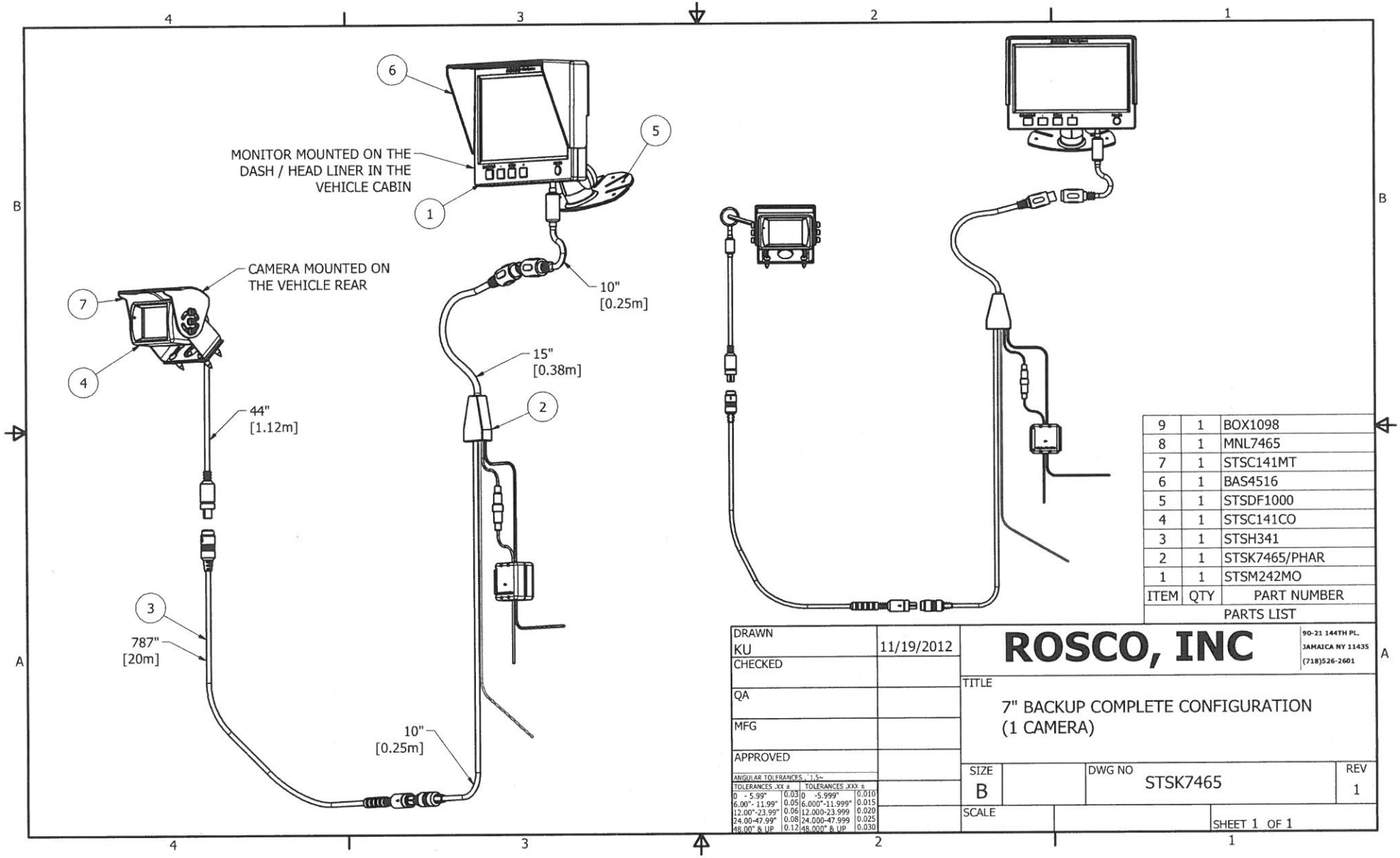
TITLE:
KIT/P1/2"FREIGHTLINER BS/10"SLD/LH/BLK

UNLESS OTHERWISE SPECIFIED: MATERIAL SEE BOM

USSC / 4ONE / GSS / FOGMAKER
ENGINEERING DEPARTMENT
150 GORDON DRIVE
EXTON, PA 19341

DWG. NO. 1100-33302001-XX

SIZE C | BY: EVW | REF: | SCALE: 1:2.5 | SHEET 1 OF 1 | REV. B



ITEM	QTY	PART NUMBER
9	1	BOX1098
8	1	MNL7465
7	1	STSC141MT
6	1	BAS4516
5	1	STSDF1000
4	1	STSC141CO
3	1	STSH341
2	1	STSK7465/PHAR
1	1	STSM242MO

PARTS LIST

DRAWN	11/19/2012
KU	
CHECKED	
QA	
MFG	
APPROVED	

ANGULAR TOLERANCES ± 1.5°

TOLERANCES .XX ±		TOLERANCES .XXX ±	
0 - 5.99"	0.03	0 -5.999"	0.010
6.00"- 11.99"	0.05	6.000"-11.999"	0.015
12.00"-23.99"	0.06	12.000-23.999	0.020
24.00-47.99"	0.08	24.000-47.999	0.025
48.00" & UP	0.12	48.000" & UP	0.030

ROSCO, INC

90-21 144TH PL.
JAMAICA NY 11435
(718)526-2601

TITLE

7" BACKUP COMPLETE CONFIGURATION
(1 CAMERA)

SIZE	DWG NO	REV
B	STSK7465	1

SCALE

SHEET 1 OF 1

Millennium-2 Series eBrochure

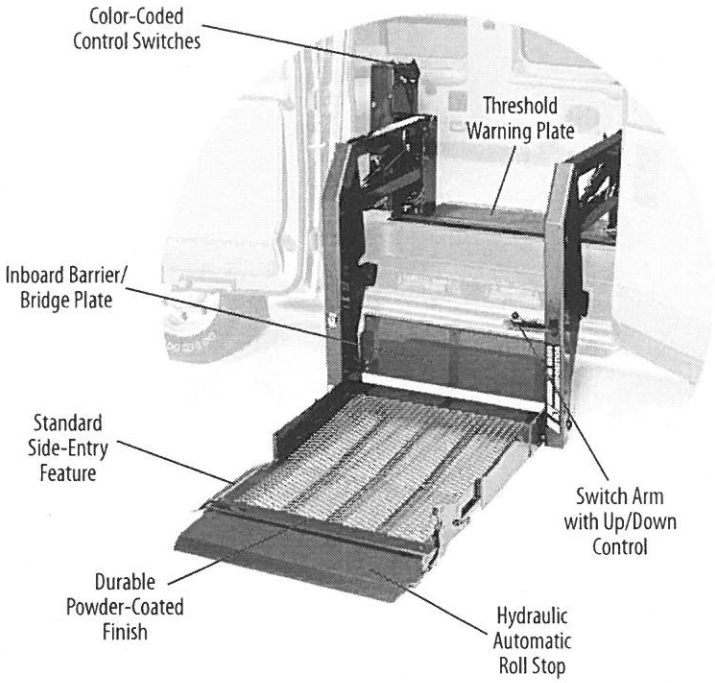
The Millennium-2 Series is the true workhorse of the Braun line. Designed for installation in the side or rear doors of domestic full-size vans, three standard models with platform lengths up to 51" ensure there is a power wheelchair lift to fit your needs. With dual hydraulic lifting arms, you'll come to rely on the lift's strength and dependability day after day, year after year.

The **Millennium-2 Series** lifts are fully hydraulic in operation, for both the fold/unfold and up/down cycles. Lift operation is controlled by the standard hand-held control, the on-lift controls, or the optional remote control.

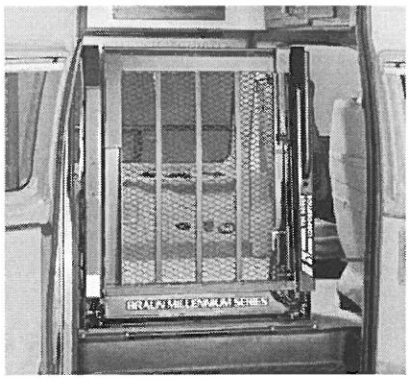
The Millennium-2 Series is designed for installation in the side or rear doors of domestic full-size vans. To make your travels more enjoyable, each lift features Braun's Quite Ride® system to ensure the quietest possible riding environment.

	Millennium-2 Series
Platform Width	31"
Platform Length	43", 47" & 51"
Lifting Capacity	750 lbs.
Hand-Held Control	Standard
Manual Backup	Standard
Remote Control	Optional
Door Operators	Optional
Side-Entry Platform	Yes
Side Door Installation	Yes
Rear Door Installation	Yes
Unit Weight	332 lbs.

www.BraunAbility.com™



Side-Entry Platform for Tight Parking Situations



BraunAbility
Life is a Moving Experience™

1-800-THE-LIFT® • 1-800-843-5438

FEATHER WEIGHT

FOLDAWAY BV & AM STYLES

Freedman Seating gives you the largest selection of Foldaways in the industry. Whether you need space for luggage or wheel chairs, we have the right seat. Easy to install and easier to operate, our Foldaways will provide you with miles and miles of happy riders and drivers. Maybe we should say, "smiles and smiles". Freedman Seating, "Not just seats—seating solutions."

Notch-Back, standard Bench-Back and High-Back are shown.

Not Just Seats

Seating Solutions™

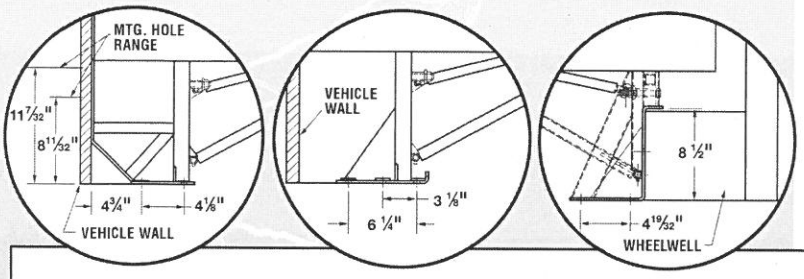
THE FEATHER WEIGHT SERIES BY

FREEDMAN SEATING COMPANY

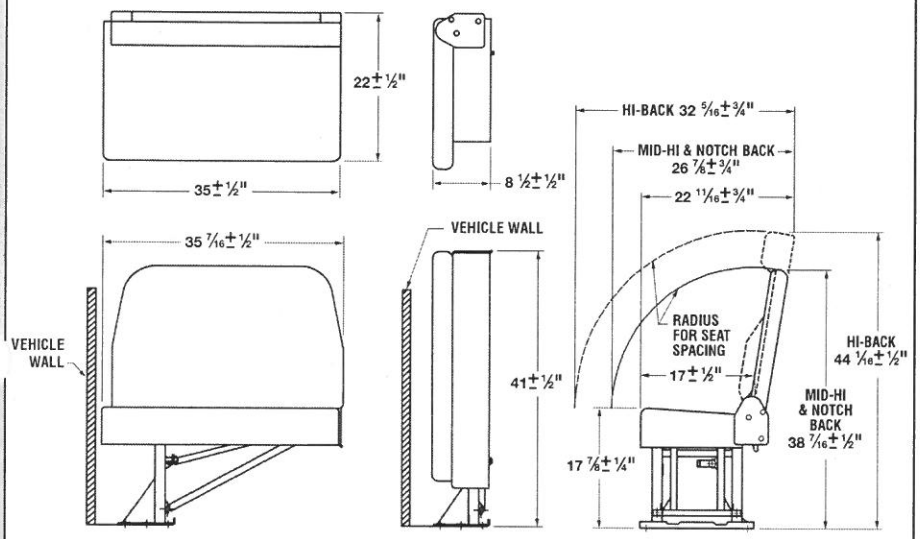
an ISO 9001:2000 certified company

FEATHER WEIGHT

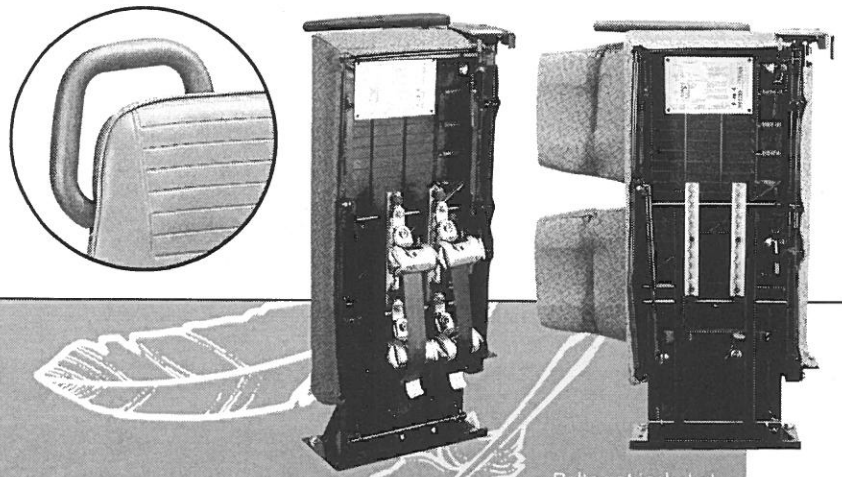
Foldaway BV & AM STYLES



AM2 Floor/Wall Mount | BV Floor Mount | BVWW3 Floor Mount



Corner Grabs | TDSS with belts | TDSS without belts



Belts not included.

Standard Features:

- BV Foldaways mount to the vehicle with four bolts to the floor (no wall mount)
- AM Foldaways mount to the vehicle with four bolts to the floor and two to the wall mount
- Seat belt ready (FMVSS 210 compliant with no leg or tether)
- Ultra-thin backrest for added hip-to-knee room and lumbar support
- High quality molded polyurethane seat and back cushions
- Folds up to less than 10" thick when in the stowed position
- Cantilever design provides reduced installation time; no floor cutting for aisle leg and easy vehicle clean up
- Wire mesh grid seat springs for even support
- 2 locking mechanisms to hold seat in stowed position

Options:

- Single or double seats
- Bench back, notch back or high back
- Wheel well seats
- Wide variety of vinyl's or cloths
- Molded U.S. arms or upholstered arms
- Black or yellow top grabs (not on high backs)
- Black or yellow corner grabs (black only on high back)
- Vertical stitching
- FTA foam
- ABS backs (Notchback only)
- Adjustable headrests (Single and Notchback only)
- Shrouds to cover the Foldaway when stowed
- USR seat belts (Under Seat Retractors)
- CRS-225 hooks and tethers
- TDSS (Tie Down Storage System)

Not Just Seats™

Seating Solutions™

THE FEATHER WEIGHT SERIES BY

FREEDMAN SEATING COMPANY

an ISO 9001:2000 certified company

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

Pure Asphalt
Manufacturer Of Specialty Coatings Since

PRODUCT DATA

3455 W. 31ST PLACE
CHICAGO, IL 60623
PH: 773.247.7030
FAX: 773.247.7066
WWW.PUREASPHALT.COM

#734
Undercoating/Chassis Coating/Sound Deadener

DESCRIPTION

A premium haps free water based coating for the protection of metal frames and underbody components of trailers, utility bodies, bus bodies, RV's and other vehicles. Can be applied to a variety of substrates (wood, foam, FRP, plastic) or direct to metal over pickled, galvanized and lightly rusted surfaces. Excellent sprayability, coverage and sag allows for a wide variety of spray equipment. A production friendly water based formula with quick dry capabilities to achieve early water and weather resistance. Resists salt, alkalis and seals out moisture. Provides a tough, pliable rubberized coating for protection against abrasion and corrosion. 734 is designed to reduce noise and vibrations when applied to vehicle underbodies, wheel wells, body interiors, or engine compartments. Affords additional sound deadening and vibration dampening at higher film builds.

COMPOSITION

Composed of an abrasive free material, formulated with emulsified petroleum hydrocarbons, modified polymer additives and corrosion inhibitors.

PROPERTIES

Color	Black (dark grey when wet)
Weight per Gal.	9.3 lbs +or-.2
Solids by Weight / Volume	52% / 43%
Flash Point	Not Applicable
Viscosity	6-8000 cps
Vertical Sag	40 mils min
V.O.C. Content	Nominal 0.0 lbs/ gallon
Salt Spray ASTM B-117	1000 hrs min.
Corrosion Resistance SAE J-2334 w/ mag chloride	1000 hrs min (40 cycles)
Corrosion Resistance NACE TM-01-69	72 cycles - pass
Fed Spec. TTC-520-B	Pass
Flammability Spec FMVSS 302	Pass
Gravelometer, ASTM D3170	5B @ 77F
Coverage	100 sq ft. per gallon at 15 mils wet

APPLICATION

Can be cold applied with conventional airless or air assist spray equipment with a minimum amount of spray back and fogging. The product is formulated to be used as supplied. Although mixing is usually not required, ensure uniform consistency prior to use. The ambient and product temperature should be 60-95°F(10-35°C) at time of application. Refer to the MSDS (Material Safety Data Sheet) for additional handling instructions, Personal Protection Equipment requirements and first aid information before using.

15-1 Air Motor pumps with 65-75 lbs of air (drum/keg pump)	.021 - .023 inches tip size
30:1 Reciprocating pumps with 30 - 40 lbs of air	.023 - .025 inches tip size

DRY TIME

Dry to light touch in 20-30 minutes depending on thickness, temperature, humidity and airflow. Fully cure in 24 hrs @ 70F. Air movement will speed drying. Product is formulated to achieve early water and freeze resistance indicated by a change of color from shiny dark gray (when first sprayed) to matte black.

CARE AND CLEAN UP OF EQUIPMENT

Dried material can be removed with mineral spirits.

PROTECT FROM FREEZING

This product will be permanently damaged in the container if frozen. Please protect from severe weather.

DSMATERIAL SAFETY DATA SHEET

MANUFACTURER **Pure Asphalt Company**
3455 W. 31st Place
Chicago, IL 60623

Technical product information:
773-247-7030

Emergency spill and health information:
773-247-7030 (CHEMTREC)

DATE PREPARED: 6-12-12
SUPERSEDES MSDS DATED: 08-31-07

1. PRODUCT IDENTIFICATION:

PRODUCT NAME(S): #734

PRODUCT DESCRIPTION: Water Based Protective Chassis Coating / Underbody Coating

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Hazardous Ingredients

COMPONENT	CAS NUMBER	%	OSHA - PEL	TLV
Petroleum Hydrocarbons	8052-42-4	30 – 40	* N/E	5 mg/m3, 8-hr.TWA

*OSHA has not established a specific PEL for CAS 8052-42-4 petroleum hydrocarbon fumes. They are considered as "particulate not otherwise regulated" with a PEL of 5 mg/m3 for the respirable dust and fraction and 15 mg/m3 for total dust fraction.

3. HAZARDS IDENTIFICATION:

HEALTH HAZARDS (including acute and chronic effects and symptoms of overexposure)
Acute:
Inhalation: May cause respiratory irritation.
Skin Contact: May cause irritation and dermatitis.
Eye Contact: May cause severe irritation.
Chronic:
Prolonged or repeated skin contact with this product may result in irritation and dermatitis. IARC has classified extracts of steam and air refined bitumens as group 2b.
Therefore, good, prudent industrial hygiene practices as outlined in this MSDS should be followed.
Medical Conditions Aggravated by Exposure: Persons with a history of chronic skin or respiratory disorders may be increased risk for worsening their conditions from exposure to this product.

4. FIRST AID

- EYE: Flush eyes with plenty of water.
- SKIN: Wash off with waterless hand cleaner and rinse with flowing water or shower.
- INGESTION: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.
- INHALATION: Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:
Flash Point (F) Not considered Flammable or Combustible; HMIS Rating = O
Method Used: Closed Cup

FLAMMABILITY LIMITS:
LFL: Not applicable

HAZARDOUS COMBUSTION PRODUCTS: If burned, produces a dense, black smoke and noxious gasses (carbon monoxide and hydrocarbons).

OTHER FLAMMABILITY INFORMATION: Do not direct water on substance. Water may used to cool closed containers. In a substance fire, use self-contained breathing apparatus.

EXTINGUISHING MEDIA: Foam, carbon dioxide, or dry chemical.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES: (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Avoid unnecessary exposure and contact.
PROTECT THE ENVIRONMENT: Avoid dilution to minimize the extent of the spill.
CLEANUP: Dike and contain with inert material (i.e., dirt or sand), in order to prevent entering municipal sewers or surface waters. Recover and recycle spilled materials if possible, otherwise collect with absorbent material and transfer to appropriate containers for disposal.
Dispose in accordance with federal, state and local regulations.

7. HANDLING AND STORAGE:

HANDLING: Practice reasonable care to avoid repeated, prolonged skin contact.
STORAGE: **Keep From Freezing, store at temperatures between 40° F and 110° F.**

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

EXPOSURE GUIDELINE(S): Use proper PPE to stay below PEL, TLV and REL limits
ENGINEERING CONTROLS: If atomizing ensure adequate building ventilation and local exhaust.
RESPIRATORY PROTECTION: If irritation occurs, or if the PEL's, TLV's or NIOSH - REL's are exceeded, use a NIOSH/MSHA approved air purifying respirator with organic vapor cartridges or canisters and a dust/mist pre-filter. In situations where the concentration of H2S exceeds the PEL or TLV, supplied air respirators or self contained breathing apparatus are required. Always use respiratory protection in accordance with your company's respiratory protection program and OSHA regulations under 29 cfr 1910.134.
SKIN PROTECTION: Wear clean, long-sleeved, body-covering clothing. Use gloves impervious to this material.
EYE/FACE PROTECTION: Wear safety glasses to avoid eye splash
Work/Hygienic Practices: Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding any unnecessary exposure and removal of the material from the skin, eyes, and clothing. Wash hands and arms frequently. Shower after exposure. Wash work clothes when soiled. Safety showers and eye wash stations should be available.

9. PHYSICAL AND CHEMICAL PROPERTIES:

- Appearance: Dark gray to black liquid mastic paint.
- Odor: Light odor.
- Melting Point (F): Not applicable
- Specific Gravity: (H20=1): 1.0 - 1.2
- Vapor Pressure: (mmHg @ 20 C): 23.5
- Evaporative Rate (Ethyl Ether = 1): Not determined
- Appearance and Odor: Dark Grey to Black liquid
- Boiling Point (F): Not determined, 212 degrees for water
- Percent Volatile by Volume: 45-50% water
- Vapor Density (air = 1): Not determined
- Solubility in Water: Soluble
- VOC content zero lbs per gallon
- PH: 8.5 - 9.5

10. STABILITY AND REACTIVITY:

CHEMICAL STABILITY: Stable. Dried coating is combustible.
INCOMPATIBILITY WITH OTHER MATERIALS: Addition of chemicals may cause coagulation.
HAZARDOUS DECOMPOSITION PRODUCTS: Refer to section 5 for hazardous combustion products.

11. TOXICOLOGICAL INFORMATION: (See section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1).

SKIN: The dermal LD50 has not been determined. The LD50 for skin absorption in rate is expected to be >200 mg/kg, based on data for a similar material.
INGESTION: The oral LD50 for rate is >500 mg/kg for similar materials.

12. ECOLOGICAL INFORMATION: (For detailed ecological data, write or call the address or non-emergency number shown in Section 1).

ENVIRONMENTAL FATE:

MOVEMENT'S PARTITIONING: No bioconcentration of the asphalt component is expected because of its high molecular weight. Dispersions will color water.
DEGRADATION AND TRANSFORMATION: The asphalt component is not expected to biodegrade.
ECOTOXICITY: Material is slightly toxic to aquatic organisms on an acute basis (LC50 between 10 and 100 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATION: (see Section 15 for Regulatory Information).

DISPOSAL: Any disposal practice must be in compliance with all federal, state/provincial, and local laws and regulations. State/provincial and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Regulations may also vary in different locations. Chemical additions, processing, storage, or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Waste characterization and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the materials. None of these waste management options should be considered "arranging to disposal."

Do not allow into any sewers, on the ground, or into any body of water.

The preferred waste management option for unused, uncontaminated, unformulated, or not otherwise altered material is to reuse or recycle. Other waste management options are to send to a properly licensed or permitted recycler, reclaimer, or incinerator. The same waste management options are recommended for used or contaminated material, although additional evaluation is required. Refer to 40 CFR Section 261, and/or any other appropriate federal, state, provincial, or local requirements for proper classification information. For additional information, see MSDS Regulatory Information (Section 15).

14. TRANSPORT INFORMATION:

For Industrial / Professional Use Only – Keep out of reach of Children

Department of Transportation: This product is not regulated by DOT when shipped domestically by land. Shipping Classification: 170080

15. REGULATORY INFORMATION:

U.S. REGULATIONS:

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.
SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories," promulgated under Section 311 and 313 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III), and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category.

CANADIAN REGULATIONS:

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for the product is:

This product is not a "Controlled Product" under WHMIS.

16. OTHER INFORMATION:

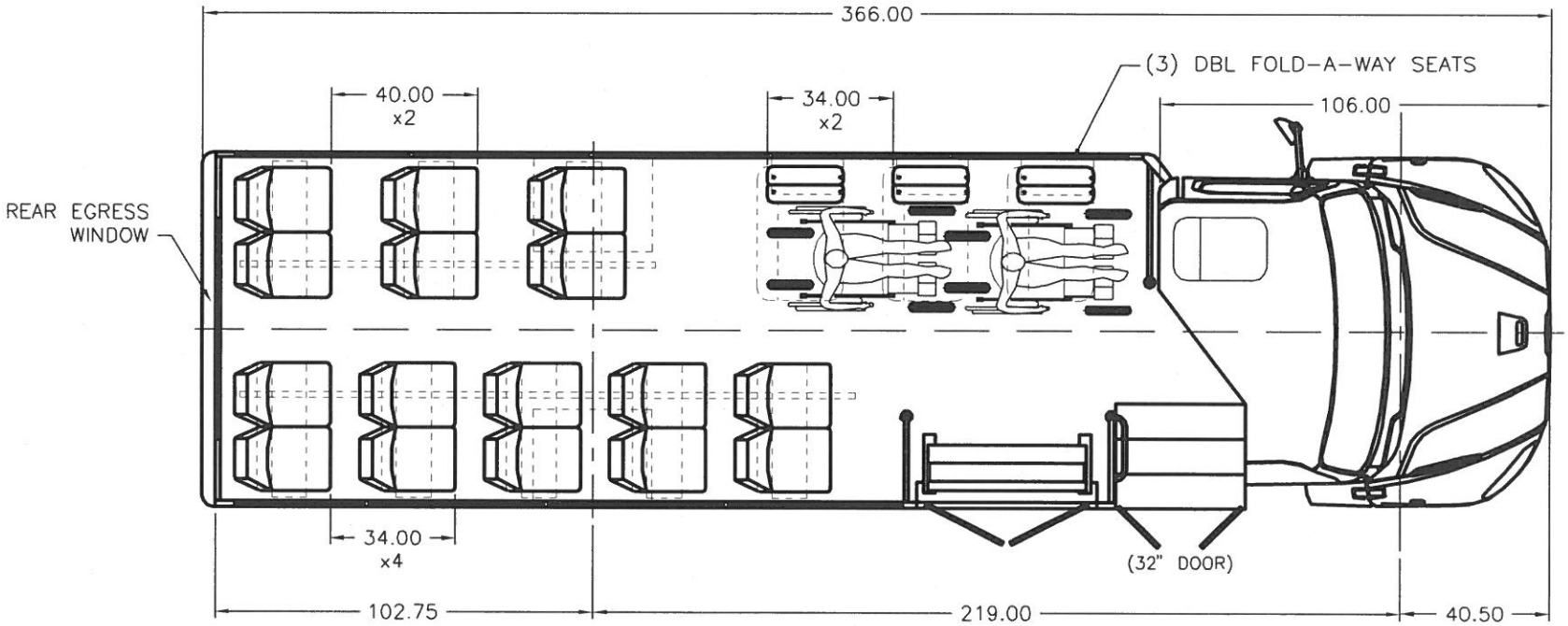
MSDS STATUS: Revised per ANSI Z400.1

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein.

PRELIMINARY

NON-PRODUCTION PRINT
FOR R&D USE ONLY
1/2/14

CUSTOMER APPROVAL
APPROVED BY: _____
APPROVED DATE: _____



FEATURES:

- 47.00 x37.00 T-SLIDER WINDOWS
- L-TRACK (FLANGED) OTHERS AVAILABLE
- 31.00 HIP TO KNEE AS SHOWN

STANDARD TOLERANCE UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES		CUSTOMER:	SONNY MERRYMAN
ASS'Y DIMS	± 0.13"	TITLE:	16 + 6 PASS & 2 W/C, FRONT LIFT
X.X	± 0.1"	SERIES:	PRESIDENT PS/2 PARATRANSIT
X.XX	± 0.06"	MODEL:	FREIGHTLINER SC2
X.XXX	± 0.063"	SIZE: B	FILE LOC: T:\Drawings\Quote\2013\Sonny Merryman
ANGULAR	± 1.0°	SCALE: 1:30	DWG#: SM-D22
INTERPRET GEOMETRIC TOLERANCING PER:		REV/ECO:	PART NO.: QUOTE #####
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APPROVED	— ###		
WEIGHT	29,500 GVRW		
FINISH	###		
MATERIAL	### ###		

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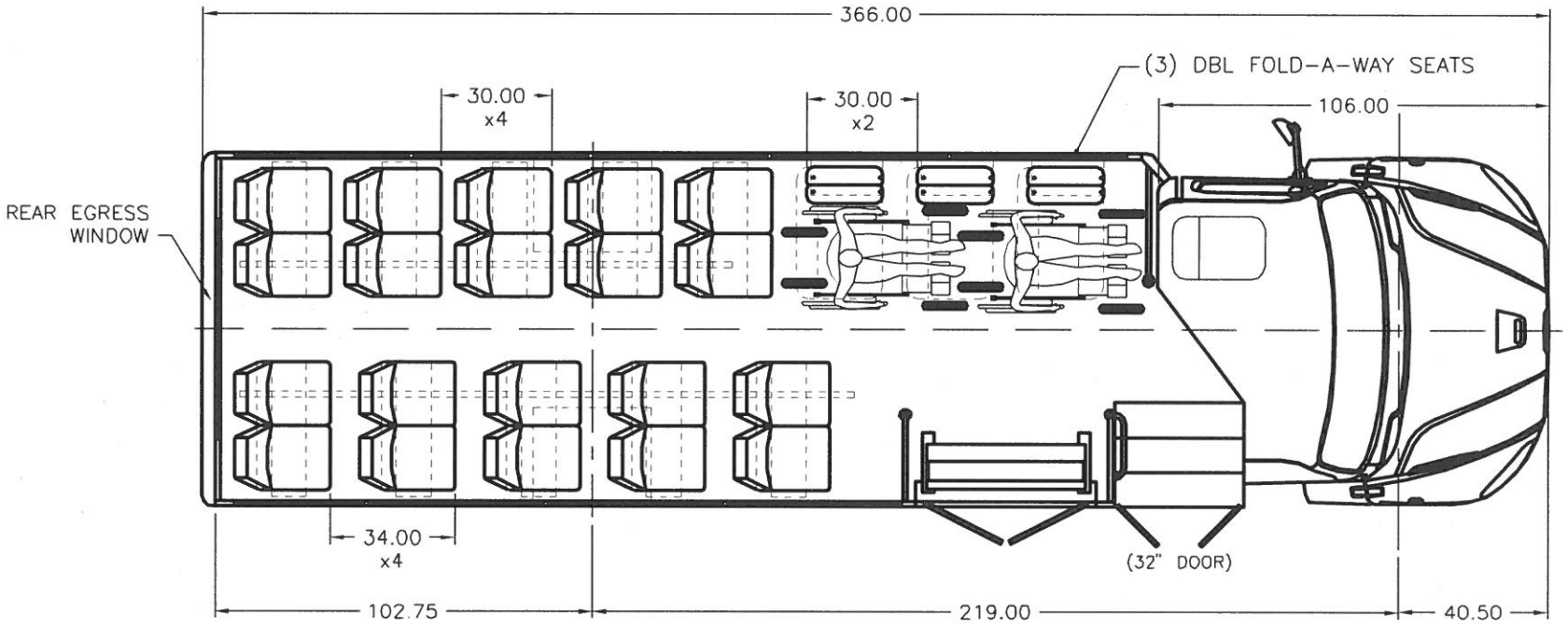
APPROVED BY: _____
APPROVED DATE: _____



FEATURES:

- 47.00 x37.00 T-SLIDER WINDOWS
- L-TRACK (FLANGED) OTHERS AVAILABLE
- 27.00 HIP TO KNEE AS SHOWN

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FINISH	###	
MATERIAL	###	
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CUSTOMER:	SONNY MERRYMAN		
TITLE:	20 + 6 PASS & 2 W/C, FRONT LIFT		
SERIES:	PRESIDENT PS/2 PARATRANSIT	MODEL:	FREIGHTLINER SC2
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REV/ECO:	PART NO.	QUOTE	####

PRELIMINARY

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1/2/14

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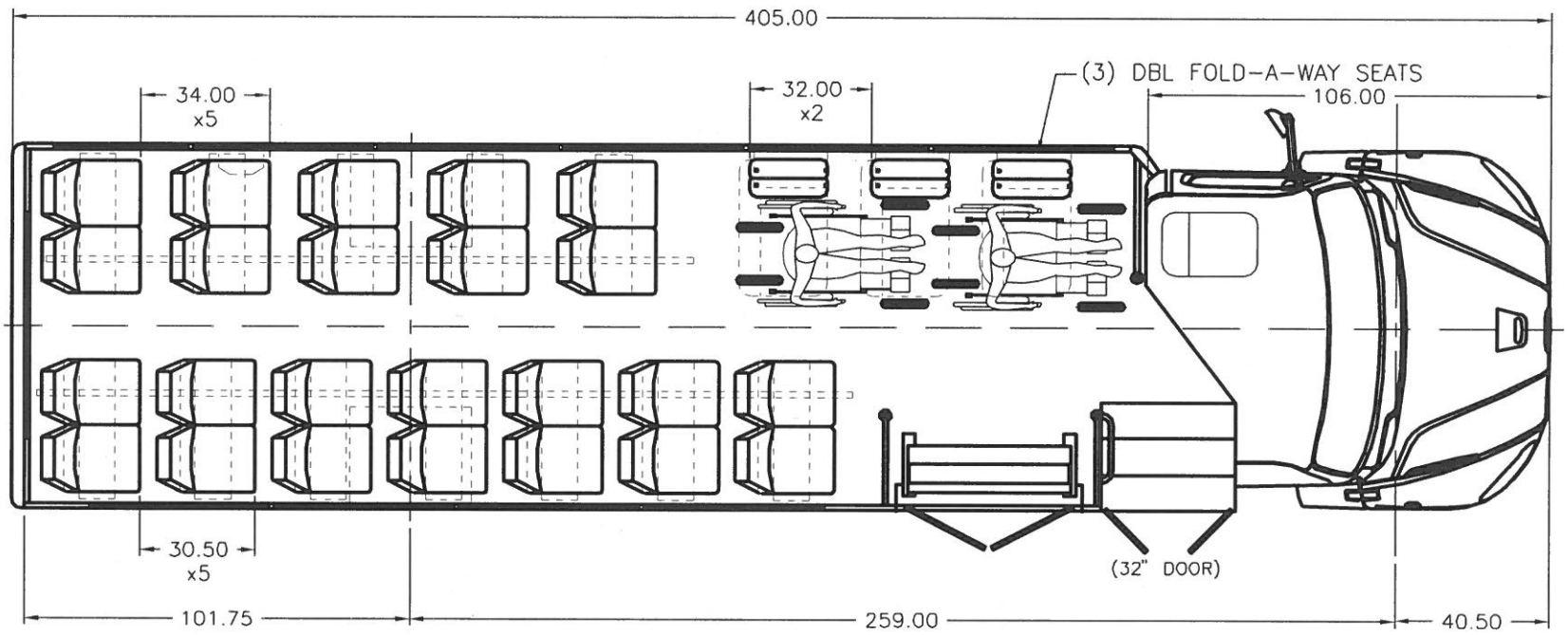
APPROVED BY:_____
APPROVED DATE:_____



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X.X	± 0.1"
X.XX	± 0.06"
X.XXX	± 0.063"
ANGULAR	± 1.0"
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MODEL:	FREIGHTLINER SC2
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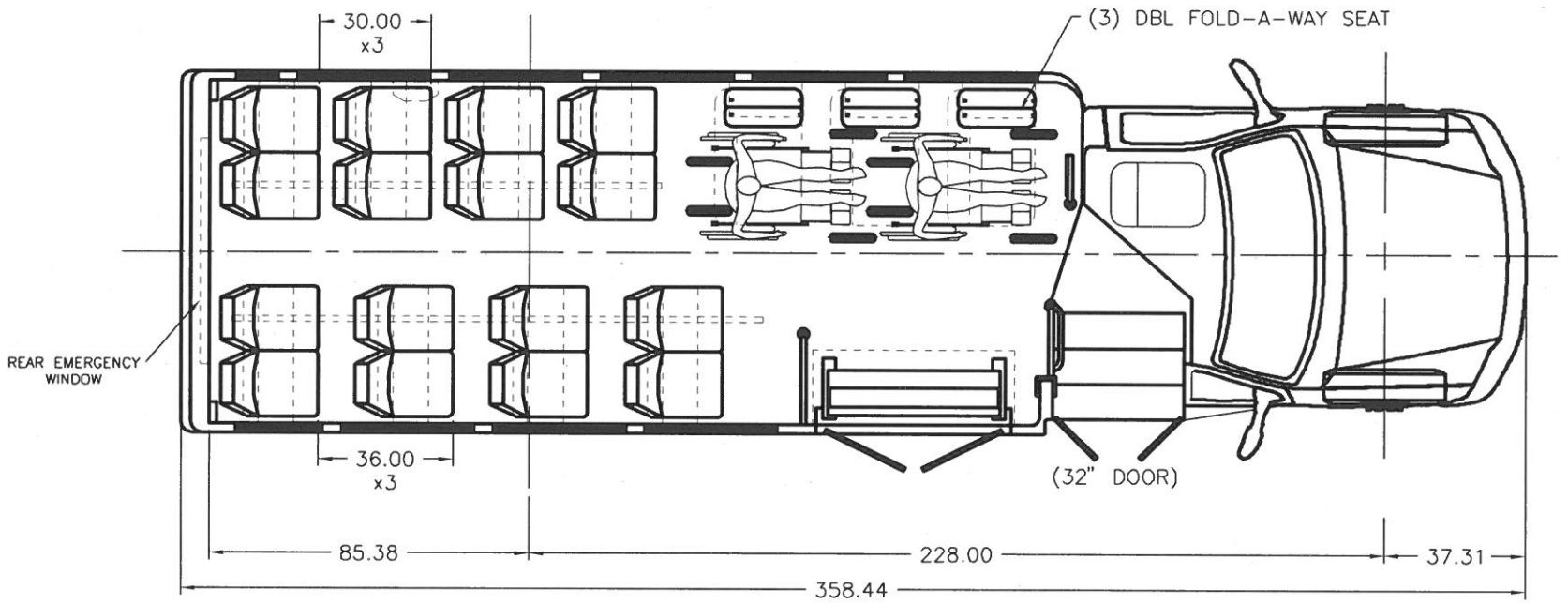

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ANGULAR	± 1.0°		
INTERPRET GEOMETRIC TOLERANCING PER:			
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APPROVED	—	####	
WEIGHT	29,500 GVRW		
FINISH	####		
MATERIAL	####		
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CUSTOMER:	SONNY MERRYMAN		
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REV/ECO:	PART NO.	QUOTE	####

STARTRANS
A SUPREME CORPORATION COMPANY

P/S2C

THE INCREDIBLY DURABLE

QUALITY CONSTRUCTION REIGNS SUPREME

The StarTrans P/S2C series will meet your strictest driving needs, no matter how demanding they are. Strong 1.5" x 1.5" steel cage sidewalls are extremely rugged to battle difficult road conditions, plus they eliminate exterior noise. The interior surfaces are stain- and scratch-resistant for added durability. Add a tough, long-lasting Freightliner chassis and you have one heck of a bus.

