Group Index, Alphabetical

Section	Section Number
Preform FRP Hood	88.00
Spray-Up Hood	88.01

Preform FRP Hood 88.00

Contents

Subject	Subject Number
General Information	050
Service Operations	
Grille Removal and Installation	100
Grille Trim Removal and Installation (Fixed-Grille Models)	102
Splash Shield Removal and Installation	110
Hood Liner Replacement	120
Half-Fender Removal and Installation	130
Hood Removal and Installation	140
Hood Tilt-Assist Replacement	142
Hood Alignment Adjustment	150
Hood and Half-Fender Repair	160
Engine Access Door Removal and Installation	170
Specifications	400

General Information

All Freightliner Business Class Trucks have a molded, fiberglass-reinforced-plastic (FRP) hood and fender assembly, and molded FRP half-fenders that mount to the cab sides. Several reinforcing members are bonded to the engine side of the hood. The argent-colored front grille is made of injection-molded plastic.

A recess in the hood, above the grille, provides the handle for hood tilting. **See Fig. 1** and **Fig. 2.**

Most Business Class Trucks are equipped with a one-piece hood that tilts forward to allow engine access. On these one-piece hoods, the grille is mounted to the front of the hood and moves forward with the hood when the hood is tilted.

Less common are special application Business Class Trucks equipped with fixed-grille hoods, and trucks having fixed-grille hoods with dual engine access (butterfly) doors.

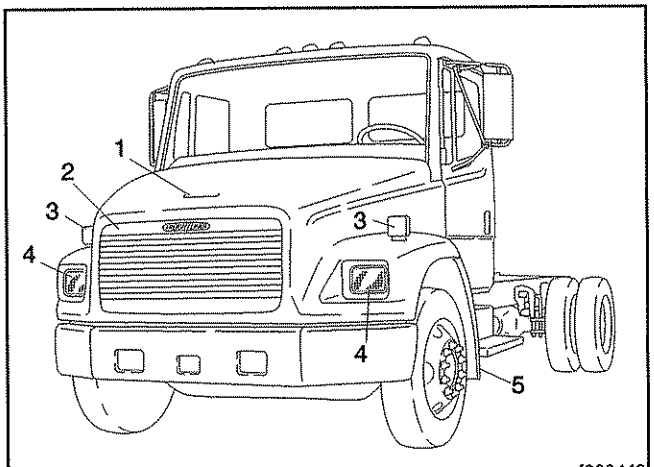
On these trucks, the grille mounts to the radiator support and does not move when the hood is tilted forward. This design provides engine access without interference problems from front-mounted sirens, lights, winches, etc.

On snow plow-equipped vehicles, the plow assembly often makes hood tilting impossible. The dual access door hood, with a hinged panel on each side of the vehicle, allows routine underhood service on these vehicles, even while the plow is installed. **See Fig. 2.**

The hood and half-fenders are compression molded using the preform molding process. The first step in this process is to produce a preform by spraying chopped glass fibers and resin binder in a controlled manner onto a screen that's the same shape as the male moulding die. The preform is then heated to cure the resin binder. Next, the preform is moved to a compression molding press. Resin is dispersed onto the preform; then the preform is placed onto the male half of a matched metal mold. As the halves of the mold close, the resin is distributed throughout the part, and is cured under heat and pressure.

After molding, the hood (or half-fender) is trimmed and prepared for painting. Before priming, the fiberglass reinforcements and metal parts are bonded to the hood.

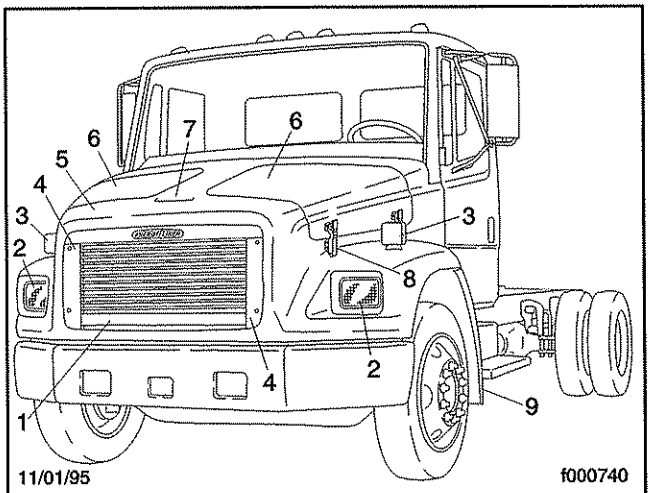
At the front of the hood, brackets mounted directly behind the front bumper, at the outside of each frame



04/22/93 f000448

1. Recessed Hood-Tilt Handle
2. Injection-Molded Plastic Hood-Mounted Grille
3. Turn-Signal/Parking Lights
4. Recessed Single Headlight
5. Cab-Mounted Half-Fender

Fig. 1, Hood Features, With Hood-Mounted Grille



11/01/95 f000740

1. Injection-Molded Plastic Radiator-Mounted Grille
2. Recessed Single Headlight
3. Turn-Signal/Parking Lights
4. Grille Trim
5. Hood
6. Engine Access "Butterfly" Door
7. Recessed Hood-Tilt Handle
8. Access Door Latch
9. Cab-Mounted Half-Fender

