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Welcome, Lu Anne Cottrill			Procu	irement Budge	eting Account	ts Receivable	Accounts	Payable				
Solicitation Response(SR) Dept: 0805	ID: ESR063021000000	08512 Ver.: 1 Function	on: New Phase: Final	Modi	ied by batch , 0	6/30/2021						
Header III 38												- 8
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General Information Contact De	efault Values Discount	Document Information	Clarification Request									-
Procurement Folder:	882993				so	Doc Code: C	RFQ					
Procurement Type:	Central Master Agreement					SO Dept: 0	805					
Vendor ID:	VS000004719	金				SO Doc ID: P	TR21000000	11				
Legal Name:	Rohrer Enterprises Inc				Publi	shed Date: 6	/4/21					
Alias/DBA:					c	Close Date: 6	/30/21					
Total Bid:	\$0.00				C	lose Time: 1	3:30					
Response Date:	06/30/2021					Status: C	losed					
Response Time:	9:52				Solicitation D	escription: /	Addendum No Medium Duty). 1 - Mid-Size Vehicles	\bigcirc			
Responded By User ID:	TClawson	2		Tot	al of Header Att	achments: 3	8					
, First Name:	Teresa				Total of All Att	achments: 3	8					
Last Name:	Clawson											
Email:	tclawson@rohrerbus.com											
Phone:	800-735-3900											



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

State of West Virginia **Solicitation Response**

Proc Folder:	882993	382993				
Solicitation Description:	Addendum No. 1 - Mid-Size Medium Duty Vehicles					
Proc Type:	Central Master A	Central Master Agreement				
Solicitation Closes		Solicitation Response	Version			
2021-06-30 13:30		SR 0805 ESR06302100000008512	1			

VENDOR					
VS0000004719 Rohrer Enterprises Inc					
Solicitation Number:	CRFQ 0805 PTR2100000011				
Total Bid:	0	Response Date:	2021-06-30	Response Time:	09:52:42
Comments:					

FOR INFORMATION CONTACT	THE BUYER		
toby.l.weich@wv.gov			
Vendor Signature X	FEIN#	DATE	
All offers subject to all terms an	d conditions contained in this solicitation		

t to all terms and conditions contained in this solicitation All otters su

Line	Comm Ln Desc		Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Mid-Size Medium Du	-Size Medium Duty Vehicles		EA	6755430.000000	0.00
Comm	Code	Manufacturer		Specifica	ation	Model #
2510150)2					
Commo	dity Line Comments:	Thank you for the opp Thanks.	oortunity to re	espond to this sol	licitation.	
Extende	ed Description:	Al Ol				

Mid-Size Medium Duty Vehicles Grand Total of Class A - G vehicles as per attached Exhibit A Pricing Page



July 30, 2021

Department of Administration Purchasing Division 2019 Washington St. E Charleston, WV 25305

RE: PTR2100000011 Mid-Sized Medium Duty Vehicles

Dear Mr. Welch,

Rohrer Bus Sales appreciates the opportunity to submit a proposal for RFQ PTR21*11 Mid-Sized Medium Duty Vehicles. Our offerings, an Defender mounted on the Freightliner Chassis meets the intent and letter of your specifications with the following documentation, clarifications and/or explanations set forth in the RFQ.



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	Service and Parts
	Contacts for Contract
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	Bid Form #5
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	Bid Form #10
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Additional Technical Proposal Support Documentation

Enclosure 7 Component Information to include below information:

3.2 Engine ISB-10 Engine 6.7L with EGR and Diesel Particulate Filter. Please see attached Enclosure 7 3.2 for additional details.

3.2.8 High Idle System- InPower Fast Idle With Interlock. Please see attached Enclosure 7 3.2.8 for additional details.

3.4 Transmission- Allison B220 Transmission. Please see attached Enclosure 7 3.4 for additional details.

3.5.4 Back Up Camera- Rosco Back Up Camera with Monitor to be provided. Please see attached Enclosure 7 3.5.4 for additional details.

3.10 Tires: Michelin XZE 245/70R19.5 16 PLY Radial. Please see Enclosure 7 3.10 for additional details.

3.15.5 Alternator- Leece-Neville 320 Amp Alternator. Please see Enclosure 7 3.15.5 for additional details.

3.1.11 Water Testing- Please see Enclosure 7.1.11 for Champion Bus's Water Testing Procedure.

3.14F Exterior Vinyl Colors: samples/chart of available colors can be found in Enclosure 7 3.14F.

3.15 Undercoating/ Rustproofing- The underside of the body including floor members, side panels below floor level (if metal), fender wells is undercoated, at the time of manufacture, with nonflammable 76M excluding any component within 12" of the exhaust, or on any part of the exhaust or related heat shields, fuel tank, fuel filler and vent tube, drive shaft or shock absorbers. Please see attached 76M data card.76M Undercoating is used to rustproof the unit. Please see Enclosure 7 3.15 for additional details.

3.16.2 Ambulatory Entrance/Exit- Will be located on the curb side front of the unit. 30" wide and electrically controlled with a switch within drivers reach. In addition to interior switch there is an exterior key switch for operation.

3.16.8 Stepwell Heater- A Warm Welcome Step well heater will be provided for the first Ambulatory entrance step. Please see Enclosure 7 3.16.8 for additional details.

3.22 Gerflor Flooring coved up the sidewalls to the seat rail to be provided. Specifications and Color choices provided in Enclosure 7 3.22.

3.27 Passenger Seating: A combination of Freedman Mid High Feather Weight, Foldaway and ICS Seats will be utilized to create the requested floorplans. Please see brochure's at Enclosure 7 3.27. Seats will be covered in D-90 Vinyl.

3.27.11 Driver's Seat- The Driver seat to be utilized is the PREMIUM HIGH BACK AIR SUSPENSION DRIVER SEAT WITH 3 CHAMBER AIR LUMBAR, INTEGRATED CUSHION EXTENSION, FORWARD AND REAR CUSHION TILT, ADJUSTABLE SHOCK ABSORBER.

3.27.1 Exterior Mirrors- Roscoe Remote Heated mirrors are to be provided. Please see brochure located at Enclosure 7 3.27.1.

3.19 QTY 2 Dual Low Profile Purpose Roof Hatches will be provided. Please see brochure located at Enclosure 7 3.19.

3.30 Wheelchair Securement system- Q-Straint Tie Downs to be provided for each Wheel Chair position. Please see brochure located at Enclosure 7 3.30.

3.37 Strap/Buckle Storage: Storage Pouches will be provided to store the Wheel Chair Restraints in. They will be wall mounted in the WC area for ease of access.

3.31 Wheel Chair Occupant Restraint System- A Lap and Shoulder belt will be provided for the WC occupant. Please see brochure located at Enclosure 7 3.30.

3.32 Wheel Chair Lift- A Braun NCL#1000 lift will be provided for all classes. Please see brochure located at Enclosure 7 3.32.

3.34 AM/FM/Radio/CD- An REI AM/FM/Radio will be provided with 8 speakers.

3.39 Training: Rohrer Bus acknowledges and understands the training requirements in this section and will work with the Division to accomplish in light of any future Covid or Travel Restrictions.

3.38.4 Fare Box Provision- Mounting and Wiring for a farebox will be provided off of the Driver's Modesty Panel.

3.38.1 Destination Sign- Transign front and side Destination Sign with OCU to be provided. Please see enclosure 7 3.38.1 for brochure.

3.38.5 PA System- A PA mic will be integrated into the radio system along with the inclusion of an exterior speaker.

3.21.15 Strobe Light- A strobe light will be provided. Please see Enclosure 7 3.21.15 for additional details.

3.28.11 Security Cameras- An Angel Trax 6 camera system will be provided and installed in the units. Please see Enclosure 7.3.28.11 for additional details.

4.15 Warranty on Complete Vehicle. FCC

Description	Time*	Distance*
BASIC CHASSIS (LESS DRIVETRAIN)	3 YEARS	50,000 MI/80 500 KM
ALLIANCE BATTERY	1 YEAR	100,000 MI/161 000 KM
BRIGHTWORK	6 MONTHS	UNLIMITED
CORROSION	6 MONTHS	UNLIMITED
CROSSMEMBERS	5 YEARS	100,000 MI/161 000 KM
EMISSIONS	5 YEARS	100,000 MI/161 000 KM
DRIVETRAIN	3 YEARS	50,000 MI/80 500 KM
CAB CORROSION/PERFORATION	3 YEARS	50,000 MI/80 500 KM
FRAME RAILS	5 YEARS	100,000 MI/161 000 KM
CAB STRUCTURE	3 YEARS	50,000 MI/80 500 KM
PAINT	1 YEAR	100,000 MI/161 000 KM
TOWING & ROADSIDE ASSISTANCE	1 YEAR	UNLIMITED

Bus Body: 3 Year/36,000 miles

4.16 Warranty on Basic Vehicle Structure. 5 year/100,000 miles

4.12.5 Warranty: warranties to be provide on subsystems and components.

	AIR	CONDITIONING AND HEAT						
ProAir A/C (formerly A.C.T.)*		3 Year/Unlimited Mileage						
	DUUKS							
A&M Systems - Doors*		1 Year, Parts & Labor 3 Year Extended Limited available – call for quote						
FAST IDLE/INTERLOCK								
InPower*		2 Year (from date of shipment from InPower)						
		FLOORING						
GerFlor*		12 Year						
		LIFTS AND RAMPS						
Braun Lifts*		5 Year Parts, 3 Year Labor (if warranty card returned	1)					
		LIGHTING						
Dialight		 12 Year LED Vehicle Interior Illumination Products 5 Year LED Reading Lamp, Compartment Light, Exterior Stepwell Light 7 Year LED Vehicle Head Light/Strip Lights (original end user) Lifetime LED Vehicle Lamp (original end user) 						
Grote Lights		1 Year from date of manufacture						
Optronic Lights*		3 Year (excluding bulbs) Incandescent (from purchase date) Lifetime of original purchaser LED lighting products						
		MIRRORS						
Safe Fleet (B&R/Hadley)		1 Year (from in-service date for original end user)						
Rosco Vision Systems*		1 Year (from date of product receipt)						
		RESTRAINTS						
Sure-Lok Tie-downs		1 Year Standard Belt Kits 1 Year Titan Series 3 year						
		ROOF HATCHES						
SMI (Transpec)		1 Year (from date of Manufacture) 2 Year – Electrical components & 5 Year on all other components (from date of manufacture) – Power Hatches						
		SEATING						
1 Yea2 YeaFreedman Seating*No W5 Yea1 Yea		r Freedman Level 1 & 2 Covers r Freedman Level 3 & up Covers /arranty Customer Supplied /Special Fabric r Metal Frames, Base Frames, Legs r Foldaway Gas Shocks						

WINDOWS				
Cleer Vision Windows	1 Year, Repair or Replacement (original end user)			
Hehr Windows	1 Year (date of delivery to original end user)			
Kinro Windows (includes	1 Year (date of sale to end-user or 18 Months from delivery to			
Starquest)*	manufacturer/dealer)			

6.1.2 Per solicitation electronic Submission is preferred.

10.2A An Champion Defender mounted on the Freightliner Chassis will be provided for all Classes. The option load for each class can be found at Enclosure 2

21 Floorplans for each class of vehicle can be found at Enclosure 2.

10.2 C Curb weight (empty weight) and gross vehicle weight rating (GVWR of vehicle) can be found at Enclosure 2.

10.2 D Exterior Vinyl Colors: samples/chart of available colors can be found in Enclosure 7 3.14F.

10.2 H

Total assembly of buses from body structure through road tests occurs at Champion Bus, Inc in Imlay City, MI. Cutaway chassis are delivered to Champion Bus from the chassis manufacture and consequently all final assembly, including the installation and interconnection of the engintransmission, axles and cooling and braking systems are performed at the chassis manufacturer's location prior to arrival in Imlay City.

The following activities take place in Imlay City, MI:

Check-in, inspection and preparation of chassis Fabrication of vehicle steel body structure Installation of vehicle body onto chassis frame Mounting of front and rear caps Installation and interconnection of heat and air conditioning equipmer Installation of floor decking and floor covering Installation of electrical system and lighting Installation of passenger seats, stanchions and grab rails Installation of doors and windows Installation of customer selected options such as destination signs, lifts, etc Water testing of completed vehicle Road testing of completed vehicle Final inspection of vehicle and preparation for shipmen

9.2 I A list of five (5) users names, addresses, emails and telephone numbers who have been provided similar equipment

REFERENCE #1: Pennsylvania Department of General Services

Rohrer Bus Sales has held the state contract for Pennsylvania since 2007 and currently holds a contract. This contract contains shuttle bus products from 21' – 31' in length and includes Ford, Chevrolet and Freightliner chassis. This contract also includes wheelchair minivan conversions.

Contact: John Levitsky, Program Manager Department of General Services Bureau of Procurement 555 Walnut Street, 6th Floor Forum Place Harrisburg, PA 17101 717-787-1206 jlevitsky@pa.gov

REFERENCE #2: Federal Government's General Service Administration

For over ten years, Rohrer Bus Sales has provided Ford and Freightliner chassis to the Federal government. Our current contract is GS-30F-DA024 and is in process of being renewed for the 3rd of 4 option periods. The annual volume on this contract is generally in the 40-50 buses per year range

Contact: Craig D. Yokum, Contract Officer U.S. General Services Administration/Federal Acquisition Service Office of Travel, Transportation and Logistics Light Vehicles Branch - QMAAA 1800 F Street, NW, 3rd Floor, Hub 3200 Washington, DC 20405 <u>craig.yokum@gsa.gov</u> Phone 703-605-9291

Cell 571-748-8753

REFERENCE #3 - International Limousine Service

Operates a fleet of 100+ shuttle buses including passenger and paratransit conversions. ILS is the Washington DC metropolitan's largest shuttle operator and holds commercial and GSA contracts throughout the area.

Contact: William DeGregory, Transportation Director International Limousine Service 2300 T Street, NE Washington, DC 20002 202-388-6800 <u>bdigregory@internationallimo.com</u>

REFERENCE #4 - Harrisburg International Airport

For over twenty years, Rohrer Bus Sales has provided Ford and Chevrolet cutaways, Freightliner M2, rear engine and low floor buses to HIA.

Contact: Robert Gardner, Vehicle Maintenance Supervisor 513 Airport Drive Middletown, PA 17057 717-948-3900 bobg@saraa.org

REFERENCE #5 - MOVTA

Contract history extends for multiple years - Rohrer Bus Sales combined with Andrew Clawson management experience has provided Ford F-550, E-350 and E-450 buses to MOVTA.

Contact: Michael Kesterson Mid-Ohio Valley Transit Authority 520 Juliana Street Parkersburg, WV 26101 304.422.4100

Addendum Acknowledgement located at Enclosure 6.

Altoona Testing located at Enclosure 7.

Champion Bus FMVSS Champion Bus Ford QVM Champion Bus ISO certification Champion Bus TVM/DBE

Please contact us immediately at (800) 735-3900 if any additional documentation is required. Thank you for your consideration.

Thanks, Andrew Clawson Account Representative



ROHRER 1.800.735.3900 x 4152 804.357.1145 Cell 717.957.4884 Fax aclawson@rohrerbus.com

Exhibit A PRICING PAGE Mid-Sized Medium Duty Transit Vehicles

VENDOR NAME: Rohrer Bus Sales

Manufacturer/ Brand: Champion Defender

		Unit Price	Estimated
Class	Item Description	Per Vehicle	Quantity
Α	Bus; Rear Air Suspension	\$ 146,778.00	8
В	Bus; Rear Air Suspension; Extended length +4	\$151,631.00	8
С	Bus; Rear Air Suspension; Extended length +8	\$156,826.00	8
D	Bus, Automatic Tire Chain Devices; full bus paint	\$151,968.00	5
E	Bus, Automatic Tire Chain Device; Extended length +4, full bus paint	\$156,828.00	5
F	Bus, Automatic Tire Chains Device; Extended length +8, full bus paint	\$161,946.00	5
G	Bus; Automatic Tire Chain Device: full bus paint;	\$151,968.00	5
			TOTAL

*Complete Form provided.

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

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

Extended Price
\$ 1,174,224.00
\$1,213,048.00
\$1,254,608.00
\$759,840.00
\$784,140.00
\$809,730.00
\$759,840.00
\$6,755,430.00

*	BASE MODEL (FREIGHTLINER S2C)
1	DEFENDER 219-S2C FREIGHTLINER 6.7L CUMMINS ENGINE
	CHASSIS OPTIONS
1	EXHAUST, STREET SIDE
1	EXTENSION, TIRE VALVE STEM
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE
*	ELECTRICAL OPTIONS
1	AS BUILT WIRING DIAGRAMS
2	DEFROST FAN, EACH
1	LIFT MASTER SWITCH W/INDICATOR LIGHT
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR
1	LIGHTS, DOOR ACTUATED DOME
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS
1	LIGHT, STROBE-ROOF MOUNTED
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR
*	REI AUDIO/VIDEO OPTIONS
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI
1	SPEAKER INTERIOR REI QTY 4
1	GOOSENECK MIC PA W/FOOTSWITCH REI
1	PAGE,SPEAKER EXTERIOR (EACH)
1	RADIO, TWO WAY PREP
*	FLOORING OPTIONS
29	GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR
1	PLYWOOD, 3/4" MARINE TECH FLOOR
1	YELLOW STANDEE LINE
1	YELLOW STEP EDGE NOSINGS
*	
1	ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR
2	FLAPS, SKIRT MOUNTED CONDENSOR
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)
1	HEAT CIRCULATION PUMP
2	HEATER 65,000 BTU
*	EXTERIOR OPTIONS
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE
1	TRANSIGN,LED DESTINATOR FRONT/SIDE
*	GRAPHICS OPTIONS
7	PAINT WHEELS (BOTH SIDES) PER WHEEL

Class A Technical Specifications

1	PAINT SKIRT ONLY
*	PARATRANSIT OPTIONS
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES:
	34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT
	LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS,
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH
2	
2	PRIORITY SEATING SIGN
*	
1	
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13
4	UNIT), REFLECTOR TRIANGLES
1	
1	
1	
2	
2	ESCADE HATCH DDO LO #0245
2 1	
1	
4	GRAB RAILS CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL FACH
2	STANCHION PADDING BLACK (PER STANCHION)
*	INTERIOR OPTIONS
1	DECAL, "NO-SMOKING"
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"
1	DECAL, "WATCH YOUR STEP"
1	DECAL,CLEARANCE HEIGHT
1	FAREBOX PREP
1	FAREBOX STANCHION
1	PASSENGER, PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
7	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE,2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
23	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM

1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
17	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
15	MOLDED AV GRAB HANDLE TOP BLACK
9	FREEDMAN US ARM (FLIP UP)
15	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID HI
	FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
22	ETA NEODDENE EOAM DASSENCED SEATS
23	
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Senarate Circuit
1	Wheel Chocks
1	A Way flashers activate with lift door
1	Angel Tray 6 Camera System
1	Fog Lights front Bumper
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram
T	



THEORETICAL WEIGHT ANALYSIS WORKSHEET

(4-CORNER)

Chassis Manufacturer: FREIGHTLINEF DSL	Vehic	le Туре;	DF310		Prepared by:	DO
Model Year:	Comp	leted Vehicle	Description:	WV-CLASS A	Date:	
OEM Modified OEM OEM FRT OEM RR Wheelbase Wheelbase GVWR GAWR GAWR 26000 9880 17500	REFE	RENCE UNI	22589.00			
Model type FL Chassis Code FP # CB002743		Lft-Frt (lbs)	Rt-Frt (lbs)	Lft-Rr (ibs)	Rt-Rr (lbs)	Total (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED		3402.00 95.45 21.57	3490.00 95.45 21.57	4456.00 35.80 318.93	4368.00 35.80 318.93	15716.00 262.50 681.00
WEIGHT OF THE OCCUPANTS (lbs) 3600.00 (150 lbs x 24 (number of designated seating positions) WHEEL CHAIRS IF USED X		145.78	139.76	1691.76	1622.71	3600.00
SUBTOTAL WEIGHT		3664.80	3746.78	6502.48	6345.43	20259,50
ADJUSTED HORIZONTAL CENTER OF GRAVITY 139.52 ADJUSTED LATERAL CENTER OF GRAVITY -0.16 ADJUSTED REAR WEIGHT 12847.92				с. Х		
ADJUSTED FRONT WEIGHT 7411.58						
ADJUSTED 4 CORNER WEIGHT		3664.80	3746.78	6502.48	6345.43	20259.50
TOTAL FRONT 7411.58 2468.42 TOTAL REAR 12847.92 4652.08 IS THE FRONT GAWR OVER NO IS THE REAR GAWR OVER NO						4652.08
PASS/FAIL Is Lft-Frt/2 Is Rt-Frt/2 ANALYSIS Exceeded? Exceeded?						
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs. 20259.50 Is GVWR Exceeded? NO 5740.50						
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is [INTE: UVW does not apply to certification of vehicles with a GVWR above 10,000 lbs.)						
The actual completed weight (UVW) of this vehicle is 15978.50 lbs. Is Maximum UVW Exceeded? NO						
DEFINITIONS						
"UVW" - Completed weight of the vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants or accessories that are normally removed when the vehicle is not in use,						
"GAWR" and "GVWR" are found on the label affixed to the cover of the incomplete Vehicle Manual (IVAN)						

e Incomplete Vehicle Manual (IVM).

"LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum capacities of all fluids necessary for operation of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appropriate allowance for cargo. Vehicles with tanks for water and/or LP gas must also account for the weight of these fluids in the cargo calculations.

Class B Technical Specifications

*	BASE MODEL (FREIGHTLIN	ER S2C)	
1	DEFENDER 219-S2C FREIGHTLINER 6.7L CUMMINS ENGINE		
	CHASSIS OPTIONS		
1	EXHAUST, STREET SIDE		
1	EXTENSION, TIRE VALVE STEM		
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE		
*	ELECTRICAL OPTION	IS	
1	AS BUILT WIRING DIAGRAMS		
2	DEFROST FAN, EACH		
1	LIFT MASTER SWITCH W/INDICATOR LIGHT		
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR		
1	LIGHTS, DOOR ACTUATED DOME		
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS	S)	
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLU CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRO	IDES SIDE I ONT CLEAR	DIRECTIONAL & REAR ANCE LIGHTS
1	LIGHT, STROBE-ROOF MOUNTED		
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP		
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Bod	y 1 for Lift	
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR		
*	REI AUDIO/VIDEO OPTI	ONS	
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI		
1	SPEAKER INTERIOR REI QTY 4		
1	GOOSENECK MIC PA W/FOOTSWITCH REI		
1	PAGE,SPEAKER EXTERIOR (EACH)		
1	RADIO, TWO WAY PREP		
*	FLOORING OPTIONS	S	
31	GERFLOOR FLOORING PER FOOT (SIRIUS)	COLOR:	SELECT COLOR
1	PLYWOOD, 3/4" MARINE TECH FLOOR		
1	YELLOW STANDEE LINE		
1	YELLOW STEP EDGE NOSINGS		
*	CLIMATE CONTROL OPT	IONS	
1	ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAP 3 CONDENSOR	PLUS 2 TM- PORATOR,	16 ADD ON CS-2 CONDENSOR, CS-
2	FLAPS, SKIRT MOUNTED CONDENSOR		
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)		
1	HEAT CIRCULATION PUMP		

2	HEATER 65,000 BTU	
*	EXTERIOR OPTIONS	
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK	
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE	
1	TRANSIGN,LED DESTINATOR FRONT/SIDE	
*	GRAPHICS OPTIONS	
7	PAINT WHEELS (BOTH SIDES) PER WHEEL	
1	PAINT SKIRT ONLY	
*	PARATRANSIT OPTIONS	
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES: 34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS, WHEELCHAIR LOCATION SIGNS	
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1	
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH	
2	POUCH, Q'STRAINT TIEDOWN	
2	PRIORITY SEATING SIGN	
*	SAFETY OPTIONS	
1	MIRRORS,HTD/RMT ROSCO M2/S2C	
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13 UNIT), REFLECTOR TRIANGLES	
1	BIO-KIT, LARGE	
1	MIRROR, INTERIOR 6.0" X 16.0"	
1	SEAT BELT WEB CUTTER	
1	FRESNAL LENS	
2	BLANKET, FIREPROOF 62" X 80"	
2	ESCAPE HATCH PRO LO #9245	
1	KICK OUT WINDOW (ADDITIONAL)	
4	EXIT INDICATOR LIGHT - WINDOW	
1	GRAB RAILS, CEILING (PAIR)	
1	STANCHION W/INTEGRATED RIGHT HAND GRAB	
1	STANCHION, W/MODESTY/DRIVERS BARRIER	
2	MODESTY PANEL PADDED VINYL EACH	
2	STANCHION, PADDING BLACK (PER STANCHION)	
*	INTERIOR OPTIONS	
1	DECAL, "NO-SMOKING"	
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"	
1	DECAL, "WATCH YOUR STEP"	
1	DECAL, CLEARANCE HEIGHT	

1	FAREBOX PREP
1	FAREBOX STANCHION
1	PASSENGER, PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
9	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE,2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
27	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM
1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
21	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
17	MOLDED AV GRAB HANDLE TOP BLACK
11	FREEDMAN US ARM (FLIP UP)
19	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID HI FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
27	FTA NEOPRENE FOAM PASSENGER SEATS
	MISC. OPTIONS
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 Way flashers activate with lift door
1	Angel Trax 6 Camera System
1	Fog Lights front Bumper
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram



THEORETICAL WEIGHT ANALYSIS WORKSHEET (4-CORNER)

Chassis Manufacturer: FREIGHTLINEF DSL	Vehicle Type:	DF310		Prepared by:	DO
Model Year;	Completed Vehicle	Description:	WV-CLASS B	Date:	
OEM Modified OEM OEM FRT OEM RR Wheelbase Wheelbase GVWR GAWR GAWR 26000 9980 17500	REFERENCE UNI	22589.00			
Model type FL Chassis Code FP #: CB002749	Lfl-Frt (Ibs)	Rt-Frt (lbs)	Lft-Rr (lbs)	Rt-Rr (Ibs)	Total (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED	3402.00 95.45 -13.43	3490.00 95.45 -13.43	4456.00 35.80 418.93	4368.00 35.80 418.93	15716.00 262,50 811.00
WEIGHT OF THE OCCUPANTS (lbs) 4200.00 (150 lbs x 28 (number of designated seating positions) WHEEL CHAIRS IF USED X	-6.07	-5.85	2143.57	2068,35	4200.00
SUBTOTAL WEIGHT	3477.96	3566.18	7054.29	6891.07	20989.50
ADJUSTED HORIZONTAL CENTER OF GRAVITY 146.17 ADJUSTED LATERAL CENTER OF GRAVITY -0.15 ADJUSTED REAR WEIGHT 13945.36 ADJUSTED FRONT WEIGHT 7044.14					
ADJUSTED 4 CORNER WEIGHT	3477.96	3566.18	7054.29	6891.07	20989.50
TOTAL FRONT IS THE FRONT GAWR OVER	7044.14 NO	2835.86 1 IS THE REA	'OTAL REAR R GAWR OVER	13945.36 NO	3554.64
PASS/FAIL ANALYSIS	ls Lft-Frl/2 is Exceeded? Ex	Rt-Frt/2 cceeded?			
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs. 20989.50 Is GVWR Exceeded? NO 5010.50					
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is [] Ibs (NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000 lbs.)					
The actual completed weight (UVW) of this vehicle is 15978.50 I	bs. Is i	Maximum UV	W Exceeded?	NO	
DEFINITIONS "UVW" - Completed weight of the vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants or accessories that are normally removed when the vehicle is not in use. "GAWR" and "GVWR" are found on the label affixed to the cover of the incomplete Vehicle Manual (IVM). "LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum capacities of all fluids necessary for operation					
or me venicie plus 150 lbs. (or 70 kg.) for each designated seating position and appropriate allowance for cargo, Vehicles with tanks for water and/or LP gas must also account for the weight of these fluids in the cargo calculations.					

Class C Technical Specifications

*	BASE MODEL (FREIGHTLINER S2C)			
1	DEFENDER 259-S2C FREIGHTLINER 6.7L CUMMINS ENGINE			
	CHASSIS OPTIONS			
1	EXHAUST, STREET SIDE			
1	EXTENSION, TIRE VALVE STEM			
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE			
*	ELECTRICAL OPTIONS			
1	AS BUILT WIRING DIAGRAMS			
2	DEFROST FAN, EACH			
1	LIFT MASTER SWITCH W/INDICATOR LIGHT			
1	LIGHT,DOOR AJAR W/BUZZER LIFT DOOR			
1	LIGHTS, DOOR ACTUATED DOME			
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)			
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS			
1	LIGHT, STROBE-ROOF MOUNTED			
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP			
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift			
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR			
*	REI AUDIO/VIDEO OPTIONS			
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI			
1	SPEAKER INTERIOR REI QTY 4			
1	GOOSENECK MIC PA W/FOOTSWITCH REI			
1	PAGE,SPEAKER EXTERIOR (EACH)			
1	RADIO, TWO WAY PREP			
*	FLOORING OPTIONS			
35	GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR			
1	PLYWOOD, 3/4" MARINE TECH FLOOR			
1	YELLOW STANDEE LINE			
1	YELLOW STEP EDGE NOSINGS			
*				
1	COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR			
2	FLAPS, SKIRT MOUNTED CONDENSOR			
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)			
1	HEAT CIRCULATION PUMP			
2	HEATER 65,000 BTU			
*	EXTERIOR OPTIONS			
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK			
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE			
1	TRANSIGN,LED DESTINATOR FRONT/SIDE			
*	GRAPHICS OPTIONS			
7	PAINT WHEELS (BOTH SIDES) PER WHEEL			

1	PAINT SKIRT ONLY
*	PARATRANSIT OPTIONS
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES: 34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W
	WINDOWS, ADA LIFT LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS, WHEELCHAIR LOCATION SIGNS
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH
2	POUCH, Q'STRAINT TIEDOWN
2	PRIORITY SEATING SIGN
*	SAFETY OPTIONS
1	MIRRORS,HTD/RMT ROSCO M2/S2C
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13 UNIT), REFLECTOR TRIANGLES
1	BIO-KIT, LARGE
1	MIRROR, INTERIOR 6.0" X 16.0"
1	SEAT BELT WEB CUTTER
1	FRESNAL LENS
2	BLANKET, FIREPROOF 62" X 80"
2	ESCAPE HATCH PRO LO #9245
1	KICK OUT WINDOW (ADDITIONAL)
4	EXIT INDICATOR LIGHT - WINDOW
1	GRAB RAILS, CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION, W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL EACH
2	STANCHION, PADDING BLACK (PER STANCHION)
*	INTERIOR OPTIONS
1	DECAL, "NO-SMOKING"
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"
1	DECAL, "WATCH YOUR STEP"
1	
1	
1	
<u> </u>	PASSENGER, PULL CURD YELLOW
<u> </u>	PASSENGER, PUSH BUTTON (PER LOCATION)
1	
*	DASSENGER STOP ROUEST BULKHEAD WOUNTED
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
11	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT.35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE.2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
31	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM

1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
25	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
23	MOLDED AV GRAB HANDLE TOP BLACK
13	FREEDMAN US ARM (FLIP UP)
23	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI,
	MID HI FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
21	ETA NEODDENE EOAM DASSENGED SEATS
31	
1	VIISC. OF HONS
1	
1	
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 Way flashers activate with lift door
1	Angel Trax 6 Camera System
1	Fog Lights front Bumper
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram



THEORETICAL WEIGHT ANALYSIS WORKSHEET (4-CORNER)

Chassis Manufacturer: FREIHTLINER DSL	Vehicle Type: DF350 Prepared by: DO				
Model Year:	Completed Vehicle Description: WV-CLASS C Date:				
OEM Modified OEM OEM FRT OEM RR Wheelbase GVWR GAWR GAWR 259.00 26000 9880 17500	REFERENCE UNI 20364.00				
Model type FL Chassis Code FP #: CB002750	Lft-Frt Rt-Fri Lft-Rr Rt-Rr Total (lbs) (lbs) (lbs) (lbs) (lbs)				
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED	3935.00 3790.00 5000.00 4580.00 17305.00 52.05 52.05 52.95 52.95 210.00 -56.82 -56.82 276.82 276.82 440.00				
WEIGHT OF THE OCCUPANTS (lbs) 4800.00 (150 lbs x 32 (number of designated seating positions) WHEEL CHAIRS IF USED X	184.32 178.58 2253.21 2183.88 4800.00				
SUBTOTAL WEIGHT	4114.56 3963.82 7582.07 7002.64 20755.00				
ADJUSTED HORIZONTAL CENTER OF GRAVITY 167.05					
ADJUSTED LATERAL CENTER OF GRAVITY -1.17					
ADJUSTED REAR WEIGHT 14676.62					
ADJUSTED FRONT WEIGHT 8078.38					
ADJUSTED 4 CORNER WEIGHT	4114.56 3963.82 7582.97 7093.64 22755.00				
TOTAL FRONT IS THE FRONT GAWR OVER	8078.38 1801.62 TOTAL REAR 14676.62 2823.38 NO IS THE REAR GAWR OVER NO				
PASS/FAIL ANALYSIS	Is Lft-Frt/2 Is Rt-Frt/2 Exceeded? Exceeded?				
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs.	22755.00 Is GVWR Exceeded? NO 3245.00				
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is (NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000	D lbs.)				
The actual completed weight (UVW) of this vehicle is 17515.00 lbs. Is Maximum UVW Exceeded? NO					
DEFINITIONS "UVW" - Completed weight of the vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants or accessories that are normally removed when the vehicle is not in use. "GAWR" and "GVWR" are found on the label affixed to the cover of the Incomplete Vehicle Manual (IVM).					
"LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum capacities of all fluids necessary for operation of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appropriate allowance for cargo. Vehicles with tanks for water and/or LP gas must also account for the weight of these fluids in the cargo calculations.					

