NEW FLYER

XCELSIOR
BETTER BY DESIGN

CITY AND COUNTY OF SAN FRANCISCO
San Francisco Municipal Transportation Agency
Request for Proposals
THE PROCUREMENT OF
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
3-E	Vehicle Structure	1) Describe the type of bus structure used. 2) What materials will be used to construct the bus including chassis or frame, side sheets, roof sheets and end caps. 3) Describe where riveting, arc welding and resistance welding will be used in the bus construction. 4) What is used for interior paneling and how is it retained? 5) Show how the design of the wheelwells meets specification requirements. Provide plan and side views of all wheelwells. 6) Describe the thermal and sound insulation used in the roof and sidewalls. 7) How does the design of the bus and its components preclude resonant vibrations? 8) Explain how the design of the bus meets the requirements for fatigue life? 9) If fiberglass wheel housing is proposed, explain how they are shielded from heat generated by the braking systems. 10) Explain how the requirements for corrosion resistance are met. 11) Describe preparations for painting, all filler and primers used and topcoat application. 12) Where is the radio compartment and, if it is not inside, why not? 13) Describe provisions and methods for towing and lifting the bus from either end. Describe hoisting and jacking points.

Attached is information as requested per Section 3-E. All structural and body materials are described. With regards to Insulation materials we propose Polyisocyanurate foam with a thickness of 1" and meeting Docket 90 specifications.
We are also including information regarding our design concepts to avoid vibration and reduce noise. New Flyer has extensively tested the Xcelsior platform to meet the requirements for fatigue life. Prior to sending our platform to Altoona for FTA qualifications tests, New Flyer performance a structure design validation using a "Shaker" table simulating a road test of 500,000 miles in the NYCT profile route B35 known to be the most severe transit route in North America. The simulation, also took into consideration the operating profile in Baltimore and it is also known to be one of the most severe routes.
Our anti corrosion system procedures are attached per your requests as well as our SDS box enclosure, and our hosting and jacking procedures.

NEW FLYER

NEW FLYER Xcelsior®

SALES INFORMATION BULLETIN

#400-001 | **Model:** Xcelsior® | **Lengths:** 40FT | **Propulsions:** ALL

Partial Stainless Steel Structure

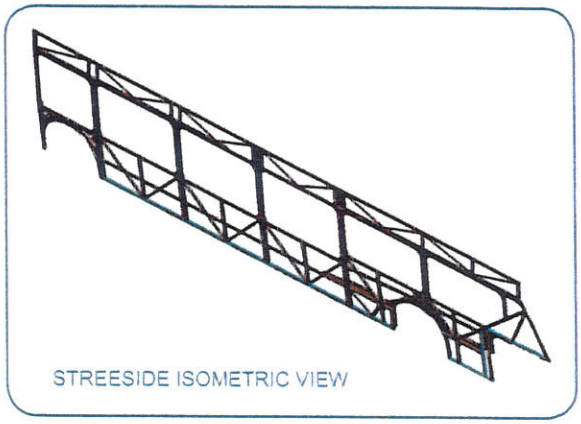
New Flyer is committed to the continuous improvement of both our products and processes with a vast engineering core dedicated to researching new ideas and implementing better designs. The recent design change to a partial stainless steel structure is the latest enhancement to our Xcelsior® product and results in a more corrosion resistant and rugged chassis. To you our customers, this means less downstream maintenance and repair, keeping your bus in active service longer.

The basic frame structure is a semi-monocoque design, using high-strength low-alloy (HSLA) steel sheet and plate (ASTM A242, A588, A606, A568, CSA G40.21 44W, 50A, 50W) and structural tube and channel (ASTM A500, CSA G40.21 50A, 50W) for structural strength and durability.

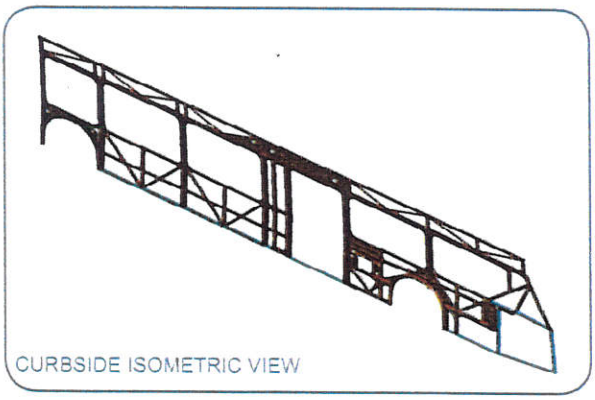
Stainless steel(AK41003) is employed as an extra line of defense against corrosion to maximize the service life of the structure. Shown in blue in the illustrations, stainless steel is used in areas exposed to extreme salt, chemicals & temperature gradients. Unlike traditional austenitic stainless steel, ferritic stainless steel is easily weldable to HSLA steel, and retains its corrosion resistant properties even after welding. AK41003 is also known for its good toughness and weld joints when exposed to cold temperatures.

Where high strength is not required, thin walled tubes (ASTM A513 for tubes with wall thickness less than 1/8") may be employed in the frame. Full length longitudinal members are used, with cross member pillars, roof bows and bulkheads. All joints are Gas Metal Arc Welded (GMAW) using semi-automatic welding equipment. The structural skin carries no load.

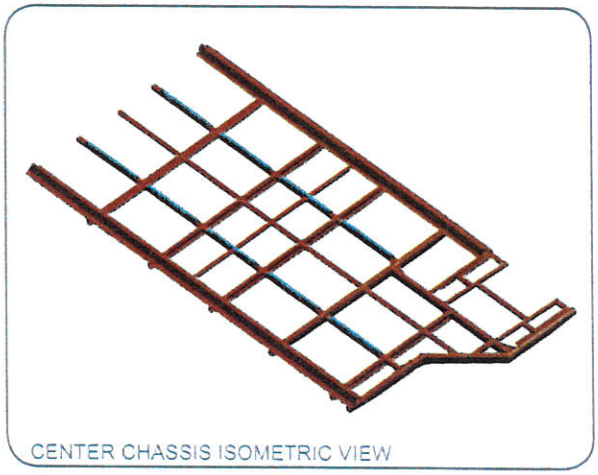
Tapping plates are constructed of steel and are welded (GMAW) to the structure. Gauge of material is specific to the application. All fixtures and accessories that are to be attached to the structure are fastened into these tapping plates via drilling and tapping, clearance holes for rivet or nuts/bolts, by providing a welded on thread or similar. This eliminates the weakening of the structure by avoiding drilling into it where possible.



STREESIDE ISOMETRIC VIEW



CURBSIDE ISOMETRIC VIEW



CENTER CHASSIS ISOMETRIC VIEW

SALES INFORMATION BULLETIN

A skid plate is provided on the street-side lower front portion of the structure. This skid plate is similar in design to the one installed on the curbside of the bus, to protect the wheelchair ramp equipment.

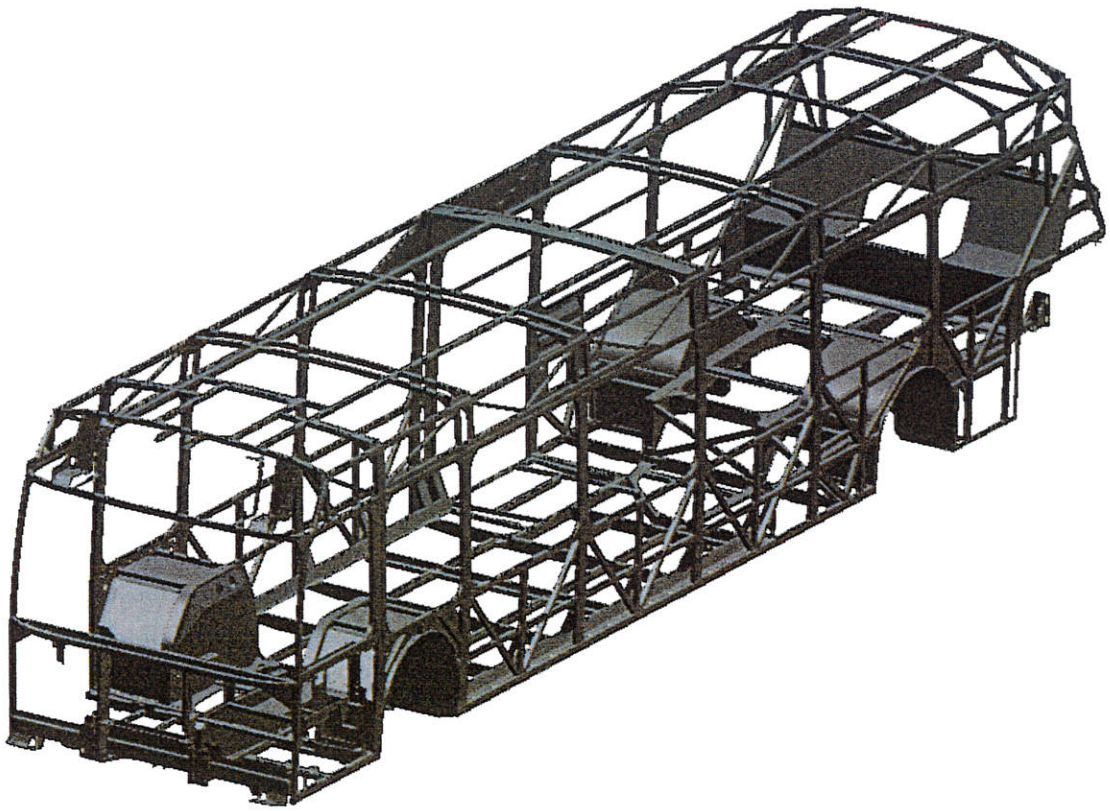
Wheel wells are constructed from 18 gauge 201 stainless steel (ASTM A240) and support by cross tubes constructed from 304 stainless steel.

All welding operations for New Flyer facilities, as well as vendors, comply with CSA (Canadian Standards Association) standard W47.1, while welding personnel comply with CSA W59. These codes are audited regularly by a third party, the Canadian Welding Bureau (CWB). Welding personnel are tested by the CWB every two years.

Visual weld inspection occurs by trained and certified weld inspectors on each frame, while NDT (Non-Destructive Testing) is performed on critical welds using die penetrant and/or magnetic particle inspection, depending on the material.