And even if you put on 50,000 miles a year, we're ready to back our claim of tough durability with a comprehensive 5 year/75,000 mile warranty.

TOUGH, BEAUTIFUL VALUE.

StarTrans P/S2Cs are encased in a steel cage for optimal safety. And every weld is individually inspected to make sure we adhere to our own high quality standards and safety regulations.

StarTrans doesn't take a back seat when it comes to passenger comfort and convenience. Wide aisles and doors, plush upholstery, spacious luggage racks and large, scenic windows are just some of the amenities.

And smooth, aerodynamic styling, engineering excellence and quality construction are why Supreme designs reign supreme.

STARTRANS P/S2C

CLOCKWISE FROM TOP

Optional high-back buckets with upgrade fabric

Drivers area with control center

Optional paratransit lift equipment available either in front or rear of axle

Driver's side slide-out battery tray with (3) Group 31 batteries.

Operator's curbside window AS-2 rated. 747 square inches of visibility. 32" x 98" double out entry door.

P/S2C BODY FEATURES

STEEL FLOOR – The steel sub frame parts are welded together. It is constructed from12-gauge roll formed, cross members in a modified "C" shape 1½" wide x 3" high. 14-gauge steel floor support tubes 1½" x ¾" are welded between the cross members to form a grid that ties the steel sub frame together.

FLOOR – The finished sub floor is ¾" thick Fiberglass reinforced plywood. The inner core is made of Northern Fir Lauch B/C plywood. This material is sandwiched between 17 oz woven rope fiberglass mat that is impregnated with fiberglass resin.

SIDEWALLS – The side wall structure shall consist of a steel cage, insulation, and exterior skin. The steel cage is constructed of 1½" x 1½" x 14 gauge tubing to form a vertical and horizontal wall frame.

ROOF – The roof structure consists of a steel cage construction utilizing a formed and capped roof bow. Roof bows are located on approx. 24" centers and constructed of 1½" x 1½" 14-gauge with the cap section being 16 gauge.

WINDOWS – Curbside Transition Window- The curbside transition window is located in front of the entry door. The total square inches of viewing area is 747". It has a tempered safety glass rating of AS-2 with a 31% tint.

Passenger Side Windows – Non-Egress- The number of windows depends on the model of the bus. The window's size is 36" high x 47" wide. It is a double "T-slider" ventilation type which is designed for the top 7" to open by sliding either the front or rear 6" sections toward the center.

ENTRY – Double-Out Entry Doors- The standard entry door is a electrically operated double door design with a clear opening of 32" wide x 98" high. A&M Systems, Inc. Aluma-Clear™ Door.

REAR BUMPER – The rear bumper is a wrap-around style constructed of 10-gauge steel.

EXTERIOR MIRRORS – There are two OEM exterior mirrors.

ELECTRICAL – Programmable multiplex system using solid state CPU input and output modules. Functions control using a 10 button programmable key pad. All wiring is SAE type & SAE J1228 compliant.

OPTIONAL A/C & HEAT – A/C systems ranging in size from 70,000 BTU to 130,000 BTU. Rear heat from 45,000 BTU - 65,000 BTU.

OPTIONAL PARATRANSIT – Wheelchair accessibility with a wide range of lifts, securement systems and seating arrangements.

OPTIONAL LUGGAGE – Luggage can be stored in over-seat, floor-to-ceiling, luggage rack, rear compartments or custom-designed areas.

DIMENSIONS

Exterior width (at wheel flare): 101"
Exterior height: 126"
Entrance clear opening: 98" x 32"
Interior width at seat level: 95.75"
Center aisle height: 79"

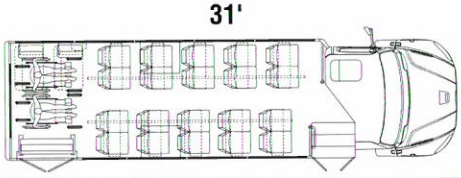
Due to Supreme Corporation's commitment to product quality, specifications and options are subject to change in the interest of product improvement and market changes.

Floorplans shown are only a few of the designs available.

FREIGHTLINER SPECIFICATIONS

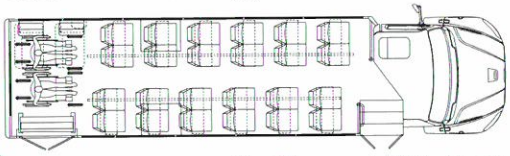
P/S2C Body Size	31'	34'	37'	39'
Wheelbase	219"	259"	279"	299"
GVWR	23,000		26,000	
GAWR, Front	8,000 lbs		10,000 lbs	
Axle, Front	AAC AF-8.0-3 8,000 lbs		AAC AF-10.0-3 10,000 lbs	
Brakes, Service	Front & Rear: Bosch hydraulic pin-slide disc brakes			
Alternator	LN 12 V 270 AMP 4944PA Pad mount with AC taps			
Battery	(3) 760 CCA group 31 2280 total CCA			
Engine	240 HP Cummins ISB 6.7			
Engine Horsepower and Torque Ratings	CUM ISB 6.7-240 HP 560 Lb/Ft @ 1600 RPM			
Frame	5/16" x 3" x 10 1/8"; 50 KPSI			
Fuel Tank	60 gallon between rails			
Front Suspension	9,000# taperleaf front suspension		10,000# Softek taperleaf spring suspension	
Rear Suspension	16,000# variable rate multileaf spring rear suspension		19,000# flat leaf spring 52" rear suspension w/o helper, w/radius leaf	
Steering	TRW power steering and tilt/telescopic column TRW THP 60 steering gear 55-degree wheel cut			
Tires	Goodyear G647RSS 245/70R19.5 14 ply		Goodyear G169 255/70R225 16 ply	
Chrome Features	Headlamps, fender flairs, frill rims and front bumper			
Transmission	Allison 2200 PTS automatic transmission w/ park Pawl, w/o PTO provision			
Horn	Dual electric			
Wiring	Fully multiplex with interval function			
Windshield Wiper	2-speed with interval function			
Standard Features	Daylight running lights, front tow hooks, engine block heater, cruise control, center switch panel with cutouts, dual Seltec TM-21 A/C compressors and dash A/C			

31'



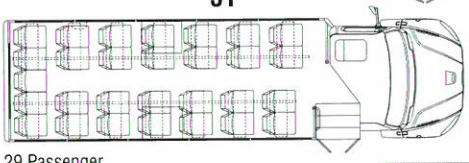
20 + 4 Passenger & 2 W/C - Rear Lift

34'



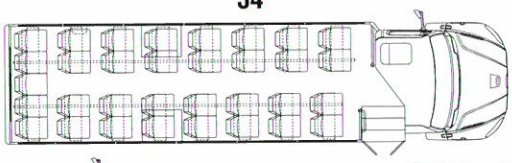
24 + 4 Passenger & 2 W/C - Rear Lift

31'



29 Passenger

34'

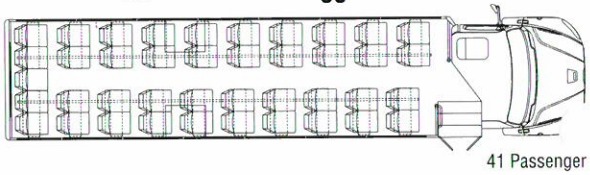


33 Passenger

37'

39 Passenger

39'



41 Passenger

StarTrans
A SUPREME CORPORATION COMPANY

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2011

STEEL FLOOR

The steel sub frame parts are welded together. It is constructed from the following material.

12-gauge roll formed, black/gray cross members with an anti-rust coating on the inside of the formed part welded to two 3/16" steel long sills which are 4 1/4" wide x 1" high. These cross members are a modified "C" shape 1 ½" wide x 3" high.

14-gauge steel floor support tubes 1 ½" x ¾" are welded between the cross members to form a grid that ties the steel sub frame together.

12-gauge seat track 1 5/8" wide x 7/8" high are welded every 6" to a 14-gauge steel strip that is 3 ½" wide and welded to the cross members.

A 10 gauge wheel chair lift support (paratransit model) is welded to the cross members under the 3" I beam and lift area only. The support is designed as a secure point for the lift so it becomes an integral part of the steel sub frame.

Rear wheel wells are constructed of 12-gauge steel and designed with flanges that are welded on top of the cross members to create a watertight seal and fastened at the wall side.

The steel sub frame is painted after sub assembly to provide protection from rust and corrosion.

UNISTRUT CHANNEL SEAT TRACK

All seating is secured in a 1 5/8" wide Unistrut channel seat track. A 3 ½" wide 14-gauge steel plate is welded to the steel sub frame. The Unistrut channel is then welded to this plate.

FLOOR

The floor structure is identical except for the following changes.

The cross members are raised 5 ½" and are supported by ¼" x 2" bar stock "V" style brackets that are welded to the bottom of the cross member and the top of the long sill.

Wheel wells are a flat 14-gauge galvaneal steel plate is welded to the sub frame to complete the wheel well area.

FLOOR DECK

The finished sub floor is ¾" thick Fiberglass reinforced plywood. This material is described as follows: The inner core of the FRP panel is made of Northern Fir Lauch B/C plywood that has been plugged and filled. The maximum number of filler plugs per 4' x 8' sheet to be no more that twenty (20).. This material is sandwiched between 17 oz woven rope fiberglass mat that is impregnated with fiberglass resin, the face side of the material to have 20 mil. Gel coat with the back side covered with co-extruded melinex film.

The FRP panels are then installed on the top of the steel sub frame with grade five (5) floor bolts. Construction adhesive is utilized as well along the top of all floor members that intersect the floor decking material as an additional securement method. A minimum of six (6) bolts per crossmember is standard.

OPTIONAL W/C FLANGED L TRACK

L track is mounted in 9 ¾" pieces and bolted through the floor with 5/16"grade 8 torx bolts. End caps are installed at each end for a finished look.

SIDE WALLS

The side wall structure shall consist of a steel cage, insulation, and exterior skin. The assembly and components of the side walls shall be as follows:
The steel cage is constructed of 1 ½" x 1 ½" x 14 gauge tubing to form a vertical and horizontal wall frame. The steel cage is designed to create a grid work that is part of the total steel structure that surrounds the passenger compartment.
The side wall is insulated with "Astro-foil" reflective material. This reflective insulation consists of two layers of aluminum foil laminated to the outside of two layers of heavy-duty polyethylene air-bubble cushioning. These bubbles form trapped air spaces between the foil surfaces to give the unit excellent "R" values. This insulation is impervious to moisture and air currents.
The exterior is a metal painted surface. This outer skin is attached to the side wall with high bond conformable acrylic foam tape. Interior is Chiller glass((high gloss fiberglass reinforced polyester).

ROOF

The roof structure consists of a steel cage construction utilizing a formed and capped roof bow. It is constructed in the following manner. Roof bows are located on approx. 24" centers and constructed of 1 ½" x 1 ½" 14-gauge with the cap section being 16 gauge. For all roof assemblies that receive a roof hatch, ¼" steel 4" x 4" corner gussets are added to each corner of the opening for additional support.

The roof also consists of (3) 3/16" steel roll bars placed at the front, center, and rear of the roof. These roll bars are married along the side then welded to a roof bow at each of the three locations.

One piece laminated panel (Lamilux/Quadrant/SymaLite – long glass fiber-reinforced polypropylene and fiberglass composite sheet).

Under the fiberglass a 3/8" exterior grade OSB panel.

A layer of Astro-foil insulation is placed between the plywood panel and the steel roof structure.

Interior is Chiller glass.

FRONT & REAR CAPS

Front cap

The front cap is a one-piece fiberglass design and constructed in the following manner.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be skin coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 -32 %.

Reinforcements are then installed and glassed in.

Rear cap

The rear cap is a three-piece design made from TPO plastic, which is pre-painted white, UV protected, and mechanically fastened to the rear wall.

Two vertical parts, one roadside and one curbside, with an upper horizontal part that overlaps each of the verticals create a natural water shed.

Reinforcements are secured in place behind the pieces with high quality adhesive.

WINDOWS

Driver's Window (meets FMVSS 205 & 217)

At the driver's position, one window is provided by the OEM. This window rolls down manually.

Curbside Transition Window (meets FMVSS 205 & 217)

The curbside transition window is located in front of the entry door. The top 1/3 is angled to fit the contour of the cab. The total square inches of viewing area is 747. It has a tempered safety glass rating of AS-2 with a 31% tint.

Passenger Side Windows – Non-Egress (meets FMVSS 205 & 217)

The number of windows depends on the model of the bus. The window's size is 36" high x 47" wide. It is a double "T-slider" ventilation type which is designed for the top 7" to open by sliding towards the rear. The window is maintained in the closed position by mechanical latches. The total square inches of viewing area is 1296. It has a tempered safety glass rating of AS-3 with a 31% tint.

Passenger Side Windows – Egress (meets FMVSS 205 & 217)

The number of windows will depend on the model of the bus. They are identical to the non-egress in construction, but are designed to be opened in an emergency situation by releasing two clearly marked red release latches located on each side of the window. There will be operating instructions located at and on each egress window.

Rear Egress Window (meets FMVSS 205 & 217)

There is one rear egress window. The window is designed to be opened in an emergency situation by releasing two clearly marked red release latches located on each side of the window. There will be operating instructions located at and on each egress window. The window's size is 22" high x 58" wide. The total square inches of viewing area is 1,276. It has a tempered safety glass rating of AS-3 and 31% tint.

Window Seals

The windows are sealed between the body and window frame with ½" ribbed rectangle closed cell rubber seal.

ASSEMBLY

The bus body is assembled in the following manner.

The entry door steel portal frame is welded and bolted to the chassis so this assembly becomes an integral part of the OEM chassis.

The steel floor sub frame assembly is then mounted on the OEM chassis utilizing by bolting to the OEM frame with 12mm x 1.75 class 9.8 bolts and nuts supplied by the chassis manufacturer utilizing the OEM rubber mount suspension system. This allows the body to be mounted the

same as the OEM cab which reduces any stress where the two are connected and helps isolate road vibrations from the body.

The floor deck is next.

The front fiberglass cap is secured to the OEM chassis utilizing mechanical fasteners and a butyl rubber seal between the chassis and the flange on the front cap to create a weather proof seal.

The side walls are then installed, securing them to the steel sub frame and portal frame welded.

The interior rear wall follows and is attached to the rear cross member and the sidewalls, are welded.

The roof is then installed and attached to the front cap, sidewalls and rear interior wall, utilizing mechanical fasteners in conjunction with steel reinforcing attachment strips.

The entry door frame and steps are installed and attached to the portal frame utilizing mechanical fasteners and butyl rubber seal. The double-out doors are then installed to complete the main body structure.

After the body is assembled a liquid sealer is applied to the seams at the floor line and interior rear wall. This sealing is in addition to sealing the interior after the final trim pieces are applied.

This completes the steel/Alufiber combination body structure, having a minimum of body seams, no exposed fasteners, resistant to impact, "body shock" (OEM rubber mounting system), oxidation finish, and non-corrosive.

The remaining components are not an integral part of the body structure, but are designed for weather protection and/or cosmetic components. The rear cap is then set over the rear interior wall and along with the Aluminum side skirts, fender flares, transition pieces and the bumper anti ride, installed with mechanical fasteners and sealed with a butyl rubber seal (interior) or an automotive caulk (exterior). In addition, the skirts and fender flares are fastened to the horizontal steel tubes in the sidewalls and the anti ride into the steel sub frame.

After all the above components are installed, an aluminum trim, secured by mechanical fasteners, is placed over the body seams. This trim is covered with a vinyl insert and sealed with an automotive caulk to assure the body is completely weather proof.

DOORS

DRIVER'S DOOR

The driver's door is OEM power window and locks with remote entry.

PASSENGER ENTRY DOOR

Entry Door Portal Frame

The entry door portal frame is a 1 ½" x 1 ½" 14-gauge tubular frame that is welded at the bus sub frame and the chassis cab floor. It is fastened with mechanical fasteners at the curbside "A" pillar. The purpose of this frame is to support the entry doorframe.

Entry Door Step Well Frame

The step well frame consists of 14-gauge galvaneal steel formed to create a perimeter frame, step well, and the finished opening for the double-out entry doors. The step well is a 2-step entry with a platform. This frame is powder coated white.

Double-Out Entry Doors

The standard entry door is a electrically operated double door design with a clear opening of 32" wide x 98" high.

A&M Systems, Inc. Aluma-Clear™ Door Specifications:

Full clear span, full view glass

Glass panel is 1/8", AS-2 green tint;

Fully black anodized 6063-T6 aluminum extruded door frame

Extrusion has a minimum wall thickness of .090"

All frame assembly joints use Key-Lok™ design for added joint rigidity

All attaching hardware is zinc plated or stainless steel for corrosion control

Lower pivot point is glass-filled injection molded design

Upper Torque Arm drive is zinc plated and easily replaced if required

Both door panels are identical and can be used in either forward or aft position

Door panels are light weight, typically less than 30 lbs. each

WHEEL CHAIR DOORS (paratransit model)

The double-out wheel chair door is constructed in the following manner.

The door leaf consists of an interior frame assembled from 1 3/8" x ¾" substrate with a 1.85 lb density foam sandwiched between an inner and outer skin of .040 smooth aluminum. These items are laminated together to form a one-piece solid door.

The front leaf utilizes a 3-point dead bolt latch system, while the rear leaf is a 2-point.

Each leaf has an upper 36" high x 14 ½" wide window. It has a total square inch viewing area of 522 and a tempered safety glass rating of AS-3 with a 31% tint.

There are 3 rubber seals, a ¼" "D" style, a ½" "D" style, and a ½" ribbed seal, which complete the assembly for a weather tight fit.

The outer perimeter frame is constructed from extruded aluminum and incorporates the hinges that have .120 steel hinge pins. The hinges are then mechanically fastened to the door leaves.

A header plate, installed at the top of the assembly, allows for two, top mounted, steel check-style, zinc plated hold open devices with 30 lb. springs.

The entire assembly is then inserted into the wheel chair door frame. This frame consists of 14-gauge galvaneal steel, powder coated white, and formed to create a perimeter frame and lift platform support; fastened to sidewall using "Lords" 606 adhesive.

EXTERIOR FEATURES

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FRONT BUMPER

The chassis manufacturer provides the standard front bumper.

DRIVER'S RUNNING BOARD

OEM Running board.

REAR BUMPER

The rear bumper is a wrap-around style constructed of 10-gauge steel. It is powder coated black. The bumper is supported by two formed 1/4" x 6 1/2" x 14 1/2" bumper brackets that are welded to steel "C" channel and bolted to the chassis frame.

EXTERIOR MIRRORS

There are two OEM exterior mirrors. The mounting brackets include both driver's side and passenger side OEM transition panel mount. The mirrors manually telescoping trailer-low w/power heated glass, integrated clearance lights and 2 way fold.

MUD FLAPS

There are four mud flaps, two front and two rear. The rear mud flaps are constructed of ¼" black thermoset plastic and are fastened to a steel support that is a part of the steel sub frame. The front mud flaps are constructed from 1/8" smooth rubber.

FUEL FILL

An aluminum fuel fill with a locking door is recessed into the body on the driver's side.

DRIVE SHAFT GUARDS

A drive shaft guard is installed on each section of the drive shaft. These guards are ¼" steel and 2" wide. They are welded to the chassis steel sub frame.

HEAT SHIELD

A heat shield is installed over the exhaust pipe and muffler. This shield is constructed from .040 aluminum and fastened to the bottom of the sub frame cross members with mechanical fasteners.

UNDERCOATING

The entire underside of the bus is undercoated with a premium haps free petroleum coating except the areas directly above the chassis exhaust pipe, muffler and tailpipe. (12" from exhaust pipe and 2" from fuel tank) The undercoating meets all MIL specs C-62218A.

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2011

ALUMINUM SKIRTING & FENDER FLARES

The lower skirting is aluminum .063 with a 3" radius at bottom, mechanically fastened, and painted to match the bus exterior. The wheel well moldings are front OEM black and fiberglass rear.

FIBERGLASS TRANSITION PIECES

The fiberglass parts are constructed in the following manner.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

INTERIOR FEATURES

REAR WALL FINISH

The interior rear wall is constructed in the following manner, starting with the interior surface and working to the outside.

The interior surface is gelcoated at a thickness of 18 to 22 mil.

A ¾" x 2" substrate frame is stapled and glued to form a grid work to support and outline the perimeter of the rear wall. Between the horizontal and vertical pieces of the substrate grid work, pieces of ¾" 2 lb. density polystyrene foam are installed to create a solid core wall.

An 1/8" sheet of substrate provides the rear layer.

The three layers of the rear wall are then assembled using a hot-melt glue/press-roller process.

Two 10-gauge steel plates (12" x 31") are secured to the rear wall (paratransit model) as tapping plates for the shoulder harness for the rear wheelchair positions.

CAB LINER

The cab liner is padded vertical trim secured fasteners and button covers.

HEADLINER

Chiller glass (high gloss fiberglass reinforced polyester)

HOSE COVERS

The rear hose covers are a one-piece fiberglass design.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

BODY SEAM TRIM

After all the above fiberglass components are installed, an aluminum trim, secured by mechanical fasteners, is placed over the body seams. This trim is covered with a vinyl insert.

FINISHED FLOOR

The standard floor covering is black, 1/8" thick, transit type smooth rubber with 3/16" ribbed rubber in the entry way and the aisle. The entry steps have a white step nosing covering the leading edge of the step riser.

ENTRY DOOR TRIM

The areas surrounding the entry door frame are trimmed with padded vinyl which matches the interior color scheme.

STANCHIONS, MODESTY PANELS, & ASSIST HANDRAILS

There are two 1 1/4" OD stainless steel stanchion poles constructed in the following manner.

Behind the driver's seat, a vertical stanchion will run from floor to ceiling connecting with a horizontal stanchion secured to the wall. All fittings and fasteners are stainless steel. The fasteners are a clad type with no exposed threads.

Behind the entry door, a vertical stanchion will run from floor to ceiling connecting with a horizontal stanchion secured to the wall. In addition, a modesty panel is attached to this assembly. All fittings and fasteners will be stainless steel. The fasteners are clad type with no exposed threads. The modesty panel is constructed from a ¾" substrate and covered with a white laminate finish. It is rectangular in shape and covered with a color-coordinated plastic edge around the entire perimeter.

An entry assist hand rail, constructed from the same materials, is attached to the entry door vertical stanchion for safety and to assist entering and exiting the bus.

INTERIOR MIRROR

A 10 ½" x 2" convex mirror with a full range adjustment is located in the driver's area, for viewing the passenger area.

WALL TRACK

The Unistrut channel is monobolted every 6" to a 1 ½" x ¾" 14-gauge steel tube that is part of the interior side wall structure.

The seat frames are bolted to the seat channel with two 7/16" grade 8 bolts, threaded into two 1 ¼" x 7/16" hardened channel nuts.

This installation meets FMVSS 207 & 210 requirements.

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2011

DRIVER'S SEAT

The driver seat pedestal is mounted in the holes provided by the OEM. The seat is a high back recliner with a right hand arm rest. This seat meets FMVSS 207 & 210 requirements.

ELECTRICAL

WIRING

All wiring added by the final stage manufacturer meets one of the following standards.

SAE Specification J1128-SXL high temperature wire (8 to 14-gauge)

SAE Specification J1128-GXL high temperature wire (8 to 14-gauge)

SAE Specification J1128-SGX high temperature wire (Battery cable)

In addition to the above specifications, all wiring is color-coded, number and function designated every 12" to enable identification and circuit trace ability.

INSTALLATION & SECUREMENT

All wiring under the body or hood is protected with a high temperature (minimum 125 degree) nylon convoluted tubing and is secured by one of the following methods.

High temperature heavy gauge wire ties

Vinyl coated P clamps.

In addition to the above requirements, all wiring is routed no closer than ¾" from any sharp edge or a minimum of 4" away from any heat source.

No wiring will be routed through the wheel well unless protected by a metal shield and convoluted tubing.

A minimum of 1 ½" clearance is maintained between any wiring and the engine to compensate for engine roll.

No wiring will be secured to brake or fuel lines.

CONNECTORS

All wiring is connected in the under-body or under-hood areas by weather pack connectors.

Where it is not possible to install a sealable insulated electrical connector in these locations, the insulated connector is protected by heat shrink tubing with a sealable glue inside.

The remaining wiring located inside the bus is connected by one of the following connectors.

Standard insulated eyelet.

Heat shrink butt connector

Standard insulated quick disconnect.

Standard insulated ring connector.

GAUGE OF WIRE

All wiring is sized to carry the electrical load required for length of bus.

LIGHTING

EXTERIOR LIGHTING

The following lights are installed and meet FMVSS 108 requirements. (Lamps, reflective devices and/or associated equipment)

Identification lamps

Three amber rectangular lights centered and recessed in the front cap

Three red rectangular lights centered and recessed in the rear cap

Clearance lamps

Two amber rectangular lights located and recessed at each outer edge of the front cap

Two red rectangular lights located and recessed at each outer edge of the rear cap

Side Marker Lights/Turn signal lamps

Two red rectangular lights located one on each side of the side wall just in front of the rear cap in line with the rear clearance lights

Two amber combination marker/turn signal lights located mid-body one on each side wall

Stop/Tail lamps, Turn signal lamps, and Backup lamps

Three 4" round light assemblies located and recessed in each side of the rear cap

License Plate Light

One chrome plated license plate light recessed in the rear cap on the driver's side

(In addition to the light, there will be space provided for the license plate in the recess.)

The chassis manufacturer supplies the headlights, chassis front turn lights, and the hazard flashers. The chassis system is then tied into the bus system by the final stage manufacturer

INTERIOR LIGHTING

Driver's Courtesy Lights

A driver's courtesy light is installed just above the driver's left shoulder. Opening the driver's door or turning the headlight switch counter-clockwise activates the light.

Step Well Entry Lights

Two step well lights are provided, one on each side of the entry step well. These lights activate when the double-out entry doors are opened.

Overhead Courtesy Lights

Overhead courtesy lights (10 standard on the 26' model and 12 standard on the 30' and 33' models) are installed in the ceiling of the bus to provide lighting for safe passenger movement.

Turning on the switch in the driver's console or opening the double-out entry door activates the lighting.

Dash Instrumentation Lighting

Dash instrumentation lighting is provided by the chassis manufacturer and activated by the headlight switch.

DRIVER'S CONTROL PANEL

MASTER DISTRIBUTION PANEL

The electrical center is installed in the front compartment above the driver. The input and output modules receive and control signals and circuitry on the body conversion. These modules are powered by a 2/0 cable that is connected to a standoff terminal in the electrical compartment. The module circuits are protected by blade type automotive fuses. All OEM circuits are provided by the chassis manufacturer.

In addition to the power supplied by the ignition hot solenoid circuit, there are two circuits in the panel that are battery hot and protected by in-line fuses. These circuits are for the radio and electric door operator options.

PMC ELECTRICAL CONTROL SYSTEM

A modular system (Multi-Plex) that will configured with 10 input/output channels to as many as 320 channels to control a body options and some chassis related items provide a safe environment for drivers and passengers. The system is programmed using a Windows™ based system that allows interlocking between any inputs and outputs. The system has 160 timers for delays (on or off) or flashers sequences to be programmed if needed in the operation.

ELECTRONIC SWITCH PANEL CONTROL

A switch panel is located within easy access of the driver to control all the functions necessary to operate the bus except the OEM chassis functions. Any electrical devices requiring a switch will be provided as needed.

MISCELLANEOUS

EXTERIOR FINISH

The standard exterior finish is a bright white gelcoat to match the OEM chassis white. Optional paint packages are painted with a Dupont paint.

WARRANTY

The finished product has a general warranty of 12 months/12,000 miles and a structural body warranty of 5 year/75,000 miles.