*	BASE MODEL (FREIGHTLINER S2C)			
1	DEFENDER 219-S2C FREIGHTLINER 6.7L CUMMINS ENGINE			
	CHASSIS OPTIONS			
1	EXHAUST, STREET SIDE			
1	EXTENSION, TIRE VALVE STEM			
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE			
*	ELECTRICAL OPTIONS			
1	AS BUILT WIRING DIAGRAMS			
2	DEFROST FAN, EACH			
1	LIFT MASTER SWITCH W/INDICATOR LIGHT			
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR			
1	LIGHTS, DOOR ACTUATED DOME			
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)			
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS			
1	LIGHT, STROBE-ROOF MOUNTED			
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP			
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift			
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR			
*	REI AUDIO/VIDEO OPTIONS			
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI			
1	SPEAKER INTERIOR REI QTY 4			
1	GOOSENECK MIC PA W/FOOTSWITCH REI			
1	PAGE,SPEAKER EXTERIOR (EACH)			
1	RADIO, TWO WAY PREP			
*	FLOORING OPTIONS			
29	GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR			
1	PLYWOOD, 3/4" MARINE TECH FLOOR			
1	YELLOW STANDEE LINE			
1	YELLOW STEP EDGE NOSINGS			
*	CLIMATE CONTROL OPTIONS			
1	ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR			
2	FLAPS, SKIRT MOUNTED CONDENSOR			
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)			
1	HEAT CIRCULATION PUMP			
2	HEATER 65,000 BTU			
*	EXTERIOR OPTIONS			
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK			
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE			
1	TRANSIGN,LED DESTINATOR FRONT/SIDE			
*	GRAPHICS OPTIONS			
7	PAINT WHEELS (BOTH SIDES) PER WHEEL			

1	PAINT ENTIRE BUS 2 COLORS NON-METALLIC (UNDER 35') INCLUDES 3.9MM NOBLE SELECT
	FRP (ROOF STAYS WHITE)
*	PARATRANSIT OPTIONS
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES:
	34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT
	LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS,
2	
2 Q	WHEEL CHAIR WEBBING LOOPS 1" 05-7580 EACH
2	
2	PRIORITY SEATING SIGN
*	SAFETY OPTIONS
1	MIRRORS.HTD/RMT ROSCO M2/S2C
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM. 5# FIRE EXTINGUISHER. FIRST AID KIT (13
	UNIT), REFLECTOR TRIANGLES
1	BIO-KIT, LARGE
1	MIRROR, INTERIOR 6.0" X 16.0"
1	SEAT BELT WEB CUTTER
1	FRESNAL LENS
2	BLANKET, FIREPROOF 62" X 80"
2	ESCAPE HATCH PRO LO #9245
1	KICK OUT WINDOW (ADDITIONAL)
4	EXIT INDICATOR LIGHT - WINDOW
1	GRAB RAILS, CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION, W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL EACH
2	STANCHION, PADDING BLACK (PER STANCHION)
1	
1	
1	DECAL, SEAT BEET MOST BE WORK AT ALL
1	DECAL CLEARANCE HEIGHT
1	FAREBOX PREP
1	FAREBOX STANCHION
1	PASSENGER. PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
7	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE,2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
23	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)

*	DRIVER SEATING COVER CHASSIS OEM
1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
17	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
15	MOLDED AV GRAB HANDLE TOP BLACK
9	FREEDMAN US ARM (FLIP UP)
15	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID
	HI FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
22	
23	
1	MISC. OPTIONS
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 Way flashers activate with lift door
1	Angel Trax 6 Camera System
1	Fog Lights front Bumper
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram
1	Onspot Tire Chains



THEORETICAL WEIGHT ANALYSIS WORKSHEET

(4-CORNER)

Chassis Manufacturer: FREIGHTLINEF DSL	Vehicle Type: DF310 Prepared by: DO					
Model Year:	Comp	leted Vehicle	Description:	WV-CLASS A	Date:	
OEM Modified OEM OEM FRT OEM RR Wheelbase Wheelbase GVWR GAWR GAWR 26000 9880 17500	REFE	RENCE UNI	22589.00			
Model type FL Chassis Code FP # CB002743		Lft-Frt (lbs)	Rt-Frt (lbs)	Lft-Rr (ibs)	Rt-Rr (lbs)	Total (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED		3402.00 95.45 21.57	3490.00 95.45 21.57	4456.00 35.80 318.93	4368.00 35.80 318.93	15716.00 262.50 681.00
WEIGHT OF THE OCCUPANTS (lbs) 3600.00 (150 lbs x 24 (number of designated seating positions) WHEEL CHAIRS IF USED X		145.78	139.76	1691.76	1622.71	3600.00
SUBTOTAL WEIGHT		3664.80	3746.78	6502.48	6345,43	20259,50
ADJUSTED HORIZONTAL CENTER OF GRAVITY 139.52 ADJUSTED LATERAL CENTER OF GRAVITY -0.16 ADJUSTED REAR WEIGHT 12847.92				x		
ADJUSTED FRONT WEIGHT 7411.58						
ADJUSTED 4 CORNER WEIGHT		3664.80	3746.78	6502.48	6345.43	20259.50
TOTAL FRONT IS THE FRONT GAWR OVER	1	7411.58 NO	2468.42 T IS THE REAI	OTAL REAR R GAWR OVER	12847.92 NO	4652.08
PASS/FAIL ANALYSIS	ls Lft-Fr Exceed	1/2 ls ed? E	s Rt-Frt/2 Exceeded?			
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs.	202	5740.50	s GVWR Ex	ceeded?	NO	
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is [NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000 lbs.)						
The actual completed weight (UVW) of this vehicle is 15978.50	lbs.	ls	Maximum UV	W Exceeded?	NO	
DEFINITIONS	war nerene					1
"UVW" - Completed weight of the vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants or accessories that are normally removed when the vehicle is not in use.						
"GAWR" and "GVWR" are found on the label affixed to the cover of the lacomplete Vehicle Manual (VAN)						

e Incomplete Vehicle Manual (IVM).

"LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum capacities of all fluids necessary for operation of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appropriate allowance for cargo. Vehicles with tanks for water and/or LP gas must also account for the weight of these fluids in the cargo calculations.

Class E Technical Specifications

1	DEFENDER 219-S2C FREIGHTLINER 6.7L CUMMINS ENGINE			
	CHASSIS OPTIONS			
1	EXHAUST, STREET SIDE			
1	EXTENSION, TIRE VALVE STEM			
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE			
*	ELECTRICAL OPTIONS			
1	AS BUILT WIRING DIAGRAMS			
2	DEFROST FAN, EACH			
1	LIFT MASTER SWITCH W/INDICATOR LIGHT			
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR			
1	LIGHTS, DOOR ACTUATED DOME			
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)			
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS			
1	LIGHT, STROBE-ROOF MOUNTED			
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP			
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift			
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR			
*	REI AUDIO/VIDEO OPTIONS			
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI			
1				
1	GOOSENECK MIC PA W/FOOTSWITCH REI			
1	PAGE,SPEAKER EXTERIOR (EACH)			
1	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP			
1 1 *	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS			
1 1 * 29	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR			
1 1 * 29 1	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) PLYWOOD, 3/4" MARINE TECH FLOOR			
1 1 * 29 1 1	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP GERFLOOR FLOORING PER FOOT (SIRIUS) PLYWOOD, 3/4" MARINE TECH FLOOR YELLOW STANDEE LINE			
1 1 * 29 1 1 1	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR PLYWOOD, 3/4" MARINE TECH FLOOR YELLOW STANDEE LINE YELLOW STEP EDGE NOSINGS			
1 1 29 1 1 1 *	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR PLYWOOD, 3/4" MARINE TECH FLOOR YELLOW STANDEE LINE YELLOW STEP EDGE NOSINGS CLIMATE CONTROL OPTIONS			
1 1 29 1 1 1 1 * 1	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR PLYWOOD, 3/4" MARINE TECH FLOOR YELLOW STANDEE LINE YELLOW STEP EDGE NOSINGS VELLOW STEP EDGE NOSINGS ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR			
1 1 29 1 1 1 1 * 1 2	PAGE,SPEAKER EXTERIOR (EACH) RADIO, TWO WAY PREP FLOORING OPTIONS GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR PLYWOOD, 3/4" MARINE TECH FLOOR YELLOW STANDEE LINE YELLOW STEP EDGE NOSINGS CLIMATE CONTROL OPTIONS ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR FLAPS, SKIRT MOUNTED CONDENSOR			
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*	EXTERIOR OPTIONS
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE
1	TRANSIGN,LED DESTINATOR FRONT/SIDE
*	GRAPHICS OPTIONS
7	PAINT WHEELS (BOTH SIDES) PER WHEEL
1	PAINT ENTIRE BUS 2 COLORS NON-METALLIC (UNDER 35') INCLUDES 3.9MM NOBLE SELECT FRP (ROOF STAYS WHITE)
-te	
*	
1	34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS, WHEELCHAIR LOCATION SIGNS
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH
2	POUCH, Q'STRAINT TIEDOWN
2	PRIORITY SEATING SIGN
*	SAFETY OPTIONS
1	MIRRORS,HTD/RMT ROSCO M2/S2C
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13 UNIT), REFLECTOR TRIANGLES
1	BIO-KIT, LARGE
1	MIRROR, INTERIOR 6.0" X 16.0"
1	SEAT BELT WEB CUTTER
1	FRESNAL LENS
2	BLANKET, FIREPROOF 62" X 80"
2	ESCAPE HATCH PRO LO #9245
1	KICK OUT WINDOW (ADDITIONAL)
4	EXIT INDICATOR LIGHT - WINDOW
1	GRAB RAILS, CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION, W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL EACH
2	STANCHION, PADDING BLACK (PER STANCHION)
*	INTERIOR OPTIONS
1	DECAL, "NO-SMOKING"
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"
1	DECAL, "WATCH YOUR STEP"
1	DECAL,CLEARANCE HEIGHT
1	FAREBOX PREP
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1	FAREBOX STANCHION
1	PASSENGER, PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	
	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
9	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE.2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
27	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM
1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
21	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
19	MOLDED AV GRAB HANDLE TOP BLACK
11	FREEDMAN US ARM (FLIP UP)
19	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID HI
	FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
27	FTA NEOPRENE FOAM PASSENGER SEATS
	MISC. OPTIONS
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 way hashers activate with lift door
1	Angel Hax o Collierd System
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram
1	Onspot Tire Chains



THEORETICAL WEIGHT ANALYSIS WORKSHEET (4-CORNER)

Chassis Manufacturer: FREIGHTLINEF DSL	Vehicle Type:	DF310		Prepared by:	DO
Model Year;	Completed Vehicle	Description:	WV-CLASS B	Date:	
OEM Modified OEM OEM FRT OEM RR Wheelbase Wheelbase GVWR GAWR GAWR 26000 9980 17500	REFERENCE UNI	22589.00			
Model type FL Chassis Code FP #: CB002749	Lfl-Frt (Ibs)	Rt-Frt (lbs)	Lft-Rr (lbs)	Rt-Rr (Ibs)	Total (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED	3402.00 95.45 -13.43	3490.00 95.45 -13.43	4456.00 35.80 418.93	4368.00 35.80 418.93	15716.00 262,50 811.00
WEIGHT OF THE OCCUPANTS (lbs) 4200.00 (150 lbs x 28 (number of designated seating positions) WHEEL CHAIRS IF USED X	-6.07	-5.85	2143.57	2068,35	4200.00
SUBTOTAL WEIGHT	3477.96	3566.18	7054.29	6891.07	20989.50
ADJUSTED HORIZONTAL CENTER OF GRAVITY 146.17 ADJUSTED LATERAL CENTER OF GRAVITY -0.15 ADJUSTED REAR WEIGHT 13945.36 ADJUSTED FRONT WEIGHT 7044.14					
ADJUSTED 4 CORNER WEIGHT	3477.96	3566.18	7054.29	6891.07	20989.50
TOTAL FRONT IS THE FRONT GAWR OVER	7044.14 NO	2835.86 1 IS THE REA	'OTAL REAR R GAWR OVER	13945.36 NO	3554.64
PASS/FAIL ANALYSIS	ls Lft-Frl/2 is Exceeded? Ex	Rt-Frt/2 cceeded?			
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT. (lbs.	20989.50 Is 5010.50	GVWR Ex	ceeded?	NO	
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is (NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000) (bs.)	N/A li	JS		
The actual completed weight (UVW) of this vehicle is 15978.50 I	bs. Is i	Maximum UV	W Exceeded?	NO	
DEFINITIONS "UVW" - Completed weight of the vehicle with maximum capacity of all fluids necess of the vehicle, but without cargo, occupants or accessories that are normally remove "GAWR" and "GVWR" are found on the label affixed to the cover of the Incomplete "LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum cap	ary for operation ed when the vehicle is Vehicle Manual (IVM). pacities of all fluids neo	not in use. cessary for op	eration		
of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appr Vehicles with tanks for water and/or LP gas must also account for the weight of thes	opriate allowance for a fluids in the cargo ca	cargo. alculations.	-		

Class F Technical Specifications

*	BASE MODEL (FREIGHTLINER S2C)						
1	DEFENDER 259-S2C FREIGHTLINER 6.7L CUMMINS ENGINE						
	CHASSIS OPTIONS						
1	EXHAUST, STREET SIDE						
1	EXTENSION, TIRE VALVE STEM						
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE						
*	ELECTRICAL OPTIONS						
1	AS BUILT WIRING DIAGRAMS						
2	DEFROST FAN, EACH						
1	LIFT MASTER SWITCH W/INDICATOR LIGHT						
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR						
1	LIGHTS, DOOR ACTUATED DOME						
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)						
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS						
1	LIGHT, STROBE-ROOF MOUNTED						
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP						
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift						
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR						
*	REI AUDIO/VIDEO OPTIONS						
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI						
1	SPEAKER INTERIOR REI QTY 4						
1	GOOSENECK MIC PA W/FOOTSWITCH REI						
1	PAGE,SPEAKER EXTERIOR (EACH)						
1	RADIO, TWO WAY PREP						
*	FLOORING OPTIONS						
29	GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR						
1	PLYWOOD, 3/4" MARINE TECH FLOOR						
1	YELLOW STANDEE LINE						
1	YELLOW STEP EDGE NOSINGS						
*	CLIMATE CONTROL OPTIONS						
1	ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR						
2	FLAPS, SKIRT MOUNTED CONDENSOR						
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)						
1	HEAT CIRCULATION PUMP						

2	HEATER 65,000 BTU
*	EXTERIOR OPTIONS
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE
1	TRANSIGN, LED DESTINATOR FRONT/SIDE
*	GRAPHICS OPTIONS
7	PAINT WHEELS (BOTH SIDES) PER WHEEL
1	PAINT ENTIRE BUS 2 COLORS NON-METALLIC (UNDER 35') INCLUDES 3.9MM NOBLE SELECT FRP (ROOF STAYS WHITE)
*	PARATRANSIT OPTIONS
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES: 34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS, WHEELCHAIR LOCATION SIGNS
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH
2	POUCH, Q'STRAINT TIEDOWN
2	PRIORITY SEATING SIGN
*	SAFETY OPTIONS
1	MIRRORS,HTD/RMT ROSCO M2/S2C
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13 UNIT), REFLECTOR TRIANGLES
1	BIO-KIT, LARGE
1	MIRROR, INTERIOR 6.0" X 16.0"
1	SEAT BELT WEB CUTTER
1	FRESNAL LENS
2	BLANKET, FIREPROOF 62" X 80"
2	ESCAPE HATCH PRO LO #9245
1	KICK OUT WINDOW (ADDITIONAL)
4	EXIT INDICATOR LIGHT - WINDOW
1	GRAB RAILS, CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION, W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL EACH
2	STANCHION, PADDING BLACK (PER STANCHION)
*	INTERIOR OPTIONS
1	DECAL, "NO-SMOKING"
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"

1	DECAL,CLEARANCE HEIGHT
1	FAREBOX PREP
1	FAREBOX STANCHION
1	PASSENGER, PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
11	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE,2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
31	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM
1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
25	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
23	MOLDED AV GRAB HANDLE TOP BLACK
13	FREEDMAN US ARM (FLIP UP)
23	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID HI FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
31	FTA NEOPRENE FOAM PASSENGER SEATS
	MISC. OPTIONS
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 Way flashers activate with lift door
1	Angel Trax 6 Camera System
1	Fog Lights front Bumper
1	Kain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram
L	Unspot lire Chains



THEORETICAL WEIGHT ANALYSIS WORKSHEET (4-CORNER)

Chassis Manufacturer: FREIHTLINER DSL	Vehicle Type: DF350 Prepared by: DO
Model Year:	Completed Vehicle Description: WV-CLASS C Date:
OEM Modified OEM OEM FRT OEM RR Wheelbase GVWR GAWR GAWR 259.00 26000 9880 17500	REFERENCE UNI 20364.00
Model type FL Chassis Code FP #: CB002750	Lft-Frt Rt-Fri Lft-Rr Rt-Rr Total (lbs) (lbs) (lbs) (lbs) (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED	3935.00 3790.00 5000.00 4580.00 17305.00 52.05 52.05 52.95 52.95 210.00 -56.82 -56.82 276.82 276.82 440.00
WEIGHT OF THE OCCUPANTS (lbs) 4800.00 (150 lbs x 32 (number of designated seating positions) WHEEL CHAIRS IF USED X	184.32 178.58 2253.21 2183.88 4800.00
SUBTOTAL WEIGHT	4114.56 3963.82 7582.07 7002.64 20755.00
ADJUSTED HORIZONTAL CENTER OF GRAVITY 167.05	
ADJUSTED LATERAL CENTER OF GRAVITY -1.17	
ADJUSTED REAR WEIGHT 14676.62	
ADJUSTED FRONT WEIGHT 8078.38	
ADJUSTED 4 CORNER WEIGHT	4114.56 3963.82 7582.97 7093.64 22755.00
TOTAL FRONT IS THE FRONT GAWR OVER	8078.38 1801.62 TOTAL REAR 14676.62 2823.38 NO IS THE REAR GAWR OVER NO
PASS/FAIL ANALYSIS	Is Lft-Frt/2 Is Rt-Frt/2 Exceeded? Exceeded?
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs.	22755.00 Is GVWR Exceeded? NO 3245.00
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is (NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000	D lbs.)
The actual completed weight (UVW) of this vehicle is 17515.00	bs. Is Maximum UVW Exceeded? NO
DEFINITIONS "UVW" - Completed weight of the vehicle with maximum capacity of all fluids necess of the vehicle, but without cargo, occupants or accessories that are normally remove "GAWR" and "GVWR" are found on the label affixed to the cover of the Incomplete	ary for operation ed when the vehicle is not in use. Vehicle Manual (IVM).
"LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum cap of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appr Vehicles with tanks for water and/or LP gas must also account for the weight of these	pacilies of all fluids necessary for operation opriate allowance for cargo. e fluids in the cargo calculations.

Class G Technical Specifications

*	BASE MODEL (FREIGHTLINER S2C)						
1	DEFENDER 219-S2C FREIGHTLINER 6.7L CUMMINS ENGINE						
	CHASSIS OPTIONS						
1	EXHAUST, STREET SIDE						
1	EXTENSION, TIRE VALVE STEM						
1	SPARE TIRE/WHEEL 19.5" SHIP LOOSE						
*	ELECTRICAL OPTIONS						
1	AS BUILT WIRING DIAGRAMS						
2	DEFROST FAN, EACH						
1	LIFT MASTER SWITCH W/INDICATOR LIGHT						
1	LIGHT, DOOR AJAR W/BUZZER LIFT DOOR						
1	LIGHTS, DOOR ACTUATED DOME						
1	LIGHT, INTERIOR LED 12" STRIP SOUND OFF (8 LIGHTS)						
1	LIGHTS, LED ALL EXTERIOR STANDARD LIGHTS-INCLUDES SIDE DIRECTIONAL & REAR CENTER BRAKE LIGHT-ALSO INCLUDES GUARDED FRONT CLEARANCE LIGHTS						
1	LIGHT, STROBE-ROOF MOUNTED						
1	ENGINE COMPARTMENT LIGHT LED 12" STRIP						
2	MASTER DISCONNECT SWITCH (BODY ONLY) 1 for Body 1 for Lift						
1	SWITCH-KEY NEXT TO ENTRY DOOR EXTERIOR						
*	REI AUDIO/VIDEO OPTIONS						
1	AM/FM/MP3 RADIO W/ 4 SPEAKERS REI						
1	SPEAKER INTERIOR REI QTY 4						
1	GOOSENECK MIC PA W/FOOTSWITCH REI						
1	PAGE,SPEAKER EXTERIOR (EACH)						
1	RADIO, TWO WAY PREP						
*	FLOORING OPTIONS						
29	GERFLOOR FLOORING PER FOOT (SIRIUS) COLOR: SELECT COLOR						
1	PLYWOOD, 3/4" MARINE TECH FLOOR						
1	YELLOW STANDEE LINE						
1	YELLOW STEP EDGE NOSINGS						
*	CLIMATE CONTROL OPTIONS						
1	ACT 125,000 BTU A/C (S2C 6.7L): OEM COMPRESSOR PLUS 2 TM-16 ADD ON COMPRESSORS, EZ-91 EVAPORATOR, EZ-3 SIDE EVAPORATOR, CS-2 CONDENSOR, CS-3 CONDENSOR						
2	FLAPS, SKIRT MOUNTED CONDENSOR						
1	ELECTRIC HEATED ENTRANCE STEP (ONE STEP)						
1	HEAT CIRCULATION PUMP						

2	HEATER 65,000 BTU
*	EXTERIOR OPTIONS
1	BUMPER,REAR ROMEO RIM (CH- DF) BLACK
1	DOOR, ENTRANCE 40" ELECTRIC CUTAWAY W/AUTO REVERSE
1	TRANSIGN, LED DESTINATOR FRONT/SIDE
*	GRAPHICS OPTIONS
7	PAINT WHEELS (BOTH SIDES) PER WHEEL
1	PAINT ENTIRE BUS 2 COLORS NON-METALLIC (UNDER 35') INCLUDES 3.9MM NOBLE SELECT FRP (ROOF STAYS WHITE)
*	PARATRANSIT OPTIONS
1	LIFT PKG BRAUN CENTURY NCL1000FIBHB3451-2 403/4; 1,000 POUND CAPACITY; INCLUDES: 34 X 51 PLATFORM, BRAUN HAND BELT, DUAL PANEL LIFT DOORS W WINDOWS, ADA LIFT LIGHTING, ADA ENTRY LIGHTING, PARK INTERLOCK, FAST IDLE, PRIORITY SEATING SIGNS, WHEELCHAIR LOCATION SIGNS
2	Q-STRAINT, DELUXE W/TRACK RETRACTABLE Q-8100-A1
8	WHEELCHAIR WEBBING LOOPS 1" Q5-7580 EACH
2	POUCH, Q'STRAINT TIEDOWN
2	PRIORITY SEATING SIGN
*	SAFETY OPTIONS
1	MIRRORS,HTD/RMT ROSCO M2/S2C
1	SAFETY PACKAGE 1: SMALL BACK UP ALARM, 5# FIRE EXTINGUISHER, FIRST AID KIT (13 UNIT), REFLECTOR TRIANGLES
1	BIO-KIT, LARGE
1	MIRROR, INTERIOR 6.0" X 16.0"
1	SEAT BELT WEB CUTTER
1	FRESNAL LENS
2	BLANKET, FIREPROOF 62" X 80"
2	ESCAPE HATCH PRO LO #9245
1	KICK OUT WINDOW (ADDITIONAL)
4	EXIT INDICATOR LIGHT - WINDOW
1	GRAB RAILS, CEILING (PAIR)
1	STANCHION W/INTEGRATED RIGHT HAND GRAB
1	STANCHION, W/MODESTY/DRIVERS BARRIER
2	MODESTY PANEL PADDED VINYL EACH
2	STANCHION, PADDING BLACK (PER STANCHION)
*	INTERIOR OPTIONS
1	DECAL, "NO-SMOKING"
1	DECAL, "SEAT BELT MUST BE WORN AT ALL"
1	DECAL, "WATCH YOUR STEP"

1	DECAL,CLEARANCE HEIGHT
1	FAREBOX PREP
1	FAREBOX STANCHION
1	PASSENGER, PULL CORD YELLOW
2	PASSENGER, PUSH BUTTON (PER LOCATION)
1	SIGNAL, CHIME 2-TONE (ADA)
1	SIGNAL, PASSENGER STOP RQUEST BULKHEAD MOUNTED
*	PASSENGER SEATING OPTIONS (SEAT PRICES INCLUDE 60" SEAT BELTS)
1	MID HI FEATHERWEIGHT RIGID SGL W/DBL T-LEG FOR REAR CENTER OR PERIMETER
7	MID HI FEATHERWEIGHT RIGID W/T LEG DBL
3	SEAT,35" FSC TWO STEP FOLDAWAY FLIP
1	ICS DOUBLE,2-ICS
*	PASSENGER SEATING FABRIC OPTIONS
23	LEVEL 4 FABRIC UPGRADE (PER PASSENGER)
*	DRIVER SEATING COVER CHASSIS OEM
1	COVER DRIVER SEAT LEVEL 4
*	SEAT BELT OPTIONS
17	SEAT BELT - USR- CBI (PER SEAT) (N/A WITH FLIP SEATS)
6	SEAT BELT - USR- FOLDAWAY CBI (PER SEAT)
5	SEAT BELT EXTENSION 24"
*	SEAT ACCESSORY OPTIONS
15	MOLDED AV GRAB HANDLE TOP BLACK
9	FREEDMAN US ARM (FLIP UP)
15	FREEDMAN ABS BACK PROTECTOR - ONLY AVAILABLE WITH FEATHERWEIGHT MID HI, MID HI FLIP, NOTCHBACK FOLDAWAY; N/A WITH ICS SEAT OR HI BACK SEATS
23	FTA NEOPRENE FOAM PASSENGER SEATS
	MISC. OPTIONS
1	Conspicuity tape 2" wide full length of bus
1	Graphics
1	Rear Turn and Brake Signals Separate Circuit
1	Wheel Chocks
1	4 Way flashers activate with lift door
1	Angel Trax 6 Camera System
1	Fog Lights front Bumper
1	Rain Gutter Over Windows and doors
1	Laminated As Built Wirining Diagram
1	Opspot Tire Chains



THEORETICAL WEIGHT ANALYSIS WORKSHEET

(4-CORNER)

Chassis Manufacturer: FREIGHTLINEF DSL	Vehic	le Туре;	DF310		Prepared by:	DO
Model Year:	Comp	leted Vehicle	Description:	WV-CLASS A	Date:	
OEM Modified OEM OEM FRT OEM RR Wheelbase Wheelbase GVWR GAWR GAWR 26000 9880 17500	REFE	RENCE UNI	22589.00			
Model type FL Chassis Code FP # CB002743		Lft-Frt (lbs)	Rt-Frt (lbs)	Lft-Rr (ibs)	Rt-Rr (lbs)	Total (lbs)
ACTUAL COMPLETED WEIGHT OF VEHICLE (UVW) ADDED FUEL FROM CALCULATED FUEL SHEET EXTRAS ADDED AFTER UNIT WAS WEIGHED		3402.00 95.45 21.57	3490.00 95.45 21.57	4456.00 35.80 318.93	4368.00 35.80 318.93	15716.00 262.50 681.00
WEIGHT OF THE OCCUPANTS (lbs) 3600.00 (150 lbs x 24 (number of designated seating positions) WHEEL CHAIRS IF USED X		145.78	139.76	1691.76	1622.71	3600.00
SUBTOTAL WEIGHT		3664.80	3746.78	6502.48	6345.43	20259,50
ADJUSTED HORIZONTAL CENTER OF GRAVITY 139.52 ADJUSTED LATERAL CENTER OF GRAVITY -0.16 ADJUSTED REAR WEIGHT 12847.92				с. Х		
ADJUSTED FRONT WEIGHT 7411.58						
ADJUSTED 4 CORNER WEIGHT		3664.80	3746.78	6502.48	6345.43	20259.50
TOTAL FRONT IS THE FRONT GAWR OVER	1	7411.58 NO	2468.42 T IS THE REAI	OTAL REAR R GAWR OVER	12847.92 NO	4652.08
PASS/FAIL ANALYSIS	ls Lft-Fr Exceed	1/2 ls ed? E	s Rt-Frt/2 Exceeded?			
GVWR (lbs.) 26000.00 LOADED VEHICLE WEIGHT (lbs.	202	5740.50	s GVWR Ex	ceeded?	NO	
Maximum UVW from Tables A & B of the Incomplete Vehicle Manual (IVM) is (NOTE: UVW does not apply to certification of vehicles with a GVWR above 10,000	0 lbs.)		N/A Ib	.		
The actual completed weight (UVW) of this vehicle is 15978.50	lbs.	ls	Maximum UV	W Exceeded?	NO	
DEFINITIONS						
"UVW" - Completed weight of the vehicle with maximum capacity of all fluids necess of the vehicle, but without cargo, occupants or accessories that are normally remove	sary for ed wher	operation the vehicle i	s not in use,			
"GAWR" and "GVWR" are found on the label affixed to the cover of the Incomplete Vehicle Manual (VAN)						

e Incomplete Vehicle Manual (IVM).

"LOADED VEHICLE WEIGHT" - Completed weight of the vehicle with maximum capacities of all fluids necessary for operation of the vehicle plus 150 lbs. (or 70 kg.) for each designated seating position and appropriate allowance for cargo. Vehicles with tanks for water and/or LP gas must also account for the weight of these fluids in the cargo calculations.



Warranty Service & Product Recalls

When buying a vehicle from Rohrer Bus, you can rest assured that you will be taken care of long after the sale. Our dedicated account representatives, Ryan Renninger (warranty) and Greg Kline (parts), are committed to service. They are here to help you from 8am – 4:30pm Monday thru Friday. Mr. Renninger is hands on and our most knowledgeable employee regarding warranty. Mr. Renninger and Mr. Kline can be reached at 1-800-735-3900.





When you purchase a vehicle you are fully aware that, at some point, you will need to repair it. That is why Rohrer Bus has stocked our bus parts warehouse with items from the most reputable manufacturers in the business. We've built our reputation as a leading commercial and school bus parts dealer by partnering with highly regarded manufacturers like Thomas Built Buses[®], AutoAbility, Braun Corporation, Champion Bus, El Dorado National, Federal Coach, General Coach, Krystal Koaches, StarTrans, and Vehicle Production Group (VPG). By working with such well-regarded industry leaders, Rohrer Bus is able to provide the exact bus parts that you are looking for.