MINIMUM YIELD / TENSILE STRENGTH

HSLA Sheet and Plate	44,000 psi / 65,000 psi
Ferritic Stainless Steel	50,200 psi / 74,400 psi
Structural Tube	50,000 psi / 65,000 psi
Thin Walled Tube	38,000 psi / 52,000 psi



NEW FLYER

XCELSIOR
BETTER BY DESIGN

SALES INFORMATION BULLETIN

#420-003 | **Model:** Xcelsior | **Lengths:** All | **Propulsions:** All

Exterior Panels

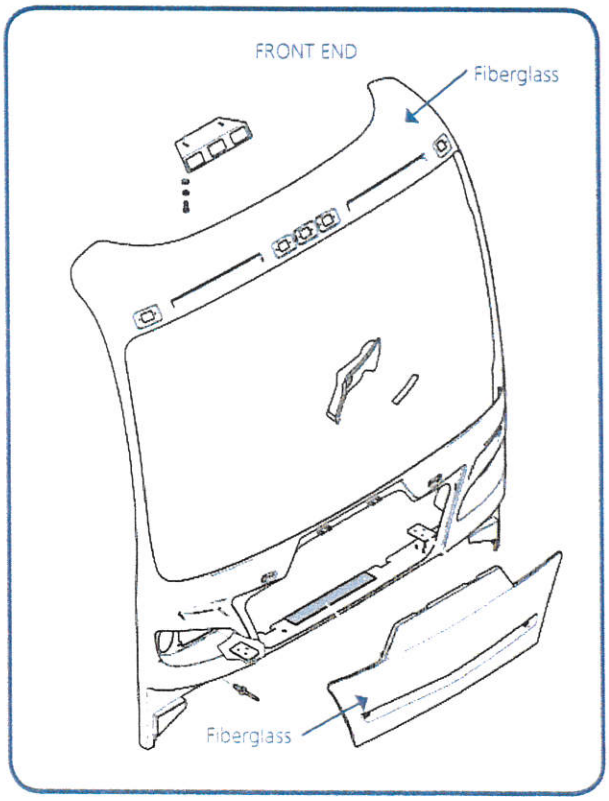
New Flyer provides a combination of aluminum and fiberglass panels that have been selected to reduce maintenance, extend durability, and provide consistency of appearance throughout the life of the coach. They are never mechanically fastened to the structure and the installations of the panels are engineered to float over the structure.

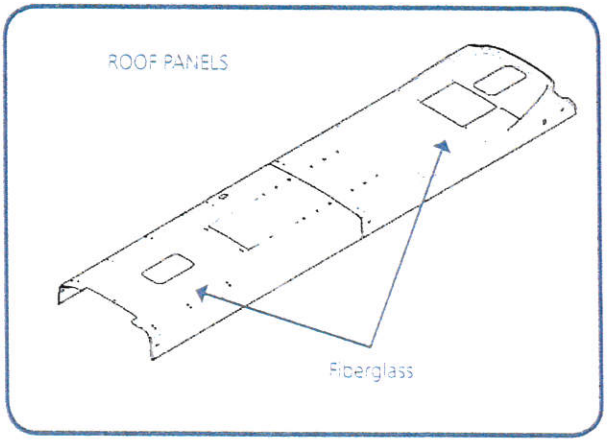
Adhesives used for the installation of exterior panels are as follows:

- Sikaflex-221 is fast curing polyurethane based adhesive sealant. It is a moisture cured non-sag system. It provides a permanent elastic bond to fasten materials with dissimilar coefficients of expansion. It is used on exterior frames and structural members to which panels are to be bonded. Sealant is applied to the exterior side wall panels, roof panels, pier panels, drip rails and upper rear panel installations.

- Sikaflex-201 is a one-component, flexible, polyurethane-based elastomeric sealant/adhesive. It is a moisture-cured, non-sag system. The chemical reaction is set in motion as soon as the adhesive is extruded or the cartridge is opened. Initially plastic in consistency, it cures to form a high-grade elastomeric adhesive. It is used to waterproof rivet seams and for the sealing of exposed and concealed joints of aluminum, steel, coated metals, wood, roof rails, door hinges, as a sealant between exterior panels, and as a general roof panel adhesive.

- Sikaflex-252 is a polyurethane-based material, which cures on exposure to air. The chemical reaction is set in motion as soon as the adhesive is extruded or the cartridge is opened. Initially plastic in consistency, it cures to form a high-grade elastomeric adhesive. It is used as an external panel adhesive such as the roof panel and front mask installations. It is applied to the entire perimeter surface of the panel.

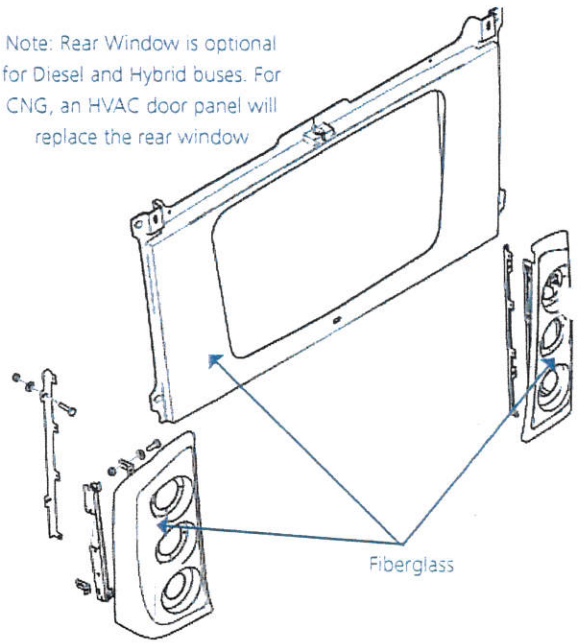




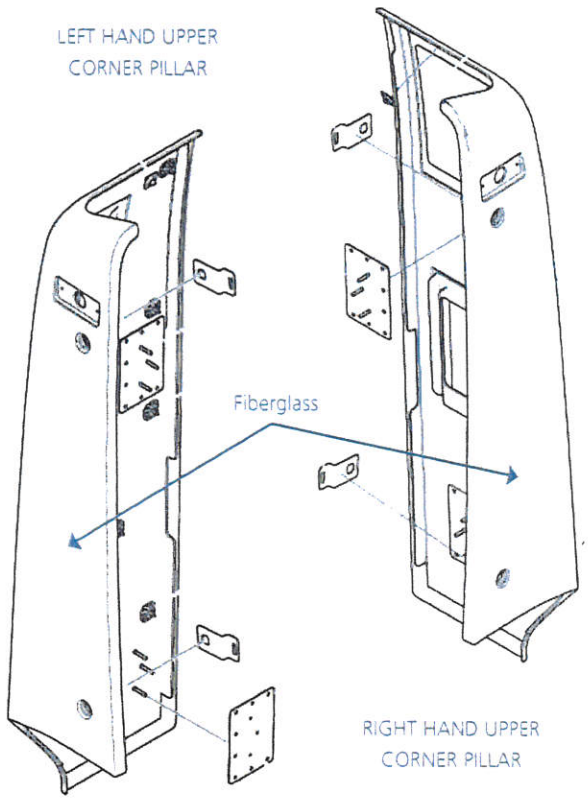
SALES INFORMATION BULLETIN

REAR WINDOW AND LOWER CORNER PILLARS

Note: Rear Window is optional for Diesel and Hybrid buses. For CNG, an HVAC door panel will replace the rear window

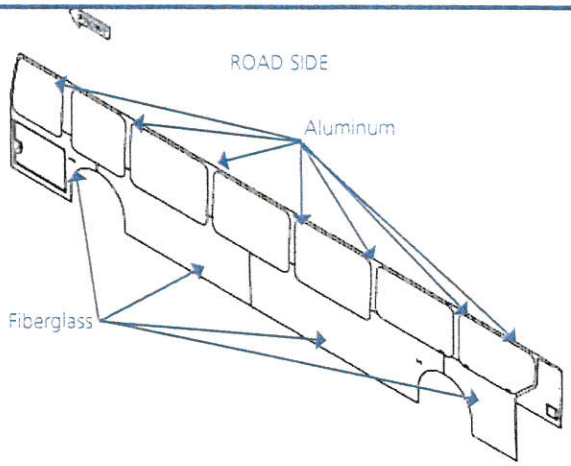


LEFT HAND UPPER CORNER PILLAR

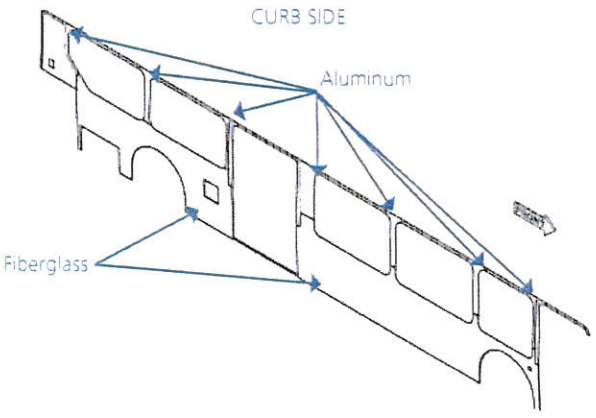


RIGHT HAND UPPER CORNER PILLAR

ROAD SIDE



CURB SIDE



NEW FLYER

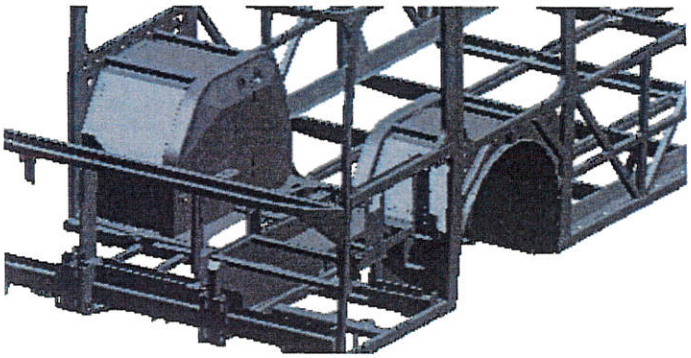
#Option 450 I Model: Xcelsior I Length: All I Propulsion: All

WHEEL HOUSE

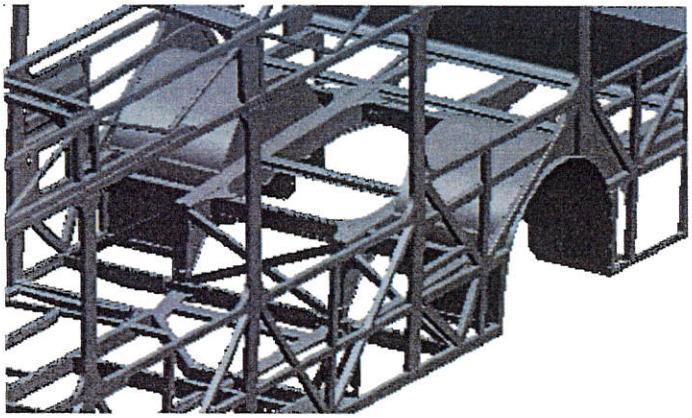
All wheelhouses (LH and RH) tubs are made of 18 gauge stainless steel. The vertical panels on the front wheelhouses are 16ga, on the center wheelhouses are 7 ga, and on the rear wheelhouses are 11 ga. The gauges vary depending on the amount of area to be welded and the amount of warpage.