Prepared for:
Sam Craig
Supreme
2592 E Kercher RD
Goshen , IN 46528
Phone: 877.258.1391

Freightliner Custom Chassis Corporation

Prepared by:
Ivan Roberts
Freightliner Custom Chassis
522 HYATT STREET
GAFFNEY, SC 29341
Phone: (864) 206-8616

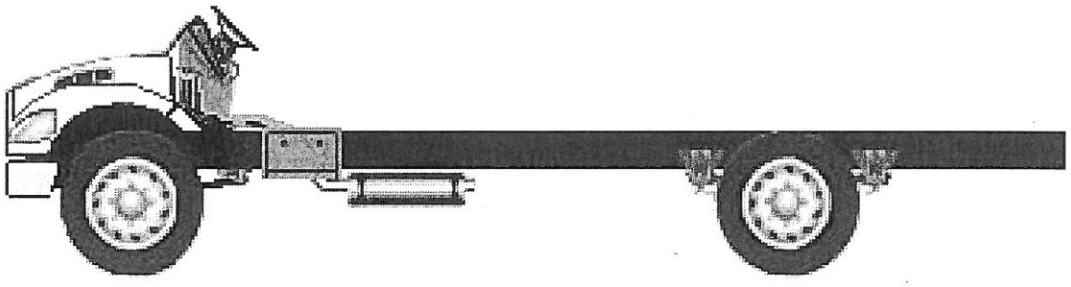
A proposal for
Supreme

Prepared by
Freightliner Custom Chassis
Ivan Roberts

Jun 06, 2012

Freightliner Custom Chassis Corp S2C

Supreme Std 279" 26,000 GVWR



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

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

Data Code	Description	Weight Front	Weight Rear	Retail Price
Price Level				
PRL-8E5	FCCC SHUTTLE BUS 2013 DATABOOK (EFF: 03/05/12)			STD
Data Version				
DRL-006	SPECPRO21 DATA RELEASE VER 006			STD
Vehicle Configuration				
001-342	S2C 106 CONVENTIONAL CAB AND CHASSIS	5,300	3,500	
002-004	SET BACK AXLE - TRUCK			STD
003-001	LH PRIMARY STEERING LOCATION			STD
AF3-037	SUPREME CORP.			N/C
99C-010	2010 EPA/CARB EMISSION CERTIFICATION			STD
General Service				
AA1-006	COWL CHASSIS CONFIG COMPLIES WITH SBMTC			STD
AA6-001	DOMICILED, USA 50 STATES (INCLUDING CALIFORNIA AND CARB OPT-IN STATES)			STD
A85-032	SHUTTLE BUS-LIGHT DUTY			STD
A84-1BU	BUS TRANSPORTATION BUSINESS SEGMENT			STD
AA4-014	PASSENGERS COMMODITY			STD
AA5-002	TERRAIN/DUTY: 100% (ALL) OF THE TIME, IN TRANSIT, IS SPENT ON PAVED ROADS			STD
AB1-008	MAXIMUM 8% EXPECTED GRADE			STD
AB5-001	SMOOTH CONCRETE OR ASPHALT PAVEMENT - MOST SEVERE IN-TRANSIT (BETWEEN SITES) ROAD SURFACE			STD
995-011	FREIGHTLINER CUSTOM CHASSIS CORPORATION BASIC CHASSIS WARRANTY			STD
A66-99D	EXPECTED FRONT AXLE(S) LOAD : 9000.0 lbs			
A68-99D	EXPECTED REAR DRIVE AXLE(S) LOAD : 17500.0 lbs			

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	Data Code	Description	Weight Front	Weight Rear	Retail Price
	A63-99D	EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 25000.0 lbs			
	ADJ-99D	GROSS VEHICLE WEIGHT ADJUSTMENT +/- : - 1500.0 lbs			
Truck Service					
	AA3-045	CHARTER/SHUTTLE/TRANSIT BUS/MOTOR COACH			STD
Engine					
	101-2GD	CUM ISB 6.7-240 240 HP @ 2300 RPM, 2600 GOV, 560 LB/FT @ 1600 RPM			
Electronic Parameters					
	79A-075	75 MPH ROAD SPEED LIMIT			N/C
	79B-004	CRUISE CONTROL SPEED LIMIT 1 MPH LOWER THAN ROAD SPEED LIMIT			N/C
	79G-998	NO IDLE SHUTDOWN CONFIGURATION			STD
	79K-017	PTO MODE ENGINE RPM LIMIT - 2300 RPM			STD
	79W-998	REMOTE PTO DISABLED			STD
	79X-998	NO REMOTE PTO SPEED 1 SETTING			STD
Engine Equipment					
	99D-009	2008 CARB EMISSION CERTIFICATION - CLEAN IDLE (INCLUDES 6X4 INCH LABEL ON LEFT SIDE OF HOOD)			STD
	266-1AH	750 SQUARE INCH DOWNFLOW RADIATOR MOUNTED IN FRONT			STD
	105-001	ENGINE MOUNTED OIL CHECK AND FILL			STD
	111-001	STANDARD ENGINE OIL			STD
	190-001	DONALDSON 1-STAGE AIR CLEANER			STD
	188-050	AIR INTAKE THROUGH LH SIDE OF HOOD			STD
	192-004	AIR CLEANER MOUNTED ON FIREWALL			STD
	124-1B6	LN 12V 270 AMP 4944PA PAD MOUNT ALTERNATOR WITH AC TAPS			
	292-1E3	(2) ALLIANCE GROUP 8D 8G8D 12V BATTS, 2300 CCA, WITH TAPERED POSTS			
	290-017	BATTERY BOX FRAME MOUNTED			STD
	282-045	SGL BATT BOX FRAME MTD LH SIDE UNDER CAB 62" (1575MM) AFT OF STD			STD
	291-001	FRAME GROUND RETURN FOR BATTERY CABLES			STD
	289-006	PLASTIC BATTERY BOX COVER			STD
	152-040	ELECTRONIC ENGINE INTEGRAL WARNING AND DERATE PROTECTION SYSTEM			STD

Prepared for:
Sam Craig
Supreme
2592 E Kercher RD
Goshen , IN 46528
Phone: 877.258.1391

Freightliner Custom Chassis Corporation

Prepared by:
Ivan Roberts
Freightliner Custom Chassis
522 HYATT STREET
GAFFNEY, SC 29341
Phone: (864) 206-8616

Data Code	Description	Weight Front	Weight Rear	Retail Price
128-076	CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH			
28F-002	ENGINE AFTERTREATMENT DEVICE, AUTOMATIC OVER THE ROAD REGENERATION AND DASH MOUNTED REGENERATION REQUEST SWITCH			STD
235-076	RH IB FRAME MTD HZ ATD			STD
23C-001	HORIZONTAL SCR CATALYST			STD
23D-001	RH IB FRAME MTD HZ SCR CATALYST			STD
35W-001	EXHAUST MITIGATION DEVICE FTL 4" ID SLIP-FIT			STD
237-072	HORIZONTAL TAILPIPE, EXITING LH REAR OF CHASSIS			STD
23U-010	10 GALLON DEF TANK RH FRAME MTD			N/C
273-037	WARNER ELECTRIC ELECTRO-MAGNETIC ON/OFF FAN CLUTCH			STD
110-003	CUMMINS SPIN ON FUEL FILTER			STD
118-001	FULL FLOW OIL FILTER			STD
103-036	ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-CHARGED SCA HEAVY DUTY COOLANT			STD
171-003	RUBBER COOLANT HOSES			STD
172-016	CONSTANT TORQUE BREEZE CLAMPS ON 1" IN DIA AND GREATER, SS CLAMPS LESS THAN 1"			STD
168-002	LOWER RADIATOR GUARD			STD
138-010	PHILLIPS-TEMRO 750 WATT/115 VOLT BLOCK HEATER			
140-010	CHROME ENGINE HEATER RECEPTACLE TEMPORARILY MOUNTED TO ENGINE			N/C
155-023	NIPPON-DENSO 12V STARTER WITH COPPER CONTACTS			STD
Transmission				
342-1MH	ALLISON 2200 PTS AUTOMATIC TRANSMISSION WITH PARK PAWL WITHOUT PTO PROVISION			
Transmission Equipment				
353-045	VEH INTERFACE WIRING W/ACC,IGN,PNL LMP,MRKR LMP SUPPLIES&NEUTRAL/PARK SIGNAL			STD
345-036	T-HANDLE CABLE SHIFT CONTROL WITH PARK POSITION FOR INTERNAL PARK PAWL			STD
370-015	WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK			STD
346-001	TRANSMISSION OIL CHECK AND FILL			STD

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Data Code	Description	Weight Front	Weight Rear	Retail Price
35T-001	SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)			STD
Front Axle and Equipment				
400-1A5	AF-10.0-3 10,000# FF1 71.5 KPI/3.74 DROP SINGLE FRONT AXLE			
402-054	BOSCH HYDRAULIC PIN-SLIDE DISC FRONT BRAKES			STD
419-004	FRONT DISC BRAKE ROTORS			STD
409-002	SKF SCOTSEAL CLASSIC FRONT OIL SEALS			N/C
40T-001	ORGANIC SAE 80/90 FRONT AXLE LUBE			STD
536-050	TRW THP-60 POWER STEERING			N/C
539-003	POWER STEERING PUMP			STD
534-015	2 QUART SEE THROUGH POWER STEERING RESERVOIR			STD
Front Suspension				
620-062	10,000# TAPERLEAF FRONT SUSPENSION			
410-017	SACHS FRONT SHOCK ABSORBERS			STD
Rear Axle and Equipment				
420-1C4	DA-RS-17.5-2 17,500# L-SERIES SINGLE REAR AXLE			
421-430	4.30 REAR AXLE RATIO			N/C
386-055	SPL100 DANA SPICER MAIN DRIVELINE WITH HALF ROUND YOKES			STD
41T-001	ORGANIC SAE 80/90 REAR AXLE LUBE			STD
393-001	DRIVELINE GUARD			STD
423-054	BOSCH HYDRAULIC PIN-SLIDE DISC REAR BRAKES			STD
451-028	REAR DISC BRAKE ROTORS W/SEPARATE TONE RINGS			
440-001	SKF SCOTSEAL CLASSIC REAR OIL SEALS			STD
435-002	REAR AXLE MOUNTED DRUM PARK BRAKE			STD
Rear Suspension				
622-1DT	19,000# FLAT LEAF SPRING 52 INCH LONG REAR SUSPENSION WITHOUT HELPER, WITH RADIUS LEAF			
630-001	REAR SWAYBAR			STD
439-017	SACHS REAR SHOCK ABSORBERS			STD
Brake System				
018-001	BOSCH HYDRAULIC BRAKE PACKAGE			STD

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522 HYATT STREET
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Data Code	Description	Weight Front	Weight Rear	Retail Price
490-032	WABCO HYDRAULIC 4S/4M WITHOUT TRACTION CONTROL			STD
Wheelbase & Frame				
545-707	7075MM (279 INCH) WHEELBASE			N/C
546-080	5/16X3.00X10-1/8 INCH STEEL FRAME (7.94MMX257.2MM/0.312X10.13 INCH) 80KSI			
552-141	3675MM (145 INCH) REAR FRAME OVERHANG			N/C
Chassis Equipment				
556-1AR	THREE-PIECE 14 INCH CHROMED STEEL BUMPER WITH COLLAPSIBLE ENDS			
558-001	FRONT TOW HOOKS - FRAME MOUNTED			STD
574-001	BUMPER MOUNTING FOR SINGLE LICENSE PLATE			STD
Fuel Tanks				
230-001	60 GALLON/227 LITER RECTANGULAR STEEL FUEL TANK - BETWEEN RAILS			STD
206-998	NO RH FUEL TANK			N/C
5A3-003	PETROLEUM DIESEL FUEL			STD
231-006	FUEL TANK WITH PROTECTIVE CAGE MOUNTED BETWEEN RAILS AFT OF REAR AXLE			N/C
664-001	PLAIN STEP FINISH			STD
205-010	RH SIDEFILL FUEL TANK CAP			STD
122-080	ALLIANCE FUEL FILTER/WATER SEPARATOR WITH PRIMER PUMP AND INDICATOR LIGHT			STD
Tires				
093-0BN	MICHELIN XZE 255/70R22.5 16 PLY RADIAL FRONT TIRES			
094-0BN	MICHELIN XZE 255/70R22.5 16 PLY RADIAL REAR TIRES			
Hubs				
418-001	GUNITE IRON FRONT HUBS			STD
Wheels				
502-431	ACCURIDE 29001 22.5X7.50 10-HUB PILOT 5-HAND STEEL DISC FRONT WHEELS			
505-431	ACCURIDE 29001 22.5X7.50 10-HUB PILOT 5-HAND STEEL DISC REAR WHEELS			
Cab Exterior				
829-071	106" BBC FLAT ROOF ALUMINUM CONVENTIONAL CAB			STD
651-004	LH CAB DOOR(S) WITH 70 DEGREE DOOR STOP			STD

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Data Code	Description	Weight Front	Weight Rear	Retail Price
653-997	OMIT STANDARD RH DOOR ASSEMBLY			STD
655-025	LH CAB DOOR LATCHES WITH MANUAL DOOR LOCKS, NO RH DOOR LOCK			STD
682-085	OPENING IN BACK OF CAB W/TEMPORARY STRUCTURE			STD
650-009	RUBBER CAB MOUNTS			STD
644-053	FIBERGLASS HOOD WITH SOFT CLOSE MECHANISM			STD
690-010	ENGINE COMPARTMENT PREMIUM NOISE ABATEMENT AND INSULATION			
646-023	HOOD MOUNTED CHROMED PLASTIC GRILLE			
65X-003	CHROMED HOOD MOUNTED AIR INTAKE GRILLE			
726-002	DUAL ELECTRIC HORNS			STD
657-001	DOOR LOCKS AND IGNITION SWITCH KEYED THE SAME			STD
312-038	INTEGRAL HEADLIGHT/MARKER ASSEMBLY WITH CHROME BEZEL			N/C
311-015	DAYTIME RUNNING LIGHTS ON FRONT TURN LAMPS WITH ENGINE RUNNING			STD
294-027	WIRING ONLY WITH SEPARATE STOP AND TURN LIGHT CIRCUITS TO END OF FRAME FOR CUSTOMER FURNISHED LAMPS			STD
300-015	STANDARD FRONT TURN SIGNAL LAMPS			STD
729-001	STANDARD SIDE/REAR REFLECTORS			STD
677-058	DUAL LEVEL ENTRY STEPS LH ONLY			STD
768-997	OMIT REAR WINDOW(S)			STD
661-020	TINTED DOOR GLASS LH WITH TINTED LH NON-OPERATING WING WINDOWS, NO RH WINDOW			STD
654-024	LH MANUAL WINDOW REGULATOR, NO RH REGULATOR			STD
663-019	1-PIECE TINTED ROPED-IN WINDSHIELD			STD
659-003	1 GALLON WINDSHIELD WASHER RESERVOIR			STD
Cab Interior				
707-1AK	OPAL GRAY VINYL INTERIOR			STD
772-006	BLACK MATS WITH SINGLE INSULATION			STD
785-004	DASH MOUNTED ASH TRAY(S) WITHOUT LIGHTER			STD
691-997	OMIT STANDARD FORWARD OVERHEAD CONSOLE			STD
694-010	IN DASH STORAGE BIN			STD
742-007	(2) CUP HOLDERS LH AND RH DASH			STD

Prepared for:
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Supreme
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522 HYATT STREET
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Data Code	Description	Weight Front	Weight Rear	Retail Price
680-006	GRAY/CHARCOAL FLAT DASH			STD
700-002	HEATER, DEFROSTER AND AIR CONDITIONER			STD
703-005	MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH			STD
170-041	ADDITIONAL AUXILIARY LINES WITH MANIFOLD PLUMBING AND COMBINED SHUTOFF TO DASH AND AUXILIARY HEATER			STD
130-027	DUAL SELTEC #TM-21 REFRIGERANT COMPRESSORS			
702-013	BODY BUILDER SUPPLIED PLUMBING FOR AIR CONDITIONER CONDENSER			N/C
739-033	STANDARD INSULATION			STD
285-020	SOLID-STATE CIRCUIT PROTECTION, PDMS W/FUSES & BRKRS, PDC W/FUSES & BRKR			STD
324-014	DOME LIGHT WITH 3-WAY SWITCH ACTIVATED BY LH AND RH DOORS			STD
32H-013	STEPWELL LAMP ON WITH DOOR(S) OPEN			STD
284-023	(1) 12 VOLT POWER SUPPLY IN DASH			
756-1CV	HB NON SUSPENSION DRIVER SEAT W/FORE AND AFT ADJUSTMENT			STD
760-997	OMIT STANDARD FRONT PASSENGER SEAT			STD
711-006	LH INTEGRAL DOOR PANEL ARMREST, NO RH ARMREST			N/C
758-036	VINYL W/VINYL INSERT DRIVER SEAT			STD
763-031	3 POINT FIXED D-RING RETRACTOR DRIVER SEAT BELT; NO PASSENGER BELT			STD
706-013	MOLDED PLASTIC DOOR PANEL			STD
532-002	ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN			
540-015	4-SPOKE 18 INCH (450MM) STEERING WHEEL			STD
765-002	DRIVER AND PASSENGER INTERIOR SUN VISORS			STD
Instruments & Controls				
732-004	GRAY DRIVER INSTRUMENT PANEL			STD
734-004	GRAY CENTER INSTRUMENT PANEL			STD
870-001	BLACK GAUGE BEZELS			STD
811-011	ODOMETER/TRIP/HOUR/DIAGNOSTIC/VOLTAGE DISPLAY: 1X7 CHARACTER, 26 WARNING LAMPS, DATA LINKED, ICU3			STD
810-027	ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE, WITHOUT ODOMETER			STD
812-001	ELECTRONIC 3000 RPM TACHOMETER			STD

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Data Code	Description	Weight Front	Weight Rear	Retail Price
852-002	ELECTRIC ENGINE OIL PRESSURE GAUGE			STD
856-001	ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE			STD
836-015	DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY			STD
844-001	2 INCH ELECTRIC FUEL GAUGE			STD
864-005	TRANSMISSION OIL TEMPERATURE INDICATOR LIGHT			STD
830-017	ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY			STD
198-002	INTAKE MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS			STD
149-013	ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL			STD
160-025	DIAGNOSTIC INTERFACE CONNECTOR, 9 PIN, SAE J1939, LOCATED BELOW DASH			STD
148-003	PROGRAMMABLE RPM CONTROL - ELECTRONIC ENGINE			STD
162-002	IGNITION SWITCH CONTROLLED ENGINE STOP			STD
660-008	SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY			STD
304-001	MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH			STD
882-027	FOOT PEDAL OPERATED PARK BRAKE AND WARNING INDICATOR FOR HYDRAULIC BRAKE			STD
299-013	SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE			STD
298-039	INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS			STD
Design				
065-000	PAINT: ONE SOLID COLOR			STD
Color				
980-3F7	CAB COLOR A: N0007EA WHITE ELITE SS			N/C
98A-998	NO GRILLE PAINT			N/C
986-019	CHASSIS PAINT: VENDOR BLACK			STD
962-970	VENDOR WHITE FRONT WHEELS/RIMS			N/C
966-970	VENDOR WHITE REAR WHEELS/RIMS			N/C
Certification / Compliance				
996-001	U.S. FMVSS CERTIFICATION			STD

SUPREME

SENATOR HD SERIES

FORD

INCREDIBLY DURABLE SUPREME SENATOR HD

QUALITY CONSTRUCTION REIGNS SUPREME.

Long-lasting durability comes easy for the **Senator HD** by Supreme. That's because it's one of the few buses that uses a combination of steel cage construction for optimum safety and overall structural strength and a tough fiberglass skin to resist stains, scratches and corrosion. Plus, fiberglass-reinforced panel (FRP) sidewalls eliminate exterior noise and are extremely strong and rugged to withstand difficult road conditions.

TRAVEL TESTED.

All of our products undergo a series of rugged testing procedures in Altoona, Pennsylvania, to assure their structural integrity. And we back our buses with a five year / 75,000 mile body structure warranty.

PASSENGER COMFORTS.

Supreme doesn't take a back seat when it comes to passenger convenience and comfort. Wide aisles and doors for easy accessibility, cushy upholstery, spacious luggage racks and large, scenic windows are just some of the benefits of riding with the **Senator HD**. We also stand ready to meet your exacting requirements, including special design configurations, to deliver exactly what you need, when you need it.

REVOLUTIONARY SUPREME "STARLINER™" HD

ABOVE: **Optional seats, fabrics and flooring to meet all customer's requests**

LEFT: **Starliner HD standard rear cap with moulded-in rear bumper and exterior LED lights.**

GREAT LOOKS — COMFORT — RIDE

The **Starliner HD** was designed with an aggressive aerodynamic styling, combined with an approach to weight and height reduction. New and innovative materials and manufacturing processes including new methods of fastening body panels to conceal all mechanical fasteners on the exterior of the vehicle have been incorporated to provide long-lasting durability. Starliner is built on a flat floor platform, providing an even surface for all passengers - no wheel wells.

Our innovative multiplex electrical system has been specifically designed for this vehicle. All components are "plug-N-play".

Supreme's new **Starliner HD** has a 3 year 36,000 mile warranty. This upgraded warranty clearly solidifies our goal to be the finest vehicle manufacturer in our industry.

STARLINER COMFORT & CONVENIENCE.

Supreme **Starliner HD** offers the customer all the convenience and comforts of a medium coach — large passenger tour windows, a wide range of custom seats and fabrics, wide 32" and 37" entry doors, Starliner custom skirts and rear cap design, custom luggage compartments, standard LED lighting... and the options go on. This bus was built to fit your bus fleet and give your customers exactly what they want.

SENATOR HD SERIES FEATURES

FLOORING – 3/4" FRP, undercoated. Floor covered with black 1/8" transit rubber with ribbed aisle. Aluminum heat shield over chassis catalytic converter and muffler.

SIDEWALLS – 3/4" polyurethane foam insulation (R-6) gelcoated to 1/4" FRP exterior with 1/4" FRP interior. Reinforced with steel perimeter and transverse supports. Completely fiberglassed to adjoining body parts to form a single unitized body.

ROOF – One-piece FRP/Nidacore laminate roof with steel cage reinforcement.

WINDOWS – 36" x 36" T-slider, 31% tinted. Clamp ring-style radius windows. Egress windows installed to meet FMVSS 217 requirements. Operator's curbside windows AS-2 rated: 369.5 square inches visibility.

ENTRY – Spacious entrance (32" x 91" clear opening) with doors that operate electric. Door panels have full height glass panels for the best possible driver's visibility. White step nosing and lighted stepwell standard. Entrance grab rail (left side).

LIGHTING – Each bus comes standard with a minimum of ten passenger courtesy lights.

ELECTRICAL – Multiplexing std

OPTIONAL A/C & HEAT – A/C systems 65,000 BTU to 125,000 BTU dual compressor systems. Rear floor heaters 45,000 BTU to 65,000 BTU each.

OPTIONAL PARATRANSIT – Wheelchair accessibility with a wide range of securement systems, wheel chair lifts and seating arrangements.

OPTIONAL LUGGAGE – Luggage can be stored in over-seat, floor-to-ceiling, rear compartments or custom-designed areas.

OPTIONAL SEATING – Forward-facing, perimeter-style and track seating are all available. Your choice of vinyl and cloth fabric in a wide range of colors.

- Bright white gelcoated body with choice of three standard striping packages.
- Black exterior mirrors – OEM Ford mirrors standard – heated & remote
- Heavy-duty 10-gauge wraparound bumper with anti-ride cover.
- Mud flaps (front and rear).
- 12-month/12,000 mile with five-year/ 75,000-mile warranty on body structure *(Senator HD)*.
- 36-month/36,000 mile with five-year/ 75,000-mile warranty on body structure *(Starliner HD)*.

Due to Supreme Corporation's commitment to product quality, specifications and options are subject to change in the interest of product improvement and market changes.

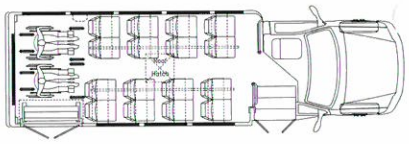
Floorplans shown are only a few of the designs available.

FORD SPECIFICATIONS

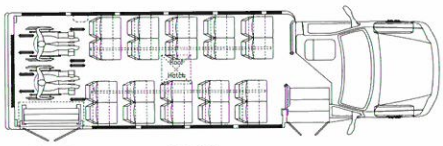
Chassis	F-450	F-550
Tinted glass	Std	Std
Automatic Transmission		
5 Speed / Gas F450 & F550	Std	Std
6 Speed / Diesel F450 & F550	Std	Std
4:10 rear axle ratio Dsl	Std	N/A
4:88 rear axle ratio Gas	Std	Std (limited slip) gas & dsl
Power Steering	Std	Std
Power Windows	Std	Std
Power Locks	Std	Std
AM / FM CD player	Std	Std
Power Brakes (4 wheel disc)	Std	Std
Dash A/C Heat	Std	Std
Auxiliary transmission cooler	Std	Std
Tilt Steering & Cruise control	Std	Std
6.8 Gas Engine V-10	Std	Std
6.7 Diesel Engine	Std	Std
40 Gal Fuel tank	Std	Std
Radial Tires LT225/70 R19.5 G	Std	Std
Chrome Front Bumper	Std	Std
Engine Block Heater	Std	Std
HD Springs and shocks	Std	Std
Engine Oil Cooler	Std	Std
Engine Gauges	Std	Std
Single 155 amp alternator (Gas)	Std	Std
Dual 155 & 200 total 355 amp (Diesel)	Std	Std
750 CCA Dual batteries	Std	Std
Wheelbase	189"	201"
GVWR 16,500#	Std	N/A
GVWR 19,500#	N/A	Std

Dimensions

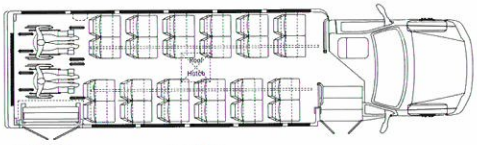
- Exterior width: 96"
- Exterior height: 121"
- First step to ground: 11½" + or - 1"
- Step heights: 8"
- Step tread depth: 9.5" max.
- Entry Door Opening (std offering): 32" x 91"
- Interior width at seat level: 92½"
- Interior width 36" above floor: 93⅜"
- Flat floor center aisle height: 75"
- Double wheelchair doors: 46" x 70.5"



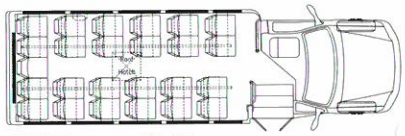
28'/16 Passenger and 2 W/C



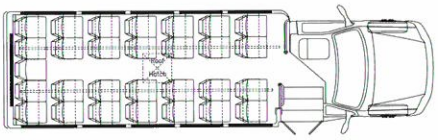
30'/20 Passenger and 2 W/C



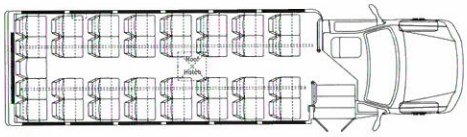
33'/24 Passenger and 2 W/C



28'/25 Passenger Shuttler



30'/29 Passenger Shuttler



33'/33 Passenger Shuttler

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2592 East Kercher Road • Goshen, IN 46528
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SENATOR F550 HD STANDARD BUILD SPECS 2011

STEEL FLOOR

The steel sub frame parts are welded together in a welding fixture. It is constructed from the following material.

12-gauge roll formed, black/gray cross members with an anti-rust coating on the inside of the formed part welded to two 3/16" steel long sills which are 4 1/2" wide x 1 1/8" high. These cross members are a modified "C" shape 1 ½" wide x 3" high.

14-gauge steel floor support tubes 1 ½" x ¾" are welded between the cross members to form a grid that ties the steel sub frame together.

12-gauge high tensile steel floor side rails attach the sidewalls to the steel floor structure.

12-gauge seat track 1 5/8" wide x 7/8" high are welded every 6" to a 14-gauge steel strip that is 3 ½" wide and welded to the cross members.

A 10 gauge wheel chair lift support (paratransit model) is welded to the cross members under the wheel chair lift area. The support is designed as a secure point for the lift so it becomes an integral part of the steel sub frame.

Rear wheel wells are constructed of 12-gauge steel and designed with flanges that are welded under the lip of the cross members to create a watertight seal and fastened at the wall side.

The steel sub frame is painted after sub assembly to provide protection from rust and corrosion.

UNISTRUT CHANNEL SEAT TRACK

All seating is secured in a 1 5/8" wide Unistrut channel seat track. A 3 ½" wide 14-gauge steel plate is welded to the steel sub frame. The Unistrut channel is then welded to this plate.

FLAT FLOOR WILL BE STANDARD NO THIS PRODUCT

FLOOR DECK

The finished sub floor is ¾" thick Fiberglass Reinforced Plywood (FRP). This material is described as follows: The inner core of the FRP panel is made of Northern Fir Lauch B/C plywood that has been plugged and filled. The maximum number of filler plugs per 4' x 8' sheet to be no more that twenty (20).. This material is sandwiched between a17 oz woven rope fiberglass mat that is impregnated with fiberglass resin, the face side of the material to have 20 mil. Gel coat with the back side covered with co-extruded melinex film.

The FRP panels are then installed on the top of the steel sub frame with grade five (5) floor bolts. Construction adhesive is utilized as well along the top of all floor members that intersect the floor decking material as an additional securement method. A minimum of six (6) bolts per crossmember is standard.

OPTIONAL W/C FLANGED L TRACK

L track is mounted in 9 ¾" pieces and bolted through the floor with 5/16"grade 8 torx bolts. End caps are installed at each end for a finished look.

SENATOR F550 HD STANDARD BUILD SPECS 2011

SIDEWALLS

The sidewall structure consists of a steel cage and fiberglass laminated together to form a one piece seamless wall. It is constructed in the following manner.

¾" x ¾" 16-gauge top (11-gauge bottom) and 1 ½" x ¾" 14-gauge steel tubing is designed to create a steel grid work that is a part of the total steel structure which then surrounds the passenger compartment. All models have one additional 1 ½" x ¾" horizontal support located 1" above and below the window line for the wheel chair shoulder harness support and added structural support along with two additional 1 ½" x ¾" vertical steel wall bows located at the wheel chair door location. A ¾" x ¾" 16-gauge steel tube framework is included around the rear wheel well area again for additional support.

The exterior is a gelcoated surface at a 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 90 to 100 mil. The fiberglass content of this layer will be 30 - 32 %.

A layer of 2.7mm Luan is then applied.

A second layer of resin and fiberglass is applied.

At the top and bottom of the window line and at track seating location a glass mat is laid in the wet resin. This gives additional strength at key stress points.

The steel cage is then laid in the wet resin and a ¾" (2.2 lb. density) polyisocyanurate foam is added between the steel cage supports and rolled down flush.

A final layer of resin and fiberglass is then sprayed on top.

While the final coat is still wet the interior surface is applied as a sub assembly consisting of an interior gelcoat with a layer of resin and woven fiberglass mat (10 oz.).

The entire assembly is placed in a vacuum press until it is cured.

ROOF

The roof structure consists of a steel cage and fiberglass laminated together to form a one piece seamless roof. It is constructed in the following manner.

¾" x ¾" 16-gauge and ¾" x 1 ½" 14-gauge steel tubing creates a steel grid work which along with the sidewall cage completes the steel that surrounds the passenger compartment.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 40 to 45 mils. The fiberglass content of this layer will be 30 - 32 %.

A second layer is then applied.

The steel cage is then laid in the wet resin and a ¾" scored Nida-Core is added between the steel cage supports and rolled down flush.

A final layer of resin and fiberglass is then sprayed on top.

The entire assembly is placed in a vacuum press until it is cured.

For all roof assemblies that receive a roof hatch, ¼" steel 4" x 4" corner gussets are added to each corner of the opening for additional support.

FRONT & REAR CAPS

The front & rear fiberglass caps are of one piece design and constructed in the following manner.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

Reinforcements are then installed and glassed in.

WINDOWS

Driver's Window (meets FMVSS 205 & 217)

At the driver's position, one window is provided by the OEM. This window rolls down manually.

Curbside Transition Window (meets FMVSS 205 & 217)

The curbside transition window is located in front of the entry door. The window's size is 40" high x 13 ½" at widest point (12" at the bottom). The top 1/3 is angled to fit the contour of the cab. The total square inches of viewing area is 425. It has a tempered safety glass rating of AS-2 with a 31% tint.

Passenger Side Windows – Non-Egress (meets FMVSS 205 & 217)

The number of windows depends on the model of the bus. The window's size is 36" high x 36" wide. It is a "T-slider" ventilation type which is designed for the top 7" to open by sliding towards the rear.. The window is maintained in the closed position by mechanical latches. The total square inches of viewing area is 1296. It has a tempered safety glass rating of AS-3 with a 31% tint.

Passenger Side Windows – Egress (meets FMVSS 205 & 217)

The number of windows will depend on the model of the bus. They are identical to the non-egress in construction, but are designed to be opened in an emergency situation by releasing two clearly marked red release latches located on each side of the window. There will be operating instructions located at and on each egress window.

Rear Egress Window (meets FMVSS 205 & 217)

There is one rear egress window. The window is designed to be opened in an emergency situation by releasing two clearly marked red release latches located on each side of the window. There will be operating instructions located at and on each egress window. The window's size is 22" high x 58" wide. The total square inches of viewing area is 1,276. It has a tempered safety glass rating of AS-3 and 31% tint.

Window Seals

The windows are sealed between the body and window frame with ½" ribbed rectangle closed cell rubber seal.

ASSEMBLY

The bus body is assembled in the following manner.

The entry door steel portal frame is welded and bolted to the chassis so this assembly becomes an integral part of the OEM chassis.

The steel floor sub frame assembly is then mounted on the OEM chassis utilizing by bolting to the OEM frame with 12mm x 1.75 class 9.8 bolts and nuts supplied by the chassis manufacturer utilizing the OEM rubber mount suspension system. This allows the body to be mounted the

same as the OEM cab which reduces any stress where the two are connected and helps isolate road vibrations from the body.

The floor deck is next. A closed-cell rubber seal is applied to the edge of the plywood floors, so when the sidewall is set this seal will close any gap between the floor and sidewall, creating a weather proof passenger compartment.

The front fiberglass cap is secured to the OEM chassis utilizing mechanical fasteners and a butyl rubber seal between the chassis and the flange on the front cap to create a weather proof seal.

The side walls are then installed, securing them to the steel sub frame and portal frame with mechanical fasteners.

The interior rear wall follows and is attached to the rear cross member and the sidewalls, utilizing mechanical fasteners.

The roof is then installed and attached to the front cap, sidewalls and rear interior wall, utilizing mechanical fasteners in conjunction with steel reinforcing attachment strips.

The entry door frame and steps are installed and attached to the portal frame utilizing mechanical fasteners and butyl rubber seal. The double-out doors are then installed to complete the main body structure.

After the body is assembled a liquid sealer is applied to the seams at the floor line and interior rear wall. This sealing is in addition to sealing the interior after the final trim pieces are applied.

This completes the steel/fiberglass composite combination body structure, having a minimum of body seams, no exposed fasteners, resistant to impact, "body shock" (OEM rubber mounting system), oxidation finish, and non-corrosive.

The remaining components are not an integral part of the body structure, but are designed for weather protection and/or cosmetic components. The rear cap is then set over the rear interior wall and along with the fiberglass side skirts, fender flares, transition pieces and the bumper anti ride, installed with mechanical fasteners and sealed with a butyl rubber seal (interior) or an automotive caulk (exterior). In addition, the skirts and fender flares are fastened to the horizontal steel tubes in the sidewalls and the anti ride into the steel sub frame.

After all the above components are installed, an aluminum trim, secured by mechanical fasteners, is placed over the body seams. This trim is covered with a vinyl insert and sealed with an automotive caulk to assure the body is completely weather proof.

DOORS

DRIVER'S DOOR

The driver's door is OEM and has a keyed lock and manual window.

PASSENGER ENTRY DOOR

Entry Door Portal Frame

The entry door portal frame is a 1 ½" x 1 ½" 14-gauge tubular frame that is welded at the bus sub frame and the chassis cab floor. It is fastened with mechanical fasteners at the curbside "A" pillar. The purpose of this frame is to support the entry doorframe.

Entry Door Step Well Frame

The step well frame consists of 14-gauge galvaneal steel formed to create a perimeter frame, step well, and the finished opening for the double-out entry doors. The step well is a 3-step entry on a standard floor, 4-step on a flat floor model. This frame is powder coated white.

Double-Out Entry Doors

The standard entry door is a electrically operated double door design with a clear opening of 32" wide x 91" high. Actuator built on rugged 11 gauge steel base plate and powder coated for superior corrosion protection. Precision machined gear set for smooth operation. Proprietary 12 VDC drive motor. All bearing surfaces fitted with oil-impregnated bronze bushings. The interconnect push-pull rods are turnbuckle-style for ease of adjusting although almost never needed after proper installation. The motor control PC board is made using solid state, micro chip technology for long in-service potential. Motor control PC board uses current sensing to turn off motor when the door reaches the closed position; the use of a closed limit switch is not used. Additionally, the system will also shut down in the event of an object inhibiting the doors from opening thus eliminating undue motor wear. The motor control PC board has an adjustment for changing the set point limit to accommodate different load requirements depending on installation requirements. The auto-reverse model "feels" an object in the pathway of the door during closing and will automatically re-open the doors preventing damage and injury. System is low maintenance once installed and properly adjusted giving hundreds of thousands of cycle potential. Key components are easily accessible for ease of maintenance. A&M Systems, Inc offers web-based service aids and information for access to the latest service information and parts available.