Fig. 2, Hood Features, With Radiator-Mounted (fixed) Grille and Dual Engine Access (butterfly) Doors

General Information

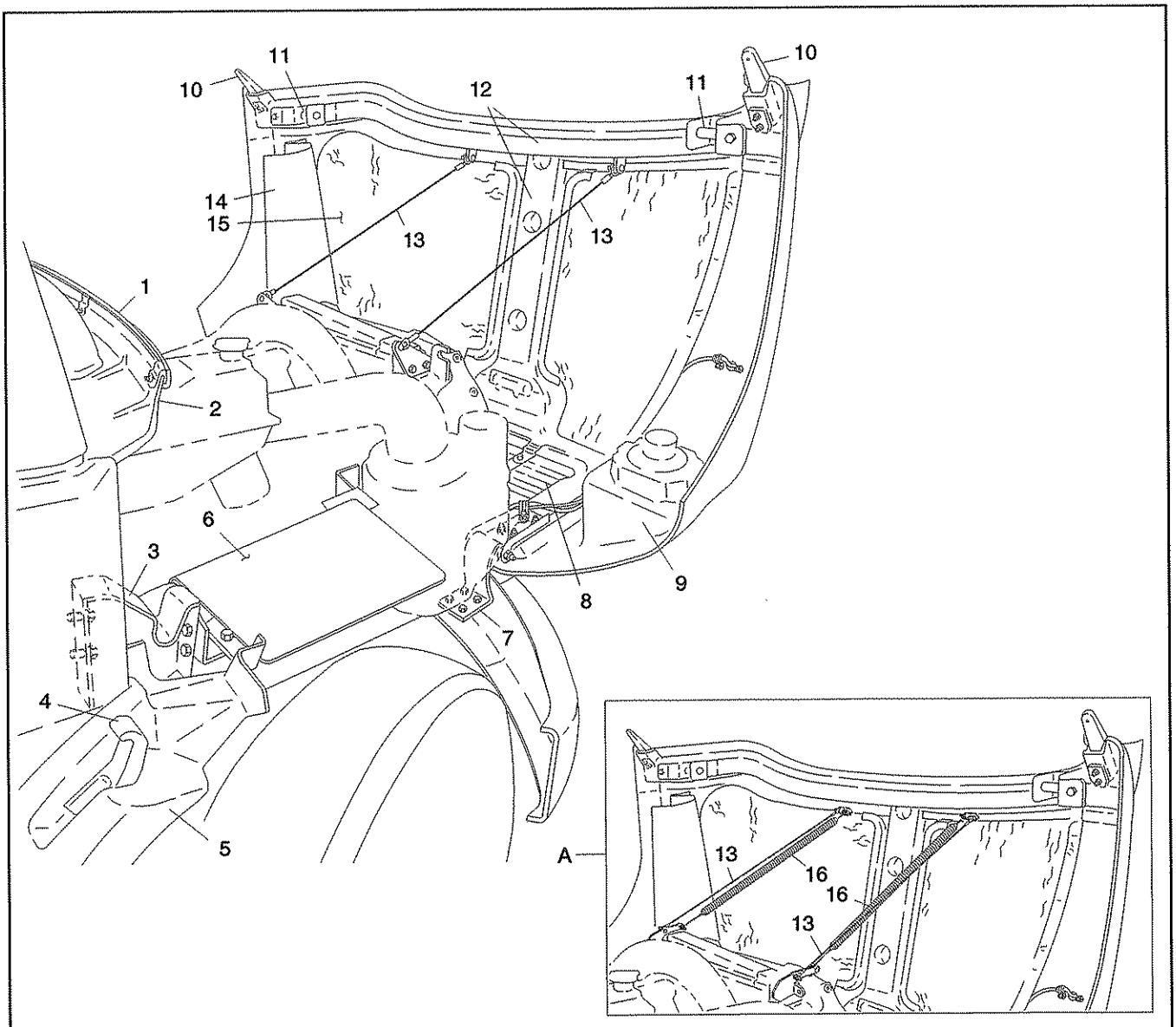
rail, support the hood-hinge pivots. Stop cables limit forward travel of the hood. Newer production vehicles have a tilt-assist assembly in addition to the stop cables. **See Fig. 3.**

When in the operating position, the hood is supported at the front by the hood-hinge pivots and at the rear by hood support brackets which are attached to the cab. A groove in each bracket mates with pins attached to the inside of the hood, near each upper rear corner. The hood is held down with two rubber over-center latches, with part of the latch attached to the hood, and the other part attached to each half-fender. To prevent warm, under-hood air from entering the cab through the air conditioner/heater air-inlet, a hood seal attaches to the cowl panel, ahead of the windshield.

Both the front hood-hinge pivots and the rear hood support brackets are adjustable forward and backward, and up and down. The front pivots are also adjustable right and left.