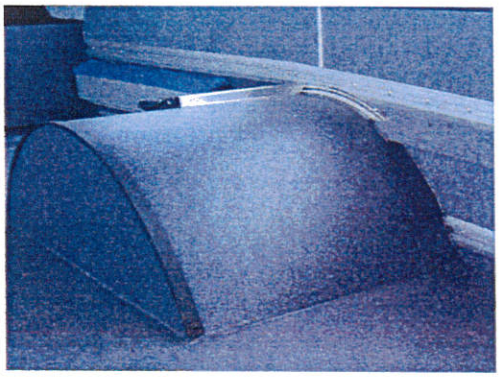
On the other side of the structure, inside the bus, wheelhouse panels (LH and RH) provide protection from the outside elements. The front wheelhouse inside covers (or luggage rack) (Curbside and Streetside) are made of black textured fiberglass.

The same part is used for both LH and RH rear wheelhouses. Inside the bus, flooring material covers the wheelhouse and is covered by a molding edge.



Front Wheelhouse





Rear Wheelhouse

Wheelhouse Penetration Test:

All wheel housings meet the Wheelhouse Penetration Test and withstand impacts of a 2-inch steel ball, with at least 200 foot-pounds of energy without penetration.

Wheelhousings, as installed and trimmed, shall withstand impacts of a 2-inch steel ball, with at least 200 foot-pounds of energy without penetration.

NEW FLYER

NOISE/VIBRATION LEVEL REDUCTION

New Flyer Xcelsior buses are designed with consideration of noise and vibration reduction. Here are the major area design consideration for reduce noise levels.

Engine & transmission (including conventional transmission and Hybrid Drive Unit):

- Engine is installed on rubber isolator engine mounts which are analyzed by the manufacturer
- The engine compartment airborne noise minimized into the cabin by use of the perforated aluminum sheet that allows airborne noise to enter into acoustic sandwich foam with a dense rubber barrier to dampen and minimize noise transfer into the cabin area.
- The rear bulkhead and rear upper deck are incorporated with dB plywood flooring which has shown overall noise reduction in the
- To date New Flyer has reduced noise transmission from the engine compartment with improved sound insulation and sound barrier material on strategic metal surfaces. Additional sealing of the engine compartment has been incorporated to eliminate any opening that would allow noise to enter the passenger compartment

Differential

- Noise and vibration is minimized by use of a single reduction hypoid axle (no outboard planetary gear sets)

Compressor

- Ping tank dampens reciprocating compressor pulses to minimize the noise. A larger copper line between the ping tank and air dryer is stiffer and reduces lower frequency vibration, also the rubber covered p-clips aid in reducing vibration
- Addition of twin compressor means the compressor pumps half the time and at higher frequency pulses (two times per revolution versus one) – which reduces the noise level at higher, less obtrusive frequency

HVAC System

- The HVAC unit has been designed, components have been relocated and baffles have been added to redirect the airflow for quieter noise levels. Also sound absorbing materials have been added to the ductwork to reduce the overall noise levels of the unit
- The roof mounted HVAC resulted in much improved rear noise levels

Windshield Wiper

- New Flyer offers high a quality electric motor wiper system on Xcelsior as standard which is quieter that the air operated wipers

Power Steering

- Pulsations in the power steering pumps are one of the biggest contributors to the power steering noise. New Flyer provides a smooth-flowing vane pump to minimize noise coupled with smooth-bend stainless steel tubing plumbing and minimized fittings. New Flyer carried over these concepts coupled with the improved mounting from the LFR model.

Tire noise through wheel wells

- Tire noise is dependent on tire selected and vehicle speed, New Flyer continued the LFR wheel well concepts. Depending on the location (front or rear), the stiffness of the panels minimizes the transmission of road noise through the panels. A mix of curved and bent stainless steel panels is employed and is welded into the structure for added support and securement. Additionally, the panels are fully sealed from the interior of the bus. Undercoating is applied not only as a corrosion protection, but also has a dampening affect. The use of rubber or Vinyl

NEW FLYER

flooring on the interior finishes off the design which serves as further noise dampening effect in addition to its main function as finished floor

Air Discharge

- The air dryer discharge noise is related to the air dryer. On the proposed Haldex air dryer, a diffuser installed on the purge exhaust minimizes the air flow rush and serves to dampen the noise of rapid decompression of the air dryer.

Cooling System Fan

- The proposed EMP electric cooling fan system includes the Curbside Noise Abatement Feature

Rotating components (Driveshaft)

- Since the noise from rotating components is exacerbated by offset alignment, New Flyer has designed the engine/transmission to axle input to be in-line. Additionally, U-joint drive shafts must be assembled in phase for proper operation and thus have specified phase marks on the driveshaft for proper assembly.

NEW FLYER

NEW FLYER MiDi®

SALES INFORMATION BULLETIN

#304-001 | **Model:** Midi® | **Lengths:** 30' & 35' | **Propulsions:** Diesel

Corrosion System

Product Features

New Flyer utilizes the best protection coating and application process for Carbon Steel in the industry. PPG's urethane-based Zinc-Rich moisture cure primer is used as our primary corrosion protection. Unlike regular paints or epoxies which resist corrosion by forming an impermeable barrier between the metal and atmospheric moisture, zinc-rich primers provide corrosion protection by electrical means. The zinc and the steel form tiny electrical-cathodic cells that protect the steel at the expense of the zinc.

Prior to applying this zinc-rich primer, our steel frames are pressure washed and grit blasted to insure proper adherence of the primer to the steel. PPG reviews our process weekly to insure we meet the application requirements of its products in order to offer this industry-leading Corrosion protection.

Along with our primer on the exterior of our steel, we also coat all of our steel tubes internally from the roof line down.

As a final measure of protection, we coat the underside of our chassis with an undercoating that is a single-component waterborne material as a sacrificial barrier to the primer.

Benefits

- Dries quickly at room temperatures.
- Unlike inorganic zinc-rich coatings, this product can be used to touch up prepared welded joints and damaged areas.
- Moisture-rich zinc in the primer offers the sacrificial material, which in turn protects the steel substrate.
- All materials used are low VOC (Volatile Organic Compound)
- PPG will supply field support in conjuntion with New Flyer if any issues arise during the warranty period of your bus

COATING THICKNESS (DRY FILM)

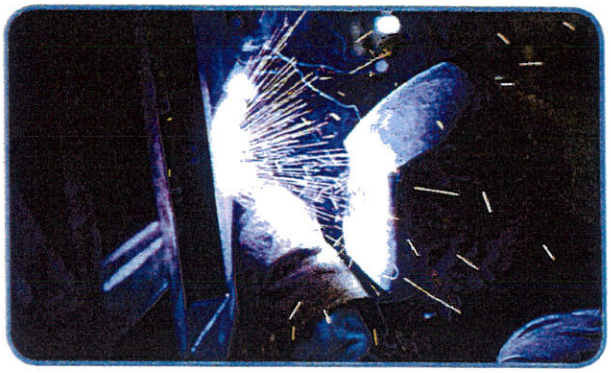
Primer Coating (zinc primer to steel)	3 mils	12-year warranty
Undercoating (sprayed over zinc primer on underbody)	8 mils	12-year warranty

NEW FLYER

NEW FLYER MiDi®

SALES INFORMATION BULLETIN

New Flyer's corrosion protection package consists of a 4-step process:



1. Preparation Before Corrosion Protection Package

The frame is welded, including taping plates, brackets, and exterior compartments. Any sharp edges are deburred, and splatter spray minimized. All holes are sealed with plugs and areas of the frame not requiring blasting or priming are protected.

2. Power Wash

The purpose of the power wash operation is to remove mill oils, machine shop oils, and antispatter compounds applied to the structure (de-grease) during the fabrication of the frame. The entire coach is washed and rinsed to prevent oils and grease from being blasted into the steel. Drain holes are plugged to prevent water from entering the tubing and exposed threads are masked off to prevent damage from grit blast. The structure is then washed using a mild detergent and blown dry to prevent flash rusting. This stage does not apply an iron phosphate coating on the frame.

3. Grit blast

The entire structure is then grit blasted to provide the primer a profile which it can anchor itself to. Using 50 grit material, this grit blast process provides the 1 - 2.5 mil profile needed for a uniform "rough" to touch matte surface. The surface is then cleaned to a SSPC-SP6 finish. Any residue grit is then blown off and the masking is removed from the protected areas except for the threaded holes and studs. To prevent distortion of the part, areas of the frame made of sheet metal are not over-blasted.

4. Moisture-Cure Urethane Zinc-Rich Primer

This is a two-part urethane primer from PPG. This primer is a low VOC organic zinc-rich coating that provides cathodic protection when applied to prepared structural steel substrates. It is an excellent undercoat for the transportation industry, providing galvanic protection similar to galvanizing when applied to properly prepared, hot or cold rolled, sand-blasted steel. Ferrous parts requiring zinc-rich primer include bus frames, fuel tank cradles, suspension bunks and all structural steel components. The product is sprayed on to achieve approx. 3 to 15 mils of Dry Film Thickness (DFT).

SPECIFICATIONS

FILM PROPERTIES	TEST METHOD	VALUE
Colour	N/A	Gray Ressish
Film Thickness	N/A	5-6 dry mils
VOC # Gallon	EPA #24	2.8 #Maximum
Gloss - 60°	ASTM D523	Matte
Pencil Hardness	ASTM D523	N/A
Crosshatch Adhesion	ASTM D523	100%
Salt Spray	ASTM D523	5000 +hours
Humidity	ASTM D523	4000 +hours
Chemical Resistance	N/A	Excellent
Abrasion Resistance	N/A	Excellent
Potlife	N/A	3-4 hours
Dry to touch Dry to handle Dry to recoat	N/A	30 min 2-4 hours 4 hour minimum

Tubular Structure

CoraTube®, a low VOC coating manufactured by PPG, is a long-term treatment for corrosion prevention and is designed to reduce internal corrosion of tubular steel-frame members. As a base option, it is fogged into all structural-steel tubes from the roof line down and its dense viscosity ensures adherence. ASTM based salt-spray tests have shown significant resistance passes at 500 hours of exposure.