A&M Systems, Inc. Aluma-Clear™ Door Specifications:

Full clear span, full view glass

Glass panel is 1/8", AS-2 green tint;

Fully black anodized 6063-T6 aluminum extruded door frame

Extrusion has a minimum wall thickness of .090"

All frame assembly joints use Key-Lok™ design for added joint rigidity

All attaching hardware is zinc plated or stainless steel for corrosion control

Lower pivot point is glass-filled injection molded design

Upper Torque Arm drive is zinc plated and easily replaced if required

Both door panels are identical and can be used in either forward or aft position

Door panels are light weight, typically less than 30 lbs. each

WHEEL CHAIR DOORS (paratransit model)

The double-out wheel chair door is constructed in the following manner.

The door leaf consists of an interior frame assembled from 1 3/8" x ¾" substrate with a 1.85 lb density foam sandwiched between an inner and outer skin of .040 smooth aluminum. These items are laminated together to form a one-piece solid door.

The front leaf utilizes a 3-point dead bolt latch system, while the rear leaf is a 2-point.

Each leaf has an upper 36" high x 14 ½" wide window. It has a total square inch viewing area of 522 and a tempered safety glass rating of AS-3 with a 31% tint.

There are 3 rubber seals, a ¼" "D" style, a ½" "D" style, and a ½" ribbed seal, which complete the assembly for a weather tight fit.

The outer perimeter frame is constructed from extruded aluminum and incorporates the hinges that have .120 steel hinge pins. The hinges are then mechanically fastened to the door leaves.

A header plate, installed at the top of the assembly, allows for two, top mounted, steel check-style, zinc plated hold open devices with 30 lb. springs.

The entire assembly is then inserted into the wheel chair door frame. This frame consists of 14-gauge galvaneal steel, powder coated white, and formed to create a perimeter frame and lift platform support; fastened to sidewall using "Lords" 606 adhesive.

EXTERIOR FEATURES

FRONT BUMPER

The chassis manufacturer provides the standard front bumper.

REAR BUMPER

The rear bumper is a wrap-around style constructed of 10-gauge steel. It is powder coated black. The bumper is supported by two formed 1/4" x 6 1/2" x 14 1/2" bumper brackets that are welded to steel "C" channel and bolted to the chassis frame.

EXTERIOR MIRRORS

The chassis manufacturer provides the standard exterior mirror.

MUD FLAPS

There are four mud flaps, two front and two rear. The rear mud flaps are constructed of ¼" black thermoset plastic and are fastened to a steel support that is a part of the steel sub frame. The front mud flaps are provided by the chassis manufacturer.

FUEL FILL

A fiberglass fuel fill is recessed into the body on the driver's side, so the OEM fuel fill pipe and fuel cap, do not protrude beyond the body side.

DRIVE SHAFT GUARDS

A drive shaft guard is installed on each section of the drive shaft. These guards are ¼" steel and 2" wide. They are welded to the chassis steel sub frame.

HEAT SHIELD

A heat shield is installed over the exhaust pipe and muffler. This shield is constructed from .040 aluminum and fastened to the bottom of the sub frame cross members with mechanical fasteners.

SENATOR F550 HD STANDARD BUILD SPECS 2011

UNDERCOATING

The entire underside of the bus is undercoated with a premium haps free petroleum coating except the areas directly above the chassis exhaust pipe, muffler and tailpipe. (12" from exhaust pipe and 2" from fuel tank) The undercoating meets all MIL specs C-62218A.

METAL SKIRTING & FENDER FLARES

The lower skirting is metal, mechanically fastened, and painted to match the bus exterior. The wheel well moldings are extruded black rubber.

FIBERGLASS TRANSITION PIECES & ANTI RIDE

The fiberglass parts are constructed in the following manner.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

INTERIOR FEATURES

REAR WALL FINISH

The interior rear wall is constructed in the following manner, starting with the interior surface and working to the outside.

The interior surface is gelcoated at a thickness of 18 to 22 mil.

A ¾" x 2" substrate frame is stapled and glued to form a grid work to support and outline the perimeter of the rear wall. Between the horizontal and vertical pieces of the substrate grid work, pieces of ¾" 2 lb. density polystyrene foam are installed to create a solid core wall.

An 1/8" sheet of substrate provides the rear layer.

The three layers of the rear wall are then assembled using a hot-melt glue/press-roller process.

Two 10-gauge steel plates (12" x 31") are secured to the rear wall (paratransit model) as tapping plates for the shoulder harness for the rear wheelchair positions.

CAB LINER

The cab liner is a one-piece fiberglass design.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

Prior to installing, Astro-Foil insulation is inserted between the exterior front cap and the cab liner.

The cab liner is then fastened to ¾" thick x 4" wide substrate strips that have been secured to the underside of the exterior front cap.

HEADLINER

The standard headliner is a one-piece laminated panel (Lamilux/Quadrant/SymaLite – long glass fiber-reinforced polypropylene and fiberglass panel).

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

The headliner is then fastened to ¾" thick x 4"(1 x 4) wide substrate that have been secured to the underside of the roof.

HOSE COVERS

The rear hose covers are a one-piece fiberglass design.

The exterior is a gelcoated surface at 18 to 22 mil thickness.

The total thickness of resin and fiberglass will be coated at a thickness of 140 to 150 mils. The fiberglass content of this layer will be 30 - 32 %.

BODY SEAM TRIM

After all the above fiberglass components are installed, an aluminum trim, secured by mechanical fasteners, is placed over the body seams. This trim is covered with a vinyl insert.

FINISHED FLOOR

The standard floor covering is black, 1/8" thick, transit type smooth rubber with 3/16" ribbed rubber in the entry way and the aisle. The entry steps have a white step nosing covering the leading edge of the step riser.

ROTOCAST TRIM PANELS

A rotocast trim panel is installed at the floor to sidewall seam. Note: Flat floor: there are no wheelwells.

The "B" pillar, driver's door header, windshield header, and curbside transition window also utilize a rotocast panel to cover the unfinished areas of the OEM chassis.

ENTRY DOOR TRIM

The areas surrounding the entry door frame are trimmed with padded vinyl which matches the interior color scheme.

STANCHIONS, MODESTY PANELS, & ASSIST HANDRAILS

There are two 1 1/4" OD stainless steel stanchion poles constructed in the following manner.

Behind the driver's seat, a vertical stanchion will run from floor to ceiling connecting with a horizontal stanchion secured to the wall. All fittings and fasteners are stainless steel. The fasteners are a clad type with no exposed threads.

Behind the entry door, a vertical stanchion will run from floor to ceiling connecting with a horizontal stanchion secured to the wall. In addition, a modesty panel is attached to this assembly. All fittings and fasteners will be stainless steel. The fasteners are clad type with no exposed threads. The modesty panel is constructed from a ¾" substrate and covered with a white

laminate finish. It is rectangular in shape and covered with a color-coordinated plastic edge around the entire perimeter.

An entry assist hand rail, constructed from the same materials, is attached to the entry door vertical stanchion for safety and to assist entering and exiting the bus.

INTERIOR MIRROR

A 2 ½" x 9" fully adjustable mirror located @ the top center portion of the windshield shall be supplied by the chassis manufacturer.

WALL TRACK

The Unistrut channel is monobolted every 6" to a 1 ½" x ¾" 14-gauge steel tube that is part of the interior side wall structure.

The seat frames are bolted to the seat channel with two 7/16" grade 8 bolts, threaded into two 1 ¼" x 7/16" hardened channel nuts.

This installation meets FMVSS 207 & 210 requirements.

DRIVER'S SEAT

The chassis manufacturer provides the driver's seat. This seat meets FMVSS207 & 210 regulations.

ELECTRICAL

WIRING

All wiring added by the final stage manufacturer meets one of the following standards.

SAE Specification J1128-SXL high temperature wire (8 to 14-gauge)

SAE Specification J1128-GXL high temperature wire (8 to 14-gauge)

SAE Specification J1128-SGX high temperature wire (Battery cable)

In addition to the above specifications, all wiring is color-coded, number and function designated every 12" to enable identification and circuit trace ability.

INSTALLATION & SECUREMENT

All wiring under the body or hood is protected with a high temperature (minimum 125 degree) nylon convoluted tubing and is secured by one of the following methods.

High temperature heavy gauge wire ties

Vinyl coated P clamps.

In addition to the above requirements, all wiring is routed no closer than ¾" from any sharp edge or a minimum of 4" away from any heat source.

No wiring will be routed through the wheel well unless protected by a metal shield and convoluted tubing.

A minimum of 1 ½" clearance is maintained between any wiring and the engine to compensate for engine roll.

No wiring will be secured to brake or fuel lines.

CONNECTORS

All wiring is connected in the under-body or under-hood areas by weather pack connectors.

Where it is not possible to install a sealable insulated electrical connector in these locations, the insulated connector is protected by heat shrink tubing with a glued seal inside.

The remaining wiring located inside the bus is connected by one of the following connectors.

Standard insulated eyelet.

Standard insulated butt connector.

Standard insulated quick disconnect.

Standard insulated ring connector.

GAUGE OF WIRE

All wiring is sized to carry the electrical load required for length of bus.

LIGHTING

EXTERIOR LIGHTING

The following lights are installed and meet FMVSS 108 requirements. (Lamps, reflective devices and/or associated equipment)

Identification lamps

Three amber rectangular lights centered and recessed in the front cap

Three red rectangular lights centered and recessed in the rear cap

Clearance lamps

Two amber rectangular lights located and recessed at each outer edge of the front cap

Two red rectangular lights located and recessed at each outer edge of the rear cap

Side Marker Lights/Turn signal lamps

Two red rectangular lights located one on each side of the side wall just in front of the rear cap in line with the rear clearance lights

Two amber combination marker/turn signal lights located mid-body one on each side wall

Stop/Tail lamps, Turn signal lamps, and Backup lamps

Three 4" round light assemblies located and recessed in each side of the rear cap

License Plate Light

One chrome plated license plate light recessed in the rear cap on the driver's side

(In addition to the light, there will be space provided for the license plate in the recess.)

The chassis manufacturer supplies the headlights, chassis front turn lights, and the hazard flashers. The chassis system is then tied into the bus system by the final stage manufacturer

SENATOR F550 HD STANDARD BUILD SPECS 2011

INTERIOR LIGHTING

Driver's Courtesy Lights

A driver's courtesy light is installed just above the driver's left shoulder. Opening the driver's door or turning the headlight switch counter-clockwise activates the light.

Step Well Entry Lights

Two step well lights are provided, one on each side of the entry step well. These lights activate when the double-out entry doors are opened.

Overhead Courtesy Lights

Overhead courtesy lights (10-standard on the 26' model and 12-standard on the 30' and 33' models) are installed in the ceiling of the bus to provide lighting for safe passenger movement. Turning on the switch in the driver's console or opening the double-out entry door activates the lighting.

Dash Instrumentation Lighting

Dash instrumentation lighting is provided by the chassis manufacturer and activated by the headlight switch.

DRIVER'S CONTROL PANEL

MASTER DISTRIBUTION PANEL

The electrical center is installed in the front compartment above the driver. The input and output modules receive and control signals and circuitry on the body conversion. These modules are powered by a 2/0 cable that is connected to a standoff terminal in the electrical compartment. The module circuits are protected by blade type automotive fuses. All OEM circuits are provided by the chassis manufacturer.

In addition to the power supplied by the ignition hot solenoid circuit, there are two circuits in the panel that are battery hot and protected by in-line fuses. These circuits are for the radio and electric door operator options.

PMC ELECTRICAL CONTROL SYSTEM

A modular system that will configured with 10 input/output channels to as many as 320 channels to control a body options and some chassis related items provide a safe environment for drivers and passengers. The system is programmed using a Windows™ based system that allows interlocking between any inputs and outputs. The system has 160 timers for delays (on or off) or flashers sequences to be programmed if needed in the operation.

ELECTRONIC SWITCH PANEL CONTROL

A switch panel is located within easy access of the driver to control all the functions necessary to operate the bus except the OEM chassis functions. Any electrical devices requiring a switch will be provided as needed.

MISCELLANEOUS

SENATOR F550 HD STANDARD BUILD SPECS 2011

EXTERIOR FINISH

The standard exterior finish is a bright white gelcoat to match the OEM chassis white. Optional paint packages are painted with a Dupont paint.

WARRANTY

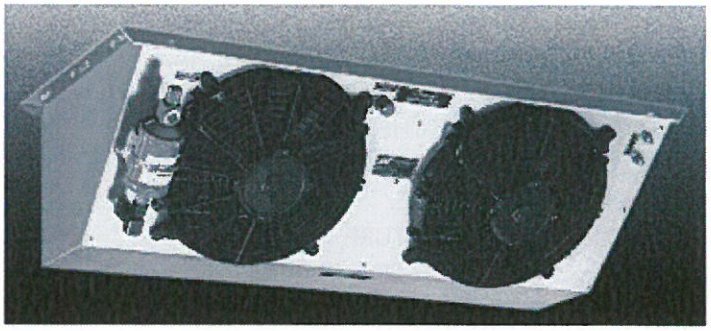
The finished product has a general warranty of 12 months/12,000 miles and a structural body warranty of 5 year/75,000 miles.

BUS AIR CONDITIONING

CS-2 CONDENSER

THE A.C.T. **CS-2** CONDENSER IS DESIGNED FOR SKIRT MOUNT APPLICATIONS. WE HAVE MANUFACTURED THIS CONDENSER SPECIFICALLY FOR THE TRANSPORTATION INDUSTRY.

IT'S LOW PROFILE, LIGHT WEIGHT ALUMINUM STRUCTURE, ENHANCED AIRFLOW, PERFORMANCE, SERVICEABILITY, AND INSTALLATION EASE ARE THE RESULT OF MANY YEARS' EXPERIENCE IN THIS INDUSTRY. THIS CONDENSER IS DESIGNED TO PERFORM IN EXTREME HOT CLIMATES AND THE MOST DEMANDING TRANSIT APPLICATIONS.



ADVANCED FEATURES

- Highgrade, Lightweight, Rust Proof Aluminum
- Internally Enhanced Copper Tubing Increases System Performance
- Integral Sightglass/Filter Drier and 100% O-Ring Connections For Maximum Leak Protection
- Unequalled Heat Rejection....
  - Lower Cooling Temperatures
  - Lower Head Pressures
- 12 Inch Diameter Fan for Increased Airflow
- Sealed Motor Design
- Two Electrical Connections

OPTIONS

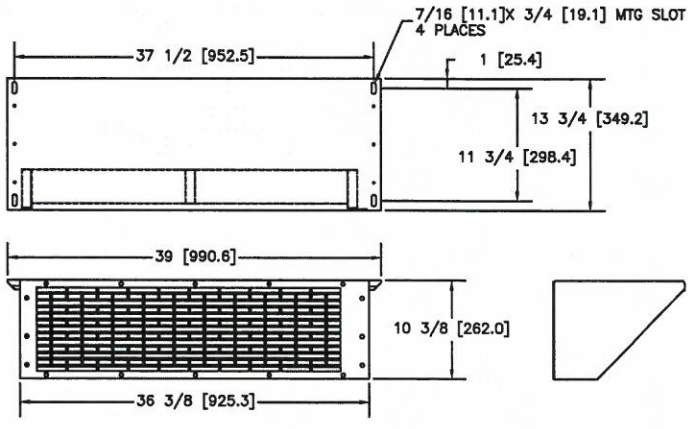
- Condenser or Skirt Mounted Air Inlet Grill
- 12 Volt or 24 Volt Motors
- Winter Protection Kit

2 YEAR LIMITED WARRANTY

SPECIFICATIONS

RATING: 60,000 Btu/Hr
AIRFLOW: 2460 cfm (3136 m3/hr)
AMPERAGE DRAW: 23 Amps @ 13.5 Volts
11 Amps @ 27 Volts
CONDENSER FANS: 12 Inch Diameter, Sealed Motors
FILTER DRIER/SIGHTGLASS: 16 Cu. Inch Displacement w/ Moisture Indicator
WEIGHT: 40 lbs.

Specifications subject to change without notice.



AMERICAN COOLING TECHNOLOGY, Inc.

www.actusa.us.com

715 Willow Springs Lane, York, PA 17406
Tel: 717.767.2775 ~ Fax: 717.767.3658
Toll Free: 877.228.4247

"SUCCESS THROUGH SIMPLICITY"

RELY ON OUR EXPERIENCE TO PROPERLY APPLY YOUR BUS AIR CONDITIONING SYSTEM

Form#CS2 rev06/11

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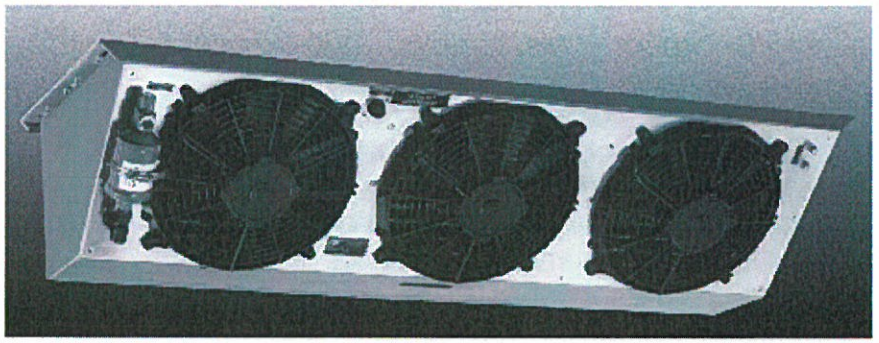
BUS AIR CONDITIONING

ACT

CS-3 CONDENSER

THE A.C.T. **CS-3** CONDENSER IS DESIGNED FOR SKIRT MOUNT APPLICATIONS. WE HAVE MANUFACTURED THIS CONDENSER SPECIFICALLY FOR THE TRANSPORTATION INDUSTRY.

IT'S LOW PROFILE, LIGHT WEIGHT ALUMINUM STRUCTURE, ENHANCED AIRFLOW, PERFORMANCE, SERVICEABILITY, AND INSTALLATION EASE ARE THE RESULT OF MANY YEARS' EXPERIENCE IN THIS INDUSTRY.



ADVANCED FEATURES

- Highgrade, Lightweight, Rust Proof Aluminum
- Internally Enhanced Copper Tubing Increases System Performance
- Integral Sightglass/Filter Drier and 100% O-Ring Connections For Maximum Leak Protection
- Unequalled Heat Rejection....
  - Lower Cooling Temperatures
  - Lower Head Pressures
- 12 Inch Diameter Fan for Increased Airflow
- Sealed Motor Design
- Two Electrical Connections

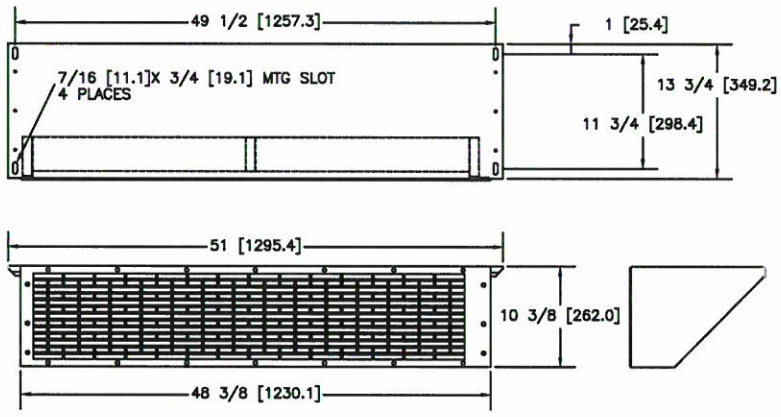
OPTIONS

- Condenser or Skirt Mounted Air Inlet Grill
- 12 Volt or 24 Volt Motors
- Winter Protection Kit

SPECIFICATIONS

RATING: Up to 82,000 Btu/Hr
AIRFLOW: 3690 cfm (4703 m3/hr)
AMPERAGE DRAW: 32 Amps @ 13.5 Volts
16 Amps @ 27 Volts
CONDENSER FANS: 12 Inch Diameter, Sealed Motors
FILTER DRIER/SIGHTGLASS: 16 Cu. Inch Displacement w/ Moisture Indicator
WEIGHT: 54 lbs.

Specifications subject to change without notice.



2 YEAR LIMITED WARRANTY

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ACT

"SUCCESS THROUGH SIMPLICITY"

RELY ON OUR EXPERIENCE TO PROPERLY APPLY YOUR BUS AIR CONDITIONING SYSTEM

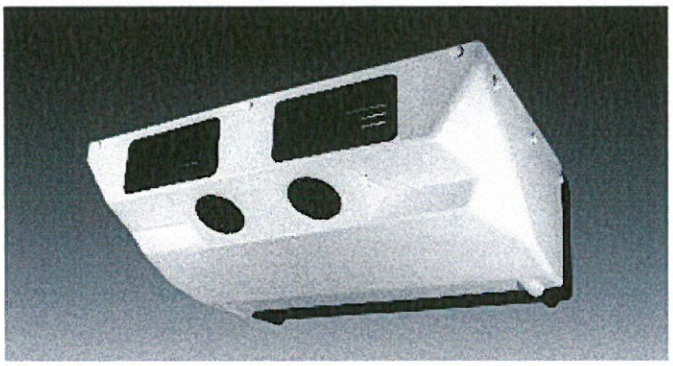
BUS AIR CONDITIONING

ACT

EZ-3 EVAPORATOR

THE A.C.T. **EZ-3** EVAPORATOR IS DESIGNED FOR FREE-BLOW CEILING MOUNT APPLICATIONS (REAR, SIDE, OR FORWARD MOUNT). WE HAVE MANUFACTURED THIS EVAPORATOR SPECIFICALLY FOR THE TRANSPORTATION INDUSTRY.

IT'S ENHANCED PERFORMANCE, SERVICEABILITY, AND INSTALLATION EASE ARE THE RESULT OF MANY YEARS' EXPERIENCE IN THIS INDUSTRY.



ADVANCED FEATURES

- Unique Louver Design Enhances Airflow Throughout The Vehicle
- Pressure Switches Located At The Evaporator For Maximum Compressor Protection
- Internally Enhanced Copper Tubing Coils Increases System Performance
- 100% O-Ring Connections For Maximum Leak Protection
- Super High Blower Speed As Standard Option
- Unitized Drain Pan Construction Eliminates Condensate Problems

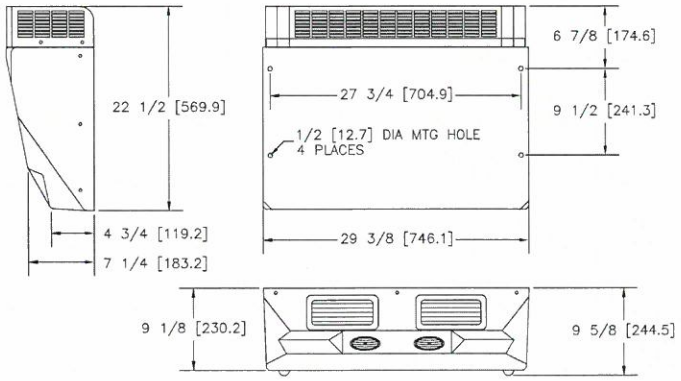
OPTIONS

- Grey or White Cover
- Adjustable or Fixed Air Outlet Louvers
- Return Air Themostat Maximizes Passenger Comfort
- 12 Volt or 24 Volt Motors

SPECIFICATIONS

COOLING CAPACITY:	**35,000 Btu/Hr**
AIRFLOW:	**700cfm (1186 m3/hr)**
AMPERAGE DRAW:	**15 Amps @ 13.5 Volts**
	7.5 Amps @ 27 Volts
WEIGHT:	**37 lbs.**
FILTER:	**Cleanable Aluminum Mesh**

Specifications subject to change without notice.



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www.actusa.us.com

715 Willow Springs Lane, York, PA 17406

Tel: 717.767.2775 ~ Fax: 717.767.3658

Toll Free: 877.228.4247

ACT

"SUCCESS THROUGH SIMPLICITY"

RELY ON OUR EXPERIENCE TO PROPERLY APPLY YOUR BUS AIR CONDITIONING SYSTEM

Form#EZ3 rev06/11

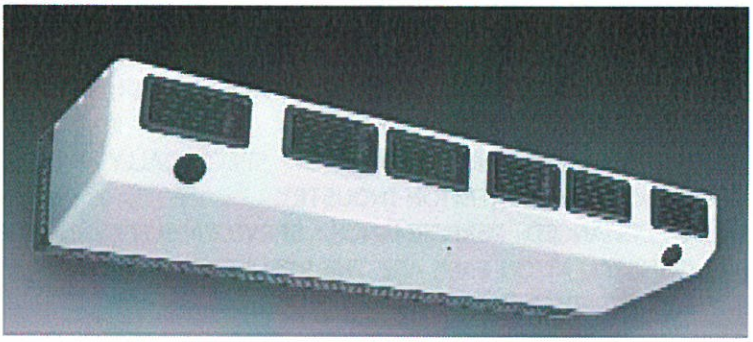
BUS AIR CONDITIONING

ACT

EZ-9 EVAPORATOR

THE A.C.T. **EZ-9** EVAPORATOR IS DESIGNED FOR CEILING MOUNT APPLICATIONS. THIS HEAVY DUTY EVAPORATOR IS DESIGNED SPECIFICALLY FOR THE TRANSPORTATION INDUSTRY.

IT'S ENHANCED PERFORMANCE, SERVICEABILITY, AND INSTALLATION EASE ARE THE RESULT OF MANY YEARS' EXPERIENCE IN THIS INDUSTRY.



ADVANCED FEATURES

- Unique Louver Design Enhances Airflow Throughout The Vehicle To Maximize Passenger Comfort.
- Pressure Switches Located At The Evaporator For Maximum Compressor Protection.
- Internally Enhanced Copper Tubing Coil Increases System Performance.
- Dual Circuit Coil For Maximum Efficiency.
- Expansion Valve Is Externally Equalized Bolt On Design For Ease of Service.
- 100% O-Ring Connections For Maximum Leak Protection.
- Low Profile Design For Added Headroom.
- Unitized Powder Coated Steel Drain Pan Construction Eliminates Condensate Problems.

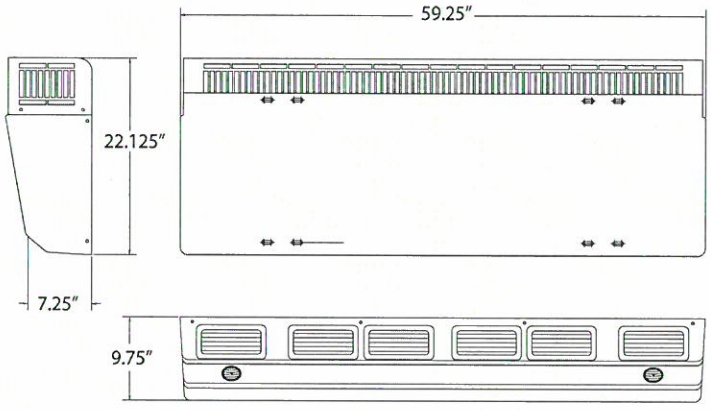
SPECIFICATIONS

COOLING CAPACITY:	**Up to 93,000 Btu/Hr**
AIRFLOW:	**2400cfm (4081 m3/hr)**
AMPERAGE DRAW:	**27 Amps @ 13.5 Volts**
	13.5 Amps @ 27 Volts
WEIGHT:	**98 lbs.**
FILTER:	**Cleanable Aluminum Mesh**

Specifications subject to change without notice.

OPTIONS

- Grey or White Covers
- Adjustable or Fixed Louvers
- Plenum Available for Ducted Applications
- 12 Volt or 24 Volt Motors
- Heat Coil



2 YEAR LIMITED WARRANTY

AMERICAN COOLING TECHNOLOGY, Inc.

www.actusa.us.com

715 Willow Springs Lane, York, PA 17406

Tel: 717.767.2775 ~ Fax: 717.767.3658

Toll Free: 877.228.4247

ACT

"SUCCESS THROUGH SIMPLICITY"

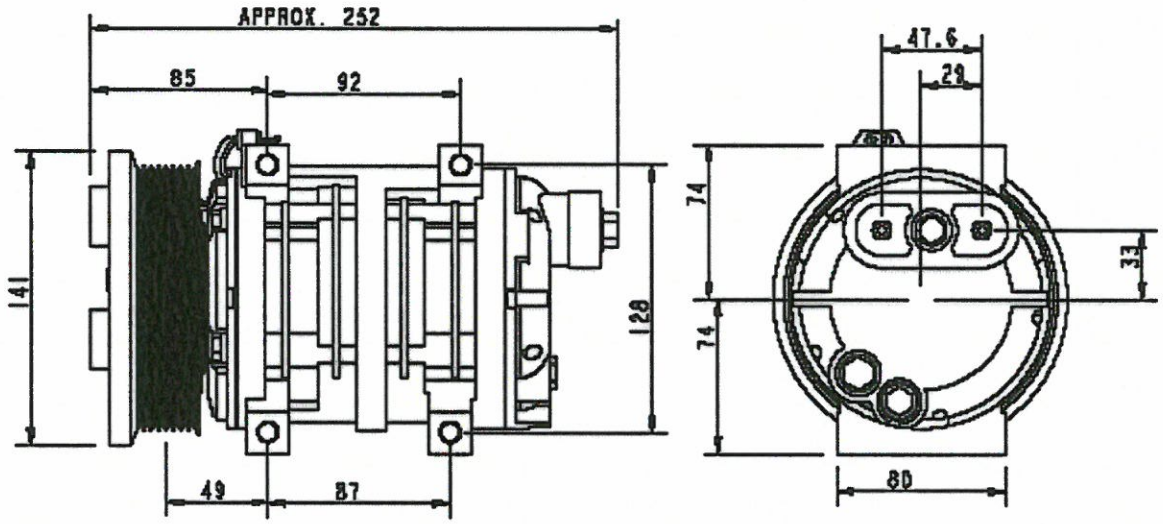
American Cooling Technology, Inc.

715 Willow Springs Lane
York, Pa. 17406

717/767-2775

FAX: 717/767-3658

TM-21 COMPRESSOR

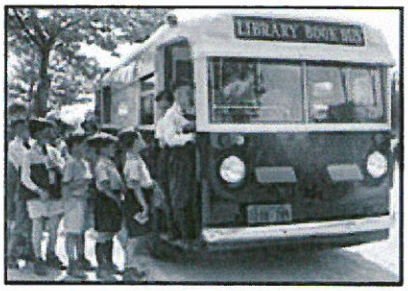


Displacement 13 cubic inches

Standard features

- Refrigerant : R-134A
- Clutch coil: 12 volt or 24 volt DC.
- Available with either Type A or Poly-V pulleys.
- Available in either Ear-mount or Direct mount configurations.
- Rotation: either Clockwise & Counterclockwise
- Permissible speed: 700-6000 rpm

WHAT IS HELP®?



HELP® is an acronym for High Energy Level Polymers. The polymer is the base polyurethane material especially developed for our bumpers which absorbs the high energy levels created when objects collide.

WHY ENERGY ABSORBING BUMPERS?

"Energy absorbing bumpers protect the vehicle from damage during repeated impacts of 5 to 10 m.p.h. They reduce down time and maintenance and insurance costs by protecting the body from damages normally incurred in minor accidents."

Handbook For Purchasing Small Transit Vehicle prepared by Pennsylvania Department of Transportation Bureau of Public Transportation.

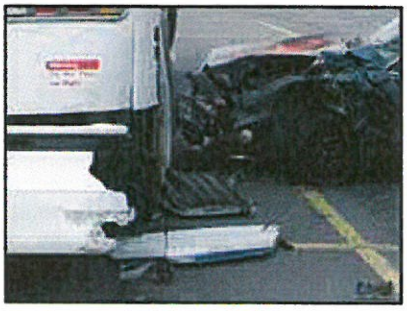
BENEFITS OF HELP® BUMPERS

Reduced Insurance Costs. Less body damage to your vehicle leads to lower premiums. HELP® Bumpers also protect objects struck by your vehicles, resulting in fewer outside claims and reduced liability from low-speed collisions.

No Maintenance. An energy absorbing polyurethane outer shell is backed with an aluminum structure that transmits residual impact forces to the vehicle chassis. The unit is puncture resistant, self-contained and self-restoring.

Reduced Vehicle Downtime. No damage to vehicle leads to reduced downtime. Less time out of service translates into increased revenues.

HELP® BUMPER PERFORMANCE



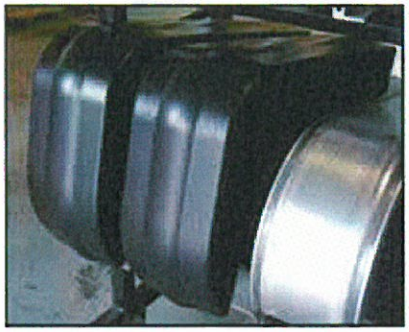
Fixed Barrier Impact
5.0 mph – No damage to bumper or bus

30° Corner Impact
5.0 mph – No damage to bumper or bus

Center Impact
6.5 mph – No damage to bumper or bus

Puncture Resistance
¼" diameter spherically radiused rod at 350lbs. force without puncture.

Repeat of Test Series
Unimpaired Performance



HELP® TECHNOLOGY

Each HELP® bumper is an energy absorbing system for **repetitive** impact absorption. The system is composed of **R**eaction **I**njection **M**olded, self-restoring, polyurethane modules that are extremely durable.

MODULES

Specifically formulated black urethane material expressly designed for repeated impact protection under wide temperature variances.

GLOBALLY RECOGNIZED

Patented Energy Absorbing HELP® Bumpers:

- (2) United States Trademark Registrations
- (6) Foreign Trademark Registrations
- (11) United States Patents
- (50) Foreign Patents

320 Channel PMC CPU, Central Processing Unit

Date datasheet created: 16/05/2013

The PMC CPU, part number 00-01015-120/-240, is the main component of Intellitec's Programmable Multiplex Control family. This is the next generation for the PMC family and replaces the following part number, 00-00800-022/-240. For additional information, please refer to the following technical brief, document Tehnical Application Brief _july_08.

The PMC CPU controls remote I/O modules through Intellitec's multiplex communications system (Pat. No. 4,907,222 and 6,011,997). This multiplex system allows the CPU, I/O Modules and switch panels to be wired together with two wires.

This CPU is identical to its' predecessor having two identical, 4-pin, Amp Mate-N-Lok connectors. Pin 1 provides a fused 12 volt power source to power things like switch back lighting. Pins 2 and 3 are the multiplex signals (two loops of 160 channels each) which communicate instructions to and from each of the I/O modules, Pin 4 is multiplex communication ground.

All the harnesses are connected with AMP, Mate-N-Lok connectors to reduce installation time and errors. Combine the Programmable Multiplex Control Central Processing Unit with the Intellitec standard, semi-custom or custom modules, and you can create the exact system configuration that you want, from basic to all encompassing.