A Massive Inventory of Bus Parts For Sale

At Rohrer Bus, our customers operate vehicles in all models, sizes, and from just about every different model year. Because of this, our inventory of bus parts for sale is massive. Even if we do not have the exact part that you need in our warehouse, we have the resources to locate it and get it to you quickly. Don't spend your time scouring for bus parts online. Call our friendly team of bus parts experts and let us get you what you are looking for quickly.



Parts Stock Room

A Transportation Company You Can Depend On.

Rohrer Bus is a company that provides the safest and most efficient **bus transportation services** and solutions available. We're large enough to offer the best products and services in the industry, but small enough to provide all of our customers with the personalized attention they deserve. If we don't have the bus parts that fit your needs, we have the resources available to find it. **Contact us** to learn more about our complete selection of bus parts for sale or call 1-888-594-3135!

Service Offerings

Rohrer Bus is a full-service transportation equipment maintenance facility. No matter how minor or serious your vehicle's problem is, we have the resources to fix it. With over 500 years of combined bus and automotive experience, our shop maintenance personnel are equipped to get your vehicle back on the road quickly. Our goal is to be your preferred bus service company, and we won't let you down!

Our Service Capabilities

- Major / minor bus repairs
- Factory trained certified technicians
- Engine Warranty Cummins, CAT, Mercedes / Detroit
- Lift repair & Warranty Braun, Ricon, Maxon
- Hand Controls Mobility Driving Aids
- Air Conditioning ACT, Trans-Air, AC Carrier
- Front End / All Wheel Alignment Minivans through Class Truck & Buses
- Custom Preventative Maintenance Packages
- Emergency Vehicle Repairs Ambulance / Fire Apparatus
- Automatic Tire Chain Installation & Repair
- D.O.T Inspection
- PA State Inspection
- Open till 6:00 AM till 11:00
- Call us: 1-888-594-3135







Service Training & Information

Training	E Learning	OEM Literature	
<u>Calendar</u>	Learning Center	Manuals	
Registration	Arvin Meritor		
Mailing List	Bendix	Videos	



Welcome to Rohrer's Service Information Training page.

Here you will find our training schedule along with a registration page where you can register for a up and coming class. If you don't see the class your looking for feel free to sign up on our wait list. As soon as we have your class scheduled we will contact you with the details.

We also offer ELearning 24/7 here you can find learning content available to you around the clock. You can study at your convenience and all you need is either a pc, tablet or phone and an internet connection.

Looking for R & R instructions or a wiring diagram look no further. Under OEM

Literature we have manuals, wiring diagrams and even some videos. If you don't see what your looking for then contact our support department at 1-888-594-3135 ext. 731.

For questions and suggestions feel free to contact us. Training Department Email:<u>info@rohrerbus.com</u> 1-717-418-4443



Body Shop

Bus Repair

Rohrer Bus is one of the only full-service body shops in the area for buses and large vehicles. Our team of experienced body shop technicians can handle just about any variety of body and/or structural damage to your vehicle.





At Rohrer Bus, we do more than sell top-quality new and pre-owned buses and vans. We also provide reliable bus repair service that can keep your vehicles operating at peak efficiency while helping to reduce your total cost of ownership.





Vehicle Graphics

Looking for the perfect design for your custom vehicle graphics? Then you have come to the right place! The Rohrer Bus custom graphics team can supply you with the design and installation of all your vinyl graphics and vehicle lettering needs.



PLEASE VISIT

WWW.ROHRERBUS.COM FOR MORE DETAILED INFORMATION REGARDING THE ABOVE MENTIONED SERVICES.



Company History

Rohrer Bus... four generations of transportation experience.

Rohrer's history all began in the early 1920's when Howard E. Rohrer Sr. started transporting school children with his horse and wagon in Allen's Cove, just south of Duncannon, Pennsylvania. The early horse-and-wagon evolved to a few wooden school bus bodies being built on car chassis'. Over the years, the need for student transportation grew. That's the way Rohrer Bus began.

Now fast forward to 1975. Howard E. Rohrer Jr. was running the business and our school bus fleet had grown to 70 buses. In addition to our growing school transportation service, Rohrer Bus added a Sales company and teamed up with Wayne school buses to represent their products. It was soon apparent that our <u>school bus</u> <u>company</u> was quickly outgrowing the facility on the family farm. So, in 1976, ground was broken for a new sales and service facility where our headquarters remain today.

By 1981, the 3rd generation of the Rohrer family was well on their way to continuing our company's transportation legacy. H.E. "Skip" Rohrer III and his brother-in-law John Schrantz, who continue to oversee the business operations today, took over the company from H.E. Rohrer Jr. By this time, our operating fleet had grown to over 200 buses and, in 1982, we became a dealer for Champion Bus selling commercial buses.

In the fall of 1999, Rohrer Bus Sales proudly became the Thomas Built Bus dealer for the much of the state of Pennsylvania. Our experience in the sale and operation of school and commercial buses, along with our reputation for providing outstanding customer service made Rohrer the logical choice when Thomas Built Buses was looking for a full-service dealership to partner with. And in 2006, just one year after receiving the Pennsylvania School Bus Association's (PSBA) Platinum Bus Award for 75 years of service to the transportation industry, Rohrer Bus was celebrated as the Thomas Built Bus Dealer of the Year.

Today, the 4th generation of the Rohrer transportation legacy is now in place with Tahva Rohrer Wylie and David Schrantz continuing our family's dedication to the transportation industry. We currently sell vehicles throughout the mid-Atlantic states of Pennsylvania, Maryland, New Jersey, Delaware, and Virginia. Rohrer Bus offers a complete lineup of vans and buses ranging from small, wheelchair-accessible passenger vans to 90passenger buses. On top of that, we are a FULL service dealer with factory-trained, ASE certified technicians providing factory approved service and warranty repairs for the ENTIRE bus.

In addition to our dealership growth, over fifteen (15) Pennsylvania school districts, intermediate units, and other entities rely on our fleet of over 500 vehicles to provide them with safe transportation services for their students. Our Duncannon headquarters has expanded several times, now with over 30,000 square feet, offering complete support along with the latest tools and equipment. With that, we are proud to be recognized as Perry County's largest employer. In addition to our Duncannon facility, Rohrer Bus has instituted several satellite facilities located throughout our growing sales territory.

Although we may have grown much larger over our many years in business, our Rohrer Bus family still prides itself on one thing: providing the very best transportation products and services available. With over 1000 years of combined industry experience, we can handle just about any transportation need, while consistently demonstrating our commitment to the highest level of quality, safety, and customer service. So, as **"The Transportation Company You Can Depend On"**, we look forward to a very long and successful relationship as your partner in safe and reliable transportation!

1515 State Road, P.O. Box 100, Duncannon, Pennsylvania 17020 • OFFICE 717.957.2141 • TOLL FREE 800.735.3900 • FAX 717.957.4884



CHAMPION BUS STANDARD WARRANTY

Notice

Please ensure that the warranty registration is completed online in Dealer Connect by your purchasing dealer. Electronic entry into the warranty system registers the warranty with Champion Bus so that Champion Bus has record of your rights under this limited warranty and to assure prompt assistance. Your dealer will provide the warranty info for you to sign in order for entry into this system. If you do not remember signing a Champion Bus warranty registration at the time of delivery, please contact your dealer.

Definition of Terms

Authorized Champion Bus Dealer ("Dealer"): This agreement is applicable only in the United States, Puerto Rico and Canada. Any Authorized Dealer of the owner's choice may perform warranty service work under the Champion Bus Warranty Agreement. This vehicle should be delivered to the authorized dealer during normal service hours. A reasonable time should be allowed after taking the vehicle to the authorized dealer for performance of the repair.

Champion Bus, Division of Forest River, Inc. ("Warrantor"): The party obligated to perform under this Agreement.

Original Purchaser: Person or entity that is a recipient of this product provided by a dealer under a purchase order or contract sales.

Wear and Tear: The deterioration of a part or material beyond the manufacturer's specified tolerances that occur naturally over time and under normal operating conditions.

1. Who Warrants The Product

The product, as described and limited here, is warranted by the manufacturer and installer of the body: Champion Bus, Division of Forest River, Inc., hereinafter referred to as Champion Bus, 331 Graham Road, Imlay City, MI 48444; a Michigan Corporation; and is administered by the Champion Bus Customer Service Department, Imlay City, Michigan.

2. Who Is Covered

Champion Bus, the warrantor, extends this limited warranty agreement to the original owner only of the vehicle during the Warranty Period.

3. What Is Covered

Champion Bus, your warrantor, extends the following limited warranty to you; in which the limited warranty covers your conversion only pertaining to material defects in all materials and workmanship supplied by or performed by Champion Bus.

4. Warranty Period

The Champion Bus limited warranty is for a period of one (1) year from the date of first delivery or 12,000 miles, whichever occurs first, except for other coverages listed under "Other Warranties That May Apply" and items listed under "Exclusions and Limitations" and "Limits of the Warranty."

5. Extended Warranty on Structural Items

Warrantor warrants to the original purchaser for a period of five (5) years from the date of first delivery or 100,000 miles, whichever comes first, that this produce shall be free of SUBSTANTIAL DEFECTS arising out of or relating to the structural portion of the product. THIS STRUCTURAL WARRANTY IS INTENDED TO COVER ONLY THE PERFORMANCE OF THE STEEL CAGE STRUCTURE OF THE BUS BODY, INCLUDING CORROSION DAMAGE TO THE BODY STRUCTURE.

6. Exterior Paint

Exterior Paint, performed by Champion Bus, is fully warranted to be free of substantial defects in workmanship by Champion Bus for the first three (3) years (36,000 miles) from date of original purchase, 50% warranted four (4) years (70,000 miles), and 25% warranted five (5) years (100,000 miles) from date of original purchase.

7. Other Warranties That May Apply

Champion Bus does not warrant the base chassis itself. The vehicle engine, chassis, drive-train, suspension system, battery and other chassis components are covered by a separate warranty offered by the manufacturer of the chassis and administered by the chassis manufacturer's authorized dealers. The tire manufacturer separately warrants tires. In addition, all aftermarket springs, suspensions, driveline retarders, etc., such as Liquid Springs, Mor Ryde, Kelderman, Telma, etc. are not covered by Champion Bus. These items are covered by their original manufacturer and their warranties may vary.

8. Owner's Responsibility

Proper preventative maintenance of the exterior and interior of the vehicle is the responsibility of the owner. See the owner's manual(s) for proper care instructions. Defects or damage as a result of improper care or maintenance are not covered by this warranty agreement.

9. Exclusions and Limitations

Damage caused by abuse, misuse, failure to observe reasonable required maintenance practices, acid rain, accidents, natural disasters, acts of war, facing of fabrics, carpeting and/or fiberglass are not covered. Light bulbs and fuses are not covered.

Damage to the unit if such damage is the result of deterioration due to normal use, wear and tear, or exposure to the elements.

Damages that may occur to the chassis, frame, other parts or components that occur due to overloading will not be covered and may invalidate portions of the Champion Bus warranty agreement.

Cosmetic or surface corrosion resulting from stone chips or scratches in paint are not covered.

Replacement parts provided under terms of the warranty agreement will whenever possible, match original equipment. When necessary, Champion Bus will substitute parts of comparable function and value. Defective items may be replaced with new, remanufactured, reconditioned or repaired components.

Modifications, alterations or repairs performed by unauthorized personnel may invalidate portions of the Champion Bus warranty. In addition, using the vehicle to tow another vehicle is prohibited and may void warranty. Contact Champion Bus Customer Service before you make modifications, alteration or repairs.

10. Recovery Limitations

No person shall be entitled to recover from warrantor for any consequential or incidental damages arising out of or relating to any defect in the product. These limitations include but are not limited to, loss of time; loss of use; loss of revenues, salaries or commissions; towing charges; bus fares; bus rentals: car rentals; gasoline expenses; telephone charges; inconvenience or other incidental damages.

11. How To Get Warranty Service

To obtain warranty service, contact or visit the dealership where you originally purchased your vehicle or another warranty service facility designated by Champion Bus. The dealership must contact Champion Bus Customer Service Department for authorization to have a warranty claim submitted. If you or your dealer has moved, or if your dealer is no longer in business, contact Champion Bus Customer Service Department (see address and telephone numbers below) for the name of a Champion Bus dealer nearest to you. Your claim must be made within 14 days of the discovery of the defect. Champion Bus will determine authorization based on and subject to the terms of the warranty agreement. All warranty claims must be reported within the warranty period. Warranty personnel must authorize all warranty service prior to performance. Warranty service may be reported directly to the warrantor or to one of their authorized dealers. If warranty personnel approve warranty service, you must leave the unit at the appropriate warranty service location for a sufficient time to perform service.

12. Who Performs Warranty Service

It is recommended you obtain warranty service at the dealership where you originally purchased your bus. If the dealership cannot perform the service work, they should call Champion Bus Customer Service Department for assistance (see number below). If you are unable to visit your original dealer, contact Champion Bus Customer Service Department (address below) for the name and location of a Champion Bus dealer near you.

13. Dispute Resolution

Should you be unable to resolve a disagreement with your dealer regarding your right to pursue warranty coverage for a needed repair, contact the Champion Bus Customer Service Department (see address below). If a dispute about warranty service arises between Champion Bus and you, the owner, the disagreement will be resolved in accordance with the customary procedures of the American Arbitration Association relating to commercial transactions, or the dispute will be submitted to a panel of three (3) arbitrators for decision. The panel will be made up of one member appointed by Champion Bus, one member appointed by the complainant/owner, and one member from the arbitrator group mentioned above. Any and all legal remedies shall be available to the owner after pursing this informal dispute resolution if a ruling is entered against Champion Bus and Champion Bus fails to abide by the ruling. The expenses of arbitration will be paid by the party against whom the arbitrator(s) rule.

14. Limits Of Warranty

This written statement of limited warranty represents the entire warranty authorized and offered by Champion Bus. There are no warranties or representations beyond those expressed in this written document. Any dealership, salesperson or agent cannot amend it. It expressly limits all warranties, including, but not limited to, by way of specification, both express and implied warranties, including warranties or merchantability and fitness for a particular purpose along with all other liabilities or obligations of Champion Bus.

FEDERAL COMPLIANCE

THE TERMS OF THE WARRANTOR'S UNDERTAKING EXPRESSED IN THIS LIMITED WARRANTY ARE DRAFTED TO COMPLY WITH THE MAGNUSEN MOSS WARRANTY LEGISLATION, P.L. 93-637 OF 1974, AND OTHER APPLICABLE LAW. ANY WARRANTY PROVISIONS PROMULGATED BY THE FEDERAL TRADE COMMISSION PURSUANT TO RULES OR ANY OTHER LAW RELATIVE THERETO ARE EXPRESSLY INCORPORATED HEREIN. TO THE EXTENT ANY PROVISIONS OF THIS LIMITED WARRANTY ARE INCONSISTENT WITH STATE LAWS, ONLY THOSE PARTS INCONSISTENT ARE VOID.

Champion Bus Division of Forest River, Inc. CUSTOMER SERVICE DEPT. 331 Graham Road Imlay City, MI 48444 Phone: 844.473.8287

STATE OF WEST VIRGINIA Purchasing Division PURCHASING AFFIDAVIT

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

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

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

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

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

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS	THE	FO	LLC	DWING	SIGNAT	URE:
---------	-----	----	-----	--------------	--------	------

Vendor's Name: Rohver Enterprises Inc PBH RE	hror Bus Sules
Authorized Signature: Ch	Date: G/24/21
State of Virginia	
County of Angusta, to-wit:	
Taken, subscribed, and sworn to before me this 21 th day of	June RENE Que
My Commission expires 30	2027. NOTARY PUBLIC
AFFIX SEAL HERE NOTAI	RY PUBLIC Jen Barris Commission Expires Grand Commission Expires Grand Commission Expires Grand Commission Com



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

State of West Virginia Centralized Request for Quote Vehicles

	002993		Reason for Modification:
Doc Description:	Mid-Size Medium Duty V	ehicles	
Proc Type:	Central Master Agreeme	nt	
Date Issued	Solicitation Closes	Solicitation No	Version
2021-05-24	2021-06-09 13:30	CRFQ 0805 PTR2100000011	1
BID RECEIVING L	DCATION		
BID CLERK			
DEPARTMENT OF	ADMINISTRATION		
CURCHASING DIV			
2019 WASHINGTO CHARLESTON	WAZ 25305		
US	VVV 23303		
VENDOR			
Vendor Customer	Code: VS0000004719)	
Vendor Name : Ro	hrer Enterprises, Inc.	DBA Rohrer Bus Sales	
Address : 1515			
Street : STATE	ROAD		
City : DUNCAN	NON		
State :PA		Country: USA	Zip : 17020-9535
Principal Contact	Andrew Clawson, Re	egional Manager	

Toby L Weich (304) 558-8802 toby.l.weich@wv.gov

Vendor Signature X

5. NP Sale , FEIN# 23-2059976

DATE 6-8-21

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

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

Andrew Clawson, Regional Manager

(Name, Title)	
Andrew Clawson, Regional Manager	
(Printed Name and Title)	
2075 B West Main Street Waynesboro, VA 22980	
(Address) 804-357-1145/ or 800-735-3900 ext 4151	
(Phone Number) / (Fax Number)	
aclawson@rohrerbus.com	
(email address)	

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law.

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales

(Company) M M, S, NP S. In David Clawson Senior Vice President

(Authorized Signature) (Representative Name, Title)

David Clawson Senior Vice President

(Printed Name and Title of Authorized Representative)

6-25-21

(Date)

804-357-1145/ or 800-735-3900 ext 4151 (Phone Number) (Fax Number)

.

Revised 04/21/2021

ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ PTR2100000011

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.

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales

Combany Sr. VP. Sales Authorized Signature

Date

6-25-21

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

CERTIFICATION FOR AIR & WATER POLLUTION

The Vendor certifies that the vehicles proposed:

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

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

6-25-21

Date Mlh. Sr. UP. S.les

Authorized Signature

Senior Vice President

Title

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales Company Name

DISADVANTAGED BUSINESS ENTERPRISE VENDORS/ MANUFACTURERS CERTIFICATION

(Check appropriate statement)

- The Vendor, <u>if a transit vehicle manufacturer</u>, hereby certifies that it has complied with the requirements of 49 CFR Section 26.49 by submitting an annual DBE goal to the Federal Transit Administration (FTA). The goal has either been approved or not disapproved by FTA.
- ✓ The Vendor, <u>if a non-manufacturing supplier</u>, hereby certifies that the manufacturer of the transit vehicle to be supplied has complied with the above-referenced requirement of 49 CFR Section 26.49.

6-25-21 Date Mhh. Sr. VP. Soles

Authorized Signature

Senior Vice President

Title

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales

Company Name

BUY AMERICA CERTIFICATION ROLLING STOCK

Certificate of Compliance

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

6-2	5-21
Date	DJALL Sr. VP. S.les
Author	ized Signature
Rohre	r Enterprises, Inc. DBA Rohrer Bus Sales
Compa	ny Name
- ·	

David Clawson

Name

Senior Vice President

Title

Certificate for Non-Compliance

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

Date

Authorized Signature

Company Name

Name

Title

FEDERAL MOTOR VEHICLE SAFETY STANDARDS CERTIFICATION

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.

6/25/21		
Date D. M. Sr Authorized Signature	VP	5.10,
Senior Vice President		
Title		-
Rohrer Enterprises, Inc. DBA Rohrer	Bus	Sales
Company Name		

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

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales hereby certifies that it

_____ IS or

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

6-25-21			
Date DJ	MM.	Sr VP	Sale :
Authorized Signa	iture 7		

Senior Vice President Title

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales Company Name

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

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

<u>Rohrer Enterprises, Inc. DBA Rohrer Bus Sales</u> (COMPANY NAME) certifies to the best of its knowledge and belief, that it and its principals:

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

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

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

Senior Vice President

Signature and Title of Authorized Official

BID FORM #8

VENDOR'S CERTIFICATION OF UNDERSTANDING AND ACCEPTANCE

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

6-25-21 Date Authorized Signature

Authorized Signature

Senior Vice President
Title

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales Company Name

SPECIFICATION COMPLIANCE

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



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

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

BID FORM #9

CERTIFICATION OF RESTRICTIONS ON LOBBYING

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

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

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

The (Vendor, Contractor) <u>Rohrer Enterprises, Inc. DBA Rohrer Bus Sales</u>, 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.

6-25-21

Date

Authorized Signature

Senior Vice President

Title

BID FORM #10

BID DOCUMENTATION CHECKLIST

Model Year: 2022

Model: ____

Bid Forms



- _____ Bid Form #2: Certification for Air & Water Pollution
- _____ Bid Form #3: Disadvantaged Business Enterprise Vendors/Manufacturers Certification
- _____ Bid Form #4: Buy America Certification Rolling Stock
- _____ Bid Form #5: Federal Motor Vehicle Safety Standards Certification
- Bid Form #6: U.S. Comptroller's Debarment List Certification
- _____ Bid Form #7: Certification of Primary Participant Regarding Debarment, Suspension, and Other Responsibility Matters
- _____ Bid Form #8: Vendor's Certification of Understanding and Acceptance
- _____ Bid Form #9: Certification of Restrictions on Lobbying
- ____ Exhibit A Pricing Page

Documentation - to be submitted with bid: <u>Referenced</u>

	3.2	Engine: An ISB-10 Engine (6.7 liter) with EGR and Diesel Particulate Filter exhaust system – provide product description, warranty information and product literature.
\checkmark	3.2.8	High Idle System: provide product description, warranty information and product literature.
	3.4	Transmission (separate cooling system): provide product description, warranty information and product literature.
	3.5.4	Back Up Camera System: provide product description, warranty information and product literature.
$\overrightarrow{\mathbf{x}}$	3.10 3.15.5	Tires: provide product description, warranty information and product literature. Alternator: provide product description, warranty information and product literature.
	3.1.11	Water Testing: provide details of water testing procedures.
/	3.14 f.	Exterior Vinyl Colors: provide samples/chart of available colors.
	3.15	Undercoating and Rustproofing: provide product description, warranty information and literature.
<u> </u>	3.16.2	Ambulatory Passenger Entrance/Exit: provide location, size, door operating details.
	3.16.8	Stepwell Heater: provide product description, warranty information and product literature.
\checkmark	3.22	Floor Covering: provide samples of floor covering and colors to be provided.
	3.27	Seating: provide product description, warranty information, product literature and color charts for all of the seating products to be utilized. Proposed floor plans.
<u> </u>	.27.11	Driver's Seat: provide description of product.
\checkmark	3.27.1	Exterior Mirrors: provide product description, warranty information and product literature.
⁄	3.19	Dual Purpose Safety Vent: provide product description, warranty information and product literature.
<u> </u>	3.30	Wheelchair Securement System: provide product description, warranty information and product literature.
	3.37	Strap/Buckle Storage: provide description and location of product.

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	<u>′</u> 3.31	Wheelchair Occupant Restraint System: provide product description, warranty information and product literature.
	_ 3.32	Wheelchair Lift: provide Make, Model #, product description, warranty information and product literature.
	3.34	AM/FM Radio/CD: provide product description, warranty information and product literature.
	3.39	Training: submit letter of understanding to the terms in this Section.
	3.38.4	Fare box Provisions: provide description of proposed location-
	3.38.1	Destination Signs: provide product description, warranty information and product literature.
	3.38.5	PA System: provide product description and product literature.
/	3.21.1:	5 Strobe Light: provide product description and product literature.
	3.28.11	l Security Cameras Only: provide product description, warranty information and product literature.
_ / _	4.10	Security Camera System Including Playback: provide product description, warranty information and product literature.
	4.15	Warranty on complete vehicle.
	4.16	Warranty on Basic Vehicle Structure.
$\underline{\checkmark}$	4.17.1	Warranty: warranties to be provided on subsystems and components.
	6.1.2	Complete two (2) bids in binder form – one (1) marked for DPT.
<u> </u>	10.2 A,	Complete mechanical description of vehicle, its construction and equipment including manufacturer's model name and /or number. Include description of front and rear air conditioning and heat systems.
<u> </u>	21	Proposed interior floor plans, showing detailed dimensions including the location of the wheelchair securement system and stanchions.
$\underline{\checkmark}$	10.2 C.	Curb weight (empty weight) and gross vehicle weight rating (GVWR) of vehicle.
$\underline{\checkmark}$	10.2 D.	Samples or paint charts of available exterior paint colors and vinyl.
\checkmark	10.2 H.	Identification of the conversion location of the van.

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<u> </u>	1 0.2 I .	A list of five (5) users names, addresses, emails, and telephone numbers who have been provided similar equipment by the Vendor.
\checkmark		No Debt Affidavit
		Addendum Acknowledgement

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REQUEST FOR QUOTATION

Mid-Size – Medium Duty Cutaway Bus

BID FORM #1

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

Name:	Location(s) of the technical service representative(s). Ryan Renninger
Address:	1515 State Road PO Box 100
-	Duncannon, PA 17020
Telephon	e: _1-800-735-6700
Name:	Andrew Clawson, Regional Manager
Address:	2075 B West Main Street
_	Waynesboro, VA 22980
Telephon	e:
	Location(s) of parts distribution center(s).
Name:	Rohrer Bus Sales
Address:	1515 State Road PO Box 100
-	Duncannon, PA 17020
Telephon	e:1-800-735-6700
Name:	N/A
Address:	
Telephon	e:
ADDENDUM ACKNOWLEDGEMENT FORM SOLICITATION NO.: CRFQ PTR2100000011

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.

Rohrer Enterprises, Inc. DBA Rohrer Bus Sales

Combany Sr. VP. Sales Authorized Signature

6-25-21

Date

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

CHAMPION QUALITY ASSURANCE WATER TEST PROCESS

The following is a description of the current water test procedure for all units produced by Champion Bus, Inc.

FACILITY

Water test bay:	20' wide x 56' long x 18' high with attached pump room measuring 15' wide x 20' long x 9' high.
Water jets:	 5 Lengths of 1%" schedule 80 pipe at 45' long running lengthwise inside the building. 15 Active nozzles per pipe length for a total of 75 nozzles (Model 24 WSQ Nozzles with 110" spray pattern). Water supplied by 3" schedule 80 pipe with 3" s'chedule 80 pipe headers on each end of system. System supply pump rated at 300 gpm
Water Pressure:	 System water pressure adjustable up to 45 psi Example: - 20 psi = 3.3 gpm/nozzle - 40 psi = 4.4 gpm/nozzle System recovery pump rated at 300 gpm

PROCEDURE

- 1. DRIVE VEHICLE INTO BAY.
- 2. ACTIVATE WATER SPRAY. (SYSTEM GOES ON, AUTOMATICALLY)
- *3. LET VEHICLE SET FOR A MINIMUM OF 15 MINUTES PER UNIT. (MORE TIME MAY BE NECESSARY, IF VEHICLE IS SLATED FOR HARSH ENVIRONMENTS. ENGINEERING SHOULD REVIEW AND APPROVE <u>ALL</u> REQUESTS FOR CHANGES TO THIS SYSTEM AND PROCEDURE. CSE THE "ECR" SYSTEM FOR REQUESTED CHANGES.)

**NOTE:* Currently. our system pressure. at the main pump is set at 10 psi. this is approximately equivalent to a rainfall of 18" per a 1 hour period.

- 4. EXAMINE ALL WINDOWS, DOORS, WHEELWELLS, ESCAPE HATCHES, VENTS, WALLS, CEILING, FLOOR, AND ANY OTHER JOINT FOR WATER LEAKS.
- 5. RECORD RESULTS ON "WATER TEST LOG".
- 6. TURN OFF WATER SPRAY. (SYSTEM SHUTS OFF AUTOMATICALLY.)
- 7. EXIT BOOTH AND RETURN VEHICLE TO REPAIR BAY AND REPAIR ALL LEAKS.
- 8. IF ANY LEAKS WERE FOUND, RETEST VEHICLE (STEPS 1-5).
- 9. PROVIDE COMPLETED "WATER TEST LOG" TO QA PERSON, GROUP 50 (NORTH BLDG) OR GROUP 70 (SOUTH BLDG.) FOR REVIEW AND FILING WITH VEHICLE'S MASTER FILE.
- 10. QA PRODUCTION PERSONNEL SHOULD ALERT ALL GROUPS, OF CONSISTENTLY FOUND, NON-CONFORMING ASSEMBLY CONCERNS.

Perfectly Adapted ISB Euro 6 Diesel Engines 150-310PS



EURO 6

The Natural Choice

Cummins B Series engines have built a pedigree for performance, durability and dependability over more than 20 years and 10 million engines. The newest version of the ISB takes this further, using the latest ultra-low emissions technologies of cooled exhaust gas re-circulation (EGR), variable geometry turbocharging (VGT), selective catalytic reduction (SCR) and diesel particulate filtration (DPF) to meet the near-zero levels of Euro 6.





We'll fit in with your plans

Our engineers will work as part of your team to provide the best possible installations

Experience

With over 90 years of engineering experience, product innovation is a key part of our heritage. Cummins has developed an air intake to exhaust integration capability, with all core technologies of combustion, fuel systems, electronic controls, turbocharging, exhaust aftertreatment and filtration in-house. This allows Cummins to develop the most optimum product for the environment and our customers.

Euro 6 represents the most significant emissions step so far and provides the biggest challenge for engine and vehicle manufacturers alike. Cummins are ideally positioned in having the widest experience in all emissions technologies. Since legislation began, we have developed a level of proven in-service experience that no-one else can match.

Over 1 million EGR engines have been manufactured since 2002, more than 750,000 SCR systems produced since 2004, and over 1 million DPFs supplied since 2007. Cummins EPA 2010 products for North America use the same level of technologies as Euro 6, and we will have 3 years and many hundreds of thousands of engines in operation by the time Euro 6 is introduced.

Support

Cummins technology and engineering expertise enables us to partner with our customers to manage the complexity of Euro 6 with them. Strong integration support capability means that we can work closely with the vehicle manufacturers to maximise the potential of their products powered by our engines. Our ability to tailor the engine to the installation is a positive advantage for them.

All Cummins engines are backed by the widest support network in the industry, with over 5,000 service outlets worldwide. Your local Cummins customer assistance centre is available to provide technical support when you need it. Visit cumminsengines.com for more details.





ISB Features and Benefits

Available in 4 cylinder 4.5 litre and 6 cylinder 6.7 litre configurations, the ISB products form the basis of Cummins strategy to provide evolutionary product features which continue to keep the company in its leading market position.

- Electronic Integration industry standard datalink accepts inputs from all powertrain components including electronic transmissions and brakes. Creates a seamless flow of information shared along a high speed network.
- Electronic Control Module (ECM) with increased capability it maintains an optimum balance between load demands, fuelefficiency and emissions. The ECM ensures that the engine and aftertreatment meet the more challenging on-board diagnostics (OBD) monitoring requirements for Euro 6.
- Electronic Protection sensors throughout the engine and aftertreatment continually transfer data back to the ECM for self diagnosis and protection. Rapid diagnostics and data downloading are available, helping to ensure maximum uptime for vehicles.
- High Pressure Common Rail fuel system – works at higher pressure and provides more precise control of the combustion process. Capable of generating up to 1800 bar injection pressures for refined and rapid power delivery, reduced noise, and improved cold start.

- Variable Geometry Turbocharger developed by Cummins Turbo Technologies the VGT is optimised for high torque and low speed capability, delivering significant performance and driveability improvements.
- Latest Engine Filtration a new nanotechnology based fuel filter media offers unmatched protection for the engine's fuel system, removing up to 98.7% of all particles as small as 4 microns. The filter's replaceable service element has less environmental impact than its predecessor, and unique patented no-filter, no-run design prevents the engine from running without a media element installed, eliminating the risk of debris entering the engine.
- New aftertreatment system a switch back configuration for compact installations, packaged ready for manufacturers to fit direct to their chassis. Controlled by the engine ECM, it incorporates a Cummins Particulate Filter (CPF) with Selective Catalytic Reduction (SCR) to meet the ultralow levels required at Euro 6. A patented SCR design uses Copper Zeolite technology for very high conversion efficiency, even at low temperatures.
- Emissions control the EGR and SCR systems are closely balanced to meet the regulated NOx levels and optimise the fuel economy and Adblue usage for the lowest possible running costs.