Underbody Sacrificial Barrier

The PPG Corashield® is a one-component, water-borne, sprayed coating designed to prevent chipping, cracking, or marring of painted or unpainted surfaces after exposure to high impact sand, gravel, and other abrasive materials. It is applied to the underside of the coach to supply a sacrificial barrier against road debris that would normally attack the PPG urethane zinc-rich primer.

Preparation

All areas of the coach, excluding the underside of the lower chassis, susceptible to over spray are masked including all exposed fittings, hoses and Synflex lines.

Application

Corashield® 7972 is sprayed through the underside of the coach and inside wheel wells to a WFT (wet film thickness) of 20 mils. An acceptable application covers all areas requiring undercoating but does not exhibit cracking from excessive film buildup.

Features and Benefits

- One-Component product means no mixing or measuring to get correct ratios
- Water-borne: environmentally safer alternative. US DOT classification is non-hazardous, nonregulated (CFR Title 49). Also classified as non-hazardous, non-regulated under Federal RCRA Hazardous Waste Program (CFR 40)
- Air Dry: reapplication of surface does not require a dry bake cycle
- High thin film performance

Structural Sealing and Undercoating

Seal Lap Joints

Application is a single bead of Sikaflex-221 Polyurethane Sealant. Caulking sealant is applied between the following:

- Structural members and floor panels, wheel wells, etc.
- Fill gaps between stitch welds
- Over miscellaneous welds that have potential to collect water
- Special attention is given to the main structural members and rear A/C area

Properties of Sikaflex-221

Sikaflex-221 is a one-component, flexible, polyurethane-based elastomeric sealant. It is a moisture-cured, non-sag system. The chemical reaction is set in motion as soon as the adhesive is extruded. Sikaflex cures to form a high-grade elastomeric adhesive. This product will bond to materials which have dissimilar coefficients of expansion and exhibits tenacious adhesion to aluminum, FRP, steel, wood, SMC, RIM, pre-painted metals, oily GALVALUME, ZINCALUME, Zincgrip, and aluminized steel, without attacking the metal coating. It has excellent weather resistance and it exhibits high recovery, making it ideal for sealing dynamically moving joints, resistant to road salts.

SPECIFICATIONS

Density	1.23 kg/L
Tack-free time*	1 to 2 hours
Cure Rate*	4mm per 24 hours
Elongation @ Break	600%
Tensile Strength	1.55 N/mm2
Lap Shear Strength	1.13 N/mm2
Peel Strength	5.2 N/mm on aluminum
Color	White
Application Temperature	5 to 40° C

* Temperature 21°C @ 65% R.H.

Service / Repair

- Corrosion coating system is simple to maintain over the life of your bus, a simple inspection and "touch up " (if required) from erosion is required once every 3 years from years 1 through 12
- If accident repairs are required to the frame, our service manual provides detailed instructions for applying the products required

Warranty

- 12 year warranty

NEW FLYER

NEW FLYER Xcelsior®

SALES INFORMATION BULLETIN

#422-001 | **Model:** Xcelsior® | **Lengths:** 35', 40' and 60' | **Propulsion:** All

Secure Diagnostics Station (SDS)

Product Features

The SDS is a standard feature on all Xcelsior® models. Its streamlined design has dual functionality, providing a barrier behind the driver and offering a secure location for unique customer-specific electronics.

In the SDS sensitive electronic equipment can be mounted to easily accessible slide-out trays. The tray spacing is adjustable to account for a wide variety of custom electronics used in the transit industry. The SDS has capacity for four (4) of these trays which are 19.50" x 15.31" (495 mm x 389 mm) in size and designed to minimize vibration.

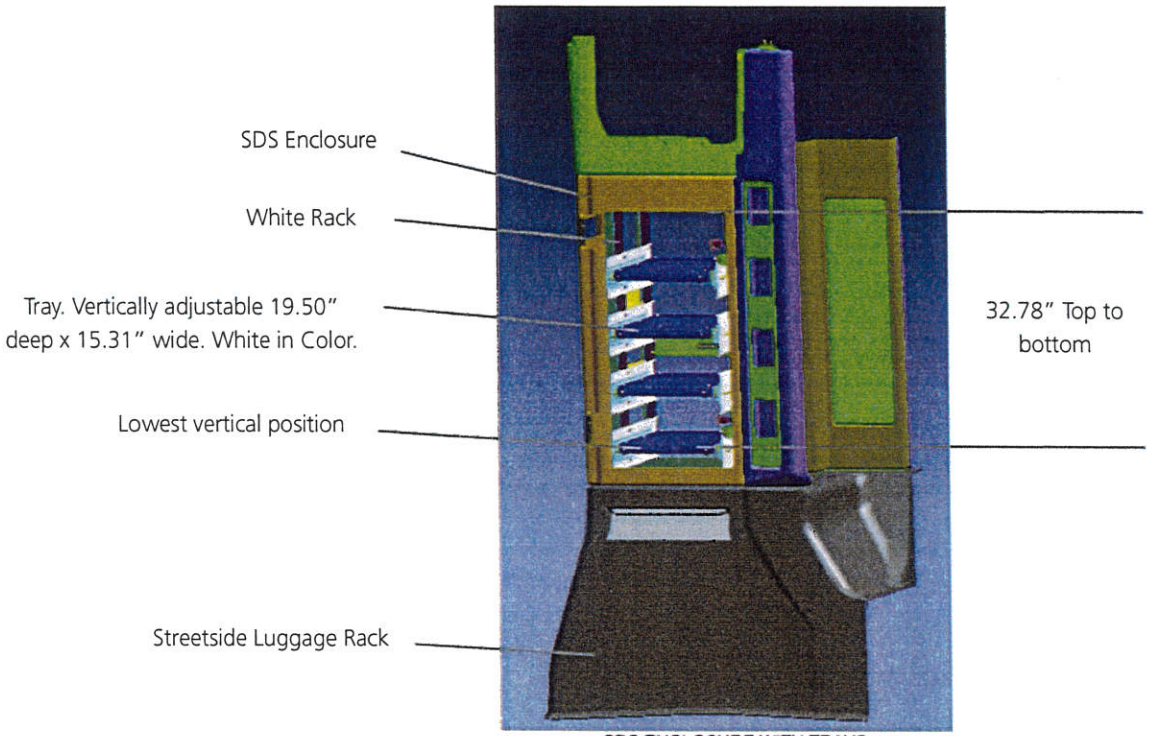
Additional features of the SDS include:

- A four (4) pocket take-one holder installed on the aisle-face-forward side of the SDS box
- A lower 1" x 18" (25 mm x 457 mm) LED strip light conveniently located 30" (762 mm) from the floor to provide aisle lighting at the front of the bus
- Quarter-turn latches to ensure security
- Space behind the driver for an optional tool/driver's storage box
- Space behind the driver for a fire extinguished
- Racks and trays painted white to enhance visibility.

Benefits

Provides a convenient and secure location for a variety of important electronic equipment such as:

- Radio
- DVR (digital video recorder)
- AVA (automatic voice annunciation) module
- AVL (automatic vehicle location) module
- APC (automatic passenger counter) module
- Wireless network devices module
- Brake stroke monitoring module
- Diagnostic ports



SDS ENCLOSURE WITH TRAYS

Service and repair

The electronic equipment in the SDS can be easily worked on with the slide-out tray design. The egress-type window behind the SDS box also allows repairs from outside the bus. Since the SDS comes with quarter-turn key, the access to the electronic equipment within it can be controlled or restricted by maintenance personnel.

14.2. Description

⚠CAUTION

Care must be taken to ensure that the vehicle will not suffer structural or drive train damage as a result of towing. The driveshaft or both rear axle shafts must be removed when towing, regardless of distance or speed traveled. Damage to the transmission/drive unit may occur if the vehicle is towed without first removing the driveshaft or rear axles.

The New Flyer vehicle can be towed from the front using either the flat or raised method. Refer to 14.2.1. "Flat Towing" on page 42 in this section for flat towing procedures. Refer to 14.2.2. "Raised Towing" on page 44 in this section for raised towing procedures. New Flyer recommends the flat towing method to minimize the likelihood of damage to the vehicle. Extra care must be taken when using the raised towing method to ensure adequate ground clearance at the rear of the vehicle. Rear towing is not recommend due to insufficient ground clearance at the front of the vehicle and the problem of locking the front wheels in a straight position.

☞NOTE:

Consult your local Transit Authority for any specific towing procedures and use them carefully in conjunction with the recommended towing procedures contained within this section.

14.2.1. Flat Towing

14.2.1.1.Preparation

1. Prepare the vehicle for towing by removing either the driveshaft or both rear axle shafts. Refer to 14.3. "Driveshaft Removal" on page 48 and Refer to 14.4. "Rear Axle Shaft Removal" on page 48 in this section for procedure.
2. Obtain an approved towing adapter kit if one is not already provided. The towing adapter used for flat towing consists of two L-shaped brackets, clevis pins and cotter pins. Refer to your New Flyer Parts Manual for towing adapter ordering information.

☞NOTE:

The towing adapters mount into receivers in the front frame of the vehicle and provide the proper offset and clearance to allow the attachment of towing equipment.

14.2.1.2.Towing Adapter Installation

1. Install each tow adapter into a receiver and locate with a clevis pin. See "Fig. GI-23: Towing Adapter" on page 43.
2. Secure each clevis pin with a cotter pin.
3. Attach the towing vehicle equipment to the tow eye of each towing adapter. The method used will vary depending on the type of towing equipment available.
4. Secure the towing vehicle to the tow adapters. The method used will vary depending on the type of towing equipment available.
5. Attach two safety restraint chains from the towing vehicle to a fixed location on the towed vehicle. See "Fig. GI-24: Safety Chain" on page 44.
6. Connect the towing vehicle air line and electrical harness to the respective tow connectors on the towed vehicle.

☞NOTE:

An auxiliary air supply must be provided to the vehicle being towed to release the spring brakes and maintain suspension height. The auxiliary air supply should be a minimum of 100 psi.