What is a PMC System

A system can be as small as one CPU and one I/O module, or it can communicate with up to 32 I/O modules. Each module can have a combination of up to 10 inputs, or outputs.

Multiple modules can be wired to a single connector. All input, or switch information is gathered through the remote modules and directly communicated to the CPU. The CPU then interprets the inputs, determines the states of all outputs and communicates that information to the remote modules via the PMC communications link (pins 2 and 3).

How Does the CPU Communicate to Modules

The PMC system communicates continually at a relatively slow rate of 4 kHz. Each input/output is updated every .040 seconds. The multiplex signal, communicates to the output modules with a large change in signal voltage.

This slow communications rate and large signal voltage change makes the PMC system extremely resistant to interference from EMI and RFI. Because of the low communications frequency and large signal change, communication can take place without fear of interference over any economical wire and eliminates the need for special cables and connectors.

The approximate module dimensions are 6.375" X 6.250" X 1.875" (16.2mm X 15.9mm X 4.8mm). The module should be installed in a protected environment inside of the vehicle.

PMC CPU Features

TheCPUhas the following features:
+ 32 modules fully programable and addressable
+ Total of 320 channels of configurable inputs and outputs
+160 channels of Programmable Timers (These timers can function as on/delay, off/delay, flasher and interval timers, eliminating the need for special flasher modules, mirror heat timers, wiper delays, load managers, etc.)
+160 Virtual Channels available for more complex application development (Provides the capability to write very complex logic relationships between the channels.)

+Sleep Mode operation with improved low power consumption (Allowing for the system to be constantly live with insignifcant drain on the vehicle battery.)

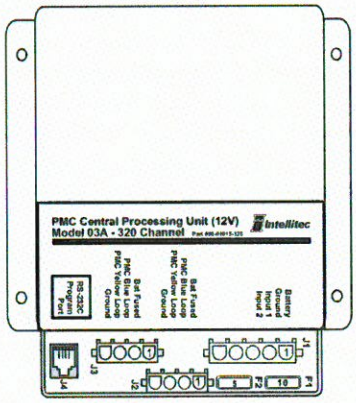
+Reduction in time for transferring and retrieving PMC application files (The application program resides in Flash memory and is retained when power is removed from the CPU.)

320 Channel PMC CPU, Central Processing Unit

Date datasheet created: 16/05/2013

The CPU RS-232C communications port and Windows software is used to setup or program the vehicle specific requirements. The port can also be used to perform system diagnostics. If a lap top isn't available most diagnostics can be performed with a volt meter.

Through the use of Intellitec's WinPMC II Windows based software program and the connection of a PC to the RS-232C port, the user can easily set up the relationships between the switch inputs, timers and outputs.



Specifications

Part Number	00-01015-120	00-01015-240
Voltage	12V	24V
Voltage Range	up to +16 Volts	+10 Volts to 36 Volts

CONNECTOR PIN DESIGNATIONS

J4	RS-232C	PC Communications (Note 1)
J2-J3	PMC Communications	(All three connectors identical)
Pin 1	Fused Power for remote backlighting	16 awg Min. Fuse F2 5 Amps Max.
Pin 2	Multiplex Signal Blue Loop	16 awg Min. (see Chapter 3 of the Users Guide)
Pin 3	Multiplex Signal Yellow Loop	16 awg Min. (see Chapter 3 of the Users Guide)
Pin 4	Communications Ground	14 awg Min. (Make no other connections)
J1-1	Battery	Fuse F1 10 Amps Max.
J1-2	Ground	
J1-3	Aux In 1 (+12V disables sleep mode)	Sleep Mode 4.7K Input Impedance
J1-4	Aux In 2 (+12V disables sleep mode)	Sleep Mode 4.7K Input Impedance

MATING CONNECTIONS

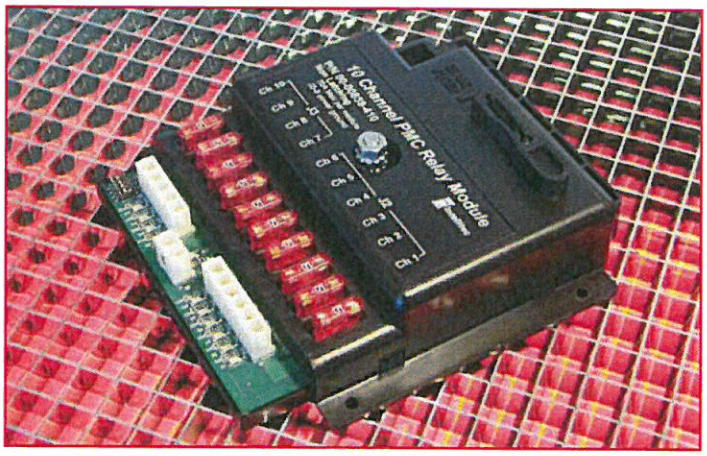
Designator	Function	Connector	Mating Part #	Contact, Typical
J1	CPU Power	5 Pin Amp Mate-N-Lok	1-480763-0	350919-3 for 14-18 AWG
J2	PMC Com	4 Pin Amp Mate-N-Lok	1-480702-0	350919-3 for 14-18 AWG
J3	PMC Com	4 Pin Amp Mate-N-Lok	1-480702-0	350919-3 for 14-18 AWG
J4	RS-232C		RJ11	(Note 1)

SYSTEM CAPACITY	
Program Memory	EPROM
User Memory	Non Volatile
Module Capacity	32
I/O per Module	10
Total I/O Control	320
Virtual Channels	160
Timer Channels	160
COMMUNICATIONS	
CPU/Module	PMC two wire 4KHZ
EMI/RFI	High Immunity
User PC Program	WinPMCII

For further information on this product, please contact Intellitec.

PMC and Multipoint Switching System, 10 Channel Relay Output Modules

Date datasheet created:
16/05/2013



The PMC Output Modules 00-00838-000 and 00-00838-410 are members of Intellitec's Programmable Multiplex Control family, as well as the 160 Channel Multipoint Switching System. They works in combination with the PMC CPU or the 160 Channel IPX Master and other standard, semi-custom, or custom I/O modules. The modules provide power fusing, switching, and distribution . They have five 20Amp SPSTrelays and five 10 amp SPST relays for switching loads to the battery. Each fuse position can be filled with a fuse or circuit breaker. The total module current should not exceed 70 Amps.

All of the output harness connections are made withAMP Mate-N-Lok connectors to reduce installation time and errors.

The approximate module dimensions are 7.0" X 6.250" X 1.875" (16.2mm X 15.9mm X 4.8mm). It should beinstalled in a protected environment inside the vehicle. The 838-000 and 838-410 can be set for module addresses ofA- P. This allows each output of the module to be addressed for any one of 160 channels in groups of 10. Using the chart on the next page, set the dip switch to address the module.

Latching Vs Non-Latching

The 838-000 is a latching module, which means that an output will turn on and latch on when it sees that it's channel has been turned on momentarily. Once the output is on, the output will turn off when it sees it's channel turn on momentarily again.

No program is necessary when used with either a PMC Central Processing Unit or the 160 Channel IPX Master. An output can be turned on by providing a momentary input on the same channel address. Another momentary input turns the output off.

Example: Intellitec's 10 button keypad has a button set for address B1 and a Latching Output Module 838-000 has an output set for address B1 while both are

If push button B1 is pressed momentarily, output B1 of the output module will latch on. Pushing the button again will latch the output off. If a push button is set for BL/MR, pressing and holding the button for 3 seconds will cause all outputs that are latched on, to turn off.

When using this module with PMC you should neither check the latched switch box in the Windows set up software for the pushbutton nor should a Boolean be written to operate the output. Channel P10 for 3 seconds will unlatch all latched outputs.

The 838-410 is a non-latching module, which means the output will turn on when it sees it's address but will not latch and should only be used with the PMC system. In this case, if the channel is turned on momentarily, the output will only be on while the channel is on, but will not latch. This module will respond to programming in the same fashion as any other PMC output module. To keep the output on, the channel must be kept on.

Diagnostic Led Indicators

Next to each Mate-N-Lok output connection you will find an LED. If the output is on, the LED will be on. Should the output be on and a fuse is blown, the LED will not illuminate.

Next to pin J1-2, you will find an LED which illuminates RED and indicates that the multiplex communication signal is not normal.

PMC and Multipoint Switching System, 10 Channel Relay Output Modules

Date datasheet created:
16/05/2013

SPECIFICATIONS

Modules	00-00838-000	00-00838-410
Nominal Vehicle Voltage	12V	12V
Outputs	Latching Outputs	Non-Latching Outputs
Module Current	70 Amps Max total	

General Connections

J1-1	Communications Signal (from Master or CPU)	18 Awg Min.
J1-2	Communications Ground (from Master or CPU)	14 Awg Min.

CHANNEL DESIGNATIONS

Channel	Connection	Type	Name	Rating
1	J2-1	Relay Output, Form A (SPST),(1)	Relay 1 Fuse 1	20 Amp Max
2	J2-2	Relay Output, Form A (SPST),(1)	Relay 2 Fuse 2	10 Amp Max
3	J2-3	Relay Output, Form A (SPST),(1)	Relay 3 Fuse 3	20 Amp Max
4	J2-4	Relay Output, Form A (SPST),(1)	Relay 4 Fuse 4	10 Amp Max
5	J2-5	Relay Output, Form A (SPST),(1)	Relay 5 Fuse 5	20 Amp Max
6	J2-6	Relay Output, Form A (SPST),(1)	Relay 6 Fuse 6	10 Amp Max
7	J3-1	Relay Output, Form A (SPST),(1)	Relay 7 Fuse 7	20 Amp Max
8	J3-2	Relay Output, Form A (SPST),(1)	Relay 8 Fuse 8	10 Amp Max
9	J3-3	Relay Output, Form A (SPST),(1)	Relay 9 Fuse 9	20 Amp Max
10	J3-4	Relay Output, Form A (SPST),(1)	Relay 10 Fuse 10	10 Amp Max

Note 1: Relay provides a fused source of voltage to the Load from the Battery.

J3-5 Power Ground

NOTE: Total Module current not to exceed 70 Amps

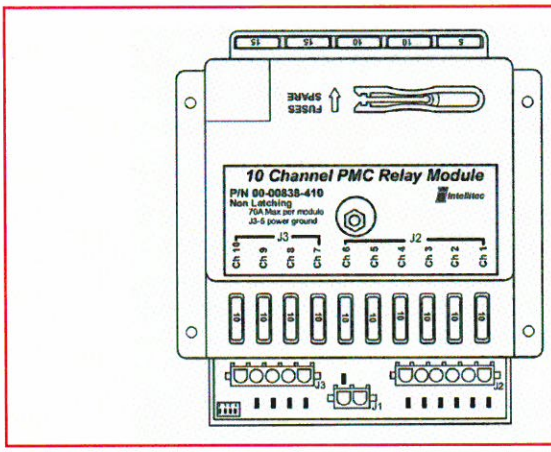
MATING CONNECTIONS

Designator	Function	Connector	Mating Part #	Contact,Typical	
				for 14-18 AWG	for 10-12 AWG
J4	Battery	#10/32 Ring Term			
J3	Communication	2 Pin Amp Mate-N-Lok	1-480698-0	350919-3	640310-3
J2	Outputs	6 Pin Amp Mate-N-Lok	640585-1	350919-3	640310-3
J1	Outputs	5 Pin Amp Mate-N-Lok	1-480763-0	350919-3	640310-3

MODULE SETTINGS

Module can be set for 1 of 16 address, A-P.
Set four dip switches per table on right. X = Switch OFF

SWITCH 4 3 2 1	MODULE Address	SWITCH 4 3 2 1	MODULE Address
0 0 0 0	A	X 0 0 0	I
0 0 0 X	B	X 0 0 X	J
0 0 X 0	C	X 0 X 0	K
0 0 X X	D	X 0 X X	L
0 X 0 0	E	X X 0 0	M
0 X 0 X	F	X X 0 X	N
0 X X 0	G	X X X 0	O
0 X X X	H	X X X X	P



For further information on this product, please contact Intellitec.

Intellitec

www.intellitec.com

320 Channel PMC CPU, Central Processing Unit

Date datasheet created: 16/05/2013

The PMC CPU, part number 00-01015-120/-240, is the main component of Intellitec's Programmable Multiplex Control family. This is the next generation for the PMC family and replaces the following part number, 00-00800-022/-240. For additional information, please refer to the following technical brief, document Tehnical Application Brief _july_08.

The PMC CPU controls remote I/O modules through Intellitec's multiplex communications system (Pat. No. 4,907,222 and 6,011,997). This multiplex system allows the CPU, I/O Modules and switch panels to be wired together with two wires.

This CPU is identical to its' predecessor having two identical, 4-pin, Amp Mate-N-Lok connectors. Pin 1 provides a fused 12 volt power source to power things like switch back lighting. Pins 2 and 3 are the multiplex signals (two loops of 160 channels each) which communicate instructions to and from each of the I/O modules, Pin 4 is multiplex communication ground.

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The PMC system communicates continually at a relatively slow rate of 4 kHz. Each input/output is updated every .040 seconds. The multiplex signal, communicates to the output modules with a large change in signal voltage.

This slow communications rate and large signal voltage change makes the PMC system extremely resistant to interference from EMI and RFI. Because of the low communications frequency and large signal change, communication can take place without fear of interference over any economical wire and eliminates the need for special cables and connectors.

The approximate module dimensions are 6.375" X 6.250" X 1.875" (16.2mm X 15.9mm X 4.8mm). The module should be installed in a protected environment inside of the vehicle.

PMC CPU Features

TheCPUhas the following features:
+ 32 modules fully programable and addressable
+ Total of 320 channels of configurable inputs and outputs
+160 channels of Programmable Timers (These timers can function as on/delay, off/delay, flasher and interval timers, eliminating the need for special flasher modules, mirror heat timers, wiper delays, load managers, etc.)
+160 Virtual Channels available for more complex application development (Provides the capability to write very complex logic relationships between the channels.)

+Sleep Mode operation with improved low power consumption (Allowing for the system to be constantly live with insignifcant drain on the vehicle battery.)

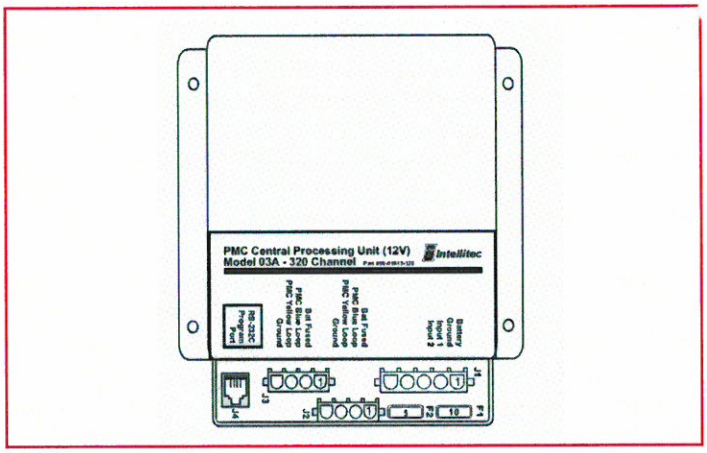
+Reduction in time for transferring and retrieving PMC application files (The application program resides in Flash memory and is retained when power is removed from the CPU.)

320 Channel PMC CPU, Central Processing Unit

Date datasheet created: 16/05/2013

The CPU RS-232C communications port and Windows software is used to setup or program the vehicle specific requirements. The port can also be used to perform system diagnostics. If a lap top isn't available most diagnostics can be performed with a volt meter.

Through the use of Intellitec's WinPMC II Windows based software program and the connection of a PC to the RS-232C port, the user can easily set up the relationships between the switch inputs, timers and outputs.



Specifications

Part Number	00-01015-120	00-01015-240
Voltage	12V	24V
Voltage Range	up to +16 Volts	+10 Volts to 36 Volts

CONNECTOR PIN DESIGNATIONS

J4	RS-232C	PC Communications (Note 1)
J2-J3	PMC Communications	(All three connectors identical)
Pin 1	Fused Power for remote backlighting	16 awg Min. Fuse F2 5 Amps Max.
Pin 2	Multiplex Signal Blue Loop	16 awg Min. (see Chapter 3 of the Users Guide)
Pin 3	Multiplex Signal Yellow Loop	16 awg Min. (see Chapter 3 of the Users Guide)
Pin 4	Communications Ground	14 awg Min. (Make no other connections)
J1-1	Battery	Fuse F1 10 Amps Max.
J1-2	Ground	
J1-3	Aux In 1 (+12V disables sleep mode)	Sleep Mode 4.7K Input Impedance
J1-4	Aux In 2 (+12V disables sleep mode)	Sleep Mode 4.7K Input Impedance

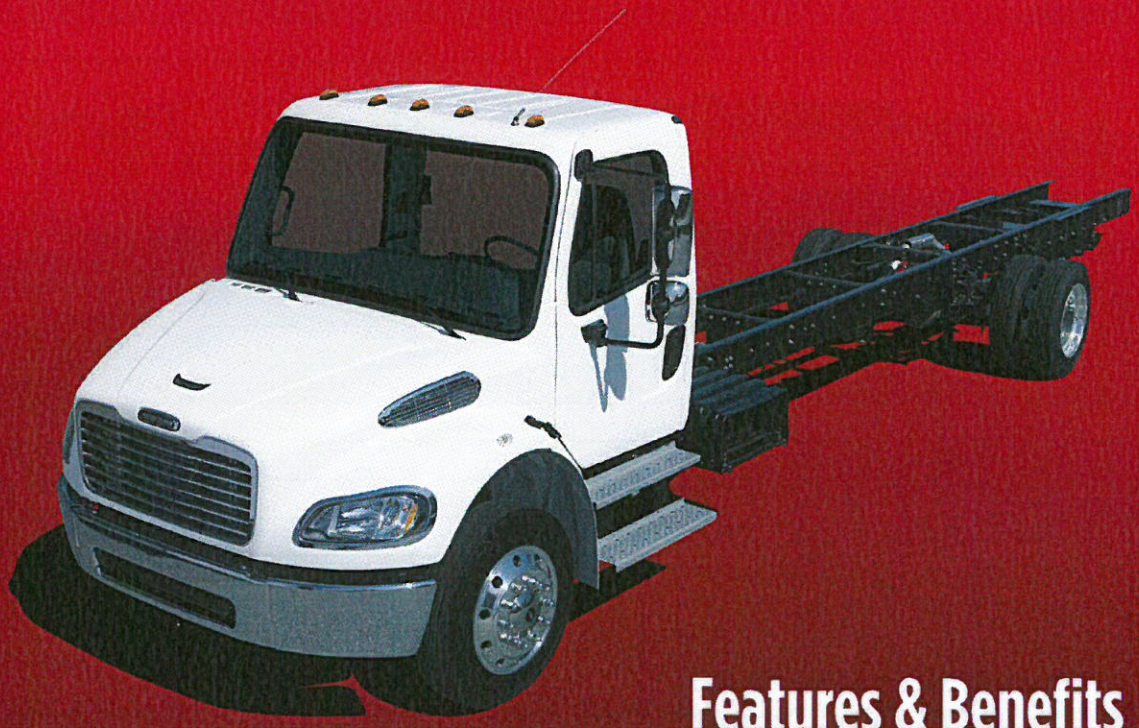
MATING CONNECTIONS

Designator	Function	Connector	Mating Part #	Contact, Typical
J1	CPU Power	5 Pin Amp Mate-N-Lok	1-480763-0	350919-3 for 14-18 AWG
J2	PMC Com	4 Pin Amp Mate-N-Lok	1-480702-0	350919-3 for 14-18 AWG
J3	PMC Com	4 Pin Amp Mate-N-Lok	1-480702-0	350919-3 for 14-18 AWG
J4	RS-232C		RJ11	(Note 1)

SYSTEM CAPACITY	
Program Memory	EPROM
User Memory	Non Volatile
Module Capacity	32
I/O per Module	10
Total I/O Control	320
Virtual Channels	160
Timer Channels	160
COMMUNICATIONS	
CPU/Module	PMC two wire 4KHZ
EMI/RFI	High Immunity
User PC Program	WinPMCII

For further information on this product, please contact Intellitec.

S2C Cutaway Commercial Bus Chassis



Features & Benefits

1. Chassis is equipped with ADA (Americans with Disabilities Act) wiring which offers body builder interface connections, eliminating the need for OEM's to splice into chassis wiring.
2. Exhaust clearance is configured to allow for an in-step wheelchair lift, giving you and your customer more floor-plan options.
3. Tuned suspensions and match-marked tires offer a superior ride compared to a traditional truck suspension.
4. S2C offers a 20% larger windshield for better visibility compared to the competition.
5. Offers 30% to 50% better driver's line of sight compared to the competition, reducing blind spots and potential hazards.
6. Low-effort, easy-tilt hood minimizes stress on the driver during inspections. Hood also offers a dampening device that minimizes rapid closure, reducing hood damage or potential injury to maintenance personnel.
7. 55-degree wheel cut offers improved maneuverability compared to the traditional truck cab configuration.
8. Cab offers floor and firewall mounted noise and heat abatement package for improved driver and passenger comfort.
9. S2C exceeds the "Buy America" requirements, giving you the confidence that your vehicle was made in America.
10. Standard frame-mounted, rollout battery tray with cover. Easier accessibility than a traditional under-step configuration.
11. Standard between the rail fuel tank allows more freedom for skirt-located features.

STANDARD FEATURES AND OPTIONS: S2C

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

S2C CUTAWAY CHASSIS

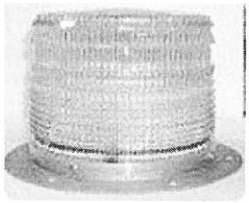
Engine	Cummins® ISB 6.7-200 200 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm
Optional engines	Cummins ISB 6.7-220 220 hp @ 2,300 rpm, 2,600 GOV, 520 lb./ft. @ 1,600 rpm Cummins ISB 6.7-240 240 hp @ 2,300 rpm, 2,600 GOV, 560 lb./ft. @ 1,600 rpm Cummins ISB 6.7-250 250 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm Cummins ISB 6.7-260 260 hp @ 2,300 rpm, 2,600 GOV, 660 lb./ft. @ 1,600 rpm
Transmission	Allison® 1000 PTS with park pawl
Optional transmission	Allison 2100 PTS, 2200 PTS, 2500 PTS, 3000 PTS, B210, B220, B300
GVWR	19,500 lbs. to 33,000 lbs.
Alternator	Delco Remy® 160 amp, 28-SI
Optional alternator	Leece-Neville® 170 amp, 185 amp, 200 amp, 270 amp and 320 amp
Axles	
Front	AAC® AF-08.0-2, 8,000 lbs. FC1
Optional front axle	AAC AF-10.0-3, 10,000 lbs.; AF-12.0-3, 12,000 lbs.
Rear	AAC ARS 15-2, 15,000 lbs.
Optional rear axle	ARS-17.5, 17,500 lbs.; ARS-19.0-2, 19,000 lbs.; ARS-21, 21,000 lbs.; ARS-23, 23,000 lbs.
Suspension	
Front	Taper-leaf spring, 7,000 lbs.
Optional front suspension	Taper-leaf spring, 9,000 lbs., 10,000 lbs. and 12,000 lbs. ratings
Rear	52" Variable-rate multi-leaf spring, 12,500 lbs.
Optional rear suspension	52" variable rate multi-leaf spring rear suspension with helper; 16,000 lbs., 18,000 lbs., 21,000 lbs. and 23,000 lbs. ratings; 23,000 lbs. AirLiner® air suspension with tuned Sachs® shocks with rear sway bar
Steering	TRW® tilt/telescoping steering column; TRW THP-45 or THP-60 steering gear; 55-degree wheel cut
Brakes	Bosch® hydraulic pin-slide disc brakes, front and rear WABCO® hydraulic ABS (4) channel
Optional air brakes	Bendix® air disc (front 22.5" wheel only); Meritor™ drum (front and rear)
Frame	5/16" x 3" x 10 1/8" 50 kpsi; 80 kpsi with rear air suspension
Wheelbase	199", 219", 238", 259", 279", 300"
Fuel tank	60-gal. between the rails
Optional fuel tanks	100-gal. mounted between the rails; 65-gal. mounted right-hand side available
Tires	Goodyear® G647 RSS 245/70R 19.5" 14-ply
Optional tires	Goodyear or Michelin® 19.5" OR 22.5"
Dash	New automotive-styled, ergonomically designed dash; odometer/trip, hour/diagnostic/voltage display; LED backlights on switches and gauges offer solid-state design and longer life; integral driver cup holders
Wiring	Fully multiplexed electrical system with body-builder-ready electrical drop for ADA wiring
Hood	Torsion-bar-assisted for easy opening with minimal force; composite headlamps with brighter beam pattern and integral turn signals
Bumper	Three-piece steel bumper; chrome option available
Battery box	Frame-mounted battery box with sliding tray; capable of holding dual 8 D batteries
Select standards	– Daylight running lights – Standard cruise control and programmable high idle
Select options	– Center switch panel with cutouts for body-builder switches – Chrome grille and headlight bezels – Dual Seltec® TM-21 A/C compressors – T-handle shift lever with interlock – Dash A/C

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

9/11, FCC/MC-S-371. Specifications are subject to change without notice. Freightliner Custom Chassis Corporation is registered to ISO 9001:2008 and ISO 14001:2004.

Product Description

- 515-400
- Specialty Low Profile Strobe Light
- 4 1/4"
- Double Flash
- 10 Joules



http://www.smiglobal.net/admin/articles/files/Specialty%20Manufacturing%20Inc%20-%20Replacement%20Procedure%20-%20515%20Strobes.pdf

STURAA TEST

10 YEAR

350,000 MILE BUS

from

SUPREME

MODEL
STARTRANS PS2 PRESIDENT

APRIL 2011

PTI-BT-R1104

PENNSTATE

The Pennsylvania Transportation Institute
Vehicle Systems and Safety Program

201 Transportation Research Building
The Pennsylvania State University
University Park, PA 16802

(814) 865-1891

Altoona Bus Testing and Research Center

2237 Old Route 220 N.
Duncansville, PA 16635

(814) 695-3404

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EXECUTIVE SUMMARY

Supreme submitted a model Startrans PS2 President, diesel-powered 37 seat (including the driver) 38-foot bus, for a 10 yr/350,000 mile STURAA test. The odometer reading at the time of delivery was 5,168 miles. Testing started on March 25, 2011 and was completed on February 13, 2012. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on April 8, 2011 and was completed on July 1, 2011.

The interior of the bus is configured with seating for 37 passengers including the driver. Note; 8 seats fold away for 3 wheelchair positions. Free floor space will accommodate 18 standing passengers resulting in a potential load of 55 persons. At the heaviest potential passenger load (29 seated, 18 standees and 3 wheelchair positions) at 150 lbs per person and 600 lbs per wheelchair position, this load results in a measured gross vehicle weight of 27,790 lbs. **Note: at Gross Vehicle Load (GVL), the weight of the rear axle is 1,490 lbs over the rear GAWR and 1,790 lbs over the GVWR.** The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 27,790 lbs. The middle segment was performed at a seated load weight of 25,150 lbs and the final segment was performed at a curb weight of 18,930 lbs. Durability driving resulted in unscheduled maintenance and failures that involved a variety of subsystems. A description of failures, and a complete and detailed listing of scheduled and unscheduled maintenance is provided in the Maintainability section of this report.

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

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

The Reliability section compiles failures that occurred during Structural Durability Testing. Breakdowns are classified according to subsystems. The data in this section are arranged so that those subsystems with more frequent problems are apparent. The problems are also listed by class as defined in Section 2. The test bus encountered no Class 1 or Class 2 failures. Of the 12 reported failures, 10 were Class 3 and two were Class 4.

The Safety Test, (a double-lane change, obstacle avoidance test) was safely performed in both right-hand and left-hand directions up to a maximum test speed of 45 mph. The performance of the bus is illustrated by a speed vs. time plot. Acceleration and gradeability test data are provided in Section 4, Performance. The average time to obtain 50 mph was 27.14 seconds. The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 31.61' at 20 mph, 61.73' at 30 mph, 110.49' at 40 mph and 142.03' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 31.77'. There was no deviation from the test lane during the performance of the Stopping Distance phase. During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane but did experience pull to the left during both approaches to the Split Friction Road surface. The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

The Shakedown Test produced a maximum final loaded deflection of 0.395 inches with a permanent set ranging between -0.003 to 0.003 inches under a distributed static load of 19,425 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. No water leakage was observed throughout the test. All subsystems operated properly.

The Static Towing Test was performed using a target load (towing force) of 22,716 lbs. All four front pulls were completed to the full test load with no damage or deformation observed. The Dynamic Towing Test was performed by means of a front-lift tow. The towing interface was accomplished using a hydraulic under-lift wrecker. The bus was towed without incident and no damage resulted from the test. The manufacturer does not recommend towing the bus from the rear, therefore, a rear test was not performed. The Jacking and Hoisting Tests were also performed without incident. The bus was found to be stable on the jack stands, and the minimum jacking clearance observed with a tire deflated was 6.7 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 4.91 mpg, 5.11 mpg, and 9.06 mpg respectively; with an overall average of 5.72 mpg.

A series of Interior and Exterior Noise Tests was performed. These data are listed in Section 7.1 and 7.2 respectively and Emissions data are listed in Section 8.

ABBREVIATIONS

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

TEST BUS CHECK-IN

I. OBJECTIVE

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

II. TEST DESCRIPTION

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

III. DISCUSSION

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

The test bus consists of a Supreme, model Startrans PS2 President. The bus has a front OEM driver's door and front passenger door rear of the front axle. A dedicated handicap door equipped with a Braun model NCL954F1B3454-2 hydraulic platform lift is located rear of the rear axle. Power is provided by a diesel-fueled, Cummins model ISB 6.7 L 240 hp engine coupled to an Allison model 2200 PTS transmission.

The measured curb weight is 6,790 lbs for the front axle and 12,140 lbs for the rear axle. These combined weights provide a total measured curb weight of 18,930 lbs. There are 37 seats including the driver and room for 18 standing passengers bringing the total passenger capacity to 55. Gross load is 150 lb x 55 = 8,250 lbs. At full capacity, the measured gross vehicle weight is 27,790 lbs. **Note: at GVL the load is 1,490 lbs over the rear GAWR and 1,790 lbs over the GVWR.**

VEHICLE DATA FORM

Bus Number: 1104	Arrival Date: 3-25-11
Bus Manufacturer: Supreme	Vehicle Identification Number (VIN): 4UZACPDU2BCAX6580
Model Number: Startrans PS2 President	Date: 3-30-11
Personnel: B.L., E.L. & E.D.	Chassis; Freightliner / S2

WEIGHT:

Individual Wheel Reactions:

Weights (lb)	Front Axle		Middle Axle		Rear Axle	
	Right	Left	Right	Left	Right	Left
CW	3,330	3,460	N/A	N/A/	6,370	5,770
SLW	3,800	4,040	N/A	N/A	8,710	8,600
GVW	4,320	4,480	N/A	N/A	9,570	9,420

Total Weight Details:

Weight (lb)	CW	SLW	GVW	GAWR
Front Axle	6,790	7,840	8,800	9,350
Middle Axle	N/A	N/A	N/A	N/A
Rear Axle	12,140	17,310	18,990	17,500
Total	18,930	25,150	27,790	GVWR: 26,000

Dimensions:

Length (ft/in)	38/9
Width (in)	97.5
Height (in)	134.3
Front Overhang (in)	40.0
Rear Overhang (in)	146.0
Wheel Base (in)	279.0
Wheel Track (in)	Front: 83.3
	Rear: 72.7

Bus Number: 1104	Date: 3-30-11

CLEARANCES:

Lowest Point Outside Front Axle	Location: Radiator pipe Clearance(in): 16.6
Lowest Point Outside Rear Axle	Location: Exhaust clamp Clearance(in): 21.1
Lowest Point between Axles	Location: Step well Clearance(in): 9.6
Ground Clearance at the center (in)	13.0
Front Approach Angle (deg)	24.5
Rear Approach Angle (deg)	7.6
Ramp Clearance Angle (deg)	3.9
Aisle Width (in)	18.7
Inside Standing Height at Center Aisle (in)	79.0

BODY DETAILS:

Body Structural Type	Integral		
Frame Material	Steel		
Body Material	Composite & aluminum		
Floor Material	Plywood		
Roof Material	Composite		
Windows Type	☐ Fixed	■ Movable	
Window Mfg./Model No.	Safety / AS3 M246		
Number of Doors	1 Driver's	1 Front passenger	1 Rear
Mfr. / Model No.	Freightliner/OEM	Not available.	Not available.
Dimension of Each Door (in)	52.1 x 26.2	97.6 x 27.8	57.8 x 32.0
Passenger Seat Type	☐ Cantilever	■ Pedestal	☐ Other (explain)
Mfr. / Model No.	Freedman Seating Co. / Not available.		
Driver Seat Type	■ Air	☐ Spring	☐ Other (explain)
Mfr. / Model No.	Bostrom / 420094136		
Number of Seats (including Driver)	29		

Bus Number: 1104	Date: 3-30-11

BODY DETAILS (Contd..)