We'll evolve to match your needs

Cummins are the engine emissions experts, we'll tailor your product to meet the latest emissions regulations

Features and Benefits – 4.5

This next generation Cummins ISB 4 cylinder engine makes a significant leap forward for Euro 6 by merging the key benefits of the ISB4.5 Euro 5 product with the recently launched ISF3.8 engine and the US EPA 2010 emission technologies. It incorporates leading automotive modular design features enabling key components to be simpler and lighter. This enables the engine weight to be 10% lower than the current product, despite the addition of emissions technologies. The combustion design also makes the new engine even quieter than the Euro 5 version.

Proven in trucks up to 18 tonnes and buses up to 12m at Euro 5, the ISB4.5 has also become one of the most widely used engines for diesel electric hybrid buses in the UK and Europe.

- EPA 2010 engine technology proven cooled exhaust gas recirculation and variable geometry turbocharging has been tailored for a 4 cylinder product and European vehicle operations.
- High Power the engine is available up to 210ps for buses and trucks, delivering high power to weight ratios.
- High Torque the engine has up to 760Nm for excellent responsiveness and vehicle productivity.
- Closed crankcase ventilation (CCV) new patented design which is integrated into the camshaft with no servicing required.

ISB4.5 Specifications

	Bus	TRUCK
POWER (PS)	150-210	150-210
PEAK TORQUE (NM)	580-760	580-760
GOVERNED SPEED (RPM)	2300	2300
NO. OF CYLINDERS	4	4
DISPLACEMENT (LITRES)	4.5	4.5
DRY WEIGHT (KG)	316	316





- Engine block and cylinder head design less mass than traditional designs with no reduction in durability. The block is 10% lighter, and the head 20% lighter than the previous ISB4.5. Additional benefits include improved coolant flow and cylinder pressure capability with reduced noise, vibration and harshness.
- Composite materials used for components such as the valve cover and oil pan to reduce weight and noise.
- Lubricating pump driven by the crankshaft via a gerotor design rather than traditionally driven by gear from the camshaft. The simpler design reduces noise and improves oil flow during cold starts.
- Cooling module brings together the water pump, oil filter and oil cooler, leading to improved pressure management and enhanced robustness and durability.





ISB6.7

Ideally suited for rigid trucks, buses and speciality vehicles, this engine provides exceptional performance with the reliability and durability expected from Cummins. Torque and power are high for an engine of this size, allowing them to be used in application classes traditionally associated with engines of higher displacement.

Weight sensitive installations such as multi-axle rigid trucks and size constrained installations such as full size and double deck buses are easily in the reach of the ISB's capabilities. Like the 4.5 litre engine, it is used in a number of diesel-electric hybrid installations.

ISB6.7 Specifications

	Bus	TRUCK
POWER (PS)	220-280	225-310
PEAK TORQUE (NM)	850-1100	850-1100
GOVERNED SPEED (RPM)	2100	2300
NO. OF CYLINDERS	6	6
DISPLACEMENT (LITRES)	6.7	6.7
DRY WEIGHT (KG)	522	522

- Rear Engine Power Take-Off (REPTO) with a drive capability of 400Nm is available. It is suitable for applications such as cement mixers, road sweepers, gritters and compactors.
- High Power the engine is available up to 280ps for buses and 310ps for trucks and coaches.
- High Torque the engine has up to 1100Nm for excellent responsiveness and vehicle productivity.
- Closed crankcase ventilation (CCV) new system mounted to the engine valve cover required to re-cycle blow-by gases now counted in the engine emissions. Positioned for cab over truck designs.



Perfectly Adapted

The new Euro 6 engines will be tailored by our engineers to meet your specific needs

EURO 6 SCHEMATIC



- 1 On-Board Diagnostic (OBD) in-cab display
- 2 Electronic Control Module can be remote or engine mounted
- 3 Cummins Designed EGR Mixing Device
- 4 High Pressure Common Rail Fuel System
- 5 Closed Crankcase Breather (CCV)
- 6 Exhaust Gas Re-circulation (EGR) Cooler
- Cummins Variable Geometry Turbocharger (VGT)

- 8 Charge Air Cooler
- Diesel Oxidation Catalyst (DOC)
- 10 Diesel Particulate Filter (DPF)
- 11 AdBlue Tank
- 12 AdBlue Doser
- 13 Decompostion Reactor Tube
- 44 Selective Catalytic Reduction (SCR) Catalyst
- 15 Ammonia Slip Catalyst
- 19 Ultra-clean exhaust outlet



ITM129-T20 & ITM129ADL-T20

2020+Ford Transit Platform Lift Interlock



Key Features

- Supports Ford Transit Chassis
- Combined Driver Display and Control Module
- Works for both rear and side doors
- Status / Diagnostic Indicators
- Monitors up to Four Door Switches plus Lift Door
- Plug-and-Play Wiring Harness
- Direct Interface to Platform Lift Systems

Ford Interlock system for monitoring platform lift door and up to four auxiliary doors.

Technical Description

InPower's Models ITM129\ITM129ADL-T20 interlock systems provide the required FMVSS 403/404 interlock functions for public-use platform lifts installed in Ford Transit chassis. The system consists of a combined driver's display and control module as well as an easyto-install plug-and-play chassis wiring harness.

The wiring harness includes a set of blunt cut wires for connecting to the platform lift system door switches and 12 volt power and T-cables for interfacing with the Ford shift lock solenoid, park signal and parking brake switch. The interlock's Lift Enable output is rated at +12 volts @ 1.8 amps, and it is compatible with current production platform lifts manufactured by Braun, Ricon and Maxon.

The driver display includes a two-inch flashing Door Ajar indicator as well as indicators for Park, Park Brake, Shifter Locked and Lift Enabled. The interlock monitors the lift door and up to four auxiliary doors. With the standard ITM129 model, if any of these doors are not fully closed, the display's Door Ajar indicator will flash. Only the lift door input will set the shift lock. With the ITM129ADL, if any door is not fully closed, the Door Ajar indicator will flash and the shift lock will set.



System Diagram



ITM129

Specifications

Module Inputs Power Input:

Side Door* In:

Door #2 In:

Door #3 In:

Power and ground are obtained from Shifter T-Harness Rear Lift Door* In: From lift door closed switch. Ground when door is Closed. (Blunt-cut Violet) Side Lift Door* In: From lift door closed switch. Ground when door is open/ajar. (Blunt-cut Tan) From side door closed switch. Ground when door is open/ajar. (Blunt-cut Orange) Door #1 or Rear Door* In: From Door #1 closed switch. Ground when door is closed. (Blunt-cut Blue) From Door #2 closed switch. Ground when door is closed. (Blunt-cut Blue) From Door #3 closed switch. Ground when door is closed. (Blunt-cut Blue)

* Lift may be installed on either the side door or the rear door. When installed in the side door, use the Tan wire for the lift door and one of the Blue wires for the rear door. When installed in the rear door, use the Violet wire for the lift door and the Orange wire for the side door.

Module Output

Lift Enable:

+12 volts @ 1.8 amps to allow platform switch operation. (Blunt-cut Yellow)

Mechanical

Dimensions: 3.50 W x 1.50 H x 0.56 D inches Weight: 0.15 lbs Operating Temperature: -40° C to +85° C Please see owner's manual OM-190 for the ITM129 and ITM129ADL for detailed cable information.

Mechanical Drawing



Electrical Systems Solutions

© Copyright 2020 InPower LLC PDS-163C 20200221 www.InPowerLLC.com Specifications subject to change without notice.

Product Data Sheet PDS-163C

OWNERS MANUAL

ITM129 & ITM129ADL and ITM129-T20 & ITM129ADL-T20 Platform Lift Interlock System for Ford Transit Chassis



Contents

1.	Introduction	. 1
2.	Product Description	. 2
3.	System Operation	. 2
4.	Interlock System Diagram	. 3
5.	Installation Procedures	. 4
6.	Wiring Instructions	. 5
7.	System Troubleshooting	. 7
8.	Mechanical Drawing	. 8
9.	Reference information	. 8

1. Introduction

This system is intended for installation in Ford Transit chassis with FMVSS compliant, public-use platform lifts manufactured by The Braun Corporation, Ricon Corporation or Maxon Mobility. If another type of lift is to be used, contact the lift manufacturer to determine compatibility.

The system is designed to meet the requirements of FMVSS 403/404 and therefore must be installed in accordance with the lift manufacturer's instructions. The installer must be trained and skilled in installing FMVSS compliant lift systems. The installation must also comply with SAE (Society of Automotive Engineers) and Ford Motor Company electrical wiring procedures.



InPower LLC 8311 Green Meadows Drive Lewis Center, Ohio 43035 USA 740-548-0965 www.InPowerLLC.com

Page 1 of 8

ITM129 Ford Interlock Owners Manual

Document: OM-190 Date: Dec. 30, 2014

2. Product Description

InPower's Model ITM129 and ITM129-T20 platform lift interlock system consists of a control module with integral driver's status display and a chassis wiring harness (See Interlock System Diagram on Page 3). The interlock's control/display module is designed to mount on the dash with its wiring harness routed through the dash. The harness contains two T-cables that connect to the shift lock solenoid and parking brake switch. The harness also contains a set of blunt-cut wires for connection to the three door switches, lift door switch and Lift Enable output to the platform lift system.

The ITM129, ITM129-T20, ITM129ADL, and ITM129-T20 interlock systems provide inputs from the platform lift door switch and three other door switches (Door 1 Switch, Door 2 Switch and Door 3 Switch); however, each model responds differently to the door switch signals.

ITM129 and ITM129-T20: When Door Switches 1, 2 or 3 are activated (door not fully closed) the DOOR AJAR display indicator will flash. When the Lift Door Switch is activated (door not fully closed) the DOOR AJAR display indicator will flash and the shift lock will be set. If the vehicle is in PARK and the parking brake is set, the Lift Enable will be set, allowing the platform lift to be operated.

ITM129ADL and ITM129-T20: When any door switch is activated (door not fully closed), the DOOR AJAR display indicator will flash and the shift lock will be set. If the vehicle is in PARK and the parking break is set, the Lift Enable will be set, allowing the platform lift to be operated.

Installation Note: The Standard ITM129 gets +12Vdc power from the Pin 2 of the Shifter T-harness (Chassis 2019 and Prior) and 2020 and later comes from the Group 2 Red 12V Batt wire attached to an ignition source fused appropriately. +12vdc comes from Auxilliary Junction Box (AJB), Fuse-31 and should be a 10 Amp Fuse. Depending on the truck options installed (ex. Auxilliary Brake Controller), the Fuse-31 may or may not be installed.

Fuse-31 is a 10 Amp fuse for the Auxilliary Brake Controller or options. If these options and/or the fuse are not installed, the ITM129 doesn't require much power so a 5 or 10 Amp fuse is acceptable to put in the F-31 location for the ITM129.

Alternately, if F31 and the AJB are not available, any reliable fused and ignition switched +12VDC source will do as a power souce for the ITM129 red wire in the T Harness.

3. System Operation

The interlock system is powered only when the Ignition Switch is on. The following is the interlock system sequence of operation:

- Step 1 Turn the Ignition switch on and start the engine.
- Step 2 Press the service brake and place shifter in Park.
- Step 3 Set the parking brake.
- The Shift Lock will activate
- Step 4 Open lift door.
 - The display Door Ajar indicator will flash
 - The Lift Enable will activate, allowing operation of platform lift.
- Step 5 The platform lift may now be operated (Refer to the platform lift operating instructions).
 During the Lift Enable sequence, if the parking brake is released the Lift Enable
- will be deactivated, preventing lift operation.
- Step 6 When the lift cycle is completed return the lift to its fully stowed position.
- Step 7 Close the lift door.
 - The Lift Enable is now deactivated.
- Step 8 Release parking brake. When released, the interlock will release the shift lock.
- Step 9 The cycle is now complete and the vehicle can be taken out of Park and driven.

Notes:

1. For model ITM129 and ITM129-T20, anytime Doors #1, #2 or #3 are opened (or ajar) the Door Ajar indicator will flash but the shifter will not lock unless the parking brake is also set.

2. For model ITM129ADL and ITM129-T20, anytime any door is opened (or ajar), the Door Ajar indicator will flash and the shifter will lock.



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Interlock Control Module



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5. Installation Procedures

5.1 Safety Precautions



This interlock product has been designed and manufactured to meet the intended application requirements and specifications, complying with FMVSS 403/404. Any modifications to the product or to the installation procedure can be dangerous and will void InPower's warranty.

- Read and understand the instructions in this manual and any other applicable manuals before starting the installation.
- Make sure that the vehicle battery power is disconnected during installation of the Interlock and lift systems.
- Reconnect the battery when the system installation is complete.
- Wear appropriate safety equipment, such as protective eyeglasses, face shield and clothing when installing equipment and handling the battery.
- Be careful when working near a battery. Make sure that the area is well ventilated and that there are no flames near the battery. Never lay objects on the battery that can short the terminals together. If battery acid gets in your eyes, immediately seek first aid. If acid gets on your skin, immediately wash it off with soap and water.
- 5.2 Getting Started

This manual provides instructions for installing the InPower Interlock System in a Ford transit chassis with a FMVSS compliant, public use (commercial) platform lift. It is important that you follow these instructions carefully and contact InPower if you need assistance or more information. Note that product technical documents are available on InPower's web site.



This interlock system installation requires additional parts and materials that are not supplied with the interlock product. Identify all required parts before starting the installation and ensure that these items are the correct type and quality (See Section 10.2).

Inspect the interlock product and all other components for damage before starting the installation. Do not perform the installation if any problems exist.

Determine the type of interlock interface required for the platform lift. This interlock system provides a +12 volt @ 1.8 amps Enable Lift output to allow the platform lift to be operated. If the lift system is not compatible with this interface signal, you must take the necessary actions to adapt the lift system interface to the interlock system's interface. Refer to the lift manufacturer's installation instructions for further details.

The recommended mounting location for the interlock control module is on the center console of the dashboard, with the wiring harness through the dash. Be certain that the chosen location permits the cables to reach the parking break and shift lock connectors. The wiring harness will connect to the shift lock solenoid, located under the center console and parking brake switch, beside the driver's seat. The unit must not be located in the engine compartment or any location that is not protected from the environment.



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6. Wiring Instructions

WARNING

!

Make sure that the vehicle battery power is disconnected during installation of the interlock and lift system. Reconnect the battery when the system installation is complete.

Installation Proceedure

1. Remove steering column cover. (See Figures 1 and 2)



Figure 1. Steering column



Figure 2. Steering column with panel removed.

- 2. Drop down glove box
- 3. Remove HVAC controls cover, cup holder and lift shifter cover. (See figures 3 and 4)



Figure 3. Center console



Figure 4. Covers removed



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4. Remove console cover screws and pull back center cover enough to gain access to shifter connector. (See figure 5)



Figure 5. Shifter connector.

5. Mount module in center cover where desired.

6. Install T-harness to shifter connector 2810. Tuck chassis connector and T-harness under shifter to ensure the paneling fits correctly. (See figure 6)



Figure 6. Shifter connector 2810

7. Run parking brake harness under carpet to parking brake connector. (See figures 7 and 8)



Figure 7. View of brake connector area.



Figure 8. View of parking brake connector.

8. Run door wires to BCM. (See figure 9 on next page)



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9. On the Ford Transit, the front driver's, front passenger and rear doors all generate a +12V signal when the doors are open are ajar. The side door, however, generates a ground signal. The lift may be installed on either the rear door or the side door. Therefore, there are two lift door wires. The rear lift door input wire is violet, while the side lift door input wire is tan. There are three blue wires for the driver's, front passenger and rear door ajar signals, and there is one orange wire for the side door ajar signal.

If the lift is installed on the rear door, one blue wire and the tan wire will not be used. If the lift is installed on the side door, the violet wire and the orange wire will not be used.

Connect the four wires to be used to their respective connections in the BCM connector 2280C.

The driver door ajar signal comes from pin 44 (green/violet wire); the passenger door ajar signal comes from pin 34 (white wire); the right side

door ajar comes from pin 51 (yellow wire); and the rear door ajar comes from pin 50 (brown/violet wire).

10. Review the platform lift installation manual to determine how to wire the interlock system to the platform lift's interlock interface. The yellow blunt cut wire in the interlock harness will supply a +12 volt @ 1.8 amp output to operate the lift. Verify that this is the correct polarity for the platform lift and then connect the yellow wire to the lift enable input on the lift.

11. Test

7. System Troubleshooting

This owners manual describes the InPower Model ITM129 Platform Lift Interlock Systems. Note that the control module contains an integral driver's status display which should be used for system troubleshooting. The interlock systems provide a Lift Enable signal output that is wired to the platform lift system to enable the lift operation when the chassis interlock conditions are satisfied. The Lift Enable signal is +12 volts when the lift can be operated.

Replacement Parts

- 1. ITM129 Control/Display Module
- OR ITM129ADL Control/Display Module

2. Chassis Wiring Harness

Troubleshooting Procedures and Tips:

 P/N:
 ITM129-MODULE

 P/N:
 ITM129ADL-MODULE

 P/N:
 7201.052

1. Determine if the interlock system is getting power. +12 volts should be present on pin 2 in shifter T Harness connector 2810 (2019 and prior). On Chassis from 2020 and up, +12V should be available on the Group 2 Red Wire. With power, you should have some display lights on. Note that the interlock system gets its ground from pin 11 of the same connector. If everything is properly connected, and you are not getting power, check fuse F31 located in the auxiliary junction box.

2. If the interlock system has power and is not operating there is a high probability that the control module is good but that there is a problem with one or more of the system inputs (e.g., the Lift Door Switch not working correctly). Operate each remote door switch and determine if the correct display indicator operates properly. You can also measure voltage at the J1 connector pins to see if the remote devices are working correctly. A common problem on interlock systems is the lift door switch failing or sticking in the open position. This will



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Troubleshooting cont.

3. If the interlock system appears to be working properly but the platform lift system will not work check the voltage on the Lift Enable output to the lift system. This signal is on pin 4 of connector J1. There should be +12 volts present to operate the lift. **CAUTION - Do not apply an external +12 volt power source to this circuit to see if the lift will operate without disconnecting the wire from the interlock system! Applying power will cause a circuit breaker to trip in the Lift Enable output circuit. If tripped, remove the power source and the circuit breaker will reset automatically.** With the Lift Enable wire disconnected from the interlock control module it is safe to apply +12 volts to the lift system's Enable input to see if the lift will operate.

8. Mechanical Drawing



9. Reference Information

Company Contacts:

Ford Motor Company Truck Body Builder Advisory Service Product Development Center MD 410 PO Box 2053 Dearborn, MI 48121-2053 1-877-840-4338 www.fleet.ford.com/truckbbas/index.htm bbasqa@ford.com The Braun Corporation 631 West 11th Street Winamac, IN 46966 (574) 946-6153 (800) 946-6158 www.braunlift.com

Ricon Corporation 7900 Nelson Road Panorama City, CA 91402 (818) 267-3038 (800) 322-2884 www.riconcorp.com

Maxon Lift Corp. 11921 Slauson Avenue Sante Fe Springs, CA 90670 (562) 464-0099 (800) 227-4116 www.maxonlift.com



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Warranty And Limitation of Damages Released 5/13/2009 CD-02 120604



InPower LLC (hereinafter "InPower") warrants its products to be free from defects in material and workmanship under normal use, care, and maintenance for a period of two (2) years from the date of shipment from InPower.

This warranty shall not apply to any failure or damage due to neglect, lack of maintenance, misuse, abuse, improper installation, improper application, vehicle obsolescence, failure of or damage inflicted by non-InPower equipment, or Acts of God, of any of the products on the part of the Buyer or to any other cause beyond the control of InPower.

Buyer's exclusive remedy in the event that any of InPower's products do not conform to the foregoing warranty shall be the repair or replacement of the defective item or parts within two years from date of shipment. All goods claiming to be nonconforming must be returned per InPower's RETURNS POLICY (CD-03), and will be shipped to InPower's business location, after first receiving a return authorization number from InPower (see CD-03). Such goods will be returned to Buyer, repaired, or replaced at In Power's option within a reasonable time per the terms set forth in the RETURNS POLICY (CD-03). InPower's acceptance of any goods so returned by Buyer shall not be deemed an admission that the goods are nonconforming; and if InPower determines that any goods returned are not defective, or are exempt from this warranty under conditions set forth above, such goods shall be reshipped to Buyer at its expense and Buyer will be charged for shipping charges incurred by InPower.

InPower's obligations under this limited material and workmanship warranty, and Buyer's exclusive remedy, shall be limited solely to the repair, exchange or replacement, at InPower's option under the terms of the RETURNS POLICY (CD-03), of any materials or workmanship which may prove defective under normal use within two years from the shipment date, and which In Power's examination shall disclose to its satisfaction to be defective. InPower's obligations under this Warranty do not extend to coverage of labor, travel, service, or non-InPower repair parts costs incurred.

THE FOREGOING WARRANTY IS IN LIEU OF ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHER WARRANTIES, EXPRESS OR IMPLIED. CORRECTION OF NONCONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL OBLIGATIONS OF INPOWER TO BUYER, WHETHER BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE WITH RESPECT TO, OR ARISING OUT OF, SUCH MERCHANDISE.

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From our headquarters in Indianapolis, Indiana, USA, to our manufacturing plants in Hungary and India, to approximately 1,400 Allison Authorized Distributors and Dealers around the globe, you are never far from the products, training, service and support you demand.

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Information or specifications subject to





FUELSENSE

More Fuel Efficient With xFE

With xFE, Allison has taken fuel economy to the next level. xFE is another in a string of innovative, fuel-saving ideas from Allison, a leader in bus transmission technology. New gear ratios allow the torque converter to lock up at lower speeds, improving fuel economy up to seven percent in xFE-equipped vehicles.

This seven percent improvement in fuel economy is in addition to the already greater efficiency created by Allison's FuelSense®, a unique package of software and electronic controls that supports an advanced array of features. The combination of these packages provides a substantial fuel economy advantage.

Dynamic Shift Sensing	Automatically selects between lower/higher speed shift schedules based on the vehicle's actual payload and the grade on which it is operating. This optimizes fuel economy while maintaining superior performance.
EcoCal	Provides lower shift points to get into lock up as soon as possible, providing necessary performance without shift cycling.
Neutral at Stop	Automatically eleminates the load on the engine when the vehicle is a full stop to save fuel and reduce overall emissions.
Acceleration Rate Management	Mitigates aggressive driving practices by automatically controlling engine torque based on the vehicle's grade and load.
5th Generation Electronic Controls	Allison 5th Generation Electronic Controls offer an enhanced array of smart controls designed to increase fuel economy and fuel efficiency for the specific needs of buses.

Allison Bus Series[™] Models Are Now Available With FuelSense[®] and xFE Technology

Proven Realiability And Durability

Allison fully automatic transmissions are built to last and require minimal service—meaning not only lower maintenance costs, but also more time on the road. Our commercial-duty automatic transmissions are designed for durability to handle the frequent starts, stops and high mileage demands that buses place on components.

Making Natural Gas **More Efficient**

Allison Automatics are perfectly suited to natural gas engines in the heavy start-stop cycle of city and transit buses. The inherent benefits of Allison's Continuous Power Technology™, featuring full-power shifts and a patented torgue converter, realize the best performance and most efficient use of fuel from buses. Natural gas engines are more responsive when joined to an Allison Automatic.

Proven Dependable And Efficient Hybrid Systems

The Allison Hybrid H 40/50 EP[™] systems feature a two-mode split parallel architecture — a pure mechanical path and a pure electric path — to achieve the highest energy efficiency. The technology operates automatically as a series or parallel hybrid, improving fuel consumption by up to 25 percent over a typical bus. Additionally, its regenerative braking capability can significantly extend the brake change interval by as much as 350 percent.

Results depend on duty-cycle. xFE provides maximum fuel savings in high start-stop duty-cycles with low average speeds. Contact your Allison representative to ensure xFE is the best choice for your specific need.



Driven To Exceed

THE PARTY OF

Our commitment to understand and satisfy your needs drives us to constantly analyze, refine and improve our products and their features. Nothing else delivers the durability, productivity and fuel economy of an Allison fully automatic transmission.

When it comes to transit and charter bus applications, Allison Bus Series[™] transmissions help keep your vehicles and your business on schedule with maximum efficiency, improved vehicle performance, safer driver operation and better passenger comfort.



The Power Of The Torque Converter

Allison's torque converter smoothly multiplies engine torque, delivering more power to the wheels. By multiplying the engine power, drivers get increased performance, faster acceleration and greater operational flexibility. An Allison Automatic eliminates power interrupts so you can accomplish more, even with a smaller engine.





0

B 300, B 400,

B 3400 xFE



B 500

Increased Safety

Since gear shifting is automatic, drivers are better able to concentrate on the task at hand... getting riders safely to the next stop.

Comprehensive Coverage

All Allison Bus Series[™] models offer comprehensive coverage with 100% parts and labor. Coverage may vary by model and application. Contact your local Allison representative for details.

Easy Maintenance

A fully automatic transmission from Allison, a trusted brand around the world, is the best way to keep your fleet on the road while reducing total cost of ownership. With extended periods between scheduled maintenance and a proven track record of reliability, Allison puts you in control of your fleet and your budget.

Prognostics	Calibrated to the vehicle's particul prognostics monitor various operat when service is due. This eliminate and provides maximum transmissic
Retarder Benefits	Allison's integral hydraulic retarder service brake performance. It redu integration with the Anti-Lock Bra and cruise control systems. In stop retarder may be automatically acti vehicle brakes are in use, extendin
Secondary Shift Schedule	Allows driver to select between tw quickly and easily, to match driving
Direction Change Enabled	Prohibits shifts from Neutral to Driv a dash switch or applying the servi
Auxiliary Function Range Inhibit	Will not allow transmission to shift service brakes are applied.



Ilar operating requirements, Allison iting parameters to determine and alert as unnecessary oil and filter changes on protection.

er complements and enhances vehicle uces braking distance, while offering full aking System, Engine Braking Systems p-and-go driving, the transmission tivated at various levels, each time the ng service brake life.

vo pre-programmed shift patterns, g conditions.

ive or Reverse without first pressing ice brakes.

into forward or reverse unless the

						RATING	iS			
MODEL	SERIAL NUMBER	RATIO	park Pawl	MAX INPUT POWER ¹ w/o SEM	MAX INPUT POWER w/SEM TORQUE LIMITING ^{1,2}	MAX INPUT TORQUE1 w/o SEM	MAX INPUT TORQUE w/SEM TORQUE LIMITING ^{1,2}	MAX TURBINE TORQUE ³	MAX GVW	MAX GCW
				hp (kW)	hp (kW)	lb-ft (N∙m)	lb-ft (N∙m)	lb-ft (N∙m)	lbs (kg)	lbs (kg)
B 210	6310									
– Transit		Close Ratio	No	230 (172)	270 (201)	520 (705)	575 (780)	850 (1152)	29,000 (13,150)	29,000 (13,150)
B 220	6310									
– Transit		Close Ratio	Yes	230 (172)	270 (201)	520 (705)	575 (780)	850 (1152)	29,000 (13,150)	29,000 (13,150)
B 295	6510									
– Transit		Close Ratio	N/A	230 (172)	N/A	620 (841)	N/A	1370 (1857)	33,000 (14,968)	33,000 (14,968)
B 300	6510									
– Transit		Close Ratio	N/A	280 (209)	N/A	735 (997)	N/A	1370 (1857)	38,000 (17,236)	38,000 (17,236)
B 400	6510									
– Transit		Close Ratio	N/A	300 (224)	N/A	925 (1254)	N/A	1370 (1857)	45,000 (20,412)	45,000 (20,412)
– Tour Coach		Close Ratio	N/A	330 (246)	N/A	1000 (1356)	N/A	1600 (2170)	45,000 (20,412)	45,000 (20,412)
B 3400 XFE	6510									
– Transit		Close Ratio	N/A	300 (224)	N/A	925 (1254)	N/A	1370 (1857)	45,000 (20,412)	45,000 (20,412)
B 500	6610									
– Transit		Close Ratio	N/A	420 (313)	N/A	1300 (1763)	N/A	2450 (3322)	—	—
– Intercity Coach		Close Ratio	N/A	550 (410)	N/A	1700 (2305)	N/A	2450 (3322)	_	_
1 Gross ratings as de	1 Gross ratings as defined by ISO 1585 or SAE J1995. 2 SEM = engine controls with Shift Energy Management. 3 Turbine torque limit based on iSCAAN standard deductions.									

GEAR RATIOS – TORQUE CONVERTER MULTIPLICATION NOT INCLUDED								
MODEL	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	REVERSE
B 210	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1	—	-4.49:1
B 220	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1	—	-4.49:1
B 295	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1	—	-4.49:1
B 300	3.49:1	1.86:1	1.41:1	1.00:1	0.75:1	0.65:1	—	-5.03:1
B 400	3.49:1	1.86:1	1.41:1	1.00:1	0.75:1	0.65:1	—	-5.03:1
B 3400 xFE	3.49:1	2.03:1	1.47:1	1.00:1	0.69:1	0.59:1	—	-3.80:1
B 500	3.51:1	1.91:1	1.43:1	1.00:1	0.74:1	0.64:1	—	-4.80:1

Recommended oil types for all models are Allison Approved TES 295® transmission fluid. 1 Transmission only. Does not include cooler, hoses or fittings. 2 Amount of oil necessary to fill a dry transmission.

	ENGINE SPEEDS					
MODEL	FULL LOAD GOVERNED SPEED Min-Max (rpm)	IDLE SPEED IN DRIVE Min-Max (rpm)	OUTPUT SHAFT SPEED (rpm)			
B 210/220	2200-3800	500-820	4500			
B 295	2200-5000	500-820	5000			
B 300/400	1950-2800	500-800	3600 ¹			
B 3400 xFE	1950-2800	500-800	3600 ¹			
B 500	1700-2300	500-800	_			

1 Retarder-equipped models only.

OIL SYSTEM					
MODEL	CAPACITY ¹ quarts (liters)	MAIN CIRCUIT FILTER	LUBE CIRCUIT FILTER	ELECTRONIC OIL LEVEL SENSOR (OLS)	
B 210/220		Spin-On Canister	—	—	
- Standard Oil Sump	13.7 ² (13.0) ²				
– Shallow Oil Sump	11.6 ² (11.0) ²				
B 300/400		Integral	Integral	Standard	
– Deep Oil Sump w/ PTO	29.75 ² (28.1) ²				
– Deep Oil Sump w/o PTO	29 ² (27.4) ²				
– Shallow Sump w/o PTO	26.75 ² (25.3) ²				
– Shallow Oil Sump w/o PTO	26 ² (24.6) ²				
B 3400 xFE		Integral	Integral	Standard	
– Deep Oil Sump w/ PTO	29.75 ² (28.1) ²				
– Deep Oil Sump w/o PTO	29 ² (27.4) ²				
– Shallow Sump w/o PTO	26.75 ² (25.3) ²				
– Shallow Oil Sump w/o PTO	26 ² (24.6) ²				
B 500		Integral	Integral	Standard	
- Deep Oil Sump and PTO	51 ² (48) ²				
– Deep Oil Sump	48² (45)²				
– Shallow Oil Sump and PTO	43 ² (41) ²				
– Shallow Oil Sump	40 ² (38) ²				

OPTIONAL RETARDER PROVISION – INTEGRAL, HYDRAULIC TYPE					
MODEL	TORQUE CAPACITY Ib-ft (N∙m)	POWER CAPACITY hp (Kw)			
B 300/400					
— High	1600 (2170)	600 (447)			
– Medium	1300 (1763)	500 (373)			
– Low	1100 (1490)	400 (298)			
– Very Low	811 (1100)				
– Ultra Low	533 (750)				
B 3400 xFE					
– High	1600 (2170)	600 (447)			
– Medium	1300 (1763)	500 (373)			
– Low	1100 (1490)	400 (298)			
– Very Low	811 (1100)				
– Ultra Low	533 (750)				
B 500					
– High	2000 (2712)	600 (447)			
– Medium	1600 (2170)	600 (447)			
– Low	1300 (1763)	500 (373)			



STAN

```
MODEL
B 210<sup>1</sup>
B 2201
B 3001
B 3400 xFE1
B 4001
B 500<sup>1</sup>
```

PHYSICAL DESCRIPTION							
MODEL	LENGTH ¹ in (mm)	DEPTH ² w/DEEP OIL PAN/SUMP in (mm)	DEPTH ² w/SHALLOW OIL PAN/SUMP in (mm)	DRY WEIGHT lbs (kg)			
B 210/220							
– SAE No. 3 mounting	28.01 (711.4)	11.22 (285.1)	10.71 (272.0)	323 (146.5)			
- SAE No. 2 mounting	28.39 (721.1)	11.22 (285.1)	10.71 (272.0)	323 (146.5)			
B 300/400							
 Basic model 	28.3 (718.7)	12.90 (327.7)	11.14 (283.1)	535 (243)			
– With PTO only	32.5 (825.4)	12.90 (327.7)	11.14 (283.1)	575 (261)			
- With retarder only	28.29 (718.5)	12.90 (327.7)	11.14 (283.1)	615 (279)			
– With PTO & retarder	32.49 (825.4)	12.90 (327.7)	11.14 (283.1)	655 (298)			
B 3400 xFE							
 Basic model 	28.3 (718.7)	12.90 (327.7)	11.14 (283.1)	535 (243)			
– With PTO only	32.5 (825.4)	12.90 (327.7)	11.14 (283.1)	575 (261)			
- With retarder only	28.29 (718.5)	12.90 (327.7)	11.14 (283.1)	615 (279)			
– With PTO & retarder	32.49 (825.4)	12.90 (327.7)	11.14 (283.1)	655 (298)			
В 500							
– Basic model	30.54 (775.8)	14.75 (374.7)	13.29 (337.6)	831 (377)			
– With PTO only	33.41 (848.7)	14.75 (374.7)	13.29 (337.6)	893 (405)			
- With retarder only	33.54 (775.7)	14.75 (374.7)	13.29 (337.6)	906 (411)			
– With PTO & retarder	33.41 (848.7)	14.75 (374.7)	13.29 (337.6)	968 (439)			
1 Length measured from flywheel housing to end of output shaft. 2 Depth measured below transmission centerline.							