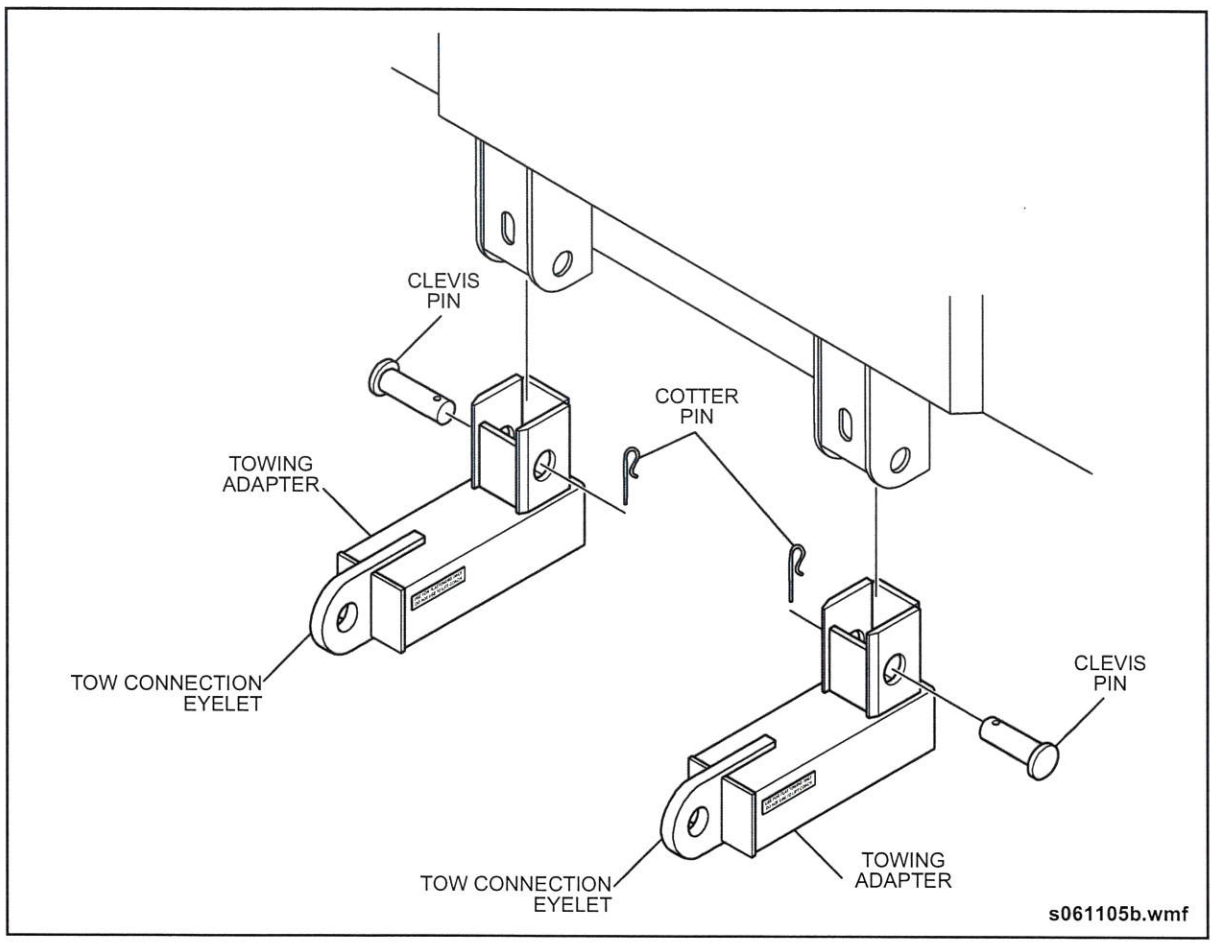


Fig. GI-23: Towing Adapter

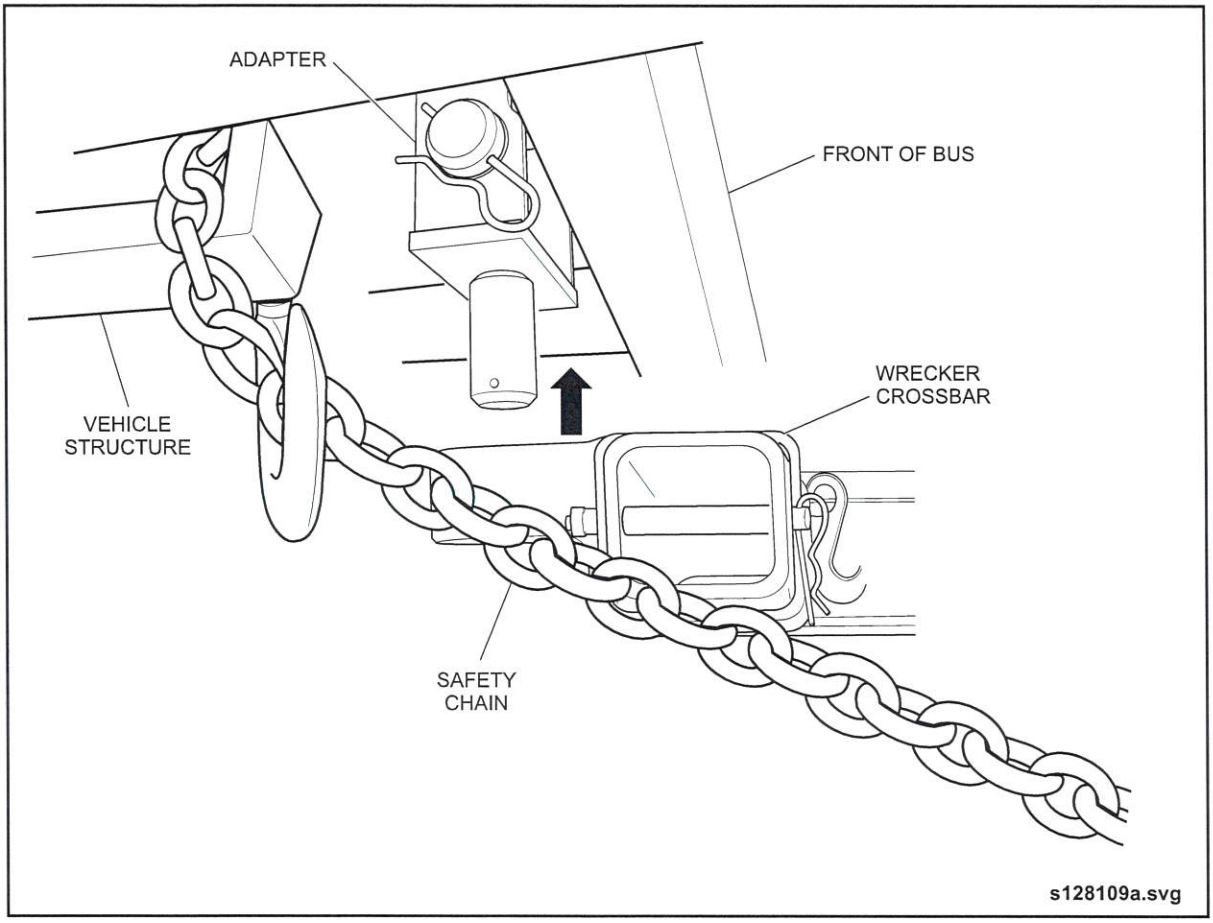


Fig. GI-24: Safety Chain

14.2.2. Raised Towing

14.2.2.1.Preparation

1. Prepare the vehicle for towing by removing either the driveshaft or both rear axle shafts. Refer to 14.3. "Driveshaft Removal" on page 48 and Refer to 14.4. "Rear Axle Shaft Removal" on page 48 in this section for procedure.
2. Obtain an approved towing adapter kit if one is not already provided. The towing adapter kit used for raised towing is a peg and socket configuration that consists of two U-shaped lift adapters that attach to the towed vehicle and two lift receivers that slide onto the towing vehicle crossbar. Refer to your New Flyer Parts Manual for towing adapter ordering information.

NOTE:

The towing adapters mount into receivers in the front frame of the vehicle and provide the proper offset and clearance to allow the attachment of towing equipment. The towing adapters are designed to work with Century 9055 Wrecker towing equipment.

14.2.2.2.Lift Adapter/Receiver Installation

1. Install the lift adapters onto the towed vehicle as follows:
   a. Slide lift adapter into vehicle receiver and locate with a clevis pin.
   b. Secure each clevis pin with a cotter pin.
2. Install the lift receivers onto the towing vehicle crossbar and slide into position so that they align with the towed vehicle lift adapters. See "Fig. GI-25: Lift Receiver Installation" on page 45.