Free Floor Space (ft^2)	28.3			
Height of Each Step at Normal Position (in)	Front 1. 11.4	2. 10.7	3. 10.7	4. 10.4
	Middle 1. N/A	2. N/A	3. N/A	4. N/A
	Rear 1. N/A	2. N/A	3. N/A	4. N/A
Step Elevation Change - Kneeling (in)	N/A			

ENGINE

Type	■ C.I.	☐ Alternate Fuel	
	☐ S.I.	☐ Other (explain)	
Mfr. / Model No.	Cummins / ISB 6.7 240		
Location	■ Front	☐ Rear	☐ Other (explain)
Fuel Type	☐ Gasoline	☐ CNG	☐ Methanol
	■ Diesel	☐ LNG	☐ Other (explain)
Fuel Tank Capacity (indicate units)	100 gals		
Fuel Induction Type	■ Injected	☐ Carburetion	
Fuel Injector Mfr. / Model No.	Cummins / ISB 6.7 240		
Carburetor Mfr. / Model No.	N/A		
Fuel Pump Mfr. / Model No.	Cummins / ISB 6.7 240		
Alternator (Generator) Mfr. / Model No.	Leece Neville / A0014944PA		
Maximum Rated Output (Volts / Amps)	14 / 270		
Air Compressor Mfr. / Model No.	Seltec / TM-21		
Maximum Capacity (ft^3 / min)	18.7		
Starter Type	■ Electrical	☐ Pneumatic	☐ Other (explain)
Starter Mfr. / Model No.	Delco Remy / 8200571 29MT		

Bus Number: 1104	Date: 3-30-11

TRANSMISSION

Transmission Type	☐ Manual	■ Automatic	
Mfr. / Model No.	Allison / 2200 PTS		
Control Type	■ Mechanical	☐ Electrical	☐ Other
Torque Converter Mfr. / Model No.	Allison / 2200 PTS		
Integral Retarder Mfr. / Model No.	N/A		

SUSPENSION

Number of Axles	2		
Front Axle Type	☐ Independent	■ Beam Axle	
Mfr. / Model No.	Axle Alliance Company / F10-3N		
Axle Ratio (if driven)	N/A		
Suspension Type	☐ Air	■ Spring	☐ Other (explain)
No. of Shock Absorbers	2		
Mfr. / Model No.	Sachs / 471700006963		
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.	Axle Alliance Company / R1752N		
Axle Ratio (if driven)	4.30 : 1		
Suspension Type	☐ Air	■ Spring	☐ Other (explain)
No. of Shock Absorbers	2		
Mfr. / Model No.	Sachs / 471700006964		

Bus Number: 1104	Date: 3-30-11

WHEELS & TIRES

Front	Wheel Mfr./ Model No.	Accuride / 9257 28844 22.5 x 7.50
	Tire Mfr./ Model No.	Goodyear G149 RSA / 245/75R 22.5
Rear	Wheel Mfr./ Model No.	Inner – Accuride / 22.5 x 7.5 Outer – Accuride / 9257 28844 22.5 x 7.50
	Tire Mfr./ Model No.	Both - Goodyear G149 RSA / 245/75R 22.5

BRAKES

Front Axle Brakes Type	☐ Cam	■ Disc	☐ Other (explain)
Mfr. / Model No.	Bosch / Not available.		
Middle Axle Brakes Type	☐ Cam	☐ Disc	☐ Other (explain)
Mfr. / Model No.	N/A		
Rear Axle Brakes Type	☐ Cam	■ Disc	☐ Other (explain)
Mfr. / Model No.	Bosch / Not available.		
Retarder Type	N/A		
Mfr. / Model No.	N/A		

HVAC

Heating System Type	☐ Air	■☐ Water	☐ Other
Capacity (Btu/hr)	Not available.		
Mfr. / Model No.	Not available.		
Air Conditioner	■ Yes	☐ No	
Location	Roof		
Capacity (Btu/hr)	130,000		
A/C Compressor Mfr. / Model No.	Carrier / AC310 Max		

STEERING

Steering Gear Box Type	Hydraulic gear
Mfr. / Model No.	TRW / THP-60
Steering Wheel Diameter	17.7
Number of turns (lock to lock)	4.75

Bus Number: 1104	Date: 3-30-11

OTHERS

Wheel Chair Ramps	Location: N/A	Type: N/A
Wheel Chair Lifts	Location: Rear	Type: Hydraulic platform
Mfr. / Model No.	Braun / NCL954F1B3454-2 (Century 2 Series)	
Emergency Exit	Location: Doors Windows Roof hatch	Number: 2 8 1

CAPACITIES

Fuel Tank Capacity (units)	100 gals.
Engine Crankcase Capacity (gallons)	3.75
Transmission Capacity (gallons)	3.70
Differential Capacity (gallons)	2.00
Cooling System Capacity (quarts)	7.75
Power Steering Fluid Capacity (quarts)	4.00

VEHICLE DATA FORM

Bus Number: 1104	Date: 3-30-11

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

Part Number	Description	Qty.
NA	Qstraint System	NA

COMPONENT/SUBSYSTEM INSPECTION FORM

Bus Number: 1104	Date: 3-30-11

Subsystem	Checked	Comments
Air Conditioning Heating and Ventilation	✓	
Body and Sheet Metal	✓	
Frame	✓	
Steering	✓	
Suspension	✓	
Interior/Seating	✓	Driver's seat torn upon arrival.
Axles	✓	
Brakes	✓	
Tires/Wheels	✓	
Exhaust	✓	
Fuel System	✓	
Power Plant	✓	
Accessories	✓	
Lift System	✓	
Interior Fasteners	✓	
Batteries	✓	

CHECK - IN

SUPREME CORP.
MODEL STARTRANS PS2 PRESIDENT

CHECK - IN CONT.

SUPREME CORP.
MODEL STARTRANS PS2 PRESIDENT
EQUIPPED WITH A BRAUN MODEL NCL954F1B3454-2
HYDRAULIC PLATFORM LIFT

CHECK - IN CONT.

INTERIOR VIEW FROM REAR

INTERIOR VIEW FROM FRONT

CHECK - IN CONT.

OPERATOR'S AREA

ENGINE COMPARTMENT

CHECK - IN CONT.

UNDERCARRIAGE FRONT

UNDERCARRIAGE REAR

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: 1104	Date: 8-5-11

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

ACCESSIBILITY DATA FORM

Bus Number: 1104	Date: 8-5-11

Component	Checked	Comments
HVAC :		
A/C Compressor	E.D.	
Filters	E.D.	
Fans	E.D.	
ELECTRICAL SYSTEM :		
Fuses	E.D.	
Batteries	E.D.	
Voltage regulator	E.D.	Internal.
Voltage Converters	N/A	
Lighting	E.D.	
MISCELLANEOUS :		
Brakes	E.D.	
Handicap Lifts/Ramps	E.D.	
Instruments	E.D.	
Axles	E.D.	
Exhaust	E.D.	
Fuel System	E.D.	
OTHERS :		

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

1.2-I. TEST OBJECTIVE

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

1.2.-II. TEST DESCRIPTION

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

1. Unscheduled Maintenance
    a. Bus number
    b. Date
    c. Mileage
    d. Description of malfunction
    e. Location of malfunction (e.g., in service or undergoing inspection)
    f. Repair action and parts used
    g. Man-hours required

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

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

A. Service
    1. Fueling
    2. Consumable checks
    3. Interior cleaning

B. Preventive Maintenance
    4. Brake adjustments
    5. Lubrication
    6. 3,000 mi (or equivalent) inspection

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

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

1.2-III. DISCUSSION

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

(Page 1 of 2)
SCHEDULED MAINTENANCE
Supreme Bus #1104

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
04-15-11	1,239	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
04-22-11	2,663	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
04-29-11	3,747	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
05-03-11	4,276	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
05-18-11	5,879	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
05-23-11	6,653	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
06-03-11	7,590	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
06-20-11	8,777	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00

(Page 2 of 2)
SCHEDULED MAINTENANCE
Supreme Bus #1104

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
06-24-11	9,824	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
01-11-12	10,856	P.M. / Inspection Fuel Economy Prep	Linkage, tie rods,universals/u-joints all lubed. Oil changed. Oil, fuel, and air filters changed. Transmission oil and filter changed.	8.00	8.00
02-10-12	11,255	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00

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. TEST OBJECTIVE

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

1.3-II. TEST DESCRIPTION

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

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

1.3-III. DISCUSSION

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

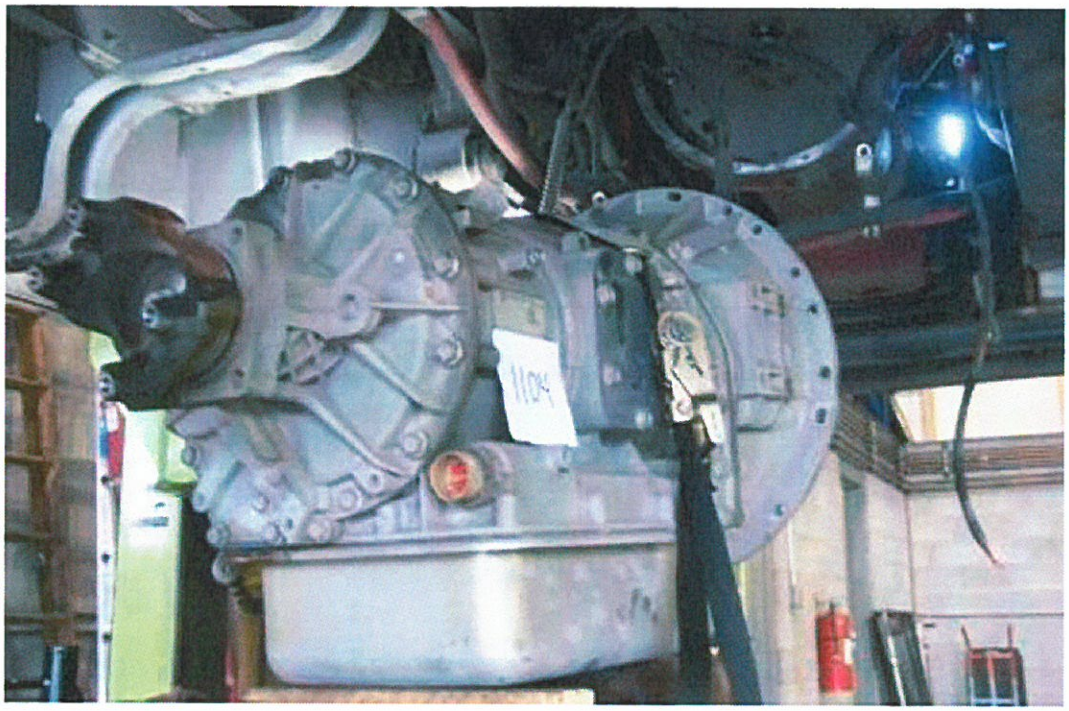
	MAN HOURS
Brake pump relay.	1.0
Right rear leaf spring.	6.0
2 rear tail pipe hangers.	1.0
9 body-to-frames mounts.	4.0
All 4 rear tires.	4.0
Left side A/C support bracket.	2.0
Left rear spring pack.	6.0
Both A/C evaps. & charge.	12.0

At the end of the test, the remaining items on the list were removed and replaced. The transmission assembly took 8.0 man-hours (two men 4.0 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.

REPLACEMENT AND/OR REPAIR FORM

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

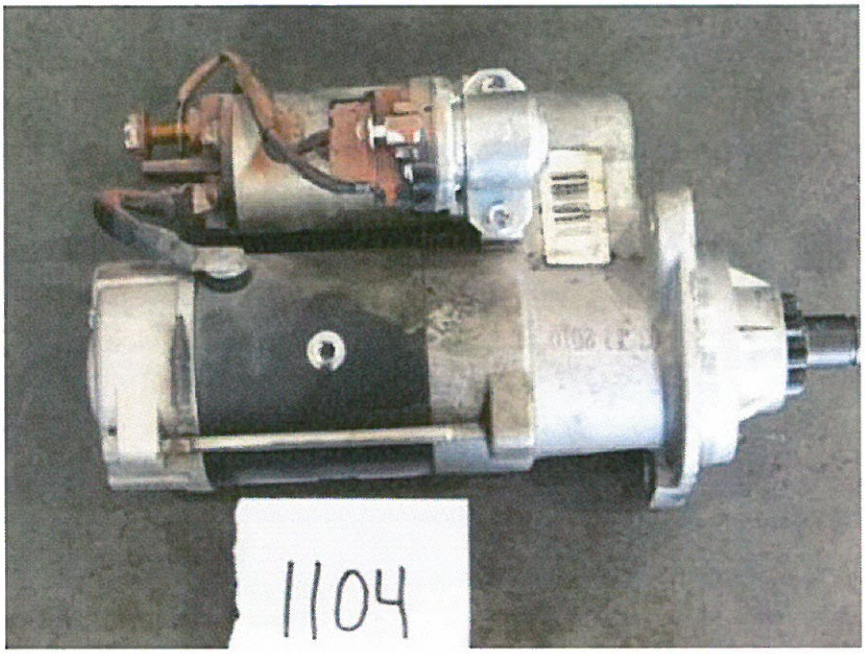
1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS



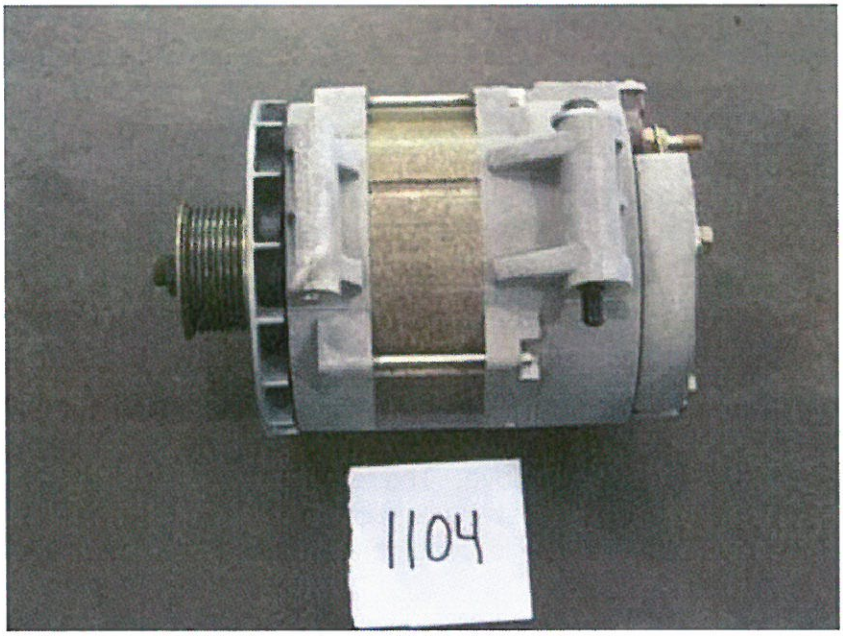
TRANSMISSION REMOVAL AND REPLACEMENT (8.00 MAN HOURS)

WIPER MOTOR REMOVAL AND REPLACEMENT (0.50 MAN HOURS)

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS CONT.



STARTER REMOVAL AND REPLACEMENT (0.75 MAN HOURS)



ALTERNATOR REMOVAL AND REPLACEMENT (0.50 MAN HOURS)

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

2-I. TEST OBJECTIVE

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

2-II. TEST DESCRIPTION

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

CLASS OF FAILURES

Classes of failures are described below:

(a) Class 1: Physical Safety. A failure that could lead directly to passenger or driver injury and represents a severe crash situation.

(b) Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.

(c) Class 3: Bus Change. A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point with a replacement bus.

(d) Class 4: Bad Order. A failure that does not require removal of the bus from service during its assignments but does degrade coach operation. The failure shall be reported by driver, inspector, or hostler.

2-III. DISCUSSION

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

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

The classification of repairs according to subsystem is intended to emphasize those systems which had persistent minor or more serious problems. There were no Class 1 or 2 failures. Of the 10 Class 3 failures, six involved the air conditioning, two occurred with the suspension and one each with the body/frame and brake system. These, and the remaining two Class 4 failures are available for review in the Unscheduled Maintenance List, located in Section 5.7 Structural Durability.

RELIABILITY DATA FORMS
Page 1 of 1

Bus Number: 1104	Date: 07-01-11
Personnel: Bob Reifsteck	

Failure Type			
Class 4 Bad Order	Class 3 Bus Change	Class 2 Road Call	Class 1 Physical Safety

Subsystems	Mileage	Mileage	Mileage	Mileage	Man Hours	Down Time
Air Conditioning		8,136			4.50	125.00
		9,018			1.50	1.50
		9,794			2.00	6.00
		10,856			2.00	48.00
		10,856			6.00	48.00
		10,856			12.00	3,367.00
Suspension		5,543			6.00	2.00
		10,659			6.00	223.00
Body/Frame		6,544			4.00	153.00
Brakes		1,504			1.00	3.00
Exhaust	6,544				1.00	0.50
Wheels/Tires	8,136				4.00	2.00

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: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	

Temperature (°F): 33	Humidity (%): 44
Wind Direction: Calm	Wind Speed (mph): Calm
Barometric Pressure (in.Hg): 30.20	

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

RIGHT - HAND APPROACH

LEFT - HAND APPROACH

4.0 PERFORMANCE

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

4.1-I. TEST OBJECTIVE

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

4.1-II. TEST DESCRIPTION

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

4.1-III. DISCUSSION

This test consists of three runs in both the clockwise and counterclockwise directions on the Test Track. Velocity versus time data is obtained for each run and results are averaged together to minimize any test variability which might be introduced by wind or other external factors. The test was performed up to a maximum speed of 50 mph. The fitted curve of velocity vs. time is attached, followed by the calculated gradeability results. The average time to obtain 50 mph was 27.14 seconds.

PERFORMANCE DATA FORM

Bus Number: 1104	Date: 1/9/12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 32	Humidity (%): 44
Wind Direction: Calm	Wind Speed (mph): Calm
Barometric Pressure (in.Hg): 30.23	
Air Conditioning compressor-OFF	✓Checked
Ventilation fans-ON HIGH	✓Checked
Heater pump motor-Off	✓Checked
Defroster-OFF	✓ Checked
Exterior and interior lights-ON	✓ Checked
Windows and doors-CLOSED	✓ Checked

ACCELERATION, GRADEABILITY, TOP SPEED

Counter Clockwise Recorded Interval Times

Speed	Run 1	Run 2	Run 3
10 mph	3.57	3.95	3.91
20 mph	6.57	6.91	6.94
30 mph	11.17	11.54	11.48
40 mph	18.01	17.85	18.16
Top Test Speed(mph) 50	28.45	28.60	28.54

Clockwise Recorded Interval Times

Speed	Run 1	Run 2	Run 3
10 mph	3.59	3.88	3.98
20 mph	6.26	6.82	6.83
30 mph	10.70	11.04	11.14
40 mph	16.36	16.94	16.80
Top Test Speed(mph) 50	25.45	25.86	25.95

1104.ACC

PERFORMANCE SUMMARY SHEET

BUS MANUFACTURER :Supreme
BUS MODEL :Startrans PS2 Presid
BUS NUMBER :1104
TEST DATE :01/19/12

TEST CONDITIONS :

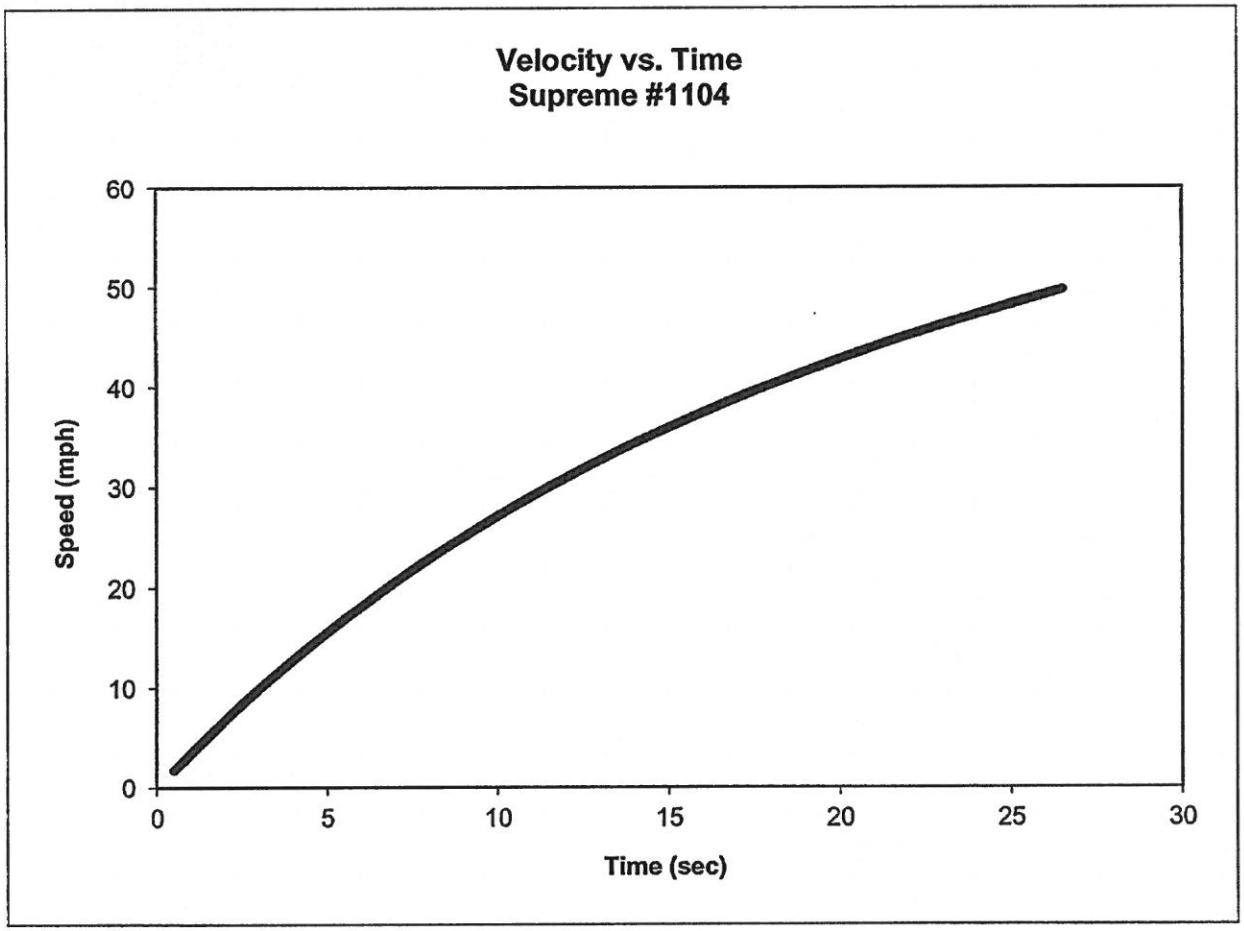
TEMPERATURE (DEG F) : 32.0
WIND DIRECTION : Calm
WIND SPEED (MPH) : .0
HUMIDITY (%) : 44
BAROMETRIC PRESSURE (IN. HG) : 30.2

VEHICLE SPEED	AVERAGE TIME (SEC)		
(MPH)	CCW DIRECTION	CW DIRECTION	TOTAL
10.0	3.82	3.81	3.81
20.0	6.64	6.81	6.72
30.0	10.96	11.40	11.18
40.0	16.70	18.01	17.35
50.0	25.75	28.53	27.14

TEST SUMMARY :

VEHICLE SPEED (MPH)	TIME (SEC)	ACCELERATION (FT/SEC^2)	MAX. GRADE (%)
1.0	.28	5.2	16.4
5.0	1.44	4.9	15.3
10.0	3.03	4.4	13.8
15.0	4.78	4.0	12.4
20.0	6.75	3.5	11.0
25.0	8.97	3.1	9.7
30.0	11.49	2.7	8.4
35.0	14.41	2.3	7.3
40.0	17.82	2.0	6.2
45.0	21.87	1.7	5.1
50.0	26.78	1.3	4.2

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


Velocity vs. Time
Supreme #1104
Speed (mph)
60
50
40
30
20
10
0
0
5
10
15
20
25
30
Time (sec)

4.0 PERFORMANCE

4.2 Performance - Bus Braking

4.2 I. TEST OBJECTIVE

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

4.2 II. TEST DESCRIPTION

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

The brake testing procedure comprises three phases:

1. Stopping distance tests

    i. Dry surface (high-friction, Skid Number within the range of 70-76)
    ii. Wet surface (low-friction, Skid Number within the range of 30-36)

2. Stability tests
3. Parking brake test

Stopping Distance Tests

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

The tests will be conducted as follows:

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

2. **Uniform Low Friction Tests:** Four maximum deceleration straight-line brake applications from 20 mph on a uniform low friction surface in a 3.66-m (12-ft) wide lane.

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

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

Stability Tests

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

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

Parking Brake Test

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

4.2-III. DISCUSSION

The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 31.61' at 20 mph, 61.73' at 30 mph, 110.49' at 40 mph and 142.03' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 31.77' There was no deviation from the test lane during the performance of the Stopping Distance phase.

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

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

Table 4.2-6. Braking Test Data Forms

Bus Number: 1104	Date: 1-6-12
Personnel: M.R., T.S., B.L. & S.C.	
Amb. Temperature (°F): 46	Wind Speed (mph): 10
Wind Direction: SW	Pavement Temperature: Start: 44° End: 54.1°

TIRE INFLATION PRESSURE (psi):				
Tire Type: Front: Toyo M154 245/75R 22.5 Rear: Toyo M154 245/75R 22.5				
	Left Tire(s)		Right Tire(s)	
Front	110		110	
	Inner	Outer	Inner	Outer
Rear	110	110	110	110
Rear	N/A	N/A	N/A	N/A

AXLE LOADS (lb)		
	Left	Right
Front	4,480	4,320
Rear	9,420	9,570

FINAL INSPECTION	
Bus Number: 1104	Date: 1-6-12
Personnel: B.L. & S.C.	

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

Date	Personnel	Fault/Repair	Description
1/6/12	B.L. & S.C.	None noted.	

Table 4.2-8.1. Stopping Distance Test Results Form

Stopping Distance (ft)					
Vehicle Direction	CW	CW	CCW	CCW	
Speed (mph)	**Stop 1**	**Stop 2**	**Stop 3**	**Stop 4**	**Average**
20 (dry)	33.00	31.98	30.81	30.64	31.61
30 (dry)	61.06	65.19	61.53	59.14	61.73
40 (dry)	115.43	115.97	104.39	106.15	110.49
45 (dry)	145.77	149.05	134.79	138.50	142.03
20 (wet)	34.77	32.05	30.31	29.95	31.77

Table 4.2-8.2. Stability Test Results Form

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

Table 4.2-8.3. Parking Brake Test Form

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

5. STRUCTURAL INTEGRITY

5.1 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL SHAKEDOWN TEST

5.1-I. DISCUSSION

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

5.1-II. TEST DESCRIPTION

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

5.1-III. DISCUSSION

This test was performed based on a maximum passenger capacity of 47 people including the driver plus 3 wheelchair positions. The resulting test load is (47 x 375 lb) = 17,625 lb. + 1,800 lbs (3 wheelchair position) = 19,425 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 0.395 inches at reference point 10. The maximum permanent deflection after the final loading sequence ranged from -0.003 inches at reference point 1 to 0.003 inches at reference point 9.

STRUCTURAL SHAKEDOWN DATA FORM

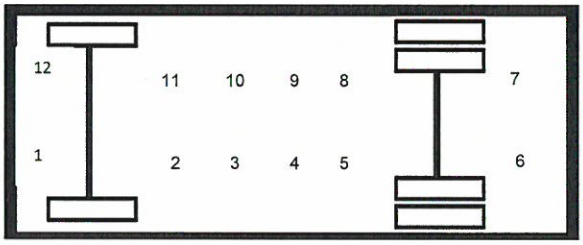
Bus Number: 1104	Date: 4-4-11
Personnel: T.S., E.L., E.D. & B.L.	Temperature (°F): 62
Loading Sequence: ■ 1 ☐ 2 ☐ 3 (check one) Test Load (lbs): 19,425 (29 seated, 18 standees & 3 w/c positions)	

Indicate Approximate Location of Each Reference Point

Right

Front of Bus

Left



Top View

Reference Point No.	A (in) Original Height	B (in) Loaded Height	B-A (in) Loaded Deflection	C (in) Unloaded Height	C-A (in) Permanent Deflection
1	0	-.118	-.118	-.019	-.019
2	0	.255	.255	.021	.021
3	0	.404	.404	.032	.032
4	0	.521	.521	.034	.034
5	0	.284	.284	.025	.025
6	0	-.075	-.075	-.024	-.024
7	0	-.103	-.103	-.029	-.029
8	0	.303	.303	.029	.029
9	0	.434	.434	.045	.045
10	0	.434	.434	.040	.040
11	0	.268	.268	.028	.028
12	0	-.247	-.247	-.004	-.004

STRUCTURAL SHAKEDOWN DATA FORM

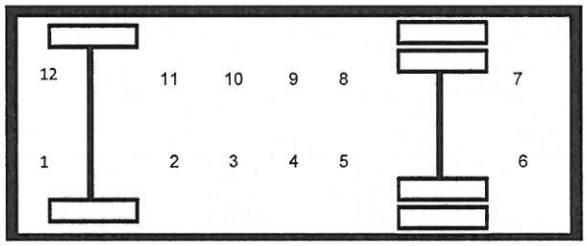
Bus Number: 1104	Date: 4-5-11
Personnel: T.S., B.L., E.L. & E.D.	Temperature (°F): 44
Loading Sequence: ☐ 1 ■ 2 ☐ 3 (check one) Test Load (lbs): 19,425 (29 seated, 18 standees & 3 w/c positions)	

Indicate Approximate Location of Each Reference Point

Right

Front of Bus

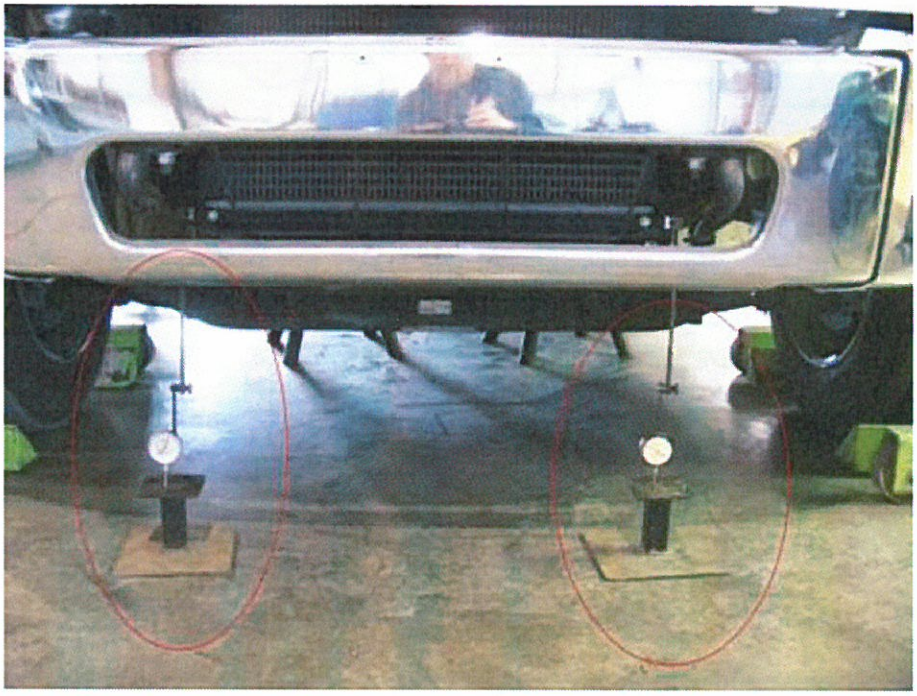
Left



Top View

Reference Point No.	A (in) Original Height	B (in) Loaded Height	B-A (in) Loaded Deflection	C (in) Unloaded Height	C-A (in) Permanent Deflection
1	-.019	-.117	-.098	-.022	-.003
2	.021	.256	.235	.022	.001
3	.032	.404	.372	.034	.002
4	.034	.421	.387	.036	.002
5	.025	.286	.261	.025	.000
6	-.024	-.076	-.052	-.024	.000
7	-.029	-.105	-.076	-.031	-.002
8	.029	.304	.275	.031	.002
9	.045	.437	.392	.048	.003
10	.040	.435	.395	.042	.002
11	.028	.270	.242	.029	.001
12	-.004	-.244	-.204	-.006	-.002

5.1 STRUCTURAL SHAKEDOWN TEST



DIAL INDICATORS IN POSITION

BUS LOADED TO 2.5 TIMES GVL
(19,425 LBS)

5.2 STRUCTURAL STRENGTH AND DISTORTION TESTS - STRUCTURAL DISTORTION

5.2-I. TEST OBJECTIVE

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

5.2-II. TEST DESCRIPTION

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

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

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

5.2-III. DISCUSSION

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

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

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies.
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

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

Bus Number: 1104	Date: 4-8-11
Personnel: E.L., E.D., B.L., T.S. & 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

	Comments
■ Windows	No deficiencies.
■ Front Doors	No deficiencies.
■ Rear Doors	No deficiencies.
■ Escape Mechanisms/ Roof Vents	No deficiencies.
■ Engine	No deficiencies.
■ Handicapped Device/ Special Seating	No deficiencies.
■ Undercarriage	No deficiencies
■ Service Doors	No deficiencies.
■ Body	No deficiencies.
■ Windows/ Body Leakage	No deficiencies.
■ Steering Mechanism	No deficiencies.

5.2 STRUCTURAL DISTORTION TEST

LEFT FRONT WHEEL SIX INCHES HIGHER

RIGHT REAR WHEEL SIX INCHES LOWER

5.3 STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC TOWING TEST

5.3-I. TEST OBJECTIVE

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

5.3-II. TEST DESCRIPTION

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

5.3-III. DISCUSSION

The load-distributing yoke was incorporated as the interface between the Static Tow apparatus and the test bus tow hook/eyes. The front test was performed to the full target test weight of 22,716 lbs (1.2 x 18,930 lbs CW). No damage or deformation was observed during all four pulls of the front test. The test bus was not equipped with a rear towing interface therefore a rear test was not performed.

STATIC TOWING TEST DATA FORM

Bus Number: 1104	Date: 1-30-12
Personnel: B.L. & E.L.	Temperature (°F): 33

Inspect right front tow eye and adjoining structure.
Comments: No damage or deformation observed.
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: Torques verified.
Inspect left tow eye and adjoining structure.
Comments: No damage or deformation observed.
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: Torques verified.
Inspect right rear tow eye and adjoining structure.
Comments: N/A
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: N/A
Inspect left rear tow eye and adjoining structure.
Comments: N/A
Check the torque of all bolts attaching tow eye and surrounding structure.
Comments: N/A
General comments of any other structure deformation or failure: All four front pulls were completed to the full target test load of 22,716 lbs (1.2 x 18,930 lbs CW). No damage or deformation was observed. The rear is not equipped with a towing interface therefore a rear test was not performed.

5.3 STATIC TOWING TEST

FRONT 20° UPWARD PULL

FRONT 20°DOWN PULL

5.3 STATIC TOWING TEST CONT.

FRONT 20° LEFT PULL

FRONT 20°RIGHT PULL

5.4 STRUCTURAL STRENGTH AND DISTORTION TESTS - DYNAMIC TOWING TEST

5.4-I. TEST OBJECTIVE

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

5.4-II. TEST DESCRIPTION

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

5.4-III. DISCUSSION

The bus was towed using a heavy-duty wrecker. The towing interface was accomplished by incorporating a hydraulic under lift. A front lift tow was performed. No problems, deformation, or damage was noted during testing. The test bus was not equipped with a rear towing interface; therefore, a rear test was not performed.

DYNAMIC TOWING TEST DATA FORM

Bus Number: 1104	Date: 1-19-12
Personnel: T.S. & E.D.	

Temperature (°F): 30	Humidity (%): 72
Wind Direction: WSW	Wind Speed (mph): 7
Barometric Pressure (in.Hg): 29.97	

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

5.4 DYNAMIC TOWING TEST

TOWING INTERFACE

TEST BUS IN TOW

5.5 STRUCTURAL STRENGTH AND DISTORTION TESTS – JACKING TEST

5.5-I. TEST OBJECTIVE

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

5.5-II. TEST DESCRIPTION

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

5.5-III. DISCUSSION

The jack used for this test has a minimum height of 8.75 inches. During the deflated portion of the test, the jacking point clearances ranged from 6.7 inches to 11.9 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	10.4"
Rear axle – one tire flat	11.8"
Rear axle – two tires flat	8.4"

JACKING TEST DATA FORM

Bus Number: 1104	Date: 4-1-11
Personnel: E.D. & E.L.	Temperature (°F): 38

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

Deflated Tire	Jacking Pad Clearance Body/Frame (in)	Jacking Pad Clearance Axle/Suspension (in)	Comments
Right front	13.5 " I 11.6 " D	9.3 " I 6.8 " D	
Left front	12.4 " I 10.4 " D	9.3 " I 6.7 " D	
Right rear—outside	12.4 " I 11.9 " D	10.5 " I 10.1 " D	
Right rear—both	12.4 " I 8.4 " D	10.5 " I 9.2 " D	
Left rear—outside	12.3 " I 11.8 " D	10.5 " I 10.1 " D	
Left rear—both	12.3 " I 8.4 " D	10.5 " I 9.3 " D	

Additional comments of any deformation or difficulty during jacking:
None noted.