NVERTER SPECIFICATIONS					
ORQUE NVERTER	NOMINAL STALL TORQUE				
C-210	2.05				
C-211	1.91				
C-221	1.73				
C-222	1.58				
C-411	2.71				
C-413	2.44				
C-415	2.35				
C-417	2.20				
C-418	1.98				
C-419	2.02				
C-421	1.77				
C-521	2.42				
C-531	2.34				
C-541	1.90				
C-551	1.79				
C-561	1.58				
C-571	1.62				

DARD POWER TAKEOFF – CONTINUOUS OPERATION							
	MOUNTING PAD POSITIONS VIEWED FROM REAR	DRIVE GEAR RATING WITH ONE PTO Ib-ft (N•m)	DRIVE GEAR RATING WITH TWO PTOs lb-ft (N•m)	DRIVE			
	3 and 9 o'clock	250 (339)	200 ² (271) ²	Turbine			
	3 and 9 o'clock	250 (339)	200 ² (271) ²	Turbine			
	4 and 8 o'clock	485 (660)	685 ³ (930) ³	Engine			
	4 and 8 o'clock	485 (660)	685 ³ (930) ³	Engine			
	4 and 8 o'clock	485 (660)	685 ³ (930) ³	Engine			
	1 and 8 o'clock	685 (930)	1175 (1595)	Engine			

1 PTO-delete option available. 2 Rating per PTO. 3 Total on the drive gear.



HD Color Backup Camera System With 5" LCD Monitor & Three Cam Inputs

for Work Trucks, Vans & Buses







HIMH



- High Resolution 5" LCD Color Monitor With Ultra Sharp Digital Display
- System Can Accept Up to 3 Camera Inputs for Multiple Camera Views
- Weatherproof, Heavy Duty Camera Provides 150° Field Of Vision
- 17 High Power InfraRed LEDs in Camera Provide Up To 15 Ft. of Night Time Visibility
- Built-In Camera Mic & Powerful Monitor Speakers
- Versatile Mounting On Dashboard or Overhead Location
- Two Year Warranty Included



ROSCO A CENTURY OF AUTOMOTIVE VISION SAFETY

MONITOR P/N: STSM206 (Included In Kit)

Screen Size Diagonal Maximum No. of Cameras Screen Ratio Resolution (Pixels) Contrast Ratio Brightness Video System Input Voltage Range Operating Temperature Shock Rating Vibration Rating Audio Weight Dimensions W x H x D Other Features

5″ 3 4:3 480(H) x 640(V) 500:1 200 cd/m² NTSC DC 12V to 32V -4°F to 158°F (-20°C to 70°C) 100G 15G Included 0.95 lbs. (0.43 kg.) 6.1" x 4.2" x 1.3" (156mm x 107mm x 32mm) Selectable mirror/normal view, optional on-screen distance scale, automatic dimming, illuminated touchpad.



STSK5065 STSK5033

- Monitor Shown w/Sunshade and U-Bracket Mount (Both Included)

- Duckfoot Mount (Cover) Also Included



Pixels InfraRed LEDs Night Vision Range Illumination IP Rating Shock Rating Vibration Rating Field of View Input Voltage Range Operating Temperature Weight Dimensions W x H x D Microphone

976(H) x 496 (V) 17 15 Feet (3m) 0 Lux (with IR LEDs) IP69K 50G @ 11ms 2.0G @ 10Hz to 1000hz 150° DC 9V ~ 18V -40°F to 185°F (-40°C to 85°C) 0.71 lbs. (0.31 kg.) 2.75″ x 1.65″ x 2.12″ Built-in





Included in STSK5033



STSH303 33' Harness





STSH301 65' Heavy Duty w/ Twist -Lock Connectors

90-21 144th Place, Jamaica, New York 11435 TEL (800) 227-2095 • FAX (718) 297-0323 Info@Roscomirrors.com www.roscomirrors.com www.roscovision.com











Robustness





MICHELIN® XZE®



MICHELIN® XZE®



6 tires for this product

Exceptional all-position radial with extra-wide, extra-deep tread designed to help deliver our best wear in high scrub regional and line haul applications.



Application



Line Haul

Regional Transport

Retreadable (Learn more)

Technical Specifications

Find a Dealer

WHY THIS TIRE?

Application specific, high scrub compound (chip and cut resistant in versions with \Rightarrow designation) make the MICHELIN[®] XZE[®] our longest wearing regional steer tire.

Deep, wide tread and optimized footprint shape help deliver long, even tread wear.

Beefy, buttressed shoulders help resist tearing and accelerated wear in high scrub applications.

Extra strong curb guards help protect sidewalls against most impacts and abrasions for long casing life.

BENEFITS AND FEATURES

1. Anti-Cut/Chip Compound

Long Tread Life – Delivers chip and cut resistance (in LRH versions with designation).

2. Optimized Tread Design

Long Tread Life and Excellent Handling – Combines fast water evacuation for excellent wet traction with an aggressive, evolving tread pattern that helps maintain driver confidence throughout the long tread life.

3. Miniature Groove Wall Sipes

Long Tread Life - Help deliver even wear, along with traction.

4. Solid Shoulders

Long Tread Life – Help resist tearing and accelerated wear in high scrub applications.

5. Full-Width Elastic Protector Ply

Casing Durability – Helps protect the working plies from bruising and penetrations, and downtime.

6. Curb Guards

Casing Durability – Help protect sidewalls against most impacts and abrasions for long casing life.

7. Groove Bottom Protector

Casing Durability – Protects against stone drilling.

8. Variable Pitch Groove Walls

Casing Durability – Protect against stone drilling.



REFERENCE MATERIALS - DOCUMENTS

MICHELIN[®] XZE[®] Product Sheet

Download (405.72Kb)

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MICHELIN® Truck Tire Warranty

Download (861.7Kb)

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MICHELIN® Truck Tire Reference Chart

Download (6.54Mb)

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MICHELIN

XZE[®] 225/70R19.5 G (Steer/All Position)

 \leftrightarrow Filter on sizes

ALL SIZES (6)

Steer/All Position

225/70R19.5 G

245/70R19.5 H

10R22.5 G

12R22.5 H

Technical Specifications



Recommended Wheels

6.75

Approved Wheels

6.00

Min Dual Spacing 1

9 inch

Tread depth

17/32 nds

Max Speed

87

Max Load per Tire Single

3970 lbs

CAI

980982

MSPN

91043



Application

Tread Depth

XZE Siped - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE - 225/70R19.5

Ζ

line haul, regional

16/32 nds

XZE - 225/70R19.5

Ζ

line haul, regional

16/32 nds

XZE - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE - 225/70R19.5



Ζ

line haul, regional

18/32 nds

XZE - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE - 225/70R19.5

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line haul, regional

18/32 nds

XZE - 225/70R19.5

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line haul, regional

18/32 nds

XZE - 225/70R19.5


18/32 nds

XZA Siped - 225/70R19.5

Ζ

line haul, regional

13/32 nds

XZA Siped - 225/70R19.5

Ζ

line haul, regional

15/32 nds

XZA Siped - 225/70R19.5

Ζ

line haul, regional

15/32 nds

XZA - 225/70R19.5

Ζ

line haul, regional

15/32 nds

XZA - 225/70R19.5

Ζ

line haul, regional

13/32 nds



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line haul, regional

Ζ

line haul, regional

15/32 nds

XZA - 225/70R19.5

Ζ

line haul, regional

15/32 nds

XZA - 225/70R19.5

Ζ

line haul, regional

15/32 nds

XZA - 225/70R19.5

Ζ

line haul, regional

13/32 nds

XZE-SA - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE-SA - 225/70R19.5

Ζ

line haul, regional

18/32 nds

XZE-SA - 225/70R19.5

Ζ

line haul, regional

18/32 nds



line haul, regional

18/32 nds

Home Page > MICHELIN XZE[®]



FREIGHT TRANSPORTATION	~
PEOPLE TRANSPORTATION	~
AGRICULTURE	
CONSTRUCTION & INDUSTRY	

HELP & ADVICE

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Sweepstakes

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Gerantum Fright Yellow Dark Aque 1200-51 7725-53, 7125-53 7725-517 1200-51 7725-53, 7125-53 7725-517 1200-51 7725-53, 7125-53 7725-53 1200-52 7725-53, 7125-53 7725-53 1200-53 7725-53 7725-53 1200-54 1600-55 7725-53 1200-55 7725-53, 7125-53 7725-53 1200-56 1600-58 1600-58 7725-53, 7125-53 7725-57 7725-57 1200-56 1600-58 1600-58 7725-53, 7125-53 7725-57 7725-57 1200-56 1200-56 7725-57 1200-56 7725-57, 7125-77 1200-56 7725-57, 7125-78 1200-57 7725-57, 7125-78 1200-57 7725-57, 7125-78 1200-57 7725-57, 7125-79 1200-57 7725-57, 7125-78 1200-57 7725-57, 7125-78 1200-57 7725-57, 7125-58 1200-57 7725-57, 7125-59 1200-57	<u>к</u> 8 м.	5. ¹⁰¹	· •	τ	
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3

Other Product Series:

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Most colors are available in other product series.

Can't find your color?

Allow us to custom match your color with our three-day, no-



PURE ASPHALT

MANUFACTURER OF SPECIALTY COATINGS SINCE 1927

3300 W. 31st STREET CHICAGO, IL 60623 PH: 773.247.7030 FAX: 773.247.7066 WWW.PUREASPHALT.COM

#76-M Undercoating/Chassis Coating

DESCRIPTION

A premium haps free polymer waterborne coating for the protection of metal frames and other underbody components on the underside of trailers, utility bodies, bus bodies, RV's and other vehicles. #76-M 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 tip sizes and spray equipment. #76-M is a water based formula with quick dry capabilities to achieve early water and weather resistance making it suitable for a variety of production situations. Provides a tough, pliable rubberized coating for protection against abrasion and corrosion. Resists salt, alkalis and seals out moisture. Affords sound deadening and vibration dampening to metal, fiberglass and plastic surfaces at higher film builds. Dry coating is tack free and can be top coated.

MATERIALS

#76-M is composed of an abrasive free material, formulated with emulsified petroleum hydrocarbons, modified polymer additives and inert fillers.

PRODUCT DATA

Color Weight per Gal. Solids Flash Point V.O.C. Content Viscosity & Sag Fed Spec. TTC-520-B

Dry to light touch (70F/30%humidity)

PROPERTIES

Black 9.3 lbs +or-.2 53% +/- 3 Not Applicable < .35 lbs per gallon Per customer specification and application equipment Pass 20 –30 minutes (at 10 mils wet/70F)

PRODUCT

DATA

APPLICATION

#76-M 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 50-95 F (10-35 C) at time of application. Before top coating, contact Pure Asphalt Co. to ensure compatibility. Refer to the MSDS (Material Safety Data Sheet) for additional handling instructions, Personal Protection Equipment requirements and first aid information before using.

APPLICATION EQUIPMENT

30:1 Reciprocating pumps with 30 - 40 lbs of air	.021025 inches tip size
(For Industrial applications w/ large pumps)	
15-1 Air Motor pumps with 65-75 lbs of air (drum/keg pump)	.021023 inches tip size

DRY TIME

76-M will dry to light touch in 20-40 minutes (depending on film thickness, temperature, humidity and airflow), and fully cure in 24 hrs @ 70F. Air movement will speed drying. Product is formulated to achieve early water and freeze resistance that will be indicated by a change of color from shiny dark gray (when first sprayed) to matte black.

CARE AND CLEAN UP OF EQUIPMENT

Spray guns, brushes and tools used for application, should be immersed in soapy water or mineral spirits when not in use. Dried material can be removed with mineral spirits.

PROTECT FROM FREEZING

This product may be damaged if frozen. Please protect from severe weather. Store in a warm place. (50-90 degrees F)

PACKAGING

Available in 16-gallon kegs, 55-gallon drums and 330 gal. totes

The information presented herein is based on the data available and is believed to be correct. However, nothing stated in this bulletin is to be taken as a warranty, expressed or implied regarding the accuracy of the information of the use of our product used singly or in conjunction with other products.

4000 SERIES ALTERNATORS

Severe Duty High Amp / High Temp Rated Alternators 12 VOLT - 185 Amps To 320 Amps 24 VOLT- 200 Amps

Designed for reliable high output State-of-the-Art rectifier system Enclosed brush/slip ring system Multi-Power- Multiple alternator system can produce up to 1280 Amps! 12 volt 185, 200, 270, 320 amp 340 320 Amp 320 300 280 270 Amp 260 240 220 200 Amp 200 OUTPUT 180 160 140 120 100 80 60 40 20 1000 2000 3000 4000 5000 6000 7000 ALTERNATOR RPM Maximum Continuous Speed - 8000 rpm Stabilized Output @ 24° C 24 Volt curves can be viewed on our website.

Internal rectifier



For information call your Leece-Neville representative today.





125°C



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HOME **PRODUCTS** VUSES V ABOUT FAQ CONTACT

SAFER BOARDING

Since 1991, Warm Welcome[®] low voltage step heaters have been used throughout North America in major city transit systems that provide services in cold weather. These same snow-melting heaters have been installed on airport shuttles, school buses, passenger trains, and even on off-shore oil platforms in the North Sea. You'll find Warm Welcome[®] low voltage step heaters from NYC to Toronto, Toledo to Washington DC, Cleveland to Spokane and many more metropolitan areas.

• welcome

HOME With a thin profile and zero moving parts WARM WELCOME[®] Step heaters can easily be installed (at the factory or retrofitted to existing vehicles) beneath the treads of any size steps or lifts. Each one is pre-wired for quick and easy installation. The step treads are environmentally friendly replacing corrosive salts and potentially damaging deicing chemical to preserve the steps of your vehicles and save on maintenance.

> Whatever your specific transit requirements, WARM WELCOME[®] can help your passengers board and debark with more safety. Manufacturers offer the step heaters pre-installed at the factory. However, retrofitting is not a problem for after-market installations in existing vehicles and fleets.

> The step heaters come pre-wired, install quickly, and work beneath any size step or lift.

CONTACT



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HOME **PRODUCTS** V USES V ABOUT FAQ CONTACT







HOW THEY WORK FOR MASS TRANSIT

Your commercial vehicles will be safer for boarding and debarking, so your passengers won't be concerned about snow or ice covered steps. When

welcome

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Manufacturers offer the step heaters pre-installed at the factory.

HOME PRODUCTS V USES V ABOUT FAQ CONTACT Retrofitting is not a problem for after-market installations in existing vehicles and fleets. The step heaters come pre-wired, install quickly, and work beneath any size step or lift.

> Mass Transit step heaters are built with a thin profile and are installed between the transit vehicles' factory step treads, and the floor. The top layer floor tread overlays the foil-covered heat element while the bottom (also foil-covered) lays flat against the vehicle floor. In this manner, the look and feel of the vehicle step is preserved while the heater is protected and your passengers are ensured a comfortable step.

WATCH EVERY STEP

SCHOOL AND SHUTTLE RANSPEC **BUS ROOF HATCHES**



SAFE EGRESS. PROVEN PERFORMANCE.





ADAPTABLE Low profile design adapts to wide range of roof surfaces



MAINTENANCE



STRENGTH

Constructed of high strength UV stable materials



Proudly manufactured in North Carolina with 35 years proven product performance





Serves as a vent on hot summer days

SPECIFICATIONS SCHOOL AND SHUTTLE ROOF HATCHES

HES			/	RVENT	MINE	ents wh		RELEA	SE HAN	ARALARI ARALARI	ASY CAL							MERIC
■ = Standard O = Optional	COLORS	/4	ALSH A	ATICA	MERGE	SW PR	UTSIDE P	ETENT	ATCHP	INGUI	4	HUTT	onch,	RANSI	chool	Ŕ	ORTHY	ORLD
MODEL	STANDARD	FEAT	URES	& O	PTIO	NS					API	PLIC		١S		SIZ	ES	
T1170 Series Triple Value Safety Vent II	White Light Gray Dark Gray			-		0	ο	0	0		•			-		-		
T1670 Series Power Safety Vent II	White Light Gray Dark Gray Beige	•	•		•	0	0	0	0		•	•	•	•		•		
T1970 Series Standard Safety Vent II	White Light Gray Dark Gray Beige	•		•	•	0	0	0	0					•		•		
9245 Series Pro Lo Roof Hatch	White Light Gray Dark Gray					0	0	0	0		•					-		•

T1170 Series / Triple Value Safety Vent II

The Triple Value Safety Vent II is a combination roof ventilator/ emergency exit that provides 5-position fresh air ventilation as well

as incorporating a built in non-closeable static exhaust vent. The product also includes a simple release handle that allows the hatch to hinge open for emergency exit.

Additional Features

- Static Vent provided with one piece outer cover designed to minimize leaks
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Available with vandal lock feature
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1670 Series / Power Safety Vent II

The Power Safety Vent II provides all the features of the Triple Value Safety Vent II with the addition of an electric fan for extracting condensation, stale or hot air from inside the vehicle to improve passenger comfort.

Additional Features

- Interchangeable with earlier Transpec models
- Available in 12 and 24 volt
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1970 Series / Standard Safety Vent II

The Standard Safety Vent II is a combination roof ventilator/emergency exit that provides 5-position fresh air ventilation and a simple release handle that allows the hatch to hinge open for emergency exit.

Additional Features

- Retrofits to all hatch openings
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape

9245 Series / Pro Lo Roof Hatch

The Pro Lo is a combination roof ventilator/ emergency exit that mounts nearly flush with the roof (0.75" above the roof). Designed to fit the roof curvature, it creates a tight seal virtually eliminating water intrusion. The hatch also incorporates a release handle allowing it to be opened as an emergency exit.

Additional Features

- Available in various radiuses to fit different roof curvatures
- Nearly flush at 0.75" above the bus
- Constructed of high strength UV stable materials
- No exterior screws for installation
- Available with vandal lock feature
- Meets D250 Standard for Canadian school bus

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EMERGENCY EXIT



5 YEAR



CE R10 RoHS

ECCO autor

BEACONS

7945 SERIES Pulse® SAE Class II or III LED

The 7945 Series beacon combines all the major benefits of the latest LED technology with a traditional, strobe style housing at a price point comparable to a strobe. Available in either 5" or 7" height profiles the 7945 is suitable for a wide range of applications where an SAE Class II light is required. The 7945 features 12-48VDC operation and 11 flash patterns to produce an attention getting warning signal.

Models			
PART NO.	MOUNT	LENS COLOR OPTIONS	LED COLOR
7945X	3 Bolt / 1" Pipe		
7950X	3 Bolt / 1″ Pipe		
7945X-VM	Vacuum-Magnet		
7950X-VM	Vacuum-Magnet		
7945X-HBT	Semi-Permanent HBT		
7950X-HBT	Semi-Permanent HBT		

Replace "X" in part number with desired color: A = amber, B = blue, C = clear, G = green, R = red

Features and Benefits

- 12-48 VDC, 1.3 Amps
- Choose profile height 5" (7945) or 7" (7950)
- 11 flash patterns
- Reinforced polypropylene base, polycarbonate lens
- Switched cigarette plug adapter (vacuum-magnet models)
- Rechargeable battery powered model available in amber
- Temperature Range: -22°F to +122°F (-30°C to +50°C)



Parts & Accessories

• Lenses: 7945 - R6050LX 7950 - R6070LX

SIRIUS



6768 Griffon



6727 Anthracite



6782 Dune

NT



6801 Graphite

|_(A



4776 Masan



4479 Kilimanjaro

NT



4517 Fuji

NT

6451 Corsaire

NT

NT

NT



TARABUS SIRIUS

DESCRIPTION		
Backing		NT
Thickness		2.25 ± 0.15 mm 0.088 ± 0.006"
Weight		2.20 ± 0.15 kg/m² 4.05 lb/Sq.Yd
Roll width		200 cm 6.56'
Roll length		24 lm 78.72'
PERFORMANCE		
Dimensional stability	ASTM D 1204	≤ 0.3 %
Abrasion resistance	ISO 9352 TABER TEST	300 ± 50 mg 0.01 ± 0.002 oz
Identation resistance	EN 433	≤ 0.2 mm < 0.008"
Low temperature resistance	D 42 1235 A	- 20°C / -4°F
Sound Damping Characteristics	ISO 717/2	∆l = 5 dB
Color fastness	ASTM D 4459	≥7
Slip resistance	ASTM D 2047	> 0.6
Fire resistance	FMVSS 302 (ISO 3795/76)	Conform
	Docket 90a (ASTM E648) (NFPA 253)	Class 1 (CRF> 0.45 W/cm²)
Resistance to chemicals	EN 423	Unaffected by diluted acids and bases Unaffected by domestic products (excluding solvents for plasticized PVC)





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."





THE FEATHER WEIGHT SERIES BY

Seating Solutions^{**}

an ISO 9001:2000 certified company

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







SAFETY FOR ALL PASSENGERS

Standard 3PT seat belts with optional ICS (Integrated Child Seat) and/or CRS (Child Restraint System) for children



ICS Integrated Child Seat FMVSS compliant





SEATING CAREGIVER

Safety for all passengers. Standard 3PT seat belts with optional ICS (Integrated Child Seat) and/or CRS(Child Restraint System) for children.

The newly upgraded Caregiver seat is designed for a comfortable, safe ride for both children and guardians. 3PT seat belts have been added for adults, while the optional ICS is available for children from 22-78 lbs. A tapered back provides unrestricted viewing for drivers, and best of all, the shoulder belts can be adjusted in seconds without taking the seat apart, avoiding clumsy operations.

Standard Features:

- Accommodates children 22-78 lbs
- Standard 3-point seat belts with FMVSS 207 and 210 seat belt anchorage compliance
- Fits where most 3PT seats were placed
- Use existing GO, GO-ES, or 3PT legs

Options:

- Available in a wide variety of vinyls and cloths
- Upholstered or US Arms
- Adjustable footrests
- Available as a single or double
- Optional Integrated Child Seat (ICS) accommodates children 22-78 lbs with FMVSS 213 Compliance
 - Fold down tongue can be folded to act as a booster seat
 - Easily adjustable ICS shoulder straps
- Optional Child Restraint System (CRS) with FMVSS 225 Compliance



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Freedman Seating is committed to lessening our impact on the planet. For your convenience, materials are now available online to download at www.freedmanseating.com.

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

HIGH-BACK SEAT



Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts). Less weight means one thing to bus builders and operators: they can get more passengers per bus. And when we say more passengers, **we mean more happy passengers**.



Seating Solutions



27-1/4 36-1/2 (W/2 U.S. ARMS) (RIGID) 35 23-1/4 6-1/2 17-1/2 (RECLINER) 197-1/4 18-1/2 42-1/4 10 ÷ Щ 18 BUS SPECS ÷ 24 - 30





Cross-country or cross-town, the Freedman Feather Weight High-Back gets you there in safety and comfort. The headrest actually cradles your head, and provides unrestricted viewing. The ultra-thin backrest gives out-standing support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight High-Back features include:

- An ultra-thin Knee-Saver type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17¹/₂" wide seat cushions
- 27¼" back height off the seat cushion, 42¼" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance–all Feather Weight seats are seat belt ready
- · Covers that can be removed and replaced easily and without the use of special tools

Feather Weight High-Back options include:

- Black molded U.S. Arms or upholstered flip-up armrests
- Side grab rail
- U.S.R.—Under
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Pillow headrests

- Seat Retractors 16" or 19" wide
 - seats available
 - Rear row guick disconnect
- CRS-225 hooks and tethers
- Side sliders
- Cup holders
- Seat belt loops



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PURE ASPHALT

MANUFACTURER OF SPECIALTY COATINGS SINCE 1927

3300 W. 31st STREET CHICAGO, IL 60623 PH: 773.247.7030 FAX: 773.247.7066 WWW.PUREASPHALT.COM

#76-M Undercoating/Chassis Coating

DESCRIPTION

A premium haps free polymer waterborne coating for the protection of metal frames and other underbody components on the underside of trailers, utility bodies, bus bodies, RV's and other vehicles. #76-M 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 tip sizes and spray equipment. #76-M is a water based formula with quick dry capabilities to achieve early water and weather resistance making it suitable for a variety of production situations. Provides a tough, pliable rubberized coating for protection against abrasion and corrosion. Resists salt, alkalis and seals out moisture. Affords sound deadening and vibration dampening to metal, fiberglass and plastic surfaces at higher film builds. Dry coating is tack free and can be top coated.

MATERIALS

#76-M is composed of an abrasive free material, formulated with emulsified petroleum hydrocarbons, modified polymer additives and inert fillers.

PRODUCT DATA

Color Weight per Gal. Solids Flash Point V.O.C. Content Viscosity & Sag Fed Spec. TTC-520-B

Dry to light touch (70F/30%humidity)

PROPERTIES

Black 9.3 lbs +or-.2 53% +/- 3 Not Applicable < .35 lbs per gallon Per customer specification and application equipment Pass 20 –30 minutes (at 10 mils wet/70F)

PRODUCT

DATA

APPLICATION

#76-M 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 50-95 F (10-35 C) at time of application. Before top coating, contact Pure Asphalt Co. to ensure compatibility. Refer to the MSDS (Material Safety Data Sheet) for additional handling instructions, Personal Protection Equipment requirements and first aid information before using.

APPLICATION EQUIPMENT

30:1 Reciprocating pumps with 30 - 40 lbs of air	.021025 inches tip size
(For Industrial applications w/ large pumps)	
15-1 Air Motor pumps with 65-75 lbs of air (drum/keg pump)	.021023 inches tip size

DRY TIME

76-M will dry to light touch in 20-40 minutes (depending on film thickness, temperature, humidity and airflow), and fully cure in 24 hrs @ 70F. Air movement will speed drying. Product is formulated to achieve early water and freeze resistance that will be indicated by a change of color from shiny dark gray (when first sprayed) to matte black.

CARE AND CLEAN UP OF EQUIPMENT

Spray guns, brushes and tools used for application, should be immersed in soapy water or mineral spirits when not in use. Dried material can be removed with mineral spirits.

PROTECT FROM FREEZING

This product may be damaged if frozen. Please protect from severe weather. Store in a warm place. (50-90 degrees F)

PACKAGING

Available in 16-gallon kegs, 55-gallon drums and 330 gal. totes

The information presented herein is based on the data available and is believed to be correct. However, nothing stated in this bulletin is to be taken as a warranty, expressed or implied regarding the accuracy of the information of the use of our product used singly or in conjunction with other products.

4000 SERIES ALTERNATORS

Severe Duty High Amp / High Temp Rated Alternators 12 VOLT - 185 Amps To 320 Amps 24 VOLT- 200 Amps

Designed for reliable high output State-of-the-Art rectifier system Enclosed brush/slip ring system Multi-Power- Multiple alternator system can produce up to 1280 Amps! 12 volt 185, 200, 270, 320 amp 340 320 Amp 320 300 280 270 Amp 260 240 220 200 Amp 200 OUTPUT 180 160 140 120 100 80 60 40 20 1000 2000 3000 4000 5000 6000 7000 ALTERNATOR RPM Maximum Continuous Speed - 8000 rpm Stabilized Output @ 24° C 24 Volt curves can be viewed on our website.

Internal rectifier



For information call your Leece-Neville representative today.





125°C



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HOME **PRODUCTS** VUSES V ABOUT FAQ CONTACT

SAFER BOARDING

Since 1991, Warm Welcome[®] low voltage step heaters have been used throughout North America in major city transit systems that provide services in cold weather. These same snow-melting heaters have been installed on airport shuttles, school buses, passenger trains, and even on off-shore oil platforms in the North Sea. You'll find Warm Welcome[®] low voltage step heaters from NYC to Toronto, Toledo to Washington DC, Cleveland to Spokane and many more metropolitan areas.

• welcome

HOME With a thin profile and zero moving parts WARM WELCOME[®] Step heaters can easily be installed (at the factory or retrofitted to existing vehicles) beneath the treads of any size steps or lifts. Each one is pre-wired for quick and easy installation. The step treads are environmentally friendly replacing corrosive salts and potentially damaging deicing chemical to preserve the steps of your vehicles and save on maintenance.

> Whatever your specific transit requirements, WARM WELCOME[®] can help your passengers board and debark with more safety. Manufacturers offer the step heaters pre-installed at the factory. However, retrofitting is not a problem for after-market installations in existing vehicles and fleets.

> The step heaters come pre-wired, install quickly, and work beneath any size step or lift.

CONTACT



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HOME **PRODUCTS** V USES V ABOUT FAQ CONTACT







HOW THEY WORK FOR MASS TRANSIT

Your commercial vehicles will be safer for boarding and debarking, so your passengers won't be concerned about snow or ice covered steps. When

welcome

0

Manufacturers offer the step heaters pre-installed at the factory.

HOME PRODUCTS V USES V ABOUT FAQ CONTACT Retrofitting is not a problem for after-market installations in existing vehicles and fleets. The step heaters come pre-wired, install quickly, and work beneath any size step or lift.

> Mass Transit step heaters are built with a thin profile and are installed between the transit vehicles' factory step treads, and the floor. The top layer floor tread overlays the foil-covered heat element while the bottom (also foil-covered) lays flat against the vehicle floor. In this manner, the look and feel of the vehicle step is preserved while the heater is protected and your passengers are ensured a comfortable step.

WATCH EVERY STEP

SCHOOL AND SHUTTLE RANSPEC **BUS ROOF HATCHES**



SAFE EGRESS. PROVEN PERFORMANCE.