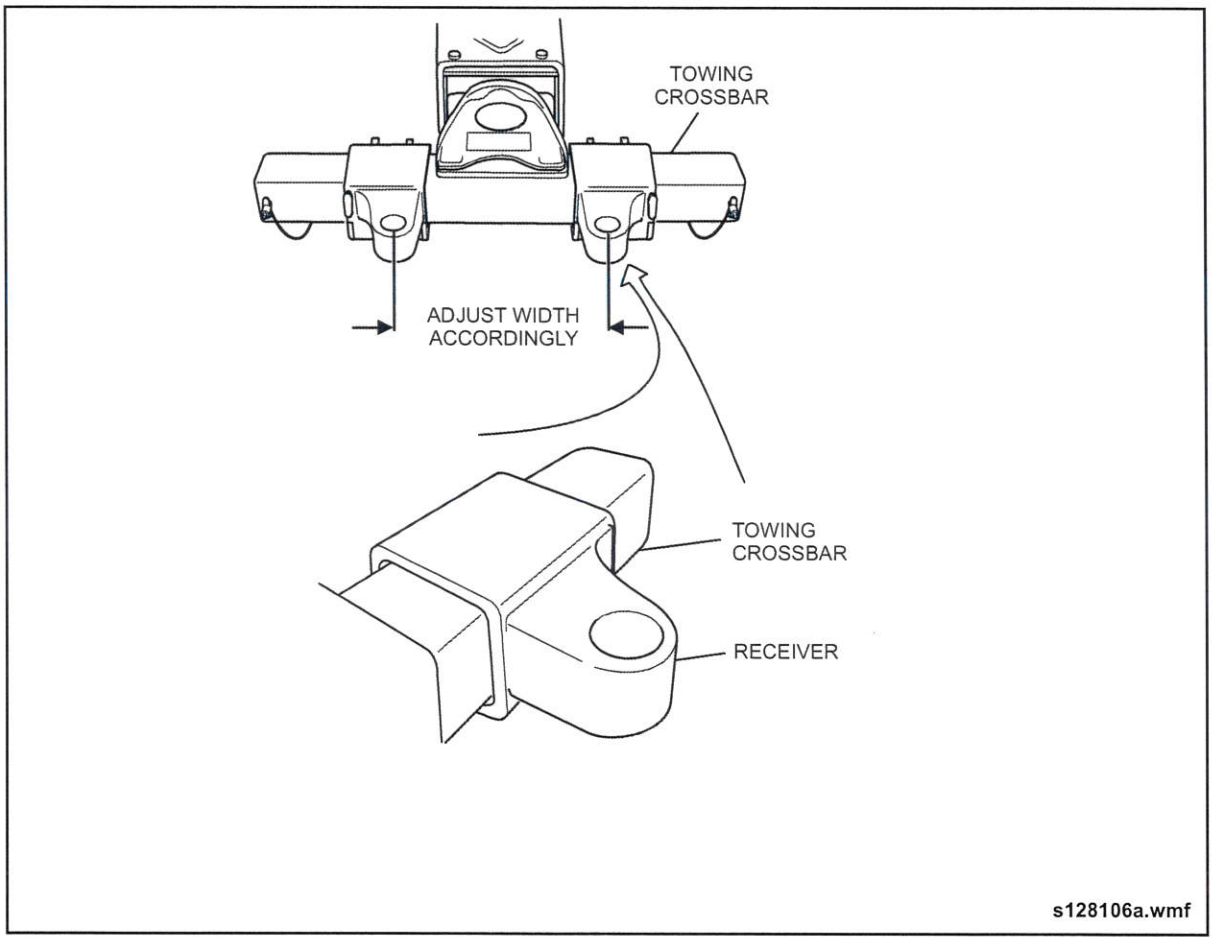


Fig. GI-25: Lift Receiver Installation

14.2.2.3.Raising & Securing the Vehicle

1. Position the wrecker's lifting boom with the lift receivers in place under the pegs of the lift adapters. See "Fig. GI-26: Securing the Lift Receivers to the Lift Adapters" on page 46.
2. Slowly raise the boom until the socket on the lift receivers engage the pegs on the lift adapters. Make any necessary adjustments to the lift receiver positions to ensure proper engagement.
3. Continue to raise the lifting boom until the lift adapters are fully engaged into the receivers.
4. Insert the lock pin through the lift adapters.
5. Raise the front wheels to the height recommended for the specific vehicle being towed and check vehicle ground clearance. Refer to 14.2.2.4. "Maximum Lifting Height" on page 47 and Refer to 14.2.2.5. "Minimum Vehicle Ground Clearance" on page 47 in this section for recommended limits.
6. Connect the towing vehicle air line and electrical harness to the respective tow connectors on the towed vehicle.

☞NOTE:

An auxiliary air supply must be provided to the vehicle being towed to release the spring brakes and maintain suspension height. The auxiliary air supply should be a minimum of 100 psi.

7. Attach two safety restraint chains from the towing vehicle to a fixed location on the towed vehicle.
8. Check to ensure that all clevis and cotter pins are properly inserted, towing equipment is fully engaged and safety chains are clear of the vehicle body before final raising and towing the vehicle.
9. Secure the steering system as follows:
   a. Rotate the steering wheel to position the wheels in the straight ahead position.
   b. Secure the steering system in this position by looping the driver's seat belt around the lower portion of the steering wheel and clipping it into the seat belt buckle. See "Fig. GI-27: Securing the Steering System" on page 47.

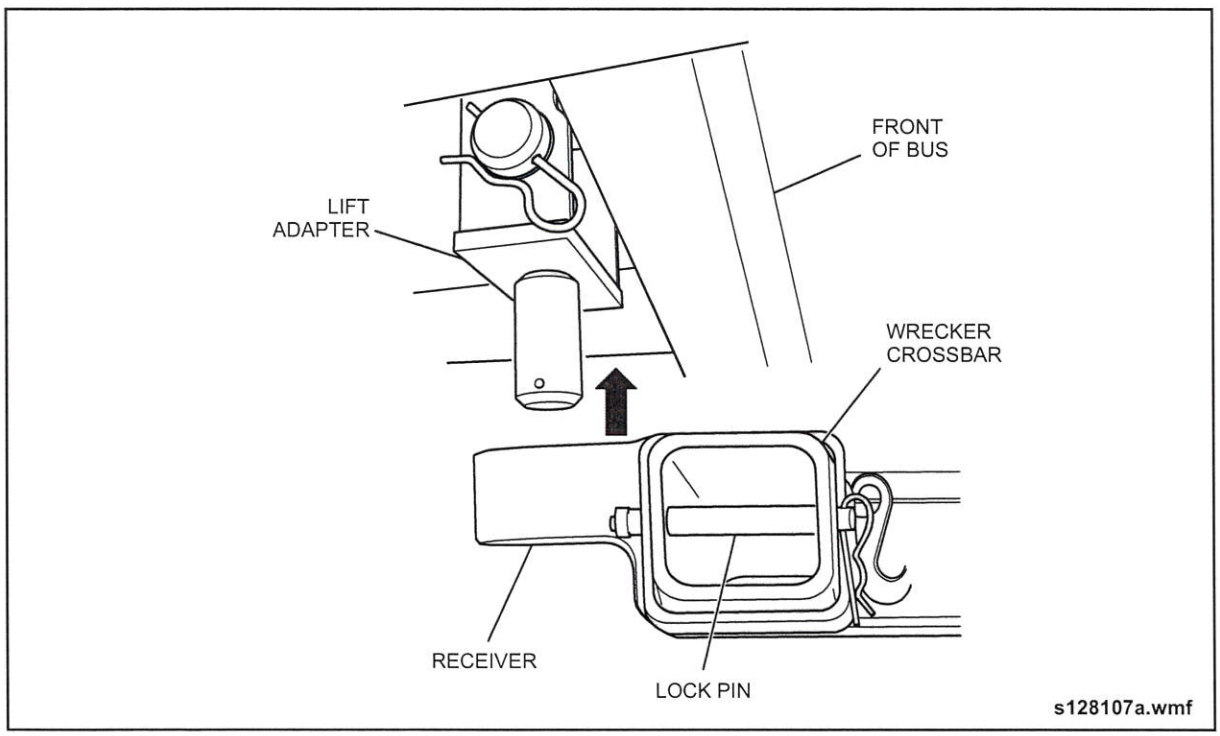


Fig. GI-26: Securing the Lift Receivers to the Lift Adapters

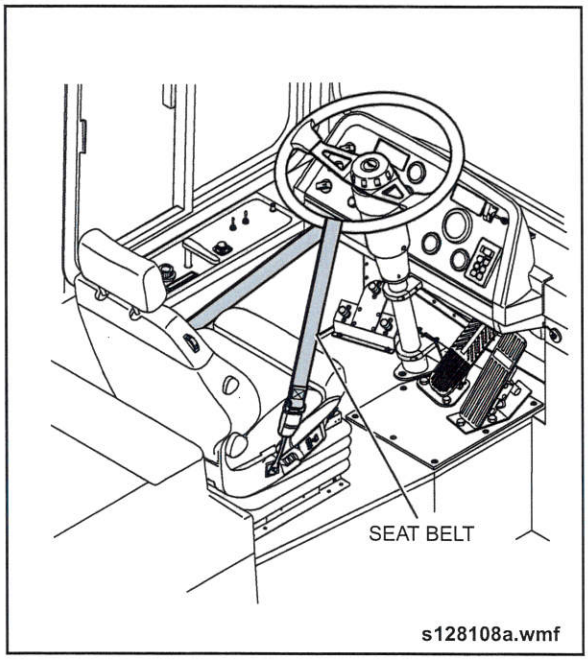


Fig. GI-27: Securing the Steering System

14.2.2.4.Maximum Lifting Height

Maximum raised height, as measured from the bottom of the front tire to the ground must not exceed 7.0 inches (17.8 cm).

14.2.2.5.Minimum Vehicle Ground Clearance

Rear bellows clearance must not be less than 7.0 inches (17.78 cm) as measured from the bottom of the articulating joint bellows to the ground. See "Fig. GI-28: Bellows Clearance" on page 47.

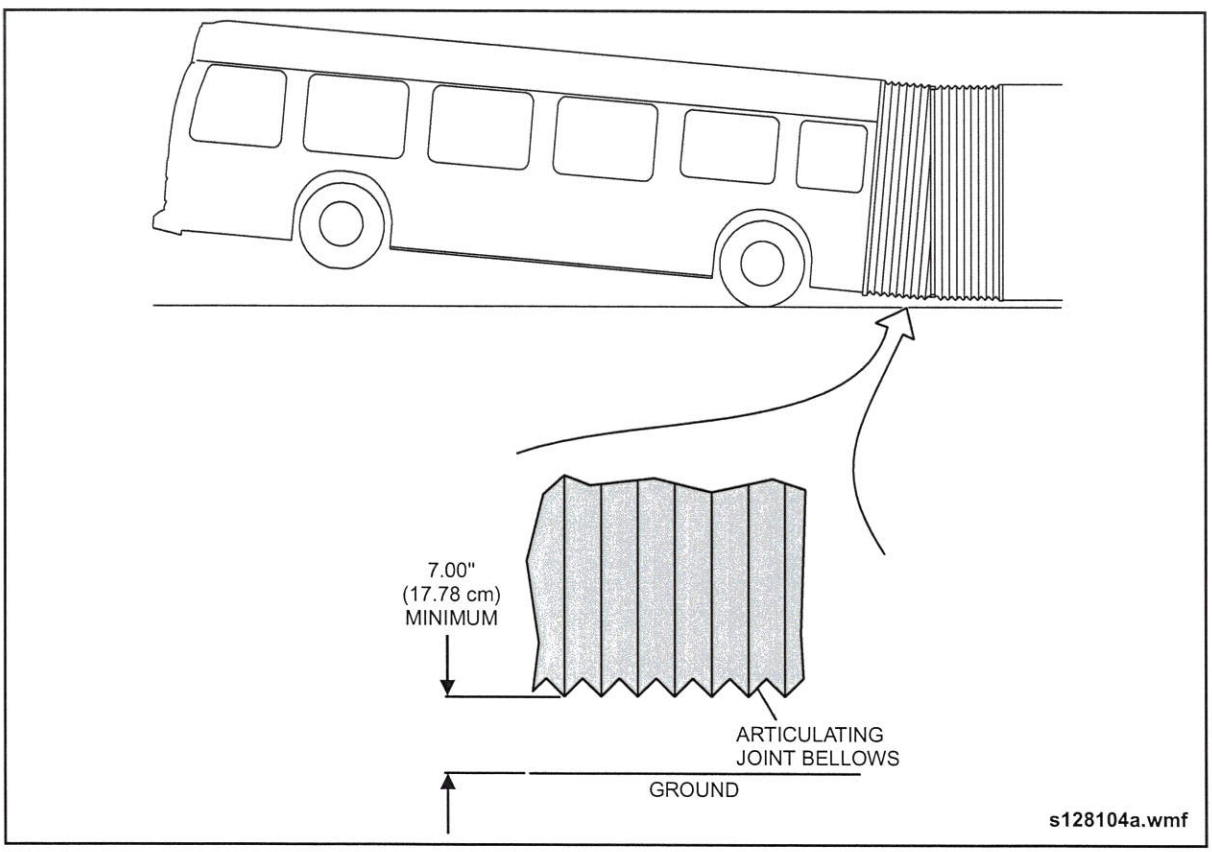


Fig. GI-28: Bellows Clearance

13.2. Lifting the Vehicle

⚠ WARNING

Make sure the wheel lift system is set up to simultaneously raise all four wheels.