5.6 STRUCTURAL STRENGTH AND DISTORTION TESTS - HOISTING TEST

5.6-I. TEST OBJECTIVE

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

5.6-II. TEST DESCRIPTION

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

5.6-III. DISCUSSION

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

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

HOISTING TEST DATA FORM

Bus Number: 1104	Date: 4-1-11
Personnel: E.D. & E.L.	Temperature (°F): 69

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

5.7 STRUCTURAL DURABILITY TEST

5.7-I. TEST OBJECTIVE

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

5.7-II. TEST DESCRIPTION

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

5.7-III. DISCUSSION

The Structural Durability Test was started on April 8, 2011 and was conducted until July 1, 2011. The first 4,625 miles were performed at a GVW of 27,790 lbs. and completed on May 5, 2011. **Note: at GVL the load is 1,490 lbs. over the rear GAWR and 1,790 lbs over the GVWR.** The next 2,000 mile SLW segment was performed at 25,150 lbs and completed on May 31, 2011, and the final 4,625 mile segment was performed at a CW of 18,930 lbs and completed on July 1, 2011.

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

Supreme - TEST BUS #1104

MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
04/04/11 TO 04/10/11	118.00	52.00	170.00
04/11/11 TO 04/17/11	1128.00	114.00	1242.00
04/18/11 TO 04/24/11	1225.00	117.00	1342.00
04/25/11 TO 05/01/11	908.00	81.00	989.00
05/02/11 TO 05/08/11	459.00	1341.00	1800.00
05/09/11 TO 05/15/11	0.00	0.00	0.00
05/16/11 TO 05/22/11	923.00	41.00	964.00
05/23/11 TO 05/29/11	358.00	20.00	378.00
5/30/2011 TO 06/05/11	764.00	34.00	798.00
06/06/11 TO 06/12/11	389.00	64.00	453.00
06/13/11 TO 06/19/11	450.00	100.00	550.00
06/20/11 TO 06/26/11	1173.00	56.00	1229.00
06/27/11 TO 07/03/11	855.00	86.00	941.00
1/9/2012 TO 01/15/12	0.00	185.00	185.00

Supreme - TEST BUS #1104

MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
01/16/12 TO 01/22/12	0.00	0.00	0.00
01/23/12 TO 01/29/12	0.00	51.00	51.00
01/30/12 TO 02/05/12	0.00	0.00	0.00
02/06/12 TO 02/12/12	0.00	163.00	163.00
TOTAL	8750.00	2505.00	11255.00

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

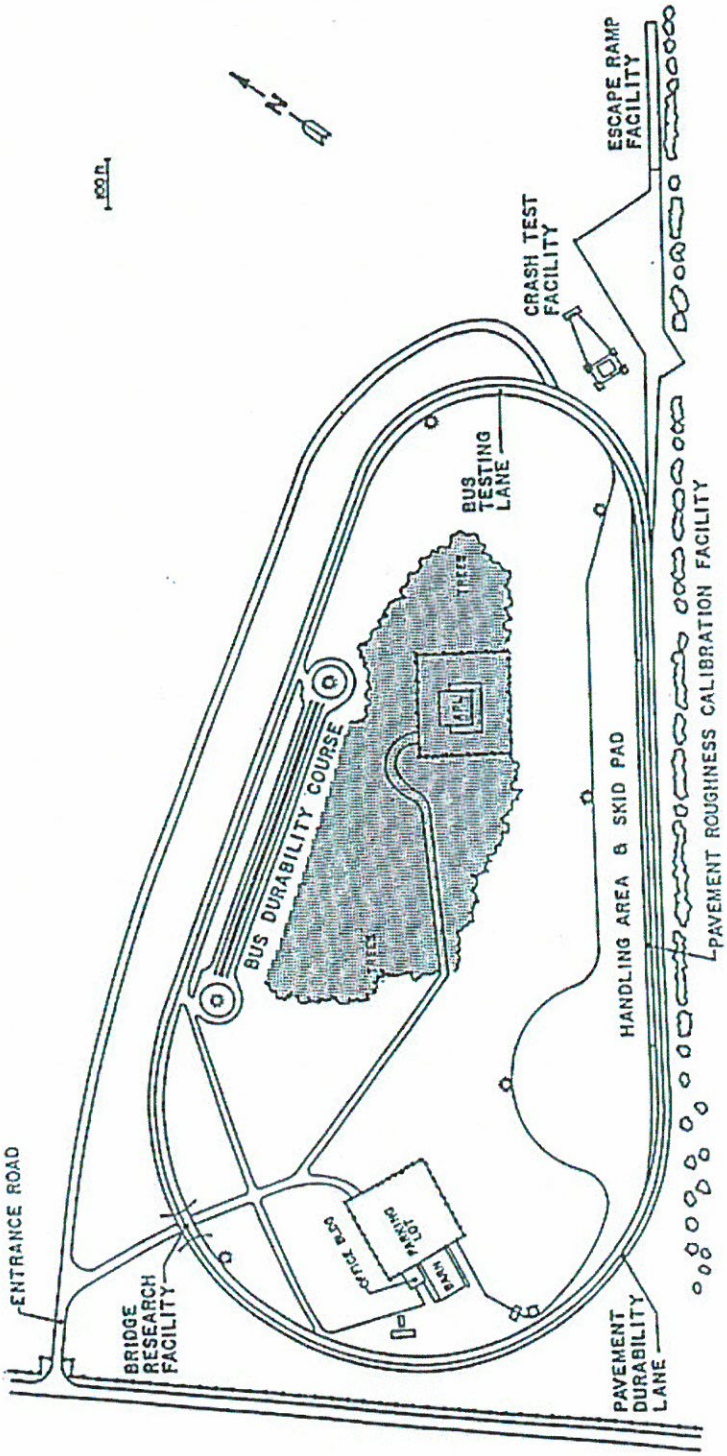
STANDARD OPERATING SCHEDULE

Monday through Friday

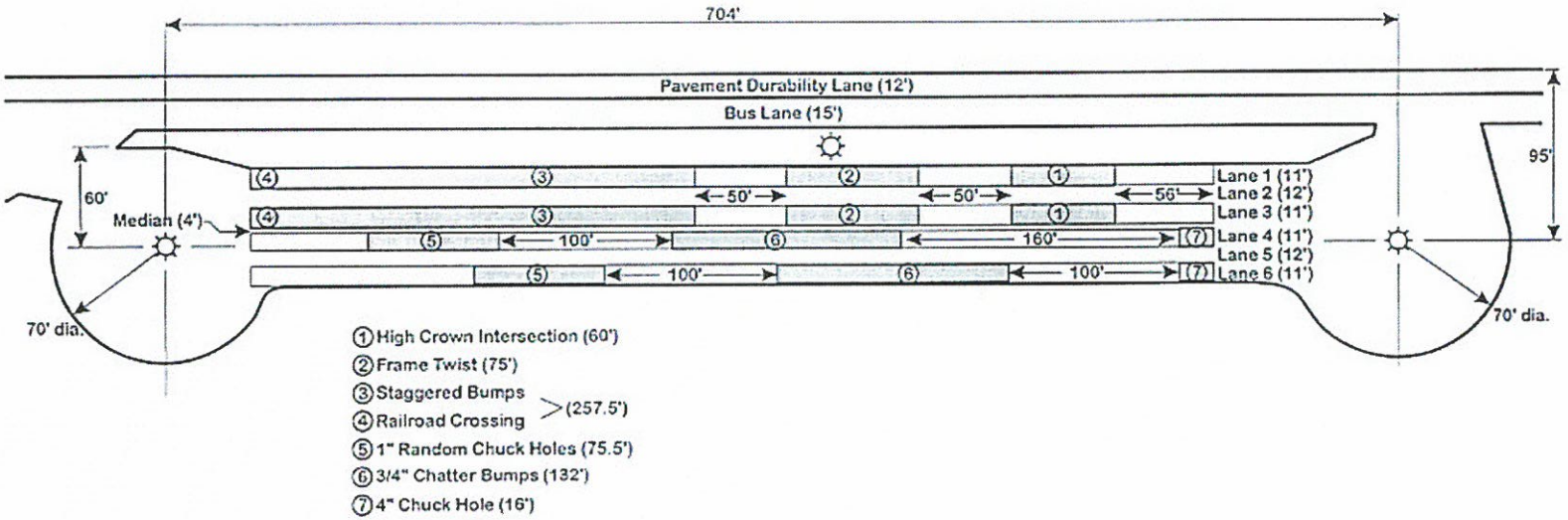
	HOUR	ACTION
Shift 1	midnight	D
	1:40 am	C
	1:50 am	B
	2:00 am	D
	3:35 am	C
	3:45 am	B
	4:05 am	D
	5:40 am	C
	5:50 am	B
	6:00 am	D
	7:40 am	C
	7:50 am	F
Shift 2	8:00 am	D
	9:40 am	C
	9:50 am	B
	10:00 am	D
	11:35 am	C
	11:45 am	B
	12:05 pm	D
	1:40 pm	C
	1:50 pm	B
	2:00 pm	D
	3:40 pm	C
	3:50 pm	F
Shift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

B---Break
C----Cycle all systems five times, visual inspection, driver's log entries
D---Drive bus as specified by procedure
F----Fuel bus, complete driver's log shift entries

"PLAN VIEW OF PENN STATE BUS TESTING AND RESEARCH FACILITY"



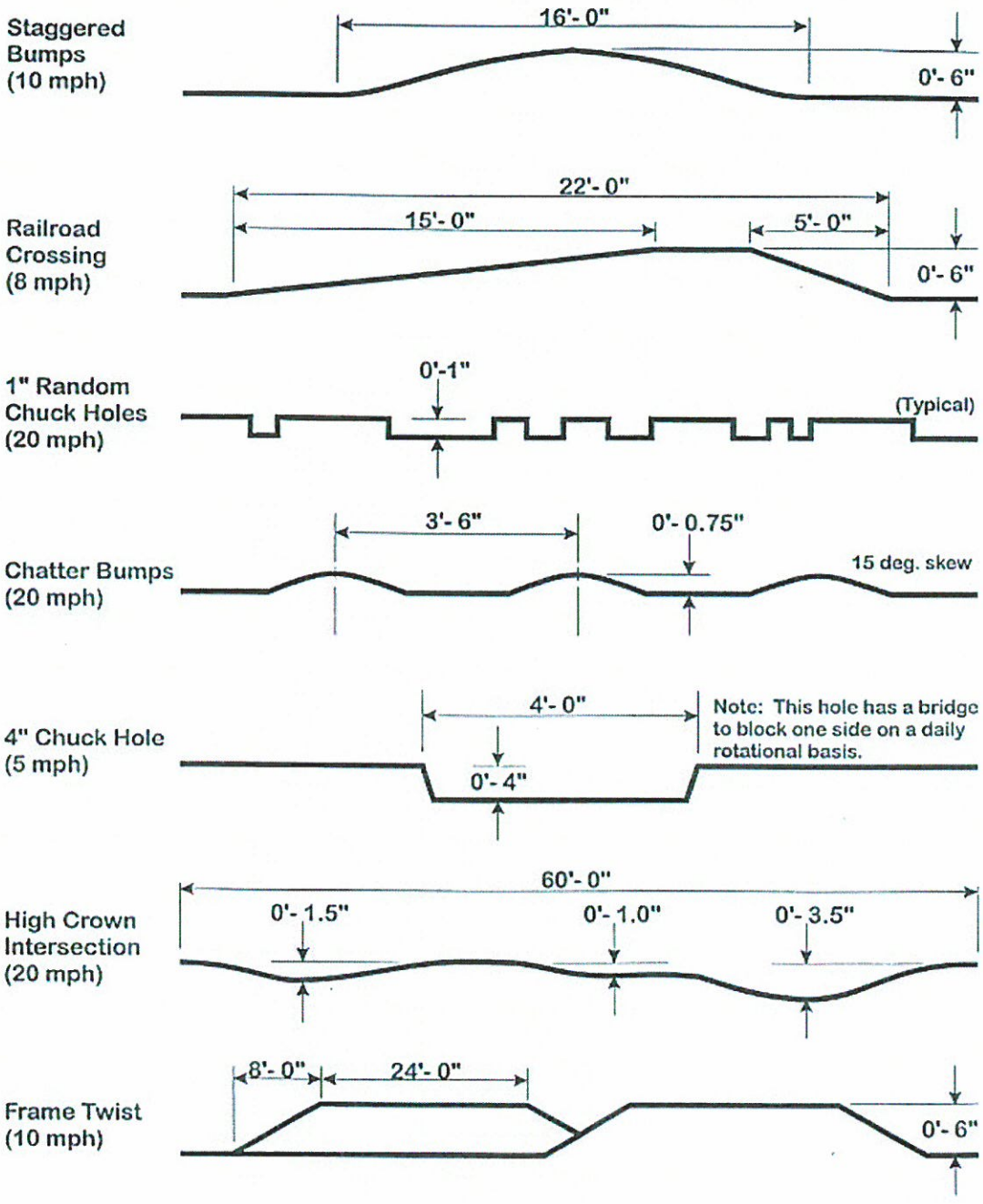
BUS TESTING AND RESEARCH TEST TRACK
UNIVERSITY PARK, PA



Plan View

Vehicle Durability Test Track

The Pennsylvania Transportation Institute
Penn State



Durability Element Profiles

The Pennsylvania Transportation Institute
Penn State

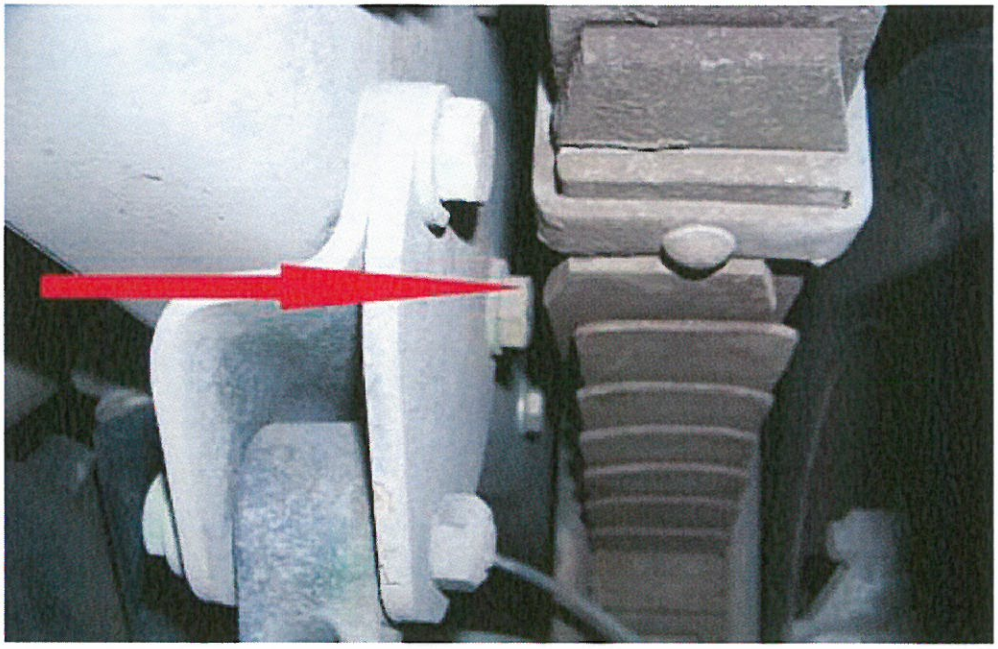
(Page 1 of 2)
UNSCHEDULED MAINTENANCE
Supreme Bus #1104

DATE	TEST MILES	SERVICE	ACTIVITY	MAN HOURS	DOWN TIME
04-18-11	1,504	The brake booster pump will not shut off.	Troubleshooting found the pump relay sticking on. Replaced relay.	1.00	3.00
05-16-11	5,543	Three plies are broken on the right rear leaf spring.	Replaced the right rear leaf spring.	6.00	2.00
06-03-11	6,544	The two rear tailpipe hangers are broken.	Replaced two rear tailpipe hangers.	1.00	0.50
06-03-11	6,544	Nine body-to-frame mounts are broken.	Replaced nine body-to-frame mounts.	4.00	153.00
06-10-11	8,136	All four rear tires are worn.	Replaced all four rear tires (mounting included).	4.00	2.00
06-14-11	8,136	Air conditioning system is not cooling.	Troubleshooting found a leak in the low pressure line. Repaired leaking line. Evacuated and recharged system.	4.50	125.00
06-21-11	9,018	The air conditioning system is not cooling.	Refrigerant charge completed by Thermo King representative.	1.50	1.50
06-24-11	9,794	The left side support bracket for the air conditioning accumulator is broken causing the refrigerant lines to loosen and leak refrigerant.	Installed new support bracket and tightened A/C fittings. Pending refrigerant charge.	2.00	6.00

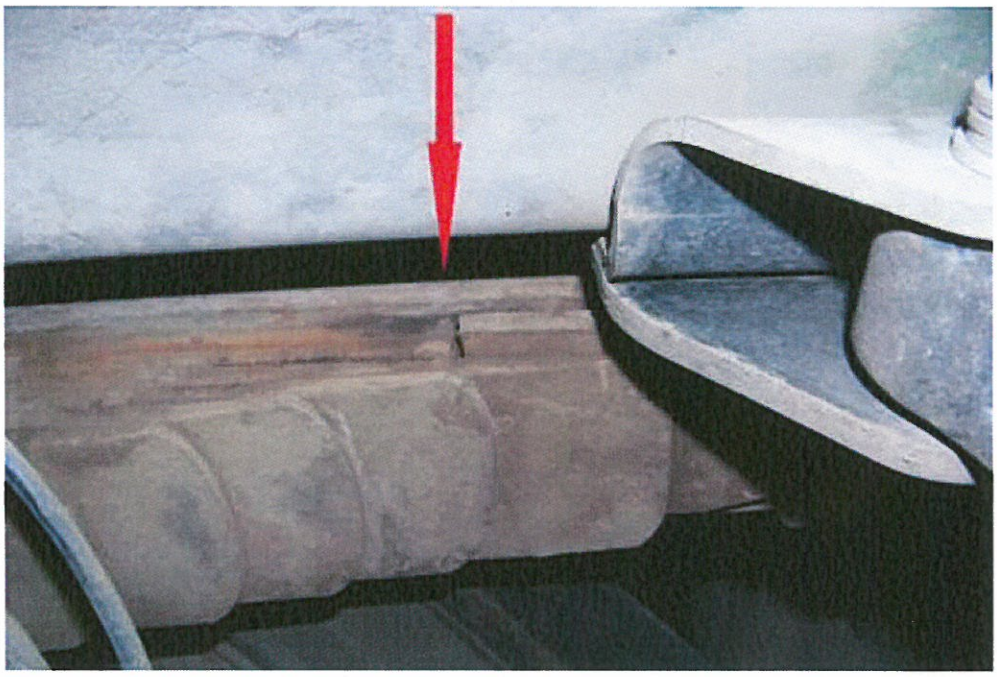
(Page 2 of 2)
UNSCHEDULED MAINTENANCE
Supreme Bus #1104

DATE	TEST MILES	SERVICE	ACTIVITY	MAN HOURS	DOWN TIME
06-30-11	10,659	The left rear spring is broken 22 inches from the forward spring pin.	Replaced left rear spring pack.	6.00	223.00
07-12-11	10,856	Two A/D lines are broken—overhead, forward.	Repaired two overhead A/C lines.	2.00	48.00
07-12-11	10,856	The HVAC trunk line on the left side overhead is coming apart.	Repaired HVAC trunk line on the left side overhead.	6.00	48.00
12-22-11	10,856	Both A/C evaporators are cracked. Refrigerant leaked off.	Warranty dealer replaced both evaporators and charged system.	12.00	3367.00

UNSCHEDULED MAINTENANCE

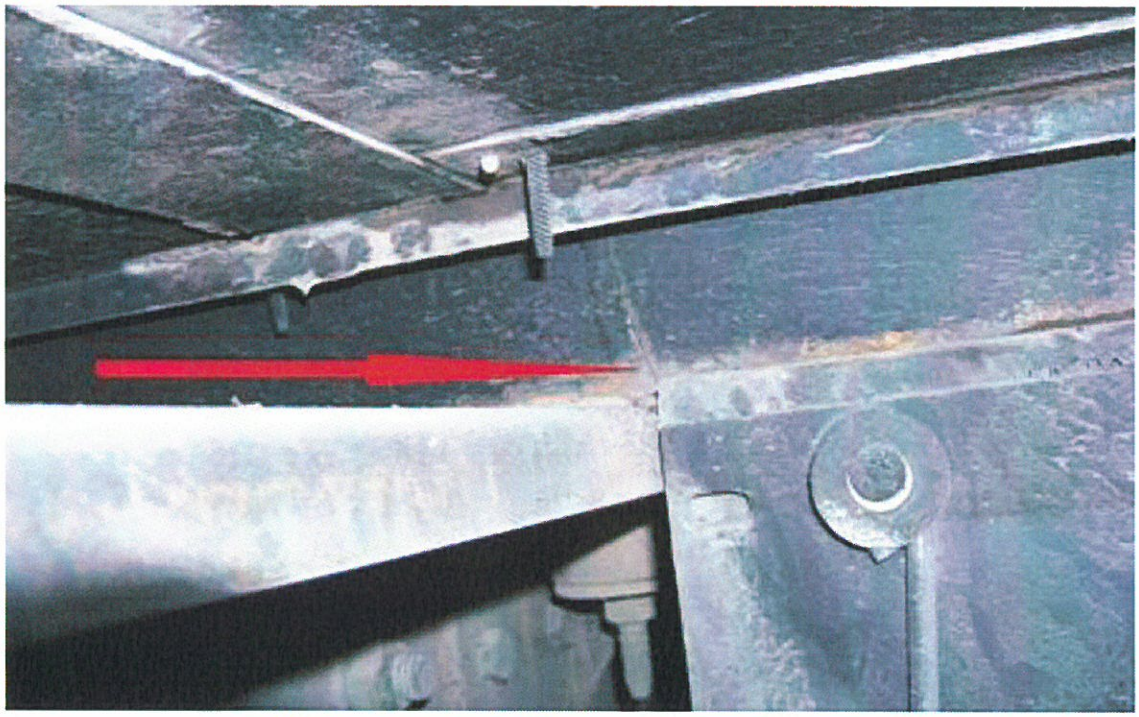


BROKEN SPRING PLIES, RIGHT REAR LEAF SPRING (5,543 TEST MILES)

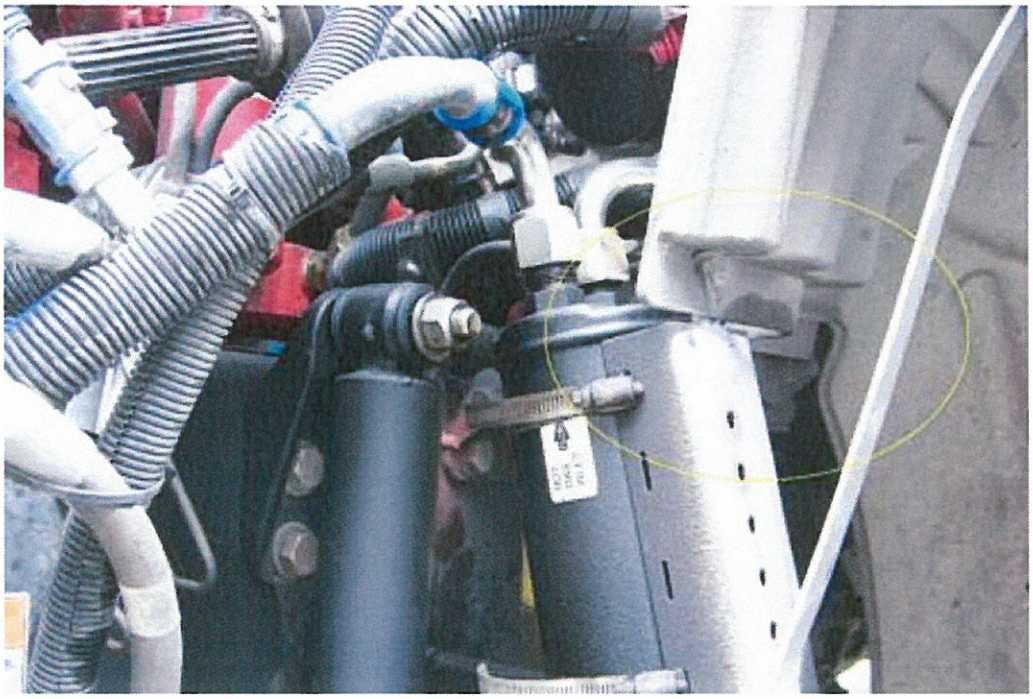


UNSCHEDULED MAINTENANCE CONT.

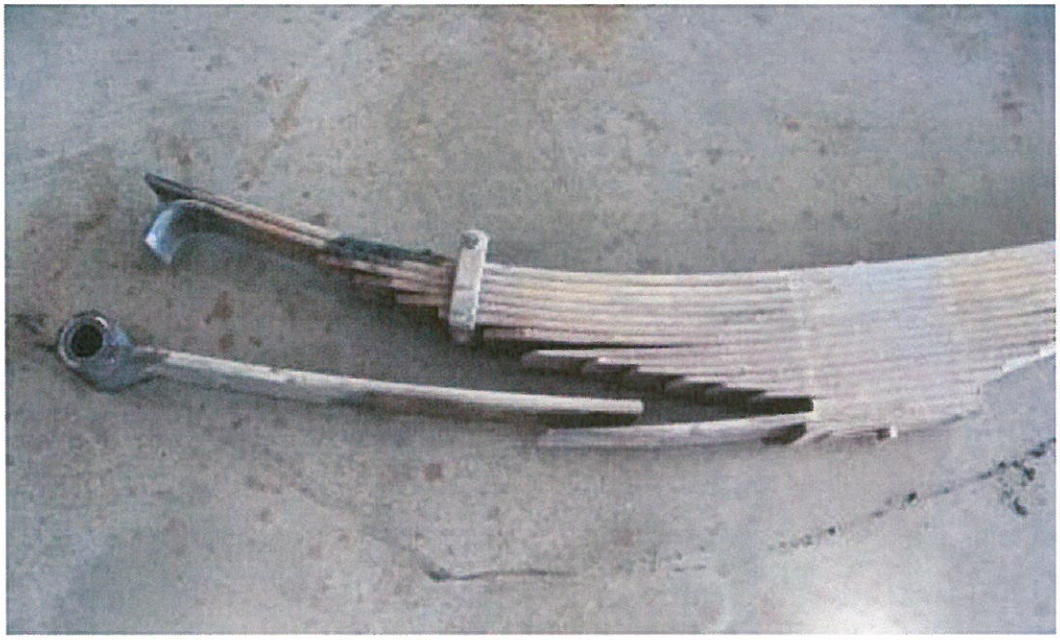
NUMEROUS CRACKED BODY-TO-FRAME MOUNTS (6,544 TEST MILES)



UNSCHEDULED MAINTENANCE CONT.

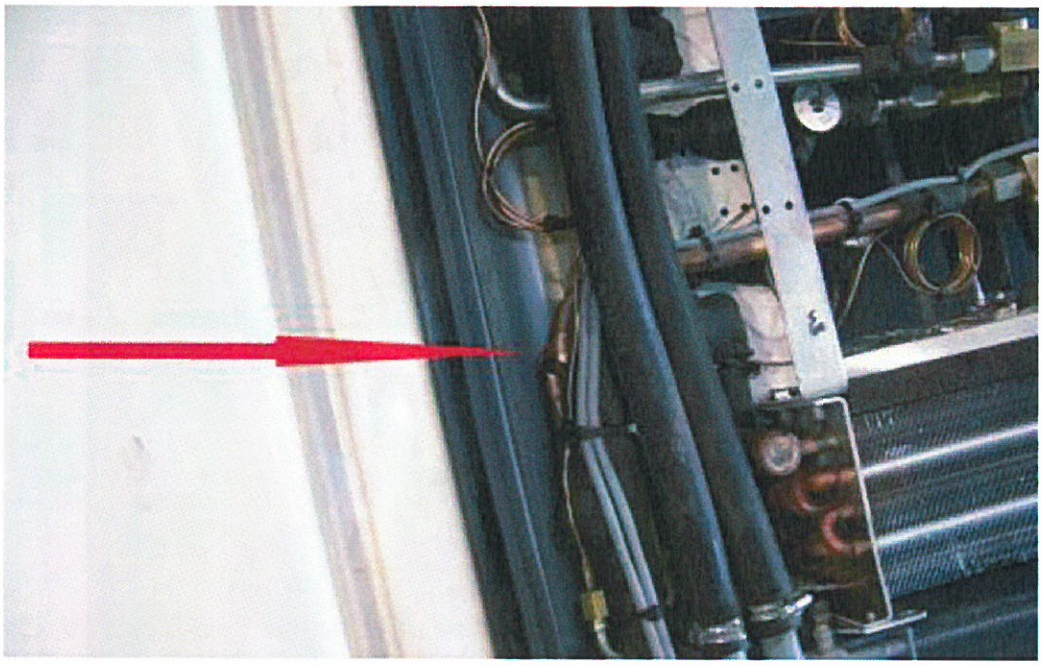


BROKEN AC ACCUMULATOR MOUNTING BRACKET
(9,749 TEST MILES)

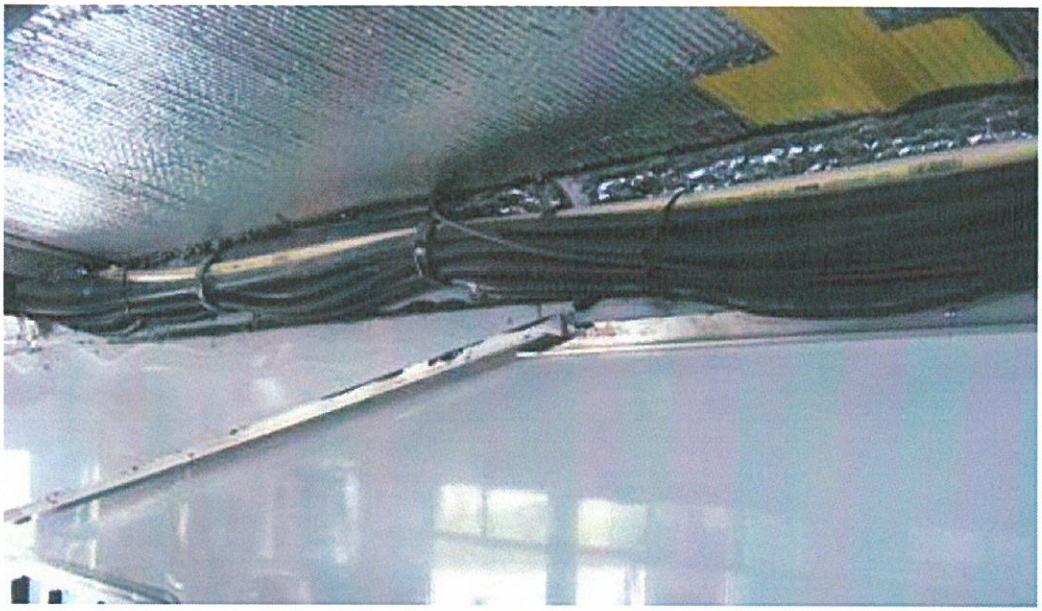


BROKEN LEFT REAR SPRING PLY
(10,659 TEST MILES)

UNSCHEDULED MAINTENANCE CONT.

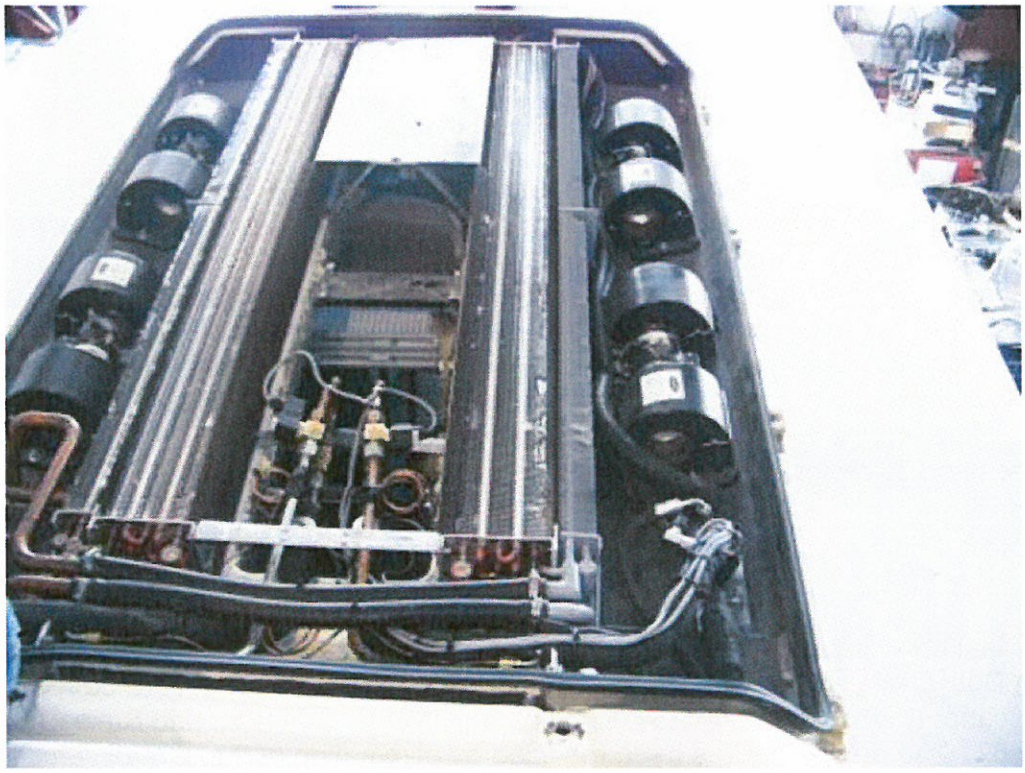


BROKEN AC LINE
(10,856 TEST MILES)



OVERHEAD AC TRUNK LINE COMING APART
(10,856 TEST MILES)

UNSCHEDULED MAINTENANCE CONT.



BOTH AC EVAPORATORS CRACKED AND LEAKING (10,856 TEST MILES)

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

6-I. TEST OBJECTIVE

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

6-II. TEST DESCRIPTION

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

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

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

1. The ADB cycle is structured as a set number of miles in a fixed time in the following order: CBD, Arterial, CBD, Arterial, CBD, and Commuter. A separate idle fuel consumption measurement is performed at the beginning and end of the fuel economy test. This phase sequence permits the reporting of fuel consumption for each of these phases separately, making the data more useful to bus manufacturers and transit properties.