ADAPTABLE Low profile design adapts to wide range of roof surfaces



MAINTENANCE



STRENGTH

Constructed of high strength UV stable materials



Proudly manufactured in North Carolina with 35 years proven product performance





Serves as a vent on hot summer days

SPECIFICATIONS SCHOOL AND SHUTTLE ROOF HATCHES

HES			/	RVENT	MINE	ents wh		RELEA	SE HAN	ARALARI ARALARI	ASY CAL							MERIC
■ = Standard O = Optional	COLORS	/4	ALSH A	ATICA	MERGE	SW PR	UTSIDE P	ETENT	ATCHP	INGUI	4	HUTT	onch,	RANSI	chool	Ŕ	ORTHY	ORLD
MODEL	STANDARD	FEAT	URES	& O	PTIO	NS					API	PLIC		١S		SIZ	ES	
T1170 Series Triple Value Safety Vent II	White Light Gray Dark Gray	-		-	•	0	ο	0	0		•			-		-		
T1670 Series Power Safety Vent II	White Light Gray Dark Gray Beige	•	•		•	0	0	0	0		•	•	•	•		•		
T1970 Series Standard Safety Vent II	White Light Gray Dark Gray Beige	•		•	•	0	0	0	0					•		•		
9245 Series Pro Lo Roof Hatch	White Light Gray Dark Gray					0	0	0	0		•					-		•

T1170 Series / Triple Value Safety Vent II

The Triple Value Safety Vent II is a combination roof ventilator/ emergency exit that provides 5-position fresh air ventilation as well

as incorporating a built in non-closeable static exhaust vent. The product also includes a simple release handle that allows the hatch to hinge open for emergency exit.

Additional Features

- Static Vent provided with one piece outer cover designed to minimize leaks
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Available with vandal lock feature
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1670 Series / Power Safety Vent II

The Power Safety Vent II provides all the features of the Triple Value Safety Vent II with the addition of an electric fan for extracting condensation, stale or hot air from inside the vehicle to improve passenger comfort.

Additional Features

- Interchangeable with earlier Transpec models
- Available in 12 and 24 volt
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape
- Meets D250 Standard for Canadian school bus

T1970 Series / Standard Safety Vent II

The Standard Safety Vent II is a combination roof ventilator/emergency exit that provides 5-position fresh air ventilation and a simple release handle that allows the hatch to hinge open for emergency exit.

Additional Features

- Retrofits to all hatch openings
- Interchangeable with earlier Transpec models
- Available in various radiuses to fit different roof curvatures
- Constructed of high strength UV stable materials
- Available with optional adhesive sealant and reflective tape

9245 Series / Pro Lo Roof Hatch

The Pro Lo is a combination roof ventilator/ emergency exit that mounts nearly flush with the roof (0.75" above the roof). Designed to fit the roof curvature, it creates a tight seal virtually eliminating water intrusion. The hatch also incorporates a release handle allowing it to be opened as an emergency exit.

Additional Features

- Available in various radiuses to fit different roof curvatures
- Nearly flush at 0.75" above the bus
- Constructed of high strength UV stable materials
- No exterior screws for installation
- Available with vandal lock feature
- Meets D250 Standard for Canadian school bus

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EMERGENCY EXIT



5 YEAR



CE R10 RoHS

ECCO autor

BEACONS

7945 SERIES Pulse® SAE Class II or III LED

The 7945 Series beacon combines all the major benefits of the latest LED technology with a traditional, strobe style housing at a price point comparable to a strobe. Available in either 5" or 7" height profiles the 7945 is suitable for a wide range of applications where an SAE Class II light is required. The 7945 features 12-48VDC operation and 11 flash patterns to produce an attention getting warning signal.

Models			
PART NO.	MOUNT	LENS COLOR OPTIONS	LED COLOR
7945X	3 Bolt / 1" Pipe		
7950X	3 Bolt / 1″ Pipe		
7945X-VM	Vacuum-Magnet		
7950X-VM	Vacuum-Magnet		
7945X-HBT	Semi-Permanent HBT		
7950X-HBT	Semi-Permanent HBT		

Replace "X" in part number with desired color: A = amber, B = blue, C = clear, G = green, R = red

Features and Benefits

- 12-48 VDC, 1.3 Amps
- Choose profile height 5" (7945) or 7" (7950)
- 11 flash patterns
- Reinforced polypropylene base, polycarbonate lens
- Switched cigarette plug adapter (vacuum-magnet models)
- Rechargeable battery powered model available in amber
- Temperature Range: -22°F to +122°F (-30°C to +50°C)



Parts & Accessories

• Lenses: 7945 - R6050LX 7950 - R6070LX

SIRIUS



6768 Griffon



6727 Anthracite



6782 Dune

NT



6801 Graphite

|_(A



4776 Masan



4479 Kilimanjaro

NT



4517 Fuji

NT

6451 Corsaire

NT

NT

NT


TARABUS SIRIUS

DESCRIPTION		
Backing		NT
Thickness		2.25 ± 0.15 mm 0.088 ± 0.006"
Weight		2.20 ± 0.15 kg/m² 4.05 lb/Sq.Yd
Roll width		200 cm 6.56'
Roll length		24 lm 78.72'
PERFORMANCE		
Dimensional stability	ASTM D 1204	≤ 0.3 %
Abrasion resistance	ISO 9352 TABER TEST	300 ± 50 mg 0.01 ± 0.002 oz
Identation resistance	EN 433	≤ 0.2 mm < 0.008"
Low temperature resistance	D 42 1235 A	- 20°C / -4°F
Sound Damping Characteristics	ISO 717/2	∆l = 5 dB
Color fastness	ASTM D 4459	≥7
Slip resistance	ASTM D 2047	> 0.6
Fire resistance	FMVSS 302 (ISO 3795/76)	Conform
	Docket 90a (ASTM E648) (NFPA 253)	Class 1 (CRF> 0.45 W/cm²)
Resistance to chemicals	EN 423	Unaffected by diluted acids and bases Unaffected by domestic products (excluding solvents for plasticized PVC)





FOLDAWAY BV & AM STYLES



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THE FEATHER WEIGHT SERIES BY

Seating Solutions^{**}

an ISO 9001:2000 certified company

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







SAFETY FOR ALL PASSENGERS

Standard 3PT seat belts with optional ICS (Integrated Child Seat) and/or CRS (Child Restraint System) for children



ICS Integrated Child Seat FMVSS compliant





SEATING CAREGIVER

Safety for all passengers. Standard 3PT seat belts with optional ICS (Integrated Child Seat) and/or CRS(Child Restraint System) for children.

The newly upgraded Caregiver seat is designed for a comfortable, safe ride for both children and guardians. 3PT seat belts have been added for adults, while the optional ICS is available for children from 22-78 lbs. A tapered back provides unrestricted viewing for drivers, and best of all, the shoulder belts can be adjusted in seconds without taking the seat apart, avoiding clumsy operations.

Standard Features:

- Accommodates children 22-78 lbs
- Standard 3-point seat belts with FMVSS 207 and 210 seat belt anchorage compliance
- Fits where most 3PT seats were placed
- Use existing GO, GO-ES, or 3PT legs

Options:

- Available in a wide variety of vinyls and cloths
- Upholstered or US Arms
- Adjustable footrests
- Available as a single or double
- Optional Integrated Child Seat (ICS) accommodates children 22-78 lbs with FMVSS 213 Compliance
 - Fold down tongue can be folded to act as a booster seat
 - Easily adjustable ICS shoulder straps
- Optional Child Restraint System (CRS) with FMVSS 225 Compliance



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Freedman Seating is committed to lessening our impact on the planet. For your convenience, materials are now available online to download at www.freedmanseating.com.

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

HIGH-BACK SEAT



Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts). Less weight means one thing to bus builders and operators: they can get more passengers per bus. And when we say more passengers, **we mean more happy passengers**.



Seating Solutions



27-1/4 36-1/2 (W/2 U.S. ARMS) (RIGID) 35 23-1/4 6-1/2 17-1/2 (RECLINER) 197-1/4 18-1/2 42-1/4 10 ÷ Щ 18 BUS SPECS ÷ 24 - 30





Cross-country or cross-town, the Freedman Feather Weight High-Back gets you there in safety and comfort. The headrest actually cradles your head, and provides unrestricted viewing. The ultra-thin backrest gives out-standing support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight High-Back features include:

- An ultra-thin Knee-Saver type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17¹/₂" wide seat cushions
- 27¼" back height off the seat cushion, 42¼" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance–all Feather Weight seats are seat belt ready
- · Covers that can be removed and replaced easily and without the use of special tools

Feather Weight High-Back options include:

- Black molded U.S. Arms or upholstered flip-up armrests
- Side grab rail
- U.S.R.—Under
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Pillow headrests

- Seat Retractors 16" or 19" wide
 - seats available
 - Rear row guick disconnect
- CRS-225 hooks and tethers
- Side sliders
- Cup holders
- Seat belt loops



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MID-HI SEAT "ROCK SOLID"

FEATER



Sustainable Seating Solutions

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

Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength andsafety (including 210 for seat belts). Less weight means one thing to bus builders and operators: they can get more passengers per bus. And when we say more passengers, we mean more happy passengers.



Seating Solutions ...

THE FEATHER WEIGHT SERIES BY FREEDMAN SEATING COMPANY an ISO 9001:2000 certified company

FEATHER WEIGHT MID-HI SEAT "ROCK SOLID"







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Sustainable Seating Solutions

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

Feather Weight Mid-Hi features include:

- An ultra-thin *Knee-Saver* type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17½" wide seat cushions
- $22\frac{1}{2}$ " back height off the seat cushion, 37" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance–all *Feather Weight* seats are seat belt ready
- Transit style-rigid backrests (starting weight without options-43 lbs.)
- Touring style-reclining backrests (starting weight without options-47 lbs.)
- Covers that can be removed and replaced easily and without the use of special tools

Feather Weight Mid-Hi options include:

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

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

ISO 9001:2000 registered



AccuStyle® & EuroStyle® Series Rearview Mirror Systems



A Century of Automotive Vision Safety

The following pages demonstrate all the advantages of Rosco's dual-lens remote mirrors for the school bus industry. Two distinct sizes and models cover all the needs of a multitude of applications. A list of some major features is shown at bottom right. A variety of heavy-duty breakaway mounting arms are available to satisfy every requirement and budget. (pls see pgs. 13,15)

The AccuStyle® Story

The EuroStyle® Story

The AccuStyle® Series mirrors combine the functionality of the EuroStyle® Series with the unique engineering capability to also be retrofitted to old or new "Loop" style arms. The AccuStyle® mirrors can be mounted on two-point, upright or overhang arms. Although employing light weight materials and construction principles, the heavy duty "spine" structure isolates the mirror from vibrations. In addition, the sleek, aerodynamic shape and light texture lowers wind drag which can lead to cost savings through greater fuel efficiency.

Smooth aerodynamic shape with full rear



Available in two-point mount configuration



Heavy duty spine structure

These masterpieces of design engineering, combine a traditional yet elegant design in an extremely functional and feature-rich package. Advantages range from hidden wiring and fasteners to vibration resistance. Space-age resins and attractive heavy texture finish, combined with stainless steel internal components make these mirrors durable and corrosion proof.



Easy access to connectors



Mirror-Lok system holds mirror glass tightly while allowing for easy replacement

Advanced Features for AccuStyle® and EuroStyle®

- Heavy-duty A.S.A. resin injection-molded housing.
- Aerodynamic styling with no obvious wires or fasteners.
- Available in different sizes with a variety of mounting options.
- Easily replaceable glass. No need for velcro.
- Both flat and convex mirrors separately motorized and heated. Each 4 way adjustable.
- Internal lens or exterior LED turn directionals.
- Available in manual version with fingertip adjustable glass.
- Packaged as components or as complete systems.

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cover for connector and clamp access

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Heavy-duty spine structure



Textured finish hides scratches and fingerprints

- Custom wire harnessing available with many styles of connectors and switches.
- Internal harnessing fed through arm to eliminate unsightly wire ties and protect wiring.
- Available in 12 or 24 volt, heated or unheated.
- Spring-loaded breakaway mechanism on mounts allows for easy return to detent position.
- Patented Spring-Break® Breakaway arm system, dampens vibration.

AccuStyle[®] 815 Series

Rearview Mirror System

Features and Benefits

- Lightweight, vibration reducing design.
- Certified by OEMs to meet FMVSS-111 requirements.
- Same model can be mounted as upright, overhang or two point mount.
- Reduces inventory of replacement parts.
- Aerodynamic, wind tunnel tested profile has lower drag coefficient for increased fuel economy.
- Available motorized or hand adjustable.
- Available with heated and LED turn signal options •
- Each motorized mirror lens is four way adjustable.
- Hidden wire and connectors. •
- Black or chrome finish is available.
- Full height rear entry cap allows for simple installation and ease of maintenance, including access to all wires and harnesses.







AccuStyle[®] 815 series 8"x15" Dual Mirrors

PART NO. DESCRIPTION

815	8″ x 15″ dual mirror, two point mount, motorized, 12 volt
815ELU / 815ERU	8" x 15" dual mirror, upright mount, motorized 12 volt with Left or Right external signal LEDs
815OG	8″ x 15″ dual mirror, overhang mount, motorized, 12 volt
815SL / 815SR	8" x 15" dual mirror, two point mount, motorized 12 volt with Left or Right mirror lens signal LEDs
815SLU / 815SRU	8" x 15" dual mirror, upright mount, motorized 12 volt with Left or Right mirror lens signal LEDs
815SLOG / 815ROG	8" x 15" dual mirror, overhang mount, motorized 12 volt with Left or Right mirror lens signal LEDs
815U	8″ x 15″ dual mirror, upright mount, motorized, 12 volt
CBL815U	8" x 15" dual mirror, upright mount, motorized 12 volt with Left or Right integrated camera
CBR815U	8" x 15" dual mirror, upright mount, motorized 12 volt with Left or Right integrated camera
M815	8" x 15" dual mirror, two point mount, hand adjustable
M815OG	8″ x 15″ dual mirror, overhang mount, hand adjustable
M815U	8″ x 15″ dual mirror, upright mount, hand adjustable

8" x 15" dual mirror, upright mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



CAP1042

REPLACEMENT PARTS

DESCRIPTION
7" x 9.5" flat mirror glass
7" x 4" convex mirror glass
7" x 9.5" flat mirror carrier and motor assembly
7" x 4" convex mirror carrier and motor assembly
7" x 9.5" flat mirror carrier and hand swivel assembly
7" x 4" convex mirror carrier and hand swivel assembly
Rear access cover for 815 mirror head, two point mount
Rear access cover for 815 mirror head, overhang or upright mt
Grommet, rubber, for 1" tube, no harness hole
Grommet, rubber, for 3/4" tube, no harness hole
Grommet, rubber, for 1" tube, harness hole
Grommet, rubber, for 3/4" tube, harness hole
815 two point mount housing (includes internal spine/clamps)
815 overhang/upright housing (includes internal spine/clamps)
7" x 9.5" flat mirror glass with Left signal LEDs
7" x 9.5" flat mirror glass with Right signal LEDs

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



AccuStyle[®] 818 Series

Rearview Mirror System

Features	and	Benefits	3
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- Lightweight,vibration reducing design.
- Certified by OEMs to meet FMVSS-111 requirements.
- Same model can be mounted as upright, overhang or two point mount.
- Reduces inventory of replacement parts.
- Aerodynamic, wind tunnel tested profile has lower drag coefficient for increased fuel economy.
- Oversized 8" x 17" housing provides additional mirror surface.
- Used on all large school and commercial bus types, including conventional and transit style platforms.
- Available motorized or hand adjustable.
- Available heated and with LED turn signal options.
- Each motorized mirror lens is four way adjustable.
- Full height rear entry cap allows for simple installation and ease of maintenance, including access to all wires and harnesses.
- Black or chrome finish is available.

Model 818 with Stainless Steel Arm





818SR/1

AccuStyle[®] 818 series 8"x17" Dual Mirrors

PART NO.	DESCRIPTION
818	8" x 17" dual mirror, two point mount, motorized, 12 volt
818OG	8″ x 17″ dual mirror, overhang mount, motorized, 12 volt
818SLU / 818SRU	8" x 17" dual mirror, upright mount, motorized 12 volt with Left or Right signal LEDs
818SLOG / 818SROG	8" x 17" dual mirror, overhang mount, motorized 12 volt with Left or Right signal LEDs
818U	8" x 17" dual mirror, upright mount, motorized, 12 volt
M818	8" x 17" dual mirror, two point mount, hand adjustable
M818OG	8″ x 17″ dual mirror, overhang mount, hand adjustable
M818U	8" x 17" dual mirror, upright mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



REPLACEMENT PARTS

DESCRIPTION
7" x 9.5" flat mirror glass
7" x 6" convex mirror glass
7" x 9.5" flat mirror carrier and motor assembly
7" x 6" convex mirror carrier and motor assembly
7" x 9.5" flat mirror carrier and hand swivel assembly
7" x 6" convex mirror carrier and hand swivel assembly
Rear access cover for 818 mirror head, two point mount
Rear access cover for 818 mirror head, overhang or upright mount
Grommet, rubber, for 1" tube, no harness hole
Grommet, rubber, for 3/4" tube, no harness hole
Grommet, rubber, for 1" tube, with harness hole
Grommet, rubber, for 3/4" tube, with harness hole
818 two point mount housing (includes internal spine/clamps)
818 overhang/upright housing (includes internal spine/clamps)
7" x 9.5" flat mirror glass with Left signal LEDs
7" x 9.5" flat mirror glass with Right signal LEDs

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



EuroStyle[®] 715 Series

Rearview Mirror System

PART NO 715/1 715D/1 715/4 M715/4 M715D/4 CAP

CAP1001 715/SHEL

715SL/1

715SR/1

Features and Benefits

- Certified by OEM's to meet FMVSS-111 requirements.
- Compact 8" x 15" housing reduces forward blind spots.
- Available in upright and overhang configurations.
- Used on all large school and commercial bus types, including conventional and transit style platforms.
- Available motorized or hand adjustable.
- Available heated and with LED turn signal options.
- Hidden wiring and connectors.
- 4-way adjustable motors.
- Available in black textured finish to help conceal surface blemishes such as scratches and road grime.









EuroStyle[®] 715 series 8"x15" Dual Mirrors

PART NO.	DESCRIPTION
715	8" x 15" dual mirror, upright mount, 12 volt motorized
715	8" x 15" dual mirror, upright mount, 12 volt motorized,
715OG	8" x 15" dual mirror, overhang mount, 12 volt motorized
715IOG	8" x 15" dual mirror, overhang mount, 12 volt motorized
715SL / 715SR	8" x 15" dual mirror, upright mount, motorized 12 volt v

715SL / 715SR	8" x 15" dual mirror, upright mount, motorized 12 volt with Left or Right signal LEDs
715SLOG / 715SROG	8" x 15" dual mirror, overhang mount, motorized 12 volt with Left or Right signal LEDs
715T	8" x 15" dual mirror, two point mount, 12 volt motorized
W715	8" x 15" dual mirror, upright mount, hand adjustable
M715OG	8" x 15" dual mirror, overhang mount, hand adjustable
W715T	8" x 15" dual mirror, two point mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.

wired for International switch

, wired for International switch



REPLACEMENT PARTS

	DESCRIPTION
	7″x 9.5″ flat mirror glass
	7″x 4″ convex mirror glass
	7"x 9.5" flat mirror carrier and hand swivel assembly
	7"x 9.5" convex mirror carrier and hand swivel assembly
	7"x 4" convex mirror carrier and hand swivel assembly
	Connector access panel available with various company logos
	Rubber grommet for 715 & 717 series mirrors
L	Shell for 715 mirrors
	7″x 9.5″ flat mirror glass with left signal LEDS
	7"x 9.5" flat mirror glass with right signal LEDS

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



EuroStyle[®] 717 Series

Rearview Mirror System

Features and Benefits

- Certified by OEMs to meet FMVSS-111 requirements.
- Oversized 8" x 17" housing provides additional mirror surface.
- Available in upright and overhang configurations.
- Used on all large school and commercial bus types, including conventional and transit style platforms.
- Available motorized or hand adjustable.
- Available heated and with LED turn signal options.
- Hidden wiring and connectors.
- 4-way adjustable motors.
- Available in black textured finish to help conceal surface blemishes such as scratches and road grime.





9.5 - 7.0 17.0 6.2

8.0

EuroStyle® 717 series 8"x17" Dual Mirrors

PART NO.	DESCRIPTION
717OG	8" x 17" dual mirror, overhang mount, 12 volt motorized
717IOG	8" x 17" dual mirror, overhang mount, 12 volt motorized, wired for International switch
717U	8" x 17" dual mirror, upright mount, 12 volt motorized
717IU	8" x 17" dual mirror, upright mount, 12 volt motorized, wired for International switch
717SLU / 717SRU	8" x 17" dual mirror, upright mount, motorized 12 volt with Left or Right signal LEDs
717SLOG / 717SROG	8" x 17" dual mirror, overhang mount, motorized 12 volt with Left or Right signal LEDs
M717OG	8" x 17" dual mirror, overhang mount, hand adjustable
M717U	8″ x 17″ dual mirror, upright mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/"

or Add "H" in Front of the "/" When Present.



Model 717SRU

TANTN	0.
717/1	
717D/1	
717/4	
717D/4	
717SL/1	
717SR/1	I
M717/4	
M717D	/4
CAP	
CAP100)1

717/SHELL

10

REPLACEMENT PARTS

DESCRIPTION
7″ x 9.5″ flat mirror glass
7" x 6" convex mirror glass
7" x 9.5" flat mirror carrier and motor assembly
7" x 6" convex mirror carrier and motor assembly
7" x 9.5" flat mirror glass with Left signal LEDs
7" x 9.5" flat mirror glass with Right signal LEDs
7" x 9.5" flat mirror carrier and hand swivel assembly
7" x 6" convex mirror carrier and hand swivel assembly
Connector access panel available with various company logos
Rubber grommet for 715 & 717 series mirrors

Shell for 717 mirrors

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/" or Add "H" in Front of the "/" When Present.



Advanced Options for AccuStyle[®] Mirror Heads AccuStyle[®] with Rear Looking Camera & External Signal LED

Spring-Break[®] and Swivel Arm Breakaway Systems

This line of mounting arms has a unique spring loaded detent mechanism that dampens vibration and keeps the arm locked in position. Heavy-duty aluminum castings sandwich a dual tubular arm for maximum hold with no maintenance requirements.

Tubular arm construction keeps things economical. The arm is concealed inside the AccuStyle® or EuroStyle® mirror housing with concealed fasteners.

Economy models offer breakaway swivel arms, or fixed arms. Fender mount systems are available for Ford, GM, and other cutaway buses.





AccuStyle® Upright with Rear

Looking Camera & LED

Rear Looking Camera

Add Rosco LED side marker lights for omni-directional vehicle alerts to other drivers and pedestrians.

Add Rosco blind spot/wide angle viewing cameras to help driver visibility. The industry's only integrated

mirror camera that adjusts positions with the convex mirror lens adjustment (both manual and remote control).













External Signal LED

Rear Looking Camera

12

E-Z Bracket®

Combination Rearview and Cross View Arm Assemblies Rearview Fender Mount with Spring-Break[®] Detent

Rosco's Unique Mounting and Arm Options HD E-Z Bracket[®] Dual-Wall Breakaway Swivel Arm

Features and Benefits

- Simple and Fast Installation: Rosco's patented E-Z Bracket[®] System makes installation of a Type "A" school bus mirror system easier than ever before (Patent No. 7,055,973).
- The under-the-fender mount utilizes existing fender mounting bolts to secure the mount below the hood.
- Rosco's unique ferrule system transfers the strength of the inner heavy-gage wall to the exterior of the vehicle.
- Installation is completed with three holes instead of as many as twelve.
- Eliminates the large arms and two braces commonly used on passenger side mirrors until now.
- Massive cast aluminum mounting base provides a stable mount for vibration resistance and durability.
- Low-profile construction is aerodynamic and aesthetically appealing.
- Contoured profile matches the fender perfectly for a solid mount that looks great on the vehicle.
- Available for both Ford and GM vehicles.



Ford E-Z Bracket® Installation with Model 815U AccuStyle® and Hawk-Eye® Cross View Combo Assembly



HD E-Z Bracket® Installation Rosco's HD E-Z Bracket® maximizes holding force with OEM inner hood components to simplify installation and minimize vibration.



GM E-Z Bracket® Installation with Model 715 EuroStyle® and Hawk-Eye® Cross View Combo Assembly



Fender Mount Rearview Mirror Assembly with Spring-Break[®] Detent (Non Combination Assembly)



GM E-Z Bracket[®] with Model 815 AccuStyle[®] and Eye-Max® LP Cross View Combo Assembly

Rosco's Dual-Wall breakaway swivel arms allow for unlimited adjustment and positioning of the mirror while rigidifying the connection to the mounting base. The result is a mirror arm that virtually eliminates vibration.







Control Switches & Custom Wire Harnessing

A variety of switches, including heater controls and timers, are available to suit all requirements. Wire harnesses are available from stock or in custom lengths, with many different standard and weatherproof connectors.

- A variety of mirror control switches in various sizes to meet every need.
- Heater control switches available in two types with optional heater timer.
- Illuminated membrane switches with combination heater and remote control for up to four lenses.

Switches and Components

PART NO	DESCRIPTION
SW-1	Remote mirror control switch, 12V lighted, 1.330"x 1.330", 12" harness
SW-3	Remote mirror control switch, 12V, 1.4" diameter, 12" harness
SW-4	Mirror heater toggle switch, 1"x 0.5"
SW-5	Mirror heater momentary switch, 1"x 0.5"
SW-5-HT	Mirror heater momentary switch, with 10 minute heater timer relay
SW-6	Mirror heater toggle switch, 1/2" diameter
HAR5012	Switch Plate Assembly, 2 remote switches and 1 momentary heater switch w/ 10 minute heater timer relay, w/ 10 pin connectors for LED turn signal
HAR5013	Switch Plate Assembly, 2 remote switches and 1 momentary heater switch w/ 10 minute heater timer relay





HAR5012 (H/R/LED) or HAR5013 (H/R





SWI1011

Rosco's family of remote control/heater membrane switches consolidates the function of two "knob" style switches and one heater with auto shut-off switch. The membrane switch combines the switches into a small solid package with illumination, circuit protection and unmatched durability.

PART NO DESCRIPTION

HAR5020 Switch Pod w/toggle heater switch, red illuminated & 2 remote switches

Ford E - Series Driver Door Mounted Switches

HAR5024 Switch Pod w/toggle heater switch, green illuminated

- HAR5029 Switch Pod w/momentary heater switch (red), timer, 2 remote switches
- HAR5032 Switch Pod w/momentary heater switch (red), timer, 2 remote switches, 10 pin connectors for LED mirror turn



Custom Wire Harnessing

- Harnesses can have custom lengths.
- Conductors available in various gauges.
- Durable connection systems for superior harnessing between mirror, arm and switch.
- Weather proof connectors are available and grommets pre-installed on harnesses.
- Connectors from various companies, including: Tyco/AMP, ITT Canon, Delphi Packard and Deutsch, as well as others.
- In house high speed termination equipment provides fast turnaround.
- UL certified wire.
- Miniature connectors allow smaller holes in vehicle body.
- Multi-conductor cabling available in 2-lead for heating only, 4-lead for single motor control and 8-lead for dual motor control and heating.

Mirror Systems **Testing For Compliance** to FMVSS-111

Our AccuStyle® and EuroStyle® rearview mirror systems and front cross view mirror systems (Eye-Max® LP, HD®, Hawk-Eye®), have been certified for compliance to FMVSS-111 by all the major school bus body builders. Companies including IC Corporation, Thomas Built Buses, Blue-Bird, Collins and Girardin, have shown time and again that Rosco mirrors not only meet, but exceed the requirements of FMVSS-111. However, we continue to test and improve our mirrors to make sure that they cover areas around the bus, beyond the requirements of FMVSS-111. We can not rest in this regard, because we know that the safety of our children depends on it.

Proper School Bus Mirror Adjustment

You know your buses are being manufactured with FMVSS-111 compliant mirrors, but how do you know that your mirrors are being properly adjusted? Can you be sure that your drivers are seeing the blind areas around the bus? Are there blind areas around the bus beyond the FMVSS-111 mandated coverage? If these questions are bothering you, then you need to see "Field of Vision", the first video which teaches you how to keep your mirrors properly adjusted at all times. This free video guideline is a perfect addition to your driver training program. It not only shows how to keep your mirrors adjusted in compliance with FMVSS-111, but also how to see blind areas beyond FMVSS-111 regulations.

Email us for your free copy: info@roscomirrors.com

Heater Switches for Ford Switch Pod





Harness Types

- 1. Arm Harness- Concealed inside arm. Can be made very short to plug into a flush mount connector on the exterior of the vehicle or to pass just inside the vehicle skin. Can be made longer to be run all the way to the control switch.
- 2. Intermediate Harness- Joins the arm harness to the switch harness. Advantageous because it can be run before installation of the arm on the vehicle assembly line. Also allows arm to be removed from bus by disconnecting a connector instead of cutting a longer wire. More commonly used on passenger side.
- 3. Switch Harness- Attached to control switch. Often integrates heater control switch. Has leads for power and mirror heater circuits. Usually very short in length.







FIELD OF VISION A video guide to proper school bus mirror adjustment in accordance with FMVSS-111

OTHER INNOVATIVE ROSCO

Fleet Safety Management Continuous Video & Event Recording,

VISION PRODUCTS Backup Safety Products, Cameras & Monitors

Rosco's Dual-Vision[™] XC is the only windshield based camera that offers all the benefits of event based recording with the added benefit of continuous recording. With Dual-Vision™ XC in your fleet has the ability to reduce your liability and insurance premiums. Some Dual-Vision™ XC features include:

- No Monthly Fees
- Up to 160 hours of continuous video on a 32GB SD card
- Tamper proof
- G-Force recognition
- Vehicle speed
- Integrated post route GPS tracking
- Driver panic button
- 24 hour surveillance timer audio, night vision
- Up to 6 camera views
- Wi-Fi download capability and much, much more.





DV231







Maximize your data's potential with our DV-Pro[®] fleet database management system. This software was developed specifically for organizing information captured by Dual-Vision™ XC recording devices. DV-Pro[®] makes it fast and easy to view or transfer footage, archive or discard content and compile reports or email files. DV-Pro $^{\textcircled{R}}$ driver tools give greater control of information generated by high capacity Dual-Vision[™] XC recorders. You can conduct searches based on detailed criteria and guickly make note of key events such as speed overages.

Safety Starts With a Rearview Camera

We cover all the safety angles so your vehicle can backup safely. Replace a standard rearview mirror with one that displays an LCD monitor as soon as the vehicle is shifted into reverse. Or install a rearview mirror backup camera that delivers an unobstructed view of what's behind the vehicle even when it's dark outside. Reduce the risks of moving in reverse. Drivers will be able to maneuver easily in reverse with one of our backup camera kits.





BULLET CAM

STSC109B **REAR LOOK DOWN OR SIDE MOUNT**

MOR-Vision Mirror/Monitor Backup Camera Kits



Rosco Vision Systems introduces a revolutionary new backup camera system (STSK6630) for large school buses and vehicles. This new system utilizes an interior 6" x 30" rearview mirror (STSM630) to display a 7" LCD monitor when the vehicle is in reverse operation. This monitor allows the driver to see behind the vehicle, and once the vehicle is shifted to all other modes of operation a normal full mirror view reappears.

The MOR-Vision series also includes our STSK5530 kit and STSK1030 kit for small and large buses. Buses equipped with MOR-Vision have options for multiple cameras and automatic monitor view changes based on operational conditions of the school bus.

With two camera inputs, the MOR-Vision systems allow for a second camera to be installed for increased visibility and security. Upgrade the MOR-Vision Mirror/ Monitor Backup Camera System with a second interior or exterior camera.



COMPLETE CAMERA KIT





STSC112 LICENSE PLATE CAM



STSC118 INTERIOR DOME CAM



STSC128 UNIVERSAL SIDE CAM



STSK1030 Mirror/Monitor 10" x 30" Backup Camera Kit STSM1030 Monitor, STSC109B Camera, and STSH341 Harness



STSK6630 Mirror/Monitor 6" x 30" Backup Camera Kit STSM630 Monitor, STSC109B Camera, and STSH341 Harness



STSK5530 Mirror/Monitor 6" x 16" Backup Camera Kit STSM530 Monitor, STSC109B Camera, and STSH341 Harness



STSK4530 Mirror/Monitor 6" x 16" Backup Camera Kit STSM230 Monitor, STSC130 Camera, and STSH330 Harness



Rosco was established in 1907. For over a century, our goals have remained the same: We are committed to producing the highest quality automotive products and providing the superior service our customers have grown to expect.

Today, we supply our products to every school bus manufacturer in North America. Our products are designed and built in the USA. Our staff has grown to over two hundred people in facilities totaling over one hundred thousand square feet.