1. Position wheel lift, centering each tire exactly between the lift forks. Make sure each tire is tightened up against the stop. See "Fig. GI-17: Typical Wheel Lifts" on page 35. See "Fig. GI-18: Wheel Placement in Hoist" on page 36.
2. Make sure all four wheel lifts are sitting squarely on the floor. Also check that the lift forks at the drive wheels support only one (outside) drive wheel on each side of the drive axle.
3. Determine that each tire is squarely seated in the lifting forks before raising. Ensure the wheel lift system is set up to simultaneously lift the four wheel lift points.
4. Always inspect above lift area, before raising vehicle to ensure that nothing will interfere with the procedure or cause damage to the vehicle.
5. Release parking brake.

☞NOTE:

If system air is depleted, either cage spring brakes or connect a filtered shop air supply, 70 psi minimum, to hold off spring brakes. This will also maintain air suspension system pressure.

6. Raise the vehicle high enough to provide adequate working clearance.
7. Position a jack stand squarely under each reinforced jacking point on the frame. Each jack stand must have a minimum weight bearing capacity of 12,000 lbs. (5,443 kg).

⚠ WARNING

At this point make sure each jack stand is precisely at the same height and is sitting completely level on the shop floor.

8. Raise the contact pad of each jack stand until it positively seats in the jacking point.
9. Slowly and carefully lower the wheel lifts until the weight of the vehicle is taken up on the jack stands.

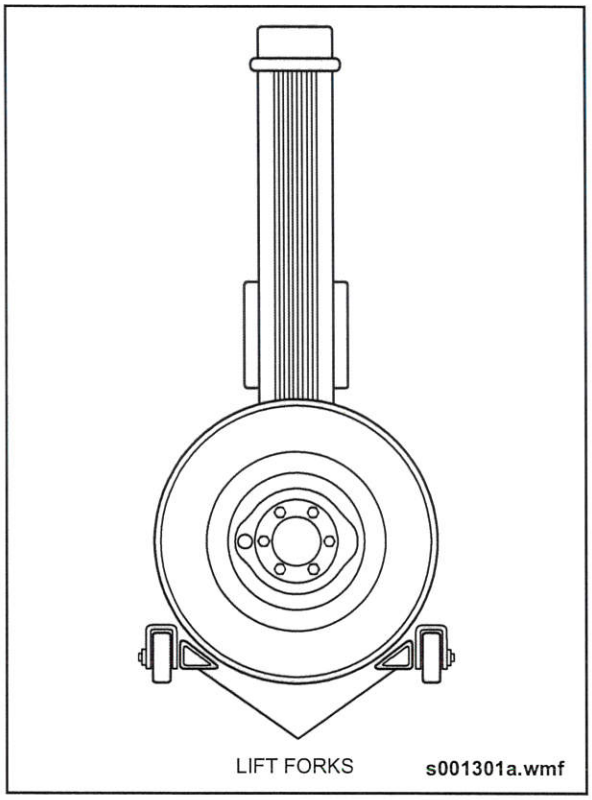


Fig. GI-17: Typical Wheel Lifts

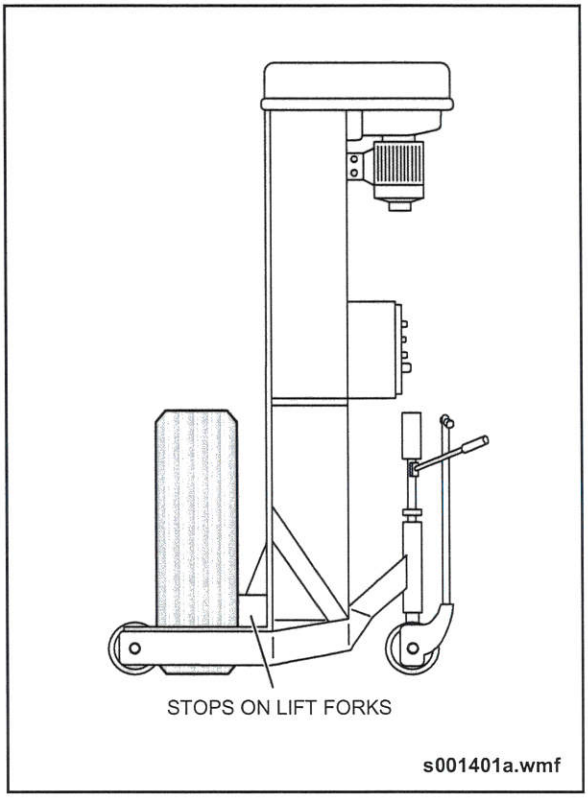


Fig. GI-18: Wheel Placement in Hoist

13.3. Hoisting the Vehicle

1. Position vehicle over hoist and align hoist posts and adapter pads so these will contact the designated points. See "Fig. GI-19: Typical Center Post Hoist" on page 37.

   Note hoisting points:

   - ❒ At Rear - hoist on suspension beams below axle.
   - ❒ At Front - hoist on hoisting points.

2. Raise hoist posts just enough so that hoist adapter pads positively contact the axle hoist points.
3. Release parking brake.

   ☞NOTE:

   If system air is depleted, either cage spring brakes or connect a filtered shop air supply, 70 psi minimum, to hold off spring brakes. This will also maintain air suspension system pressure.

4. Always inspect above hoist area, before raising the vehicle to ensure that nothing will interfere with the procedure or cause damage to the vehicle.
5. Ensure that hoist adapter pads are still properly located, then raise vehicle.
6. Raise front and rear of vehicle at the same rate, maintaining correct level at all times.
7. Raise the vehicle high enough to provide adequate working clearance.
8. Engage hoist safety locks.

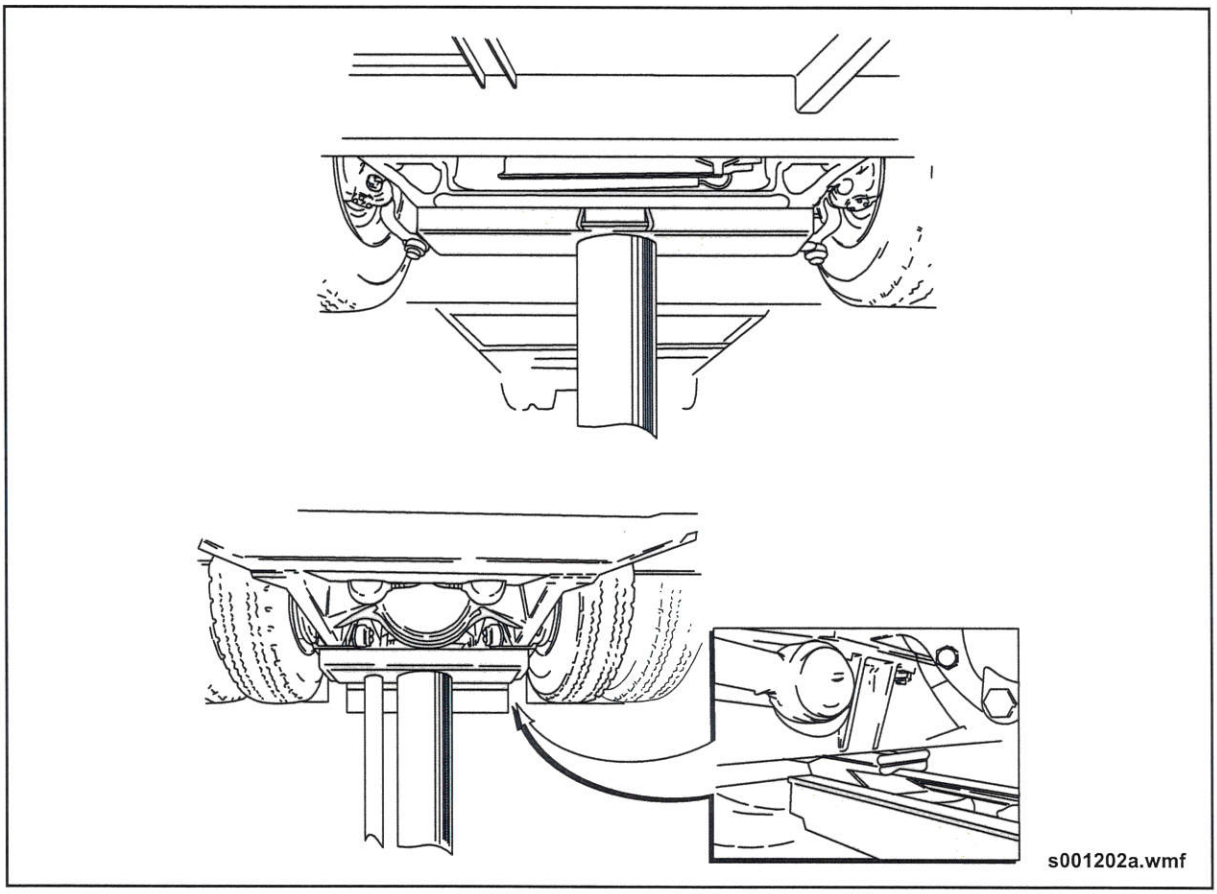


Fig. GI-19: Typical Center Post Hoist

9. Position a jack stand squarely under each reinforced jacking point on the frame. Each jack stand must have a minimum weight bearing capacity of 12,000 lbs. (5,443 kg). See "Fig. GI-20: Jack Stand" on page 38.