2. The operating profile for testing purposes shall consist of simulated transit type service at seated load weight. The three test phases (figure 6-1) are: a central business district (CBD) phase of 2 miles with 7 stops per mile and a top speed of 20 mph; an arterial phase of 2 miles with 2 stops per mile and a top speed of 40 mph; and a commuter phase of 4 miles with 1 stop and a maximum speed of 40 mph. At each designated stop the bus will remain stationary for seven seconds. During this time, the passenger doors shall be opened and closed.

3. The individual ADB phases remain unaltered with the exception that 1 mile has been changed to 1 lap on the Penn State Test Track. One lap is equal to 5,042 feet. This change is accommodated by adjusting the cruise distance and time.

4. The acceleration profile, for practical purposes and to achieve better repeatability, has been changed to "full throttle acceleration to cruise speed".

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

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

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

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

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

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

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

FUEL ECONOMY CALCULATION PROCEDURE

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

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

The fuel economy correction consists of three steps:

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

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

$$\mathbf{FEo_{mi/lb}} = \text{Observed fuel economy} = \frac{\text{miles}}{\text{lb of fuel}}$$

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

$$\mathbf{FEo_{mpg}} = \mathbf{FEc_{mi/lb}} \times Gs \times Gw$$

where **Gs** = Specific gravity of test fuel at 60°F (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.

$$\mathbf{FEc} = \mathbf{FEo_{mpg}} \times \frac{Q}{H}$$

where

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

Combining steps 1-3 yields

$$\Rightarrow FEc = \frac{miles}{lbs} \times (Gs \times Gw) \times \frac{Q}{H}$$

4.) Covert the fuel economy from mpg to an energy equivalent of miles per BTU. Since the number would be extremely small in magnitude, the energy equivalent will be represented as miles/BTUx10^6.

Eq = Energy equivalent of converting mpg to mile/BTUx10^6.

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

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°F). 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.

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

$$\mathbf{FEo_{mi/scf}} = \text{Observed fuel economy} = \frac{\text{miles}}{\text{scf of fuel}}$$

2.) Convert the observed fuel economy to miles per lb by dividing FEo by the density of the test fuel at standard conditions (Lb/ft^3).

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.

$$\mathbf{FEo_{mi/lb}} = FEo / Gm$$

where Gm = Density of test fuel at standard conditions

3.) Convert the observed fuel economy (FEomi/lb) to an energy equivalent of (miles/BTUx10^6) 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/BTUx10^6
H = Volumetric heating value of test fuel at standard conditions

6-III. DISCUSSION

This is a comparative test of fuel economy using diesel fuel with a heating value of 19,631.0 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 126,700.0 btu/gal.

An extensive pretest maintenance check is made including the replacement of all lubrication fluids. The details of the pretest maintenance are given in the first three Pretest Maintenance Forms. The fourth sheet shows the Pretest Inspection. The next sheet shows the correction calculation for the test fuel. The next four Fuel Economy Forms provide the data from the four test runs. Finally, the summary sheet provides the average fuel consumption. The overall average is based on total fuel and total mileage for each phase. The overall average fuel consumption values were; CBD – 4.91 mpg, ART – 5.11 mpg, and COM – 9.06 mpg. Average fuel consumption at idle was 0.86 gph.

FUEL ECONOMY PRE-TEST MAINTENANCE FORM

Bus Number: 1104	Date: 1-4-12	SLW (lbs): 25,150
Personnel: B.L., E.L. & E.D.		

FUEL SYSTEM	OK	Date	Initials
Install fuel measurement system	✓	1/11/12	B.L.
Replace fuel filter	✓	1/11/12	B.L.
Check for fuel leaks	✓	1/11/12	B.L.
Specify fuel type (refer to fuel analysis)	Diesel		
Remarks: None noted.			
BRAKES/TIRES	OK	Date	Initials
Inspect hoses	✓	1/4/12	E.D.
Inspect brakes	✓	1/4/12	E.D.
Relube wheel bearings	✓	1/4/12	E.D.
Check tire inflation pressures (mfg. specs.)	✓	1/4/12	E.D.
Remarks: None noted.			
COOLING SYSTEM	OK	Date	Initials
Check hoses and connections	✓	1/4/12	B.L.
Check system for coolant leaks	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 1104	Date: 1-4-12
Personnel: B.L., E.D. & E.L.	

ELECTRICAL SYSTEMS	OK	Date	Initials
Check battery	✓	1/4/12	B.L.
Inspect wiring	✓	1/4/12	B.L.
Inspect terminals	✓	1/4/12	B.L.
Check lighting	✓	1/4/12	B.L.
Remarks: None noted.			

DRIVE SYSTEM	OK	Date	Initials
Drain transmission fluid	✓	1/4/12	E.L.
Replace filter/gasket	✓	1/4/12	E.L.
Check hoses and connections	✓	1/4/12	E.L.
Replace transmission fluid	✓	1/4/12	E.L.
Check for fluid leaks	✓	1/4/12	E.L.
Remarks: None noted.			

LUBRICATION	OK	Date	Initials
Drain crankcase oil	✓	1/4/12	B.L.
Replace filters	✓	1/4/12	B.L.
Replace crankcase oil	✓	1/4/12	B.L.
Check for oil leaks	✓	1/4/12	B.L.
Check oil level	✓	1/4/12	B.L.
Lube all chassis grease fittings	✓	1/4/12	B.L.
Lube universal joints	✓	1/4/12	B.L.
Replace differential lube including axles	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 3)

Bus Number: 1104	Date: 1-4-12
Personnel: B.L., E.L. & E.D.	

EXHAUST/EMISSION SYSTEM	OK	Date	Initials
Check for exhaust leaks	✓	1/4/12	B.L.
Remarks: None noted.			
ENGINE	**OK**	**Date**	**Initials**
Replace air filter	✓	1/4/12	E.D.
Inspect air compressor and air system	✓	1/4/12	B.L.
Inspect vacuum system, if applicable	**NA**	1/4/12	B.L.
Check and adjust all drive belts	✓	1/4/12	B.L.
Check cold start assist, if applicable	✓	1/4/12	B.L.
Remarks: None noted.			
STEERING SYSTEM	**OK**	**Date**	**Initials**
Check power steering hoses and connectors	✓	1/4/12	E.D.
Service fluid level	✓	1/4/12	E.D.
Check power steering operation	✓	1/4/12	E.D.
Remarks: None noted.			
	OK	**Date**	**Initials**
Ballast bus to seated load weight	✓	1/4/12	B.L.
TEST DRIVE	**OK**	**Date**	**Initials**
Check brake operation	✓	1/4/12	B.L.
Check transmission operation	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST INSPECTION FORM

Bus Number: 1104	Date: 1-11-12
Personnel: S.C.	

PRE WARM-UP	If OK, Initial
Fuel Economy Pre-Test Maintenance Form is complete	S.C.
Cold tire pressure (psi): Front 110 Middle N/A Rear 110	S.C.
Tire wear:	S.C.
Engine oil level	S.C.
Engine coolant level	S.C.
Interior and exterior lights on, evaporator fan on	S.C.
Fuel economy instrumentation installed and working properly.	S.C.
Fuel line -- no leaks or kinks	S.C.
Speed measuring system installed on bus. Speed indicator installed in front of bus and accessible to TECH and Driver.	S.C.
Bus is loaded to SLW	S.C.
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 110 Middle N/A Rear 112	S.C.
Environmental conditions Average wind speed <12 mph and maximum gusts <15 mph Ambient temperature between 30°F(-1C°) and 90°F(32°C) Track surface is dry Track is free of extraneous material and clear of interfering traffic	S.C.

FUEL ECONOMY SUMMARY SHEET

BUS MANUFACTURER :**Supreme** BUS NUMBER :**1104**
BUS MODEL :**Startrans PS2 President** TEST DATE :**01/11/12**

FUEL TYPE : DIESEL
SP. GRAVITY : .8400
HEATING VALUE : 19631.00 BTU/Lb
FUEL TEMPERATURE : 88.70 deg F
Standard Conditions : 60 deg F and 14.7 psi
Density of Water : 8.3373 lb/gallon at 60 deg F

CYCLE	TOTAL FUEL USED(GAL)	TOTAL MILES	FUEL ECONOMY MPG(Measured)	FUEL ECONOMY MPG (Corrected)
Run # :1, CCW				
CBD	1.078	5.73	5.315	4.83
ART	.692	3.82	5.520	5.01
COM	.377	3.82	10.133	9.20
TOTAL	2.147	13.37	6.227	5.66
Run # :2, CW				
CBD	1.051	5.73	5.452	4.95
ART	.666	3.82	5.736	5.21
COM	.386	3.82	9.896	8.99
TOTAL	2.103	13.37	6.358	5.77
Run # :3, CCW				
CBD	1.059	5.73	5.411	4.91
ART	.692	3.82	5.520	5.01
COM	.391	3.82	9.770	8.87
TOTAL	2.142	13.37	6.242	5.67
Run # :4, CW				
CBD	1.055	5.73	5.431	4.93
ART	.665	3.82	5.744	5.22
COM	.378	3.82	10.106	9.18
TOTAL	2.098	13.37	6.373	5.79

IDLE CONSUMPTION (MEASURED)

First 20 Minutes Data : .25GAL Last 20 Minutes Data :.27 GAL
Average Idle Consumption : .78GAL/Hr

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

Run 1 : -1.2 Run 2 : .9 Run 3 : -.9 Run 4 : 1.2

SUMMARY (CORRECTED VALUES)

Average Idle Consumption : .86 G/Hr
Average CBD Phase Consumption : 4.91 MPG
Average Arterial Phase Consumption : 5.11 MPG
Average Commuter Phase Consumption : 9.06 MPG
Overall Average Fuel Consumption : 5.72 MPG
Overall Average Fuel Consumption : 41.62 Miles/ Million BTU

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1104	Manufacturer: Supreme	Date: 1-11-12
Run Number: 1	Personnel: G.C. & S.C.	
Test Direction: □CW or ■CCW	Temperature (°F): 39	Humidity (%): 64
SLW (lbs): 25,150	Wind Speed (mph) & Direction: Calm	Barometric Pressure (in.Hg): 29.91

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	7:22	7:22	28.4	0	.358	.358
ART #1	0	3:55	3:55	28.3	0	.348	.348
CBD #2	0	7:54	7:54	30.3	0	.366	.366
ART #2	0	3:55	3:55	30.2	0	.344	.344
CBD #3	0	8:01	8:01	32.1	0	.354	.354
COMMUTER	0	6:09	6:09	31.3	0	.377	.377
							Total Fuel = 2.147 gals

20 minute idle : Total Fuel Used = 0.249 gals

Heating Value = 19,631.0 BTU/LB

Comments: None noted.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1104	Manufacturer: Supreme	Date: 1-11-12
Run Number: 2	Personnel: G.C. & S.C.	
Test Direction: ■CW or □CCW	Temperature (°F): 39	Humidity (%): 64
SLW (lbs): 25,150	Wind Speed (mph) & Direction: Calm	Barometric Pressure (in.Hg): 29.91

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	8:22	8:22	28.8	0	.344	.344
ART #1	0	3:59	3:59	28.6	0	.333	.333
CBD #2	0	8:03	8:03	32.2	0	.359	.359
ART #2	0	4:01	4:01	31.8	0	.333	.333
CBD #3	0	8:25	8:25	32.1	0	.348	.348
COMMUTER	0	6:14	6:14	32.8	0	.386	.386
							Total Fuel = 2.103 gals

20 minute idle : Total Fuel Used = N/A gals

Heating Value = 19,631.0 BTU/LB

Comments: None noted.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1104	Manufacturer: Supreme	Date: 1-11-12
Run Number: 3	Personnel: G.C. & S.C.	
Test Direction: □CW or ■CCW	Temperature (°F): 41	Humidity (%): 64
SLW (lbs): 25,150	Wind Speed (mph) & Direction: Calm	Barometric Pressure (in.Hg): 29.91

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	8:24	8:24	32.5	0	.340	.340
ART #1	0	3:55	3:55	32.2	0	.353	.353
CBD #2	0	8:06	8:06	33.6	0	.360	.360
ART #2	0	3:58	3:58	32.6	0	.339	.339
CBD #3	0	8:09	8:09	34.1	0	.359	.359
COMMUTER	0	6:03	6:03	33.5	0	.391	.391
							Total Fuel = 2.142 gals

20 minute idle : Total Fuel Used = N/A gals

Heating Value = 19,631.0 BTU/LB

Comments: None noted.

FUEL ECONOMY DATA FORM (Liquid Fuels)

Bus Number: 1104	Manufacturer: Supreme	Date: 1-11-12
Run Number: 4	Personnel: G.C. & S.C.	
Test Direction: ■CW or □CCW	Temperature (°F): 42	Humidity (%): 56
SLW (lbs): 25,150	Wind Speed (mph) & Direction: 6 / SSE	Barometric Pressure (in.Hg): 29.85

Cycle Type	Time (min:sec)		Cycle Time (min:sec)	Fuel Temperature (°C)	Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	8:16	8:16	31.9	0	.343	.343
ART #1	0	4:10	4:10	30.7	0	.328	.328
CBD #2	0	8:01	8:01	32.0	0	.353	.353
ART #2	0	3:54	3:54	32.1	0	.337	.337
CBD #3	0	7:55	7:55	32.4	0	.359	.359
COMMUTER	0	6:01	6:01	32.0	0	.378	.378
							Total Fuel = 2.098 gals

20 minute idle : Total Fuel Used = 0.271 gals
Heating Value = 19,631.0 BTU/LB
Comments: None noted.

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 47.7 dB(A); ranging from 46.0 dB(A) at the driver's seat to 48.8 dB(A) in line with the middle speaker. The interior ambient noise level for this test was < 34.0 dB(A).

The second test measures interior noise during acceleration from 0 to 35 mph. This noise level ranged from 67.2 dB(A) at the middle passenger seats to 73.9 dB(A) at the driver's seat. The overall average was 69.9 dB(A). The interior ambient noise level for this test was 30.0 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: 1104	Date: 4-1-11
Personnel: E.D., E.L. & B.L.	
Temperature (°F): 38	Humidity (%): 73
Wind Speed (mph): 3	Wind Direction: NW
Barometric Pressure (in.Hg): 29.53	
Initial Sound Level Meter Calibration: ■ checked by: E.D.	
Interior Ambient Noise Level dB(A): < 34.0	Exterior Ambient Noise Level dB(A): 48.5
Microphone Height During Testing (in): 48	

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	46.0
Front Passenger Seats	47.6
In Line with Front Speaker	48.2
In Line with Middle Speaker	48.8
In Line with Rear Speaker	48.1
Rear Passenger Seats	47.5

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

Comments: All readings taken in the center aisle.

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

Bus Number: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 33	Humidity (%): 44
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.23	
Initial Sound Level Meter Calibration: ■ checked by: B.L.	
Interior Ambient Noise Level dB(A): 30.0	Exterior Ambient Noise Level dB(A): 42.3
Microphone Height During Testing (in): 48	

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	73.9
Front Passenger Seats	70.3
Middle Passenger Seats	67.2
Rear Passenger Seats	68.2

Final Sound Level Meter Calibration: ■ checked by: B.L.

Comments: All readings taken in the center aisle.

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

Bus Number: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 33	Humidity (%): 44
Wind Speed (mph): Calm	Wind Direction: Calm
Barometric Pressure (in.Hg): 30.23	

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 42.1 dB(A), the average test result obtained while accelerating from a constant speed was 70.8 dB(A) on the right side and 71.4 dB(A) on the left side.

When accelerating from a standstill with an exterior ambient noise level of 42.1 dB(A), the average of the results obtained were 66.4 dB(A) on the right side and 71.0 dB(A) on the left side.

With the vehicle stationary and the engine, accessories, and air conditioning on, the measurements averaged 58.3 dB(A) at low idle, 60.8 dB(A) at high idle, and 71.9 dB(A) at wide open throttle. With the accessories and air conditioning off, the readings averaged 0.2 dB(A) higher at low idle, 0.4 dB(A) lower at high idle, and the same 71.9 dB(A) at wide open throttle. The exterior ambient noise level measured during this test was 42.2 dB(A).

EXTERIOR NOISE TEST DATA FORM
Accelerating from Constant Speed

Bus Number: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 37	Humidity (%): 44
Wind Speed (mph): 7	Wind Direction: SW
Barometric Pressure (in.Hg): 30.11	
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.	
Initial Sound Level Meter Calibration: ■ checked by: B.L.	
Exterior Ambient Noise Level dB(A): 42.1	

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	70.3	1	71.0
2	70.4	2	71.4
3	70.4	3	71.4
4	71.0	4	71.4
5	70.5	5	71.3
Average of two highest actual noise levels = 70.8 dB(A)		Average of two highest actual noise levels = 71.4 dB(A)	

Final Sound Level Meter Calibration Check: ■ checked by: B.L.
Comments: None noted.

EXTERIOR NOISE TEST DATA FORM
Accelerating from Standstill

Bus Number: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 37	Humidity (%): 44
Wind Speed (mph): 7	Wind Direction: SW
Barometric Pressure (in.Hg): 30.11	
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.	
Initial Sound Level Meter Calibration: ■ checked by: B.L.	
Exterior Ambient Noise Level dB(A): 42.1	

Accelerating from Standstill Curb (Right) Side		Accelerating from Standstill Street (Left) Side	
Run #	Measured Noise Level dB(A)	Run #	Measured Noise Level dB(A)
1	66.3	1	70.1
2	66.2	2	69.1
3	66.3	3	71.3
4	66.4	4	70.6
5	66.4	5	69.6
Average of two highest actual noise levels = 66.4 dB(A)		Average of two highest actual noise levels = 71.0 dB(A)	

Final Sound Level Meter Calibration Check: ■ checked by: B.L.
Comments: None noted.

EXTERIOR NOISE TEST DATA FORM
Stationary

Bus Number: 1104	Date: 1-9-12
Personnel: M.R., T.S. & B.L.	
Temperature (°F): 37	Humidity (%): 44
Wind Speed (mph): 7	Wind Direction: SW
Barometric Pressure (in.Hg): 30.11	

Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: T.S.

Initial Sound Level Meter Calibration: ■ checked by: B.L.

Exterior Ambient Noise Level dB(A): 42.2

Accessories and Air Conditioning ON

Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)
		Measured	Measured
Low Idle	735	57.8	58.8
High Idle	975	60.0	61.6
Wide Open Throttle	2,795	71.2	72.6

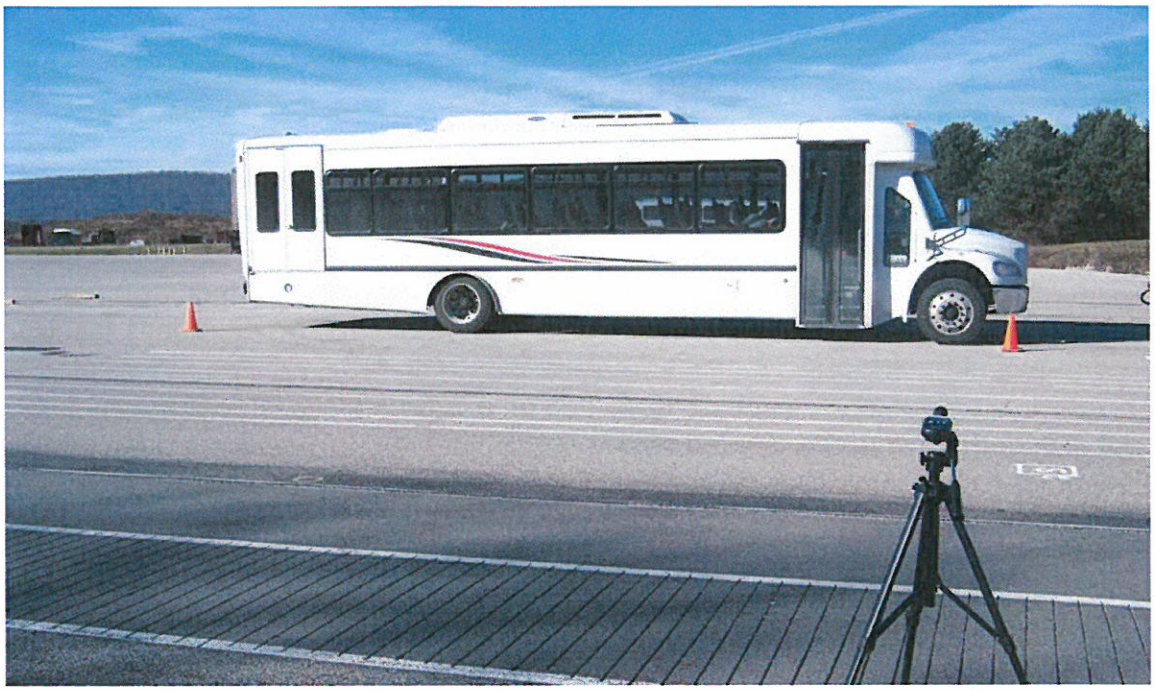
Accessories and Air Conditioning OFF

Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)
		Measured	Measured
Low Idle	755	57.2	59.8
High Idle	975	59.1	61.7
Wide Open Throttle	2,799	71.5	72.2

Final Sound Level Meter Calibration Check: ■ checked by: B.L.

Comments: None noted.

7.2 EXTERIOR NOISE TESTS



TEST BUS UNDERGOING EXTERIOR NOISE TEST

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

8-I. TEST OBJECTIVE

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

8-II. TEST DESCRIPTION

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

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

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

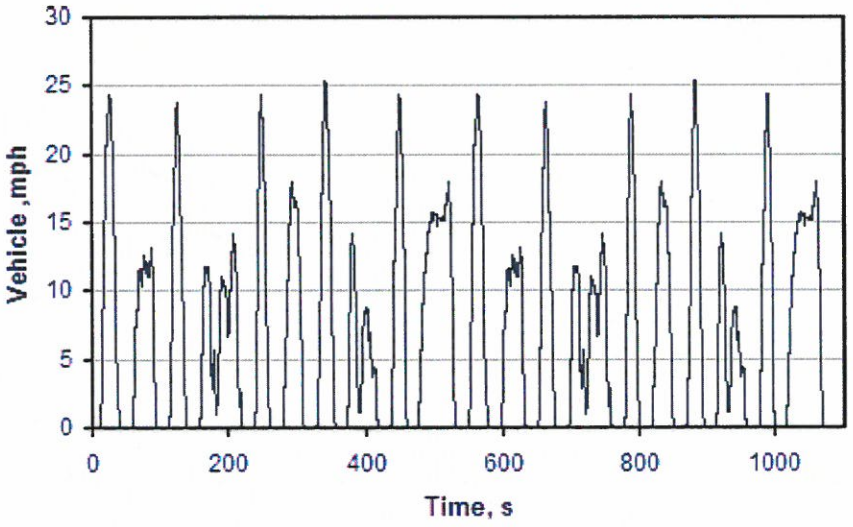


***Figure 1**. Manhattan Driving Cycle (duration 1089 sec, Maximum speed 25.4mph, average speed 6.8mph)*

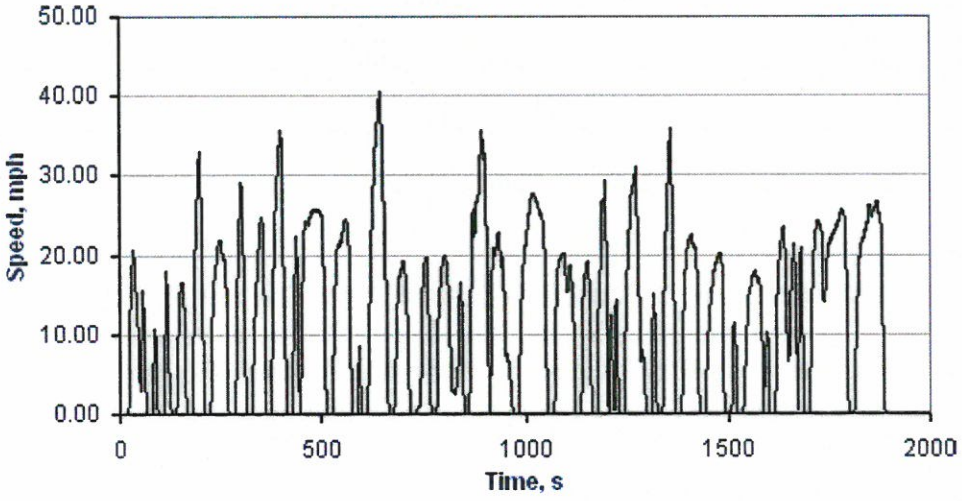


***Figure 2**. Orange County Bus Cycle (Duration 1909 Sec, Maximum Speed 41mph, Average Speed 12mph)*

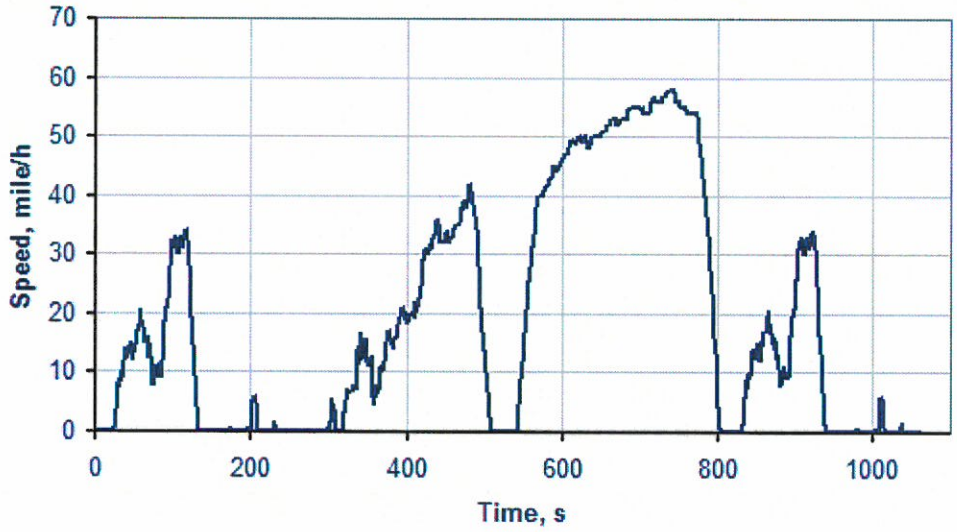


***Figure 3**. HD-UDDS Cycle (duration 1060seconds, Maximum Speed 58mph, Average Speed 18.86mph)*

8-III. TEST ARTICLE

The test article is a Supreme model Startrans PS2 President transit bus equipped with diesel fueled Cummins ISB 6.7 L 240 HP engine. The bus was tested on February 9, 2012.

8-IV. TEST EQUIPMENT

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

Vehicle exhaust is collected by a Horiba CVS, full-flow dilution tunnel. The system has separate tunnels for diesel and gasoline/natural gas fueled vehicles. In the case of diesel vehicles, particulate emissions are measured gravimetrically using 47mm Teflon filters. These filters are housed in a Horiba HF47 particulate sampler, per EPA 1065

test procedures.. Heated gaseous emissions of hydrocarbons and NOx are sampled by Horiba heated oven analyzers. Gaseous
emissions for CO, CO2 and cold NOx are measured using a Horiba Mexa 7400 series gas analyzer. System operation, including the operation of the chassis dynamometer, and all calculations are controlled by a Dell workstation running Horiba CDCTS test control software. Particulate Filters are weighed in a glove box using a Sartorius microbalance accurate to 1 microgram.

8-V. TEST PREPARATION AND PROCEDURES

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

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

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

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

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

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

8-VI DISCUSSION

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

After the emissions data was analyzed, the results indicated a higher than normal level of particulates. The exhaust system was disassembled to investigate and determine the cause of the unusually high particulate levels. Upon disassembly, a large concretion of solidified urea (about the size of a baseball) was discovered in the diesel exhaust fluid dosing valve section of the decomposition reactor, located just upstream from the SCR catalyst. During testing, fine particles (less than 10 microns) of solid urea passed through the catalyst and were collected on the particulate filters. This urea contamination resulted in higher than normal numbers for particulate emissions. The bus manufacture was notified and offered the opportunity to correct the problem and repeat the test; they declined this option. In consultation with the chassis manufacturer and the engine manufacturer the bus manufacturer decided to publish the results without further testing or offering a determination as to the cause of the problem.

TABLE 1 Emissions Test Results

Driving Cycle	Manhattan	Orange County Bus	UDDS
CO_2, gm/mi	2,524	1,818	1,412
CO, gm/mi	0.32	0.23	0.22
THC, gm/mi	0.004	0.005	0.080
NMHC, gm/mi	na	na	na
NO_x, gm/mi	0.76	0.61	1.06
Particulates. gm/mi	0.03*	0.006*	0.031*
Fuel consumption mpg	1.04	5.06	7.20

***Note: The results for particulate emissions are consistently higher than similar buses. Please see discussion in the report.**

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

UREA DEPOSIT FOUND AT INLET TO SCR CATALYST

FUEL ECONOMY PRE-TEST MAINTENANCE FORM

Bus Number: 1104	Date: 1-4-12	SLW (lbs): 25,150
Personnel: B.L., E.L. & E.D.		

FUEL SYSTEM	OK	Date	Initials
Install fuel measurement system	✓	1/11/12	B.L.
Replace fuel filter	✓	1/11/12	B.L.
Check for fuel leaks	✓	1/11/12	B.L.
Specify fuel type (refer to fuel analysis)	Diesel		
Remarks: None noted.			
BRAKES/TIRES	OK	Date	Initials
Inspect hoses	✓	1/4/12	E.D.
Inspect brakes	✓	1/4/12	E.D.
Relube wheel bearings	✓	1/4/12	E.D.
Check tire inflation pressures (mfg. specs.)	✓	1/4/12	E.D.
Remarks: None noted.			
COOLING SYSTEM	OK	Date	Initials
Check hoses and connections	✓	1/4/12	B.L.
Check system for coolant leaks	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 1104	Date: 1-4-12
Personnel: B.L., E.D. & E.L.	

ELECTRICAL SYSTEMS	OK	Date	Initials
Check battery	✓	1/4/12	B.L.
Inspect wiring	✓	1/4/12	B.L.
Inspect terminals	✓	1/4/12	B.L.
Check lighting	✓	1/4/12	B.L.
Remarks: None noted.			
DRIVE SYSTEM	OK	Date	Initials
Drain transmission fluid	✓	1/4/12	E.L.
Replace filter/gasket	✓	1/4/12	E.L.
Check hoses and connections	✓	1/4/12	E.L.
Replace transmission fluid	✓	1/4/12	E.L.
Check for fluid leaks	✓	1/4/12	E.L.
Remarks: None noted.			
LUBRICATION	OK	Date	Initials
Drain crankcase oil	✓	1/4/12	B.L.
Replace filters	✓	1/4/12	B.L.
Replace crankcase oil	✓	1/4/12	B.L.
Check for oil leaks	✓	1/4/12	B.L.
Check oil level	✓	1/4/12	B.L.
Lube all chassis grease fittings	✓	1/4/12	B.L.
Lube universal joints	✓	1/4/12	B.L.
Replace differential lube including axles	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 3)

Bus Number: 1104	Date: 1-4-12
Personnel: B.L., E.L. & E.D.	

EXHAUST/EMISSION SYSTEM	OK	Date	Initials
Check for exhaust leaks	✓	1/4/12	B.L.
Remarks: None noted.			

ENGINE	OK	Date	Initials
Replace air filter	✓	1/4/12	E.D.
Inspect air compressor and air system	✓	1/4/12	B.L.
Inspect vacuum system, if applicable	**NA**	1/4/12	B.L.
Check and adjust all drive belts	✓	1/4/12	B.L.
Check cold start assist, if applicable	✓	1/4/12	B.L.
Remarks: None noted.			

STEERING SYSTEM	OK	Date	Initials
Check power steering hoses and connectors	✓	1/4/12	E.D.
Service fluid level	✓	1/4/12	E.D.
Check power steering operation	✓	1/4/12	E.D.
Remarks: None noted.			

	OK	Date	Initials
Ballast bus to seated load weight	✓	1/4/12	B.L.

TEST DRIVE	OK	Date	Initials
Check brake operation	✓	1/4/12	B.L.
Check transmission operation	✓	1/4/12	B.L.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST INSPECTION FORM

Bus Number: 1104	Date: 1-11-12
Personnel: S.C.	

PRE WARM-UP	If OK, Initial
Fuel Economy Pre-Test Maintenance Form is complete	S.C.
Cold tire pressure (psi): Front 110 Middle N/A Rear 110	S.C.
Tire wear:	S.C.
Engine oil level	S.C.
Engine coolant level	S.C.
Interior and exterior lights on, evaporator fan on	S.C.
Fuel economy instrumentation installed and working properly.	S.C.
Fuel line -- no leaks or kinks	S.C.
Speed measuring system installed on bus. Speed indicator installed in front of bus and accessible to TECH and Driver.	S.C.
Bus is loaded to SLW	S.C.
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 110 Middle N/A Rear 112	S.C.
Environmental conditions Average wind speed <12 mph and maximum gusts <15 mph Ambient temperature between 30°F(-1C°) and 90°F(32°C) Track surface is dry Track is free of extraneous material and clear of interfering traffic	S.C.

Pricing Page:
Complete the form provided below.
Please note the awards may be made to multiple vendors.

Class	Item Description	Unit Price Per Vehicle	Estimated Quantity	Extended Price
A	Bus; Rear Air Suspension	$137,145.00	10	$1,374,150.00
B	Bus; Rear Air Suspension; Extended length +4	$138,526.00	10	$1,385,260.00
C	Bus; Rear Air Suspension; Extended length +8	$142,880.00	10	$1,428,800.00
D	Bus; Automatic Tire Chain Device; full bus paint	$136,986.00	5	$684,930.00
E	Bus; Automatic Tire Chain Device; Extended length +4; full bus paint	$138,098.00	5	$690,490.00
F	Bus; Automatic Tire Chain Device; Extended length +8; full bus paint	$141,863.00	5	$709,315.00
G	Bus; Automatic Tire Chain Device; full bus paint; gasoline engine	$98,589.00	5	$492,945.00
H	Bus; Rear Air Suspension; Extended length +8; CNG	$105,857.00	10	$1,058,570.00
			TOTAL	$7,824,460.00

RFQ No. PTR14016

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: 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 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: Sonny Merryman, Inc

Authorized Signature: _____ Date: 1-8-14

State of Virginia

County of Campbell, to-wit:

Taken, subscribed, and sworn to before me this 8 day of January, 2014.

My Commission expires April 30, 2016.

AFFIX SEAL HERE

VICKY M. OVERSTREET COMMONWEALTH OF VIRGINIA NOTARY PUBLIC

NOTARY PUBLIC Vicky M Overstreet
#110524

CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

Sonny Merryman, Inc

(Company)

(Authorized Signature)

Chad Seals

(Representative Name, Title)

434-821-1000 434-821-8203

(Phone Number) (Fax Number)

1/8/14

(Date)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: PTR14016

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)

[✓]	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 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.

Sonny Merryman, Inc
Company

Authorized Signature

1/9/14
Date

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