As we move forward we have set our goals even higher. We are now certified to ISO-9001:2008. Our focus on Total Quality Management and continuous improvement will keep our product quality at levels our customers demand.

We will strive to improve our customer service through online and other electronic resources. We will continue to develop newer and better products to serve the ever-changing needs of the marketplace of tomorrow.





A Century of Automotive Vision Safety

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NEW YORK SINCE 1907

Vulcan[™] Series V12 HD/IP Mobile DVR

12-CHANNEL DVR

DIMENSIONS

- · Height: 3.5 inches
- · Width: 8.7 inches
- · Depth: 11.6 inches
- Weight: 5.7 pounds

TWELVE (12) A/V INPUTS

• 8 channels D1, WD1, 720P, or up to 1080P + 4 channels IP up to 1080P

VIDEO OUTPUTS

• 2 channels

AUDIO OUTPUTS

2 channels

CAMERA COMPATIBILITY

- 8 channels D1, WD1, 720P, or up to 1080P (see NTSC)
- · 4 channels IP up to 1080P

STORAGE MEDIA

RECORDING MEDIUM

• One (1) 2.5" SATA hard drive and one (1) optional solid-state SD card

CAPACITY

• 1TB (standard) up to 2TB (capable) (optional) 64GB SD card up to 512GB

RECORDING OPTIONS

· SD card slot for redundant recording

INTERFACE

- NETWORK DATA CONNECTION
- One RJ45 x 1 (10/100 M/1000M)

EXPANSION

• RS232 × 2, RS485 × 2

GPS INTERFACE

· Built-in, compatible with optional GPS antenna

DRIVER ACTION DETECTION

PANIC BUTTON

- The remote status indicator (panic button) can be connected to show DVR power/record status without using a video monitor
- · The driver-operated panic button has the following functions:
 - · Solid green LED indicates that the unit has power and is recording
 - · Event marker (panic button)

DRIVER ACTION DETECTION WIRES

8 signal wires individually programmable to indicate alarm or event



BUILT-IN G-FORCE SENSOR

COMPRESSION FORMAT

- Video: H.264
- Audio: ADPCM, G.711A G.711U

RECORD RESOLUTION

NTSC

1080P, 720P, WD1(928X480), WHD1(928X240), WCIF(464X240), D1(704x480), HD1(704x240), CIF(352x240)

PAL

• 1080P, 720P, WD1(928X576), WHD1(928X288), WCIF(464X288), D1(704X576), HD1(704x288), CIF(352x288)

RECORDING OPTIONS

- Continuous record: System will record all channels continuously while vehicle is running (factory setting).
- Alarm record: System will record when an alarm is triggered.
- Motion record: System will record when the cameras detect motion while vehicle is running.
- · Schedule record: System will boot and record according to user-selectable schedule.

ELECTRICAL & OPERATING REQUIREMENTS

AUTO ON/OFF DETECTION ACC detection

DELAY OFF SETTING

· User selectable up to 24 hours

OPERATING VOLTAGE • 8~36VDC

OPERATING TEMPERATURE

 -14°F (-25°C) ~ +158°F (+70°C); -40°F (-40°C) ~ +158°F (+70°C) with heater

Specifications, features and applications of use are subject to change without notice. V 4/2017

POWER CONSUMPTION

• 0W-105.3W

POWER SUPPLY

- INPUT RANGE
- DC 8-36V

OUTPUT RANGE DC5V/DC12V

- OUTPUT CURRENT
- 5V@500mA, 12V@500mA

BUILT-IN POWER PROTECTION

LOW VOLTAGE PROTECTION

· User selectable and programmed at installation

HOUSING/CASING

- · Removable, shock-mounted
- · Vandal-resistant locking front cover
- · Shock-resistant: MIL-STD-810F
- Aluminum
- · Optional fan with filter, removable for cleaning

BUILT-IN WI-FI MODULE

OPTIONAL COMPONENTS

- VIRTUAL SYNCHRONIZED MAPPING External Virtual Synchronized Mapping[™]
- module with North American maps
- Includes GPSV1 antenna
- · Embeds GPS tracking information synchronized with recorded video footage

GPS ANTENNA

FIREPROOF BOX BACKUP

CELLULAR MODEM



QRT-1 SERIES



MAX / DELUXE / STANDARD 4-POINT SECUREMENT WHEELCHAIR RETRACTORS



QRT-1 SERIES

The Securement System That Changed Everything

The original 4-point wheelchair securement system, QRT-1 Series retractors defined the way passenger safety devices are designed and tested.

With a range of 3 different options to fit every need and every budget, the QRT-1 Series of retractors offer easy to use, effective 4-Point securement of wheelchairs for virtually any vehicle application.

QRT MAX

FULLY AUTOMATIC, premium knobless retractor that allows for one-handed operation.

QRT DELUXE

SELF-LOCKING & SELF-TENSIONING retractor with ergonomic housing and dual tensioning knobs.



QRT STANDARD

SEMI-AUTOMATIC retractor that meets all industry standards and specifications.

More than 30 years ago, Q'STRAINT introduced the world's first fully integrated 4-Point wheelchair passenger securement system, now an industry standard the world over. The QRT line of retractors are the linchpin of that system.





Every QRT retractor is fully ADA complaint, and meets or exceeds all standards and regulations, including:

- SAE J2249, ISO 10542,
- FMVSS 209, 302, 210, 222
- CMVSS 209
- CSA Z605
- and 30mph/20g crash testing

Anchorage Options

All QRT-1 Series Retractors are compatible with L-Track, L-Pockets and Slide 'N Click anchorages, or may be directly mounted to vehicle floors, seat legs or barriers.







SLIDE 'N CLICK For kits that include Slide 'N Click anchorages, QRT Series retractors feature a single-bolt SNC assembly and plunger that allows a full 360° rotation, eliminating anchorage alignment guesswork.

QRT-1 SERIES FEATURES COMPARISON

	MAX	DLX	STD	
Knobless, One-Handed Operation. No knobs to interfere with wheels and footrests.	0			
Dual Tensioning Knobs. Provides additional tensioning if needed.		0		
Single Tensioning Knob. Provides additional tensioning if needed.			0	
Automatic, Self-Locking. Allows easy, one-handed hook-up.	0	0		
Self-Tensioning. Retractors automatically take up 'slack'.	0	0		
Positive Lock Indicator. Patented feature clearly indicates when fitting is locked in anchorage.	0	0	0	
Interchangeable. Eliminates confusion: no right, left, front or rear locations.	0	0	0	
Low Profile & Compact. Elimination of mounting bracket allows retractors to fit under most footrests.	0	0	0	
Accommodates Larger Wheelchairs. Reduced overall length leaves more room for wheelchairs.	0	0		
Ultra-Durable. Hardened steel and coated zinc for maximum corrosion resistance.	0	0	0	
Universal Design. Accommodates virtually all wheelchair designs, including scooters.	0	0	0	
J-Hook. Reduces twisting of belts and ensures proper securement for all wheelchair designs.	0	0	0	
Foot Release Lever. Easy release eliminates the stress of bending down.	•	•	0	



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CENTURY SERIES NCL1000-2 WHEELCHAIR LIFTS

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

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

NCL1000-2 CENTURY SERIES WHEELCHAIR LIFT

STANDARD FEATURES

• 1,000-pound lifting capacity

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

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

SAFETY FEATURES

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

EASE OF USE FEATURES

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

BRAUNABILITY'S UNRIVALED SERVICE

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

The NC1000-2 Century Series Wheelchair Lift from BraunAbility

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



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

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



🗮 MADE IN THE USA

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

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TRANSIGN[®]



The LED Destinator[®] Series - perfect for fleets of all types - is available in a variety of sizes and colors to fit your installation and display needs. These versatile and highly adaptive signs offer full integration into Destination, Route, and Next Stop announcement services, always keeping your customers pointed towards their next destination.



SOFTWARE AND PROGRAMMING

Our signs and control modules are pre-programmed and include FREE software. Advanced controllers are available for J1708/J1587 system integration and Hands-Free operation, ensuring the safest and most reliable performance for any fleet.

STANDARD FEATURES

- Destination Messages
- Next Stop Announcements
- Public Relations Messaging
- Scrolling/Flashing/Stacked Messages



AVAILABLE ADVANCED FEATURES INCLUDE:

- Automated GPS message progression
- Hands-Free operation for safety
- Voice Announcements
- J1708/J1587 integration compatible
- Automatic brightness control
- Basic programming software included (USB)
- Maintenance free- ZERO cost of ownership
- Many OCU options to suit your needs



BUY AMERICA - MADE IN U.S.A.

Using the highest quality parts, our LED Destinator[®] Signs are proudly made in Detroit, Michigan USA in full compliance with **the Buy America Act.**

LED DESTINATOR[™] WARRANTY INFO

With a lifetime warranty that outlasts the lifetime of most vehicles (100,000 hours at full brightness), our signs will exceed your expectations in reliability and performance.



ABOUT TRANSIGN

Established in 1959, Transign is a leading provider of high-quality signage for the transit industry. We remain committed to providing world-class U.S. based customer service and technical support.

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TRANSIGN®

LED Destinator® Electronic Signs - Dimensions

Signs	Pixel Count H x W (pixels)	Display H x W (in)	Enclosure H x W x D (in)
LD16160	16 x 160	6 ¹ / ₂ x 63 ¹ / ₈	9 ¹ / ₂ x 64 ⁵ / ₈ x 2 ³ / ₈
LD16128	16 x 128	6 ¹ / ₂ x 50 ¹ / ₂	9 ¹ / ₂ x 52 x 2 ³ / ₈
LD16112	16 x 112	6 ¹ / ₂ x 44 ¹ / ₈	9 ¹ / ₂ x 45 ³ / ₄ x 2 ³ / ₈
LD1696	16 x 96	6 ¹ / ₂ x 37 ⁷ / ₈	9 ¹ / ₂ x 39 ³ / ₈ x 2 ³ / ₈
LD1680	16 x 80	6 ¹ / ₂ x 31 ⁵ / ₈	9 ¹ / ₂ x 33 x 2 ³ / ₈
LD1632	16 x 32	6 ¹ / ₂ x 12 ³ / ₄	9 ¹ / ₂ x 14 x 2 ³ / ₈
LD12112	12 x 112	4 ⁷ / ₈ x 44 ¹ / ₈	8 x 45 ³ / ₄ x 2 ³ / ₈
LD1280	12 x 80	4 ⁷ / ₈ x 31 ⁵ / ₈	8 x 33 ¹ / ₈ x 2 ³ / ₈
LD1232	12 x 32	4 ³ / ₄ x 12 ³ / ₄	8 x 14 x 2 ³ / ₈
LD896	8 x 96	3 ¹ / ₄ x 37 ⁷ / ₈	6 ³ / ₈ x 39 ³ / ₈ x 2 ³ / ₈
LD864	8 x 64	3 ¹ / ₄ x 25 ¹ / ₄	6 ³ / ₈ x 26 ³ / ₄ x 2 ³ / ₈

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Stop Request Signs

- Flush, ceiling or surface mount
- Any font/color combination
- Back-lit by efficient LED's

Special

Roller Curtain Signs

- High-res logos & graphics
- Perfect for large fleets
- Virtually maintenance free
- Reliable, efficient LED backlight
- Available in 12 and 24 VDC
- Up to 120 destinations



Run Number Box

- Metal or plastic frame
- Available in 2, 3, or 4 digits
- Easy to read 4" lettering

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- Spring loaded return
- Reliable, efficient LED backlight
- Virtually maintenance free



LED Run Number Box

- Steel enclosure
- ADA compliant
- Reliable LED's
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- Automatic brightness
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Destinator[®] Series

ADA compliant
LED's rated at 100K hours

• Easy to install

Interior Passenger Information Sign

STURAA TEST

10 YEAR

350,000 MILE BUS

from

CHAMPION BUS INC. GENERAL COACH AMERICA INC.

MODEL DEFENDER

DECEMBER 2009

PTI-BT-R0911



The Thomas D. Larson Transportation Institute

201 Transportation Research Building(814) 865-1891The Pennsylvania State UniversityUniversityUniversity Park, PA16802

Bus Testing and Research Center

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

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EXECUTIVE SUMMARY

Champion Bus Inc. General Coach America Inc. submitted a model Defender. The bus is built on a Freightliner model Business Class M2 chassis, diesel-powered 29 seat (including the driver) 35-foot bus, for a 10 yr/350,000 mile STURAA test. The odometer reading at the time of delivery was 2,670 miles. Testing started on June 15, 2009 and was completed on November 27, 2009. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on July 3, 2009 and was completed on November 23, 2009.

The interior of the bus is configured with seating for 29 passengers including the driver plus 2 wheelchair positions. Free floor space will accommodate 20 standing passengers resulting in a potential load of 49 persons plus 2 handicap positions. At 150 lbs per person and 600 lbs per wheelchair position, this load results in a measured gross vehicle weight of 24,540 lbs. The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 24,540 lbs. The middle segment was performed at a seated load weight of 21,630 lbs and the final segment was performed at a curb weight of 16,440 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.

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 4 failures. Of the three reported failures, 1 was a Class 2 and two were Class 3.

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 24.46 seconds.

The Shakedown Test produced a maximum final loaded deflection of 0.274 inches with a permanent set ranging between -0.004 to 0.002 inches under a distributed static load of 19,575 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 19,728 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 5.0 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 6.39 mpg, 6.86 mpg, and 14.21 mpg respectively; with an overall average of 7.73 mpg.

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

ABBREVIATIONS

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

TEST BUS CHECK-IN

I. 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 Champion Bus Inc., General Coach America Inc., model Defender. The bus is built on a Freightliner model Business Class M2 chassis. The bus has an O.E.M. driver's and a passenger door rear of the front axle and a dedicated handicap entrance equipped with a Braun Corp. model NL919F1BHB-2 handicap lift rear of the rear axle. Power is provided by a diesel-fueled, Mercedes-Benz model OM926 LA engine coupled to an Allison Series 2200 transmission.

The measured curb weight is 7,180 lbs for the front axle and 9,260 lbs for the rear axle. These combined weights provide a total measured curb weight of 16,440 lbs. There are 29 seats including the driver and room for 20 standing passengers plus 2 wheelchair positions bringing the total passenger capacity to 49 plus 2 wheelchair positions. Gross load is 150 lb x 49 = 7,350 lbs plus 2 wheelchair positions = 8,550 lbs. At full capacity, the measured gross vehicle weight is 24,540 lbs.

VEHICLE DATA FORM

Bus Number: 0911	Arrival Date: 6-15-09
Bus Manufacturer: Champion Bus	Vehicle Identification Number (VIN): 559AM350RLM218504
Model Number: Defender	Date: 6-15-09
Personnel: S.C.	Chassis: Freightliner / Business Class M2

WEIGHT:

Individual Wheel Reactions:

Weights	Front Axle		Middle Axle		Rear Axle	
(lb)	Right	Left	Right	Left	Right	Left
CW	3,550	3,630	N/A	N/A	4,790	4,470
SLW	3,890	4,010	N/A	N/A	6,860	6,870
GVW	4,140	4,280	N/A	N/A	8,090	8,030

Total Weight Details:

Weight (lb)	CW	SLW	GVW	GAWR
Front Axle	7,180	7,900	8,420	9,880
Middle Axle	N/A	N/A	N/A	N/A
Rear Axle	9,260	13,730	16,120	17,500
Total	16,440	21,630	24,540	GVWR: 16,440

Dimensions:

Length (ft/in)	35 / 5.0
Width (in)	96.0
Height (in)	122.0
Front Overhang (in)	41.0
Rear Overhang (in)	125.0
Wheel Base (in)	259.0
Wheel Track (in)	Front: 82.8
	Rear: 72.6
Bus Number: 0911	Date: 6-15-09
------------------	---------------

CLEARANCES:

Lowest Point Outside Front Axle	Location: Oil pan	Clearance(in): 9.6
Lowest Point Outside Rear Axle	Location: Body	Clearance(in): 14.5
Lowest Point between Axles	Location: Step well	Clearance(in): 9.6
Ground Clearance at the center (in)	11.2	
Front Approach Angle (deg)	17.0	
Rear Approach Angle (deg)	11.9	
Ramp Clearance Angle (deg)	4.9	
Aisle Width (in)	18.3	
Inside Standing Height at Center Aisle (in)	77.3	

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BODY DETAILS:

Body Structural Type	Integral				
Frame Material	Steel	Steel			
Body Material	Steel & fiberglass				
Floor Material	Plywood				
Roof Material	Steel & fiberglass				
Windows Type	■ Fixed	■ Fixed			
Window Mfg./Model No.	Clear Vision / AS3 M	130 DOT22			
Number of Doors	_1_ Front _1_ Rear _1_ Handicap				
Mfr. / Model No.	A & m / 12V Auto Re	e-open			
Dimension of Each Door (in)	Front-30.8 x90.3	Rear-36.1 x 55.4	Handicap-46.7 x 72.5		
Passenger Seat Type	Cantilever	Pedestal	□ Other (explain)		
Mfr. / Model No.	Freedman Seating Co. / na				
Driver Seat Type	■ Air □ Spring □ Other (explain)				
Mfr. / Model No.	Bostrum Seating Inc. / Talladega 910				
Number of Seats (including Driver)	29 + 2 wheelchair positions				

Bus Number: 0911 Date: 6-15	5-09
-----------------------------	------

BODY DETAILS (Contd..)

Free Floor Space (ft ²)	30.5		
Height of Each Step at Normal Position (in)	Front 1. <u>11.2</u>	2. <u>9.0</u> 3. <u>9.0</u>	4. <u>9.1</u>
	Middle 1. <u>N/A</u>	2. <u>N/A</u> 3. <u>N/A</u>	4. <u>N/A</u>
	Rear 1. <u>N/A</u>	2. <u>N/A</u> 3. <u>N/A</u>	4. <u>N/A</u>
Step Elevation Change - Kneeling (in)	N/A		

ENGINE

Туре	■ C.I.	□ Alternate Fuel	
	□ S.I.	□ Other (explain)	
Mfr. / Model No.	Mercedes-Benz / Ol	M926 LA	
Location	■ Front	□ Rear	□ Other (explain)
Fuel Type	□ Gasoline		Methanol
	■ Diesel		□ Other (explain)
Fuel Tank Capacity (indicate units)	60 gals		
Fuel Induction Type	■ Injected		
Fuel Injector Mfr. / Model No.	Mercedes-Benz / OM926 LA		
Carburetor Mfr. / Model No.	N/a		
Fuel Pump Mfr. / Model No.	Mercedes-Benz / Ol	M926 LA	
Alternator (Generator) Mfr. / Model No.	Prestolite Leece-Neville / A0014949		
Maximum Rated Output (Volts / Amps)	14 / 270		
Air Compressor Mfr. / Model No.	Wabco / na		
Maximum Capacity (ft ³ / min)	15.5		
Starter Type	Electrical	Pneumatic	□ Other (explain)
Starter Mfr. / Model No.	Delco / 38MT		

Bus Number: 0911		Date: 6-	Date: 6-15-09		
TRANSMISSION					
Transmission Type	Manual		Automatic		
Mfr. / Model No.	Allison Tra	Insmissior	n / Series 2200		
Control Type	Mechani	ical	Electrical Other		
Torque Converter Mfr. / Model No.	Allison Tra	Insmissior	n / Series 2200		
Integral Retarder Mfr. / Model No.	N/A				
SUSPENSION					
Number of Axles	2				
Front Axle Type	Indeper	ndent	Beam Axle		
Mfr. / Model No.	Arvin Meritor / MFS10143ANN202				
Axle Ratio (if driven)	N/A				
Suspension Type	□ Air		■ Spring	□ Other (explain)	
No. of Shock Absorbers	2				
Mfr. / Model No.	Sachs / 10-13760-000				
Middle Axle Type	□ Indeper	ndent	🗆 Beam Axle		
Mfr. / Model No.	N/A				
Axle Ratio (if driven)	N/A		1		
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.	Arvin Meritor / ARS-17.5-2				
Axle Ratio (if driven)	4.56				
Suspension Type	■ Air		□ Spring	□ Other (explain)	
No. of Shock Absorbers	2				
Mfr. / Model No.	Gabriel / 16-15817-000				

Bus Number: 0911	Date: 6-15-09

WHEELS & TIRES

Front	Wheel Mfr./ Model No.	Accuride / 19.5 x 7.5
	Tire Mfr./ Model No.	Michelin XZE / 245/70R 19.5
Rear	Wheel Mfr./ Model No.	Accuride / 19.5 x 7.5
	Tire Mfr./ Model No.	Michelin XZE / 245/70R 19.5

BRAKES

Front Axle Brakes Type	■ Cam		Disc	□ Other	(explain)
Mfr. / Model No.	No. Arvin Meritor / Q Plus				
Middle Axle Brakes Type	□ Cam	□ Cam □ Disc □ Other (explain)			(explain)
Mfr. / Model No.	N/A			- 	
Rear Axle Brakes Type	■ Cam		Disc	□ Other	(explain)
Mfr. / Model No.	Arvin Meritor /	Q Plu	IS		
Retarder Type	N/A				
Mfr. / Model No.	N/A				
HVAC	 		 		
Heating System Type	□ Air ■ Water □ Other			□ Other	
Capacity (Btu/hr)	Dash –na Interior ceiling 130,000				
Mfr. / Model No.	Dash OEM Rear - ACT / ACT50 HD				
Air Conditioner	■ Yes □ No				
Location	Dash & rear in	terior	ceiling		
Capacity (Btu/hr)	70,000				
A/C Compressor Mfr. / Model No.	Dash – Sande	n Cor	p. / U4417	Rear - AC	CT / ACT50 HD
STEERING					
Steering Gear Box Type	Hydraulic gear				
Mfr. / Model No.	TRW / THP Series				
Steering Wheel Diameter	17.7				
Number of turns (lock to lock)	4.25				

Bus Number: 0911	Date: 6-15-09

OTHERS

Wheel Chair Ramps	Location: N/A	Type: N/A	
Wheel Chair Lifts	Location: Right rear	Type: Hydraulic platform	
Mfr. / Model No.	The Braun Corp. / NL919F1BHB-2		
Emergency Exit	Location: Windows Number: 3		
	Doors 2		
	Roof hatch	1	

CAPACITIES

Fuel Tank Capacity (units)	60 gals
Engine Crankcase Capacity (gallons)	7.75
Transmission Capacity (gallons)	3.75
Differential Capacity (gallons)	4.0
Cooling System Capacity (gallons)	8.0
Power Steering Fluid Capacity (quarts)	3.1

VEHICLE DATA FORM

Bus Number: 0911

Date: 6-15-09

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

Part Number	Description	Qty.
N/A	N/A	N/A

COMPONENT/SUBSYSTEM INSPECTION FORM

Bus Number: 0911

Date: 6-26-09

Subsystem	Checked	Comments
Air Conditioning Heating and Ventilation	√	
Body and Sheet Metal	~	
Frame	~	
Steering	~	
Suspension	~	
Interior/Seating	~	
Axles	~	
Brakes	~	
Tires/Wheels	~	
Exhaust	~	
Fuel System	~	Diesel
Power Plant	~	
Accessories	√	
Lift System	√	
Interior Fasteners	√	
Batteries	1	

CHECK - IN



CHAMPION BUS INC., GENERAL COACH AMERICA INC. MODEL DEFENDER



CHECK - IN CONT.



CHAMPION BUS INC., GENERAL COACH AMERICA INC., MODEL DEFENDER EQUIPPED WITH A BRAUN CORP. MODEL NL919F1BHB-2 HANDICAP LIFT



DRIVER'S STATION

CHECK - IN CONT.



TEST BUS INTERIOR FRONT TO REAR



TEST BUS INTERIOR REAR TO FRONT

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: 0911

Date: 11-25-09

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

ACCESSIBILITY DATA FORM

Bus Number: 0911

Date: 11-25-09

Component	Checked	Comments
HVAC :		
A/C Compressor	✓	
Filters	✓	
Fans	✓	
ELECTRICAL SYSTEM :		
Fuses	✓	
Batteries	✓	
Voltage regulator	✓	
Voltage Converters	✓	
Lighting	✓	
MISCELLANEOUS :		
Brakes	✓	
Handicap Lifts/Ramps	✓	
Instruments	✓	
Axles	✓	
Exhaust	✓	
Fuel System	✓	_
OTHERS :		

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

1.2-I. <u>TEST OBJECTIVE</u>

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.

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
07-16-09	575	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
08-03-09	1,521	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
08-20-09	2,599	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
09-11-09	3,081	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
09-17-09	3,769	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
09-29-09	5,221	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
10-19-09	6,642	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00

(Page 1 of 2) SCHEDULED MAINTENANCE Champion #0911

(Page 2 of 2) SCHEDULED MAINTENANCE Champion #0911

DATE	TEST MILES	SERVICE	ACTIVITY	DOWN TIME	HOURS
10-21-09	6,723	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
10-27-09	7,493	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
11-03-09	8,545	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
11-09-09	9,654	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
11-16-09	11,154	P.M. / Inspection	Linkage, tie rods, universals/u-joints all lubed; all fluids checked.	4.00	4.00
11-23-09	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:

<u>ITEM</u>	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 no additional components were removed for repair or replacement. At the end of the test, the remaining items on the list were removed and replaced. The transmission assembly took 4.0 man-hours (two men 2.0 hrs) to remove and replace. The time required for repair/replacement of the four remaining components is given on the following Repair and/or Replacement Form.

REPLACEMENT AND/OR REPAIR FORM

Subsystem	Replacement Time
Transmission	4.0 man hours
Wiper Motor	0.5 man hours
Starter	0.5 man hours
Alternator	1.0 man hours
Batteries	0.5 man hours

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS



TRANSMISSION REMOVAL AND REPLACEMENT (4.0 MAN HOURS)



WIPER MOTOR REMOVAL AND REPLACEMENT (0.5 MAN HOURS)

1.3 REPLACEMENT AND/OR REPAIR OF SELECTED SUBSYSTEMS CONT.



STARTER REMOVAL AND REPLACEMENT (0.5 MAN HOURS)



ALTERNATOR REMOVAL AND REPLACEMENT (1.0 MAN HOURS)

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

2-I. <u>TEST OBJECTIVE</u>

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

2-II. TEST DESCRIPTION

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

CLASS OF FAILURES

Classes of failures are described below:

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

2-III. DISCUSSION

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

The 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 Class 4 failures. The one Class 2 failure was the result of a failed Re-Gen. The two Class 3 failures involved the electrical system. These three failures are available for review in the Unscheduled Maintenance List, located in Section 5.7 Structural Durability.

RELIABILITY DATA FORMS

Bus Number: 0911

Date: 11/23/09

Personnel: Bob Reifsteck

	Failure Type]			
	C	lass 4 Bad Order	C C	lass 3 Bus hange	C	lass 2 Road Call	C P	class 1 hysical Safety			
Subsystems		Milea	ge	Mileag	е	Mileag	je	Mileage	e	Man Hours	Down Time
Engine/Transmission						5,677	7			4.00	168.0
Electrical				6,793						1.00	1.00
				7,443						1.00	1.00

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: 0911	Date: 10-22-09
Personnel: B.S., B.L. & S.C.	

Temperature (°F): 58	Humidity (%): 66
Wind Direction: SW	Wind Speed (mph): 5
Barometric Pressure (in.Hg): 30.03	

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

3. SAFETY



RIGHT - HAND APPROACH



LEFT - HAND APPROACH

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

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

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

4-II. TEST DESCRIPTION

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

4-III. DISCUSSION

This test consists of three runs in both the clockwise and counterclockwise directions on the Test Track. Velocity versus time data is obtained for each run and results are averaged together to minimize any test variability which might be introduced by wind or other external factors. The test was performed up to a maximum speed of 50 mph. The fitted curve of velocity vs. time is attached, followed by the calculated gradeability results. The average time to obtain 50 mph was 24.46 seconds.

PERFORMANCE DATA FORM

Bus Number: 0911		Date: 10-22-09			
Personnel: B.S., B.L. & S.C.					
Temperature (°F): 58		Humidity (%): 66	Humidity (%): 66		
Wind Direction: SV	N	Wind Speed (mph):	: 5		
Barometric Pressu	ıre (in.Hg): 30.03				
Air Conditioning co	ompressor-OFF	✓Checked	√Checked		
Ventilation fans-Ol	N HIGH	✓Checked	✓ Checked		
Heater pump moto	or-Off	<u>√</u> Checked			
Defroster-OFF		✓ Checked			
Exterior and interio	or lights-ON	✓ Checked			
Windows and door	rs-CLOSED	✓ Checked			
P P	ACCELERATION, GRA	ADEABILITY, TOP SP	EED		
	Counter Clockwise F	Recorded Interval Time	es		
Speed	Run 1	Run 2	Run 3		
10 mph	4.14	4.98	4.23		
20 mph	7.14	7.45	6.98		
30 mph	10.57	10.76	11.58		
40 mph	16.89	16.04	17.67		
Top Test Speed(mph) 50	24.98	23.61	23.33		
Clockwise Recorded Interval Times					
Speed	Run 1	Run 2	Run 3		
10 mph	5.17	5.07	4.85		
20 mph	8.45	8.82	8.26		
30 mph	12.61	12.16	11.51		
40 mph	16.60	17.98	17.20		
Top Test Speed(mph) 50	24.64	25.26	24.95		

0911.ACC

PERFORMANCE SUMMARY SHEET

BUS MANUFACTURER BUS MODEL	:Champion :Defender	BUS NUMBER TEST DATE	:0911 :10/22/09				
TEST CONDITIONS :							
TEMPERATURE (DEG F): 58.0WIND DIRECTION: SWWIND SPEED (MPH): 5.0HUMIDITY (%): 66BAROMETRIC PRESSURE (IN. HG): 30.0							
VEHICLE SPEED AVERAGE TIME (SEC)							
(MPH)	CCW DIRECTION	CW DIRECTION	TOTAL				
$ \begin{array}{c} 10.0\\ 20.0\\ 30.0\\ 40.0\\ 50.0 \end{array} $	4.45 7.19 10.97 16.87 23.97	5.03 8.51 12.09 17.26 24.95	4.74 7.85 11.53 17.06 24.46				

TEST SUMMARY :

VEHICLE SPEED	TIME	ACCELERATION	MAX. GRADE
(MPH)	(SEC)	(FT/SEC^2)	(%)
$ \begin{array}{r} 1.0\\ 5.0\\ 10.0\\ 15.0\\ 20.0\\ 25.0\\ 30.0\\ 35.0\\ 40.0\\ 45.0\\ 50.0\\ \end{array} $.34	4.2	13.3
	1.76	4.1	12.7
	3.62	3.8	12.0
	5.59	3.6	11.3
	7.68	3.4	10.6
	9.92	3.2	9.9
	12.31	3.0	9.2
	14.89	2.7	8.6
	17.66	2.5	7.9
	20.67	2.3	7.3
	23.93	2.2	6.7

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



5. STRUCTURAL INTEGRITY

5.1 STRUCTURAL STRENGTH AND DISTORTION TESTS -STRUCTURAL SHAKEDOWN TEST

5.1-I. DISCUSSION

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

5.1-II. TEST DESCRIPTION

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

5.1-III. <u>DISCUSSION</u>

This test was performed based on a maximum passenger capacity of 49 people including the driver plus 2 wheelchair positions. The resulting test load is $(49 \times 375 \text{ lb}) = 18,375 \text{ lbs} + 1,200 \text{ lbs}$ (2 wheelchair positions) = 19,575 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 0.274 inches at reference point 9. The maximum permanent deflection after the final loading sequence ranged from -0.004 inches at reference points 1 and 12 to 0.002 inches at reference points 4 and 5.