WARNING

At this point make sure each jack stand is precisely at the same height and is sitting completely level on the shop floor.

10. Raise the contact pad of each jack stand until it positively seats in the jacking point.
11. Slowly and carefully lower the center post hoists until the weight of the vehicle is taken up on the jack stands.

WARNING

DO NOT position jack stands under rear axle suspension beam.

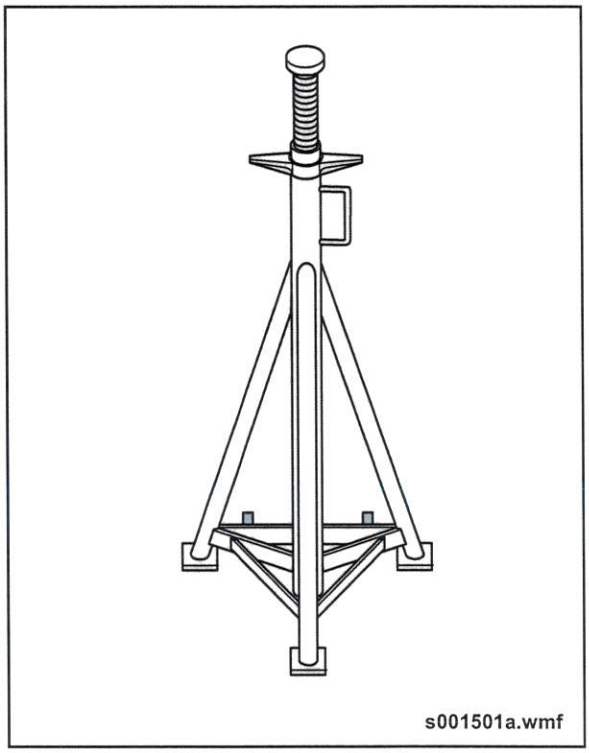


Fig. GI-20: Jack Stand

13.4. Jacking the Vehicle

CAUTION

DO NOT attempt to jack the vehicle on an incline, or rough or uneven surface.

13.4.1. Front Jacking Procedure

A chassis tube assembly is located rearward of the front wheels of your New Flyer vehicle. A jacking adapter assembly available from NFI, is installed into this tube assembly when the front of the vehicle requires jacking. See "Fig. GI-21: Jacking Adapter" on page 39.

1. Apply the park brake.
2. Place blocks behind the rear wheels.
3. On the side requiring jacking, install the jacking adapter as follows:
   a. Locate the chassis tube assembly.
   b. Install the jacking adapter.
   c. Secure the jacking adapter by installing the locking pin through both the chassis tube and the jacking adapter.
   d. Insert the hairpin cotter to secure the locking pin.
4. Using a 10" bottle jack on a stable, level surface, jack the front side of the vehicle as follows:
   a. Position the bottle jack under the jacking adapter point A.
   b. Raise the bottle jack to its maximum height.
   c. Place support blocks under the chassis tube assembly.
   d. Lower the bottle jack to rest the chassis tube assembly on the blocks.
   e. Position the bottle jack under the jacking adapter point B.
   f. Raise the bottle jack to a sufficient height for the required repair.
   g. Place additional support blocks under the chassis tube assembly.
   h. Lower the bottle jack to rest the chassis tube assembly on the blocks.
5. Lower the vehicle using the jacking adapter and bottle jack as follows:
   a. Position the bottle jack under the jacking adapter point B.
   b. Raise the bottle jack to free the support blocks.
   c. Remove support blocks.
   d. Lower the bottle jack to 1/2" before its lowest position.
   e. Place support blocks under the chassis tube assembly.
   f. Lower the bottle jack to rest the chassis tube assembly on the blocks.
   g. Position the bottle jack under the jacking adapter point A.
   h. Raise the bottle jack to free the support blocks.
   i. Remove support blocks.
   j. Lower and remove the bottle jack.

6. Remove the jacking adapter from the chassis tube assembly.
7. Remove the blocks from behind the rear wheels.
8. Lower the vehicle onto the blocks and proceed with the required repair.

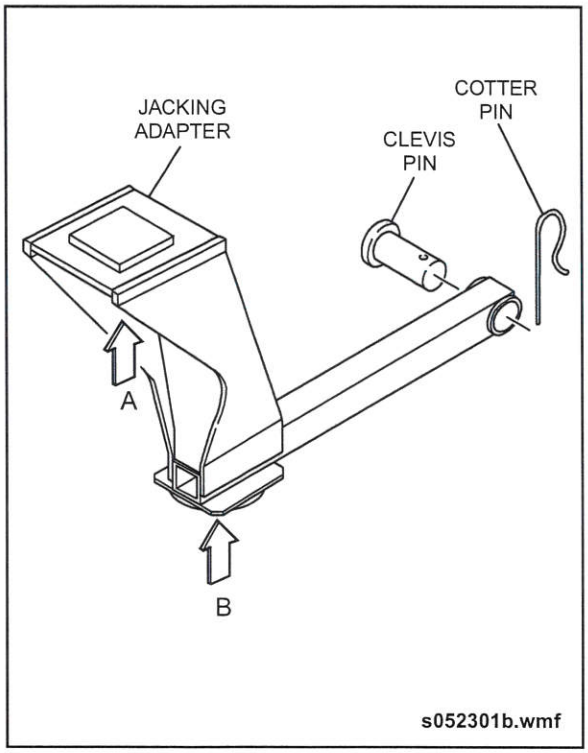


Fig. GI-21: Jacking Adapter

13.4.2. Rear Jacking Procedure

⚠ CAUTION

DO NOT attempt to jack the vehicle on an incline or on a rough or uneven surface.

1. Apply the park brake.
2. Ensure the front wheels are facing forward.
3. Place blocks in front of the front wheels.
4. Using a 10" bottle jack on a stable, level surface, jack the rear side of the vehicle as follows:
   a. Locate the appropriate jack stand point under the frame rail at the rear of the vehicle. See "Fig. GI-22: Jacking (hoisting) Points & Stand Placement" on page 40.
   b. Position the bottle jack under the jack stand point.
   c. Raise the bottle jack to a sufficient height for the required repair.
   d. Place support blocks under the frame rail.
   e. Lower the bottle jack to rest the frame rail on the support blocks.
5. Lower the vehicle using the bottle jack as follows:
   a. Position the bottle jack under the jack stand point.
   b. Raise the bottle jack to free the support blocks.
   c. Remove the support blocks.
   d. Lower and remove the bottle jack.
6. Remove the blocks from in front of the front wheels.

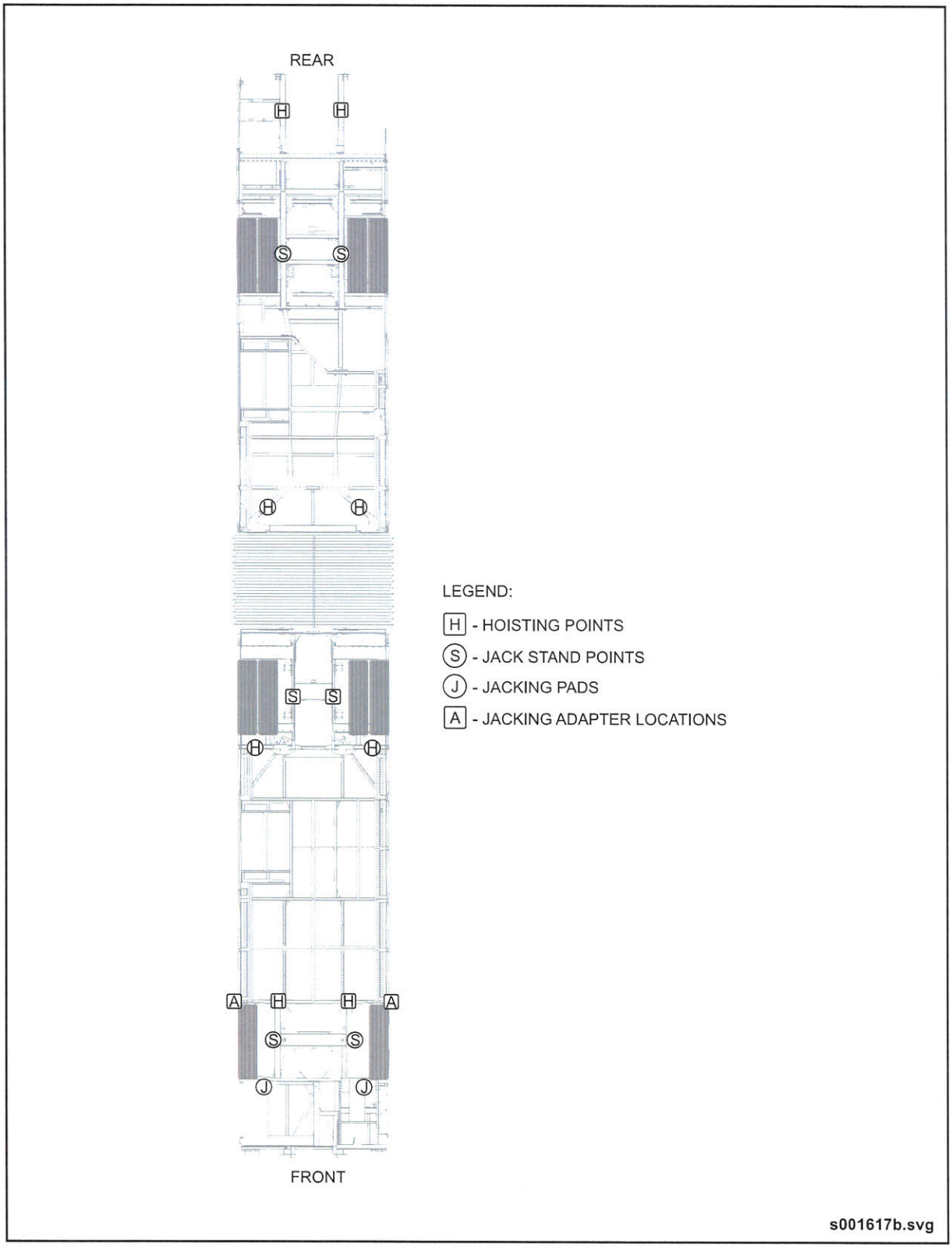


Fig. GI-22: Jacking (hoisting) Points & Stand Placement