STRUCTURAL SHAKEDOWN DATA FORM

Bus Number: 0911	Date: 6-22-09
Personnel: E.D., E.L., P.S. & K.D.	Temperature (°F): 75
Loading Sequence: ■ 1 □ 2 □ 3 (check one) Test Load (lbs): 19,575	

Indicate Approximate Location of Each Reference Point

Front of Bus

Right



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	157	157	.011	.011
2	0	.135	.135	.018	.018
3	0	.234	.234	.020	.020
4	0	.282	.282	.023	.023
5	0	.239	.239	.022	.022
6	0	.078	.078	.052	.052
7	0	040	040	020	020
8	0	.246	.246	.020	.020
9	0	.297	.297	.024	.024
10	0	.251	.251	.022	.022
11	0	.150	.150	.016	.016
12	0	197	197	.005	.005

STRUCTURAL SHAKEDOWN DATA FORM

Bus Number: 0911	Date: 6-23-09
Personnel: T.S., E.D., E.L. & P.S.	Temperature (°F): 80
Loading Sequence: □ 1 ■ 2 □ 3 (check one) Test Load (lbs): 19,575	

Indicate Approximate Location of Each Reference Point

Front of Bus

Right



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	.011	157	168	.007	004
2	.018	.140	.122	.018	.000
3	.020	.241	.221	.021	.001
4	.023	.291	.268	.025	.002
5	.022	.247	.225	.024	.002
6	.052	.083	.031	.050	002
7	020	051	071	021	001
8	.020	.249	.229	.021	.001
9	.024	.298	.274	.024	.000
10	.022	.250	.228	.021	001
11	.016	.149	.133	.014	002
12	.005	203	208	.001	004

5.1 STRUCTURAL SHAKEDOWN TEST



BUS LOADED TO 2.5 TIMES GVL (19,575 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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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.

Bus Number: 0911	Date: 6-26-09
Personnel: J.P., E.L., T.S., P.S. & S.C.	Temperature(°F): 71

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



RIGHT FRONT WHEEL SIX INCHES HIGHER



LEFT REAR WHEEL SIX INCHES HIGHER

5.3 STRUCTURAL STRENGTH AND DISTORTION TESTS - STATIC TOWING TEST

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

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

5.3-II. TEST DESCRIPTION

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

5.3-III. DISCUSSION

The 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 load of 19,728 lbs ($1.2 \times 16,440$ lbs CW). No damage or deformation was observed during all four pulls of the test. The manufacturer recommends no towing from the rear, therefore a rear test was not performed.

STATIC TOWING TEST DATA FORM

Bus Number: 0911	Date: 11-19-09
Personnel: B.L., T.S. & S.C.	Temperature (°F): 50

Inspect right front tow hooks an	nd adjoining structure.
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Comments: No damage or deformation observed.

Check the torque of all bolts attaching tow hooks and surrounding structure.

Comments: Torques verified.

Inspect left tow hooks and adjoining structure.

Comments: No damage or deformation observed.

Check the torque of all bolts attaching tow hooks and surrounding structure.

Comments: Torques verified.

Inspect right rear tow hooks and adjoining structure.

Comments: N/A

Check the torque of all bolts attaching tow hooks and surrounding structure.

Comments: N/A

Inspect left rear tow hooks and adjoining structure.

Comments: N/A

Check the torque of all bolts attaching tow hooks 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 19,728 lbs. (1.2 x 16,440 lbs CW).

No damage or deformation was observed. Manufacturer recommends no towing

from the rear.

5.3 STATIC TOWING TEST



FRONT 20° UPWARD PULL



5.3 STATIC TOWING TEST CONT.



FRONT 20° LEFT PULL



FRONT 20° RIGHT PULL

5.4 STRUCTURAL STRENGTH AND DISTORTION TESTS -DYNAMIC TOWING TEST

5.4-I. TEST OBJECTIVE

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

5.4-II. TEST DESCRIPTION

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

5.4-III. DISCUSSION

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

DYNAMIC TOWING TEST DATA FORM

Bus Number: 0911	Date: 10-7-09
Personnel: S.C. & B.L.	

Temperature (°F): 56	Humidity (%): 63
Wind Direction: SE	Wind Speed (mph): 12
Barometric Pressure (in.Hg): 30.01	

Inspect tow equipment-bus interface.

Comments: A safe and adequate connection was made between the tow equipment

and the bus.

Inspect tow equipment-wrecker interface.

Comments: A safe and adequate connection was made between the tow equipment

and the wrecker.

Towing Comments: A front lift tow was performed incorporating a hydraulic

under lift wrecker.

Description and location of any structural damage: None noted.

General Comments: No problems 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 5.0 inches to 14.6 inches. No deformation or damage was observed during testing. A complete listing of jacking point clearances is provided in the Jacking Test Data Form.

JACKING CLEARANCE SUM	MARY
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Condition	Frame Point Clearance
Front axle – one tire flat	8.5"
Rear axle – one tire flat	13.5"
Rear axle – two tires flat	11.2"

JACKING TEST DATA FORM

Bus Number: 0911	Date: 6-17-09	
Personnel: E.D. & E.L.	Temperature (°F): 63	

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

Deflated Tire	Jacking Pad Clearance Body/Frame	Jacking Pad Clearance Axle/Suspension	Comments		
Right front	12.1 " I 8.5 " D	7.2 " I 5.0 " D			
Left front	12.0 " I 8.5 " D	7.2 " I 5.1 " D			
Right rear—outside	13.9 " I 13.5 " D	14.7 " I 14.3 " D			
Right rear—both	13.9 " I 11.2 " D	14.7 " I 12.8 " D			
Left rear—outside	14.1 " I 13.7 " D	15.0 " I 14.6 " D			
Left rear-both	14.1 " I 11.3 " D	15.0 " I 13.0 " D			
Right middle or tag—outside	NA	NA			
Right middle or tag—both	NA	NA			
Left middle or tag— outside	NA	NA			
Left middle or tag— both	NA	NA			
Additional comments of any deformation or difficulty during jacking:					
None noted.					

5.6 STRUCTURAL STRENGTH AND DISTORTION TESTS - HOISTING TEST

5.6-I. TEST OBJECTIVE

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

5.6-II. TEST DESCRIPTION

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

5.6-III. DISCUSSION

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

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

HOISTING TEST DATA FORM

Bus Number: 0911	Date: 6-18-09
Personnel: E.D., E.L. & P.S.	Temperature (°F): 68

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

5.7 STRUCTURAL DURABILITY TEST

5.7-I. TEST OBJECTIVE

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

5.7-II. TEST DESCRIPTION

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

5.7-III. DISCUSSION

The Structural Durability Test was started on July 3, 2009 and was conducted until November 23, 2009. The first 4,625 miles were performed at a GVW of 24,540 lbs. and completed on September 17, 2009. The next 2,000 mile SLW segment was performed at 21,630 lbs and completed on September 30, 2009, and the final 4,625 mile segment was performed at a CW of 16,440 lbs and completed on November 23, 2009.

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.

Wright Bus- TEST BUS #0911

MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

DATE	TOTAL DURABILITY TRACK	TOTAL OTHER MILES	TOTAL
6-29-09 TO	0.00	45.00	45.00
07/05/09			
6-29-09 TO	81.00	3.00	84.00
07/05/09			
7-13-09 TO	410.00	36.00	446.00
07/19/09			
7-20-09 TO	130.00	6.00	136.00
07/26/09			
7-27-09 TO	715.00	49.00	764.00
08/02/09			
8-03-09 TO	800.00	40.00	840.00
08/09/09			
8-10-09 TO	220.00	41.00	261.00
08/16/09			
8-17-09 TO	58.00	3.00	61.00
08/23/09			
8-24-09 TO	54.00	1.00	55.00
08/30/09			
8-31-09 TO	61.00	4.00	65.00
09/06/09			
9-07-09 TO	448.00	20.00	468.00
09/13/09			
9-14-09 TO	755.00	40.00	795.00
09/20/09			
9-21-09 TO	891.00	51.00	942.00
09/27/09			
9-28-09 TO	682.00	31.00	713.00
10/04/09			

Wright Bus- TEST BUS #0911

MILEAGE DRIVEN/RECORDED FROM DRIVER'S LOGS

10-05-09 TO	1.00	1.00	2.00
10/11/09			
10-12-09 TO	786.00	86.00	872.00
10/18/09			
10-19-09 TO	380.00	164.00	544.00
10/25/09			
10-26-09 TO	923.00	141.00	1064.00
11/01/09			
11-02-09 TO	1273.00	141.00	1414.00
11/08/09			
11-09-09 TO	83.00	1500.00	1583.00
11/15/09			
11-16-09 TO	0.00	0.00	0.00
11/22/09			
11-23-09 TO	0.00	101.00	101.00
11/29/09			
TOTAL	8751.00	2504.00	11255.00

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

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

STANDARD OPERATING SCHEDULE

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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



(Page 1 of 1) UNSCHEDULED MAINTENANCE Champion Bus #0911

DATE	TEST MILES	SERVICE	ACTIVITY	MAN HOURS	DOWN TIME
10-07-09	5,677	Bus will not go in to Re-Gen. "Engine shut down" light on.	Towed bus to warranty dealer. Warranty dealer performed "forced" Re-Gen.	4.00	168.00
10-22-09	6,793	The battery hold came loose and wore a hole in the battery.	Replaced damaged battery with used battery. Ordered new battery.	1.00	1.00
10-27-09	7,443	Battery that was ordered on 10/22/09 arrived.	Installed new battery.	1.00	1.00

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

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

FEo_{mi/lb} = Observed fuel economy = <u>miles</u> Ib 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

FEompg = FEcmi/lb x Gs x 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.

where

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

Combining steps 1-3 yields

==> FEc = $\underline{\text{miles}} x (\text{Gs x Gw}) x \underline{Q}$ lbs H

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

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

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

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

The reported fuel economy is based on the following: measured test quantities-distance traveled (miles) and fuel consumed (scf); density of test fuel, and volumetric heating value (BTU/lb) of test fuel at standard conditions (P=14.73 psia and T=60°F). These combine to give a fuel economy in miles per lb. The energy equivalent (mile/BTUx10⁶) will also be provided so that the results can be compared to buses that use other fuels.

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

		total miles
phase	miles per phase	per run
CBD	1.9097	5.7291
ART	1.9097	3.8193
COM	3.8193	3.8193
FEo _{mi/scf} = Obs	served fuel econom	y = <u>miles</u>
		sct of fuel

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

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

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/BTUx10⁶) 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/BTUx10⁶ H = Volumetric heating value of test fuel at standard conditions
6-III. DISCUSSION

This is a comparative test of fuel economy using diesel fuel with a heating value of 19,631.0 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 127,700.0 btu/gal.

An extensive pretest maintenance check is made including the replacement of all lubrication fluids. The details of the pretest maintenance are given in the first three Pretest Maintenance Forms. The fourth sheet shows the Pretest Inspection. The next sheet shows the correction calculation for the test fuel. The next four Fuel Economy Forms provide the data from the four test runs. Finally, the summary sheet provides the average fuel consumption. The overall average is based on total fuel and total mileage for each phase. The overall average fuel consumption values were; CBD – 6.39 mpg, ART – 6.86 mpg, and COM – 14.21 mpg. Average fuel consumption at idle was 0.44 gph.

FUEL ECONOMY PRE-TEST MAINTENANCE FORM

Bus Number: 0911	Date: 10-19-09	SLW (lbs): 21,630
Personnel: J.P., B.L. & S.C.		

FUEL SYSTEM	ок	Date	Initials
Install fuel measurement system	✓	10/19/09	S.C.
Replace fuel filter	✓	10/19/09	B.L.
Check for fuel leaks	✓	10/19/09	S.C.
Specify fuel type (refer to fuel analysis)	Diesel		
Remarks: None noted.			
BRAKES/TIRES	ОК	Date	Initials
Inspect hoses	✓	10/19/09	J.P.
Inspect brakes	✓	10/19/09	J.P.
Relube wheel bearings	✓	10/19/09	J.P.
Check tire inflation pressures (mfg. specs.)	✓	10/19/09	S.C.
Remarks: None noted.			
COOLING SYSTEM	ОК	Date	Initials
Check hoses and connections	✓	10/19/09	S.C.
Check system for coolant leaks	✓	10/19/09	S.C.
Remarks: None noted.			

FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 2)

Bus Number: 0911	Date: 10-	19-09		
Personnel: S.C., J.P. & B.L.				
ELECTRICAL SYSTEMS		OK	Date	Initials
Check battery		✓	10/19/09	S.C.
Inspect wiring		✓	10/19/09	S.C.
Inspect terminals		✓	10/19/09	S.C.
Check lighting		✓	10/19/09	S.C.
Remarks: None noted.				
DRIVE SYSTEM		OK	Date	Initials
Drain transmission fluid		\checkmark	10/19/09	J.P.
Replace filter/gasket		✓	10/19/09	J.P.
Check hoses and connections		✓	10/19/09	J.P.
Replace transmission fluid		✓	10/19/09	J.P.
Check for fluid leaks		✓	10/19/09	J.P.
Remarks: None noted.				
LUBRICATION		OK	Date	Initials
Drain crankcase oil		✓	10/19/09	B.L.
Replace filters		✓	10/19/09	B.L.
Replace crankcase oil		✓	10/19/09	B.L.
Check for oil leaks		✓	10/19/09	B.L.
Check oil level		✓	10/19/09	B.L.
Lube all chassis grease fittings		✓	10/19/09	B.L.
Lube universal joints		✓	10/19/09	B.L.
Replace differential lube including axles		✓	10/19/09	B.L.
Remarks: None noted.				

Bus Number: 0911	Date: 10	-19-09					
Personnel: S.C.							
EXHAUST/EMISSION SYSTEM		OK	Date	Initials			
Check for exhaust leaks		✓	10/19/09	S.C.			
Remarks: None noted.							
ENGINE		OK	Date	Initials			
Replace air filter		✓	10/19/09	B.L.			
Inspect air compressor and air system		✓	10/19/09	B.L.			
Inspect vacuum system, if applicable		N/A	10/19/09	B.L.			
Check and adjust all drive belts		~	10/19/09	B.L.			
Check cold start assist, if applicable		✓	10/19/09	B.L.			
Remarks: None noted.							
STEERING SYSTEM		OK	Date	Initials			
Check power steering hoses and connectors		\checkmark	10/19/09	S.C.			
Service fluid level		✓	10/19/09	S.C.			
Check power steering operation		✓	10/19/09	S.C.			
Remarks: None noted.							
		OK	Date	Initials			
Ballast bus to seated load weight		✓	10/19/09	S.C.			
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
TEST DRIVE		OK	Date	Initials			
Check brake operation		$\checkmark$	10/19/09	S.C.			
Check transmission operation ✓ 10/19/09							
Remarks: None noted.							

## FUEL ECONOMY PRE-TEST MAINTENANCE FORM (page 3)

### FUEL ECONOMY PRE-TEST INSPECTION FORM

Bus Number: 0911					
Personnel:					
PRE WARM-UP		If OK, Initial			
Fuel Economy Pre-Test Maintenance Form i	s complete	S.C.			
Cold tire pressure (psi): Front <u>120</u> Middle <u>N//</u>	<u>A</u> Rear <u>120</u>	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	S.C.				
Fuel line no leaks or kinks	S.C.				
Speed measuring system installed on bus. S installed in front of bus and accessible to TE	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 <u>125</u> Middle <u>N</u>	S.C.				
Environmental conditions Average wind speed <12 mph and maximum Ambient temperature between 30°F(-1C°) a Track surface is dry Track is free of extraneous material and cle interfering traffic	S.C.				

Bus Number: 09	11	Manufacturer: Champion Date: 10-20-09					
Run Number: 1	5.0 / W 1 / Galery Market (2015/2016)	Personne	el: B.L., T.S. & S.	.C.			
Test Direction: □	CW or ∎CCW	Temperat	ture (°F): 62		Humidity (%)	): 78	
SLW (lbs): 21,63	0	Wind Spe	ed (mph) & Dire	ection: Calm	Barometric F	Pressure (in.H	lg): 30.15
Cycle Type	Time (min:sec)		Cycle Time Fuel (min:sec) Temperatur (°C)		Flow Meter Reading (gals)		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	8:25	8:25	27.2	0	.295	.295
ART #1	0	3:53	3:53	30.4	0	.260	.260
CBD #2	0	8:29	8:29	32.4	0	.301	.301
ART #2	0	3:58	3:58	41.8	0	.250	.250
CBD #3	0	8:26	8:26	34.8	0	.309	.309
COMMUTER	0	5:58	8:58	42.2	0	.286	.286
						Total Fue	el = 1.701 gals
5 minute idle*: Total Fuel Used = .038 gals *							

Heating Value = 19,631.0 BTU/LB

Comments: A 5 minute idle was performed instead of a 20 minute idle due to design. This bus is designed with a "no-

idle" 5 minute shutdown.

Bus Number: 09	11	Manufact	Manufacturer: Champion			Date: 10-21-09		
Run Number: 2		Personne	l: B.L., B.S. & S.	.C.				
Test Direction:	CW or □CCW	Temperat	ure (°F): 51		Humidity (%)	): 72		
SLW (lbs): 21,63	0	Wind Spe	ed (mph) & Dire	ction: 7 / SW	Barometric F	Pressure (in.H	lg): 30.24	
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	25.4	0	.302	.302	
ART #1	0	3:56	3:56	26.4	0	.266	.266	
CBD #2	0	8:25	8:25	26.9	0	.299	.299	
ART #2	0	3:55	3:55	27.5	0	.254	.254	
CBD #3	0	8:27	8:27	28.6	0	.290	.290	
COMMUTER	0	5:56	5:56	27.2	0	.265	.265	
Total Fuel = 1.676 gals								
20 minute idle : Total Fuel Used = N/A gals								
Heating Value = 19,631.0 BTU/LB								

Comments: None noted.

Bus Number: 09	Number: 0911 Manufacturer: Champion Date: 10-21-09			Manufacturer: Champion			
Run Number: 3		Personne	l: B.S., B.L. & S	.C.			**
Test Direction: □	CW or ∎CCW	Temperat	ure (°F): 56		Humidity (%)	): 72	
SLW (lbs): 21,63	0	Wind Spe	ed (mph) & Dire	ection: 4 / SW	Barometric F	Pressure (in.H	lg): 30.24
Cycle Type	Time (min:sec)		in:sec) Cycle Time (min:sec)		Flow Meter Reading Fi (gals) Us		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	
CBD #1	0	8:29	8:29	26.8	0	.320	.320
ART #1	0	3:59	3:59	27.6	0	.266	.266
CBD #2	0	8:30	8:30	29.8	0	.320	.320
ART #2	0	4:01	4:01	28.8	0	.253	.253
CBD #3	0	8:27	8:27	30.2	0	.180	.180
COMMUTER	0	6:01	6:01	33.6	0	.194	.194
						Total Fue	el = 1.533 gals
20 minute idle :	Total Fuel Use	ed = N/A gals		21			
Heating Value = 19,631 BTU/LB							
Comments: None noted.							

Bus Number: 09	11	Manufact	Manufacturer: Champion		Date: 10-21-09		
Run Number: 4		Personne	l: B.S., B.L. & S	.C.			
Test Direction:	∎CW or □CCW	Temperat	ure (°F): 65		Humidity (%	): 70	
SLW (lbs): 21,63	60	Wind Spe	ed (mph) & Dire	ection: 4 / SW	Barometric I	Pressure (in.H	lg): 30.24
Cycle Type	Time (min:sec)		Time (min:sec) Cycle Time (min:sec)		Flow Meter Reading Fu (gals) Use		Fuel Used (gals)
	Start	Finish		Start	Start	Finish	Notice 19
CBD #1	0	8:21	8:21	29.2	0	.125	.125
ART #1	0	3:54	3:54	33.7	0	.252	.252
CBD #2	0	8:29	8:29	35.4	0	.294	.294
ART #2	0	3:58	3:58	39.8	0	.252	.252
CBD #3	0	8:29	8:29	47.5	0	.297	.297
COMMUTER	0	6:02	6:02	41.4	0	.269	.269
Total Fuel = 1.489 gals							
5 minute idle*:	Total Fuel Use	d = .035 gals			1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -		
Heating Value = 19,631.0 BTU/LB							
Comments: A 5 minute idle was performed instead of a 20 minute idle due to design. This bus is designed with a "no-"							
idle" 5 minute shutdown.							

#### 0911 .ful FUEL ECONOMY SUMMARY SHEET

BUS MANUFACTURER :Char BUS MODEL :Defe	npion ender	BUS I TEST	WMBER :0911 DATE :10/21/09	
FUEL TYPE : SP. GRAVITY : HEATING VALUE : FUEL TEMPERATURE : Standard Conditions : Density of Water :	DIESEL .8400 19631.00 BT 60.00 deg F 60 deg F an 8.3373 lb/g	U/Lb d 14.7 psi allon at 60 deg	) F	
CYCLE TOTAL FUEL TOT USED(GAL)	TAL MILES F	UEL ECONOMY MPG(Measured)	FUEL ECONOMY MPG (Corrected)	
Run # :1, CCW         CBD       .905         ART       .510         COM       .286         TOTAL       1.701	5.73 3.82 3.82 13.37	6.331 7.490 13.357 7.860	5.83 6.90 12.31 7.24	
Run # :2, CW CBD .891 ART .520 COM .265 TOTAL 1.676	5.73 3.82 3.82 13.37	6.431 7.346 14.415 7.977	5.93 6.77 13.28 7.35	
Run # :3, CCW CBD .820 ART .519 COM .194 TOTAL 1.533	5.73 3.82 3.82 13.37	6.988 7.360 19.691 8.721	6.44 6.78 18.15 8.04	
Run # :4, CW CBD .716 ART .504 COM .269 TOTAL 1.489	5.73 3.82 3.82 13.37	8.003 7.579 14.201 8.979	7.38 6.98 13.09 8.27	
IDLE CONSUMPTION (MEAS	SURED)			
First 20 Minutes Data Average Idle Consumpti	: .04GAL on : .11G	Last 20 Minu AL/Hr	ites Data : .04GAL	-
RUN CONSISTENCY: % Dif	ference fro	m overall avera	ige of total fuel us	ed
Run 1 : -6.3 Run 2	2:-4.8	Run 3 : 4.2	Run 4 : 6.9	
SUMMARY (CORRECTED VAL	UES)			
Average Idle Consumpti Average CBD Phase Cons Average Arterial Phase Average Commuter Phase Overall Average Fuel C Overall Average Fuel C	on sumption consumptio consumption consumption consumption	: .12 G/HI : 6.39 MPG n : 6.86 MPG n : 14.21 MPG : 7.73 MPG : 56.20 Mile	es/ Million BTU	

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## 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 43.5 dB(A); ranging from 42.1 dB(A) in line with the middle speaker to 44.8 dB(A) at the driver's seat. The interior ambient noise level for this test was < 34.0 dB(A).

The second test measures interior noise during acceleration from 0 to 35 mph. This noise level ranged from 67.8 dB(A) at the middle passenger seats to 74.3 dB(A) at the driver's seat. The overall average was 70.5 dB(A). The interior ambient noise level for this test was < 34.0 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: 0911	Date: 6-12-09				
Personnel: T.S. & S.C.					
Temperature (°F): 71	Humidity (%): 72				
Wind Speed (mph): Calm	Wind Direction: Calm				
Barometric Pressure (in.Hg): 30.11					
Initial Sound Level Meter Calibration:	ecked by: S.C.				
Interior Ambient Noise Level dB(A): < 34.0	Exterior Ambient Noise Level dB(A): 48.5				
Microphone Height During Testing (in): 48.0					

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	44.8
Front Passenger Seats	43.6
In Line with Front Speaker	42.1
In Line with Middle Speaker	43.1
In Line with Rear Speaker	43.3
Rear Passenger Seats	43.9

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

Comments: All readings taken in the center aisle.

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

Bus Number: 0911	Date: 10-22-09	
Personnel: B.S., B.L. & S.C.		
Temperature (°F): 61	Humidity (%): 61	
Wind Speed (mph): 5	Wind Direction: SW	
Barometric Pressure (in.Hg): 30.03		
Initial Sound Level Meter Calibration:  Checked by: S.C.		
Interior Ambient Noise Level dB(A): < 34.0	Exterior Ambient Noise Level dB(A): 49.9	
Microphone Height During Testing (in): 48.0		

Measurement Location	Measured Sound Level dB(A)
Driver's Seat	74.3
Front Passenger Seats	70.6
Middle Passenger Seats	67.8
Rear Passenger Seats	69.3

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

**Comments:** All readings taken in the center aisle.

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

Bus Number: 0911	Date: 10-22-09
Personnel: B.S., B.L. & S.C.	
Temperature (°F): 61	Humidity (%): 61
Wind Speed (mph): 5	Wind Direction: SW
Barometric Pressure (in.Hg): 30.03	

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 41.5 dB(A), the average test result obtained while accelerating from a constant speed was 71.6 dB(A) on the right side and 72.4 dB(A) on the left side.

When accelerating from a standstill with an exterior ambient noise level of 42.5 dB(A), the average of the results obtained were 69.5 dB(A) on the right side and 70.3 dB(A) on the left side.

With the vehicle stationary and the engine, accessories, and air conditioning on, the measurements averaged 62.9 dB(A) at low idle and 75.8 dB(A) at wide open throttle. With the accessories and air conditioning off, the readings averaged 2.6 dB(A) lower at low idle and 0.7 dB(A) lower at wide open throttle. The exterior ambient noise level measured during this test was 41.8 dB(A). Note; this test bus was not equipped with a high idle mode; therefore data for that condition is not available.

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

Bus Number: 0911	Date: 10-22-09	
Personnel: B.S., B.L. & S.C.		
Temperature (°F): 64	Humidity (%): 61	
Wind Speed (mph): 5	Wind Direction: SW	
Barometric Pressure (in.Hg): 30.03		
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: S.C.		
Initial Sound Level Meter Calibration: ■ checked by: S.C.		
Exterior Ambient Noise Level dB(A): 41.5		

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	70.8	1	72.1
2	71.2	2	72.3
3	71.5	3	72.3
4	71.3	4	72.3
5	71.6	5	72.4
Average of two highest actual noise levels = 71.6 dB(A)		Average of two highest actual noise levels = 72.4 dB(A)	

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

Comments: None noted.

### EXTERIOR NOISE TEST DATA FORM Accelerating from Standstill

Bus Number: 0911	Date: 11-22-09	
Personnel: B.S., B.L. & S.C.		
Temperature (°F): 64	Humidity (%): 61	
Wind Speed (mph): 5	Wind Direction: SW	
Barometric Pressure (in.Hg): 30.03		
Verify that microphone height is 4 feet, wind speed is less than 12 mph and ambient temperature is between 30°F and 90°F: ■ checked by: S.C.		
Initial Sound Level Meter Calibration: ■ checked by: S.C.		
Exterior Ambient Noise Level dB(A): 42.5		

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	69.6	1	70.5
2	69.1	2	69.3
3	69.4	3	69.7
4	69.3	4	70.1
5	68.7	5	69.9
Average of two highest actual noise levels = 69.5 dB(A)		Average of two highes levels = 70.3 dB(A)	t actual noise

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

Comments: None noted.

### EXTERIOR NOISE TEST DATA FORM Stationary

Bus Number: 0911		Date: 10-22-09		
Personnel: B.S., B.L. & S.C.				
Temperature (°F): 64		Humidity (%): 61	Humidity (%): 61	
Wind Speed (mph): 5		Wind Direction: SW	1	
Barometric Pressure (i	in.Hg):	30.03	30.03	
Verify that microphone temperature is betwee	e height is 4 feet, w n 30°F and 90°F: ∎	ind speed is less than ∎ checked by: S.C.	12 mph and ambient	
Initial Sound Level Me	ter Calibration: ■ c	hecked by: S.C.		
Exterior Ambient Noise	e Level dB(A): 41.8	6		
	Accessories and	Air Conditioning ON		
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)	
		Measured	Measured	
Low Idle	798	62.2	63.5	
High Idle	N/A	N/A	N/A	
Wide Open Throttle	2,675	76.0	75.5	
	Accessories and	Air Conditioning OFF		
Throttle Position	Engine RPM	Curb (Right) Side dB(A)	Street (Left) Side db(A)	
		Measured	Measured	
Low Idle	800	59.6	60.9	
High Idle	N/A	N/A	N/A	
Wide Open Throttle	2,675	75.6	74.5	
Final Sound Level Meter Calibration Check: ■ checked by: S.C.				
Comments: None noted.				

## 7.2 EXTERIOR NOISE TESTS



## TEST BUS UNDERGOING EXTERIOR NOISE TESTING





# **Federal Motor Vehicle Safety Standards**

The following is a brief summary of all applicable **FMVSS Title 49** (**Federal Motor Vehicle Safety Standards**) of which Champion Bus Ford E350 & E450 Challenger Transit Buses comply. Complete and up to date copies of the FMVSS worksheets supporting test data is available upon request by calling 1-810-724-6474 or writing to Champion Bus Inc. 331 Graham Rd. Imlay City, Mi. 48444.

<b>Definitions:</b>	OEM	Original Equipment Manufacturer
	FSM	Final Stage Manufacturer

**FMVSS 101 Control Location, Identification and Illumination** * This is certified by the OEM and the FSM.

**FMVSS 102 Transmission Shift Lever Sequence & Starter Interlock** * This is certified by the OEM and the FSM.

- **FMVSS 103 Windshield Defrosting and Defogging System** * This is certified by the OEM.
- **FMVSS 104 Windshield Wiping and Washing System** * This is certified by the OEM.

#### **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 108 Lamps, Reflective Devices & Associated Equipment

* The devices installed by the FSM meet all requirements.

#### **FMVSS 111 Rearview Mirrors**

* The is certified by the OEM.

#### **FMVSS 113 Hood Latch System**

* This is certified by the OEM.

### **FMVSS 115 Vehicle Identification Number**

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

### **FMVSS 116 Hydraulic Brake Fluids**

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

### FMVSS 119 New Pneumatic Tires for Motor Vehicles Other Than Passenger Cars

* 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 204 Steering Control Rearward Displacement**

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

### FMVSS 205 Glazing Material (Windows)

* The windows supplied by the FSM meet all requirements.

### **FMVSS 207 Seating Systems**

* The seating supplied by the FSM meet all requirements.

#### **FMVSS 209 Seat Belt Assemblies**

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

#### **FMVSS 210 Seat Belt Assemblies Anchorages**

* The seat belt assemblies' anchorages supplied by 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 Roll Over Protection**

* Even though this is not a requirement for transit buses, Champion Bus Inc. has tested to this standard and meets all requirements.

### **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 FSM meet all requirements.

### **FMVSS 403 Platform Lift Systems for Motor Vehicles**

* The Platform Lift installed by the FSM meet all requirements.

### **FMVSS 404 Platform Lift Installations in Motor Vehicles**

* The Platform Lift installed by the FSM meet all requirements.

Benlemps.

Ben Cupp Director of Engineering Champion Bus Inc.

13, February 2019



U.S. Department Of Transportation Federal Transit Administration

Headquarters

East Building, 5th Floor – TCR 1200 New Jersey Avenue, SE Washington, DC 20590

September 30, 2019

Kathleen Czewski, DBELO Champion Bus Inc., General Coach America, Inc. & Goshen Coach Inc. 331 Graham Road Imlay City, MI 48444

Re: TVM DBE Goal Concurrence/Certification Letter - Fiscal Year 2020

Dear Ms. Czewski:

This letter is to inform you that the Federal Transit Administration's (FTA) Office of Civil Rights has received Champion Bus Inc., General Coach America, Inc., & Goshen Coach Inc.'s Disadvantaged Business Enterprise (DBE) goal and methodology for FY 2020 for the period of October 1, 2019–September 30, 2020. This goal submission is required by the U.S. Department of Transportation's DBE regulations at 49 CFR Part 26 and must be implemented in good faith.

We have reviewed your FY 2020 DBE goal and determined that it is compliant with DOT's DBE regulations. You are eligible to bid on FTA-funded transit contracts. This letter or a copy of the TVM listing on FTA's website may be used to demonstrate your compliance with DBE requirements when bidding on federally funded vehicle procurements.

FTA reserves the right to remove/suspend this concurrence if your DBE program or FY 2020 DBE goal is not implemented in good faith. In accordance with this good faith requirement, you must submit your DBE Uniform Report to FTA by December 1, 2019. This report should reflect all FTA-funded contracting activity for the second period of FY 2019 (i.e., from April 1 to September 30).

Please also be mindful that your FY 2021 DBE goal methodology must be submitted to FTA by August 1, 2020. Any significant updates to the program plan must be submitted to FTA as they occur. Thank you for your cooperation. If you have any questions regarding this approval, please contact the FTA DBE Team via e-mail at *FTATVMSubmissions@dot.gov*.

Sincerely,

John Day

Program Manager Office of Civil Rights