Splash shields under the hood extend to the inboard side of the tires. The left-hand splash shield attaches to the hood, and the right-hand shield attaches to the frame and the cab bulkhead.

On the underside of the hood are several 1-inch-thick (25 mm) polyester polyurethane foam hood liners, with a polymer-film facing. The liners reduce engine noise emissions.



04/27/93

f880207

A. Equipped with Tilt Assist

1. Hood Seal
2. Air-Inlet Panel
3. Rear Hood Support Bracket
4. Hood Latch Bracket
5. Half-Fender
6. Right-Hand Splash Shield
7. Hood Hinge
8. Grille
9. Headlight Housing
10. Hood Latch
11. Rear Hood Support Assembly
12. Hood Reinforcements
13. Hood-Stop Cable Assembly
14. Left-Hand Splash Shield
15. Hood Liner Panel
16. Hood Tilt-Assist Assembly

Fig. 3, Hood Components

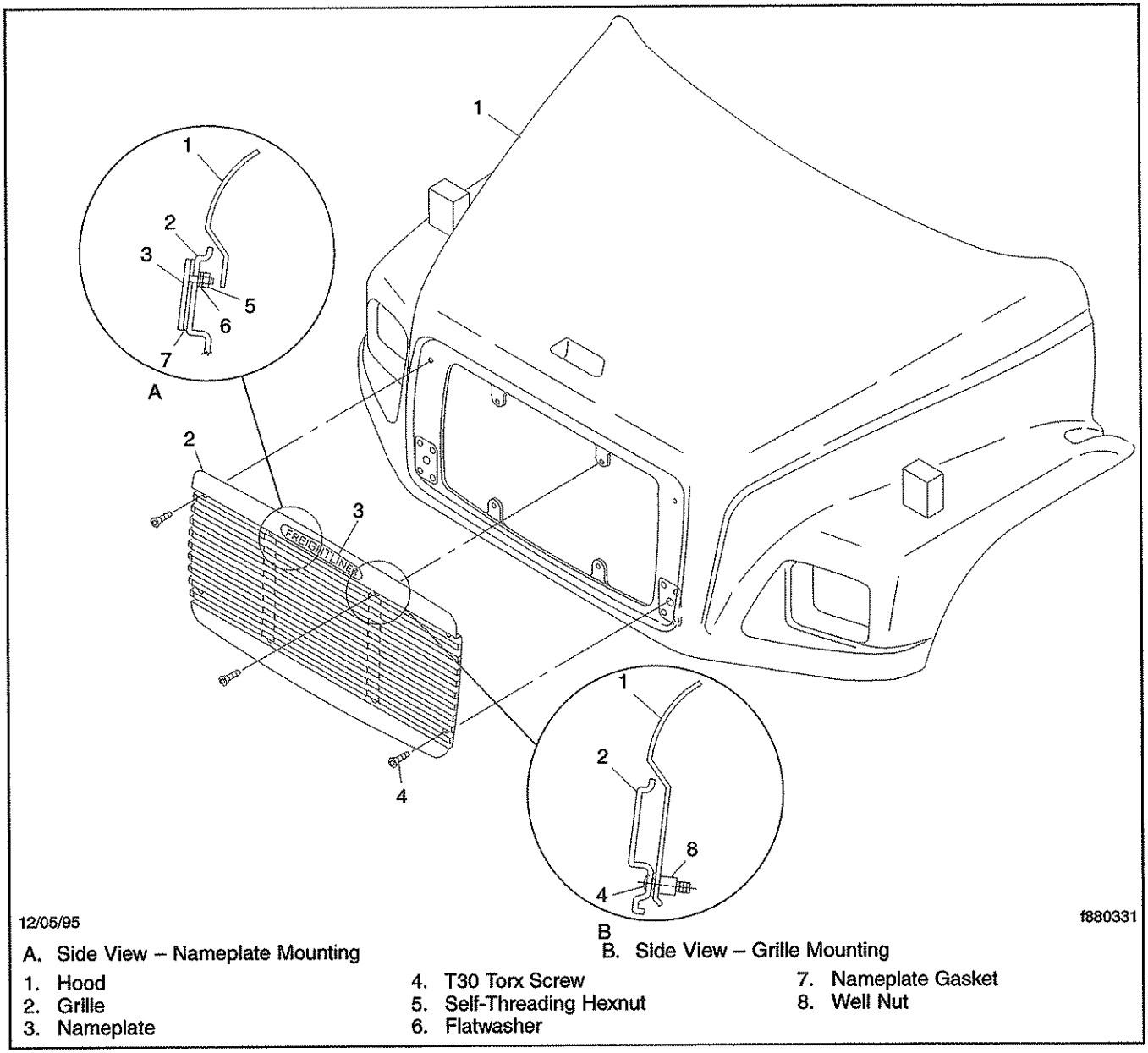
Grille Removal and Installation

The grille is made of injection-molded, argent colored plastic. The removal and installation method depends on whether the grille is hood-mounted or radiator-mounted.

Hood-Mounted Grille (See Fig. 1)

REMOVAL

1. Apply the parking brakes.



A. Side View – Nameplate Mounting
B. Side View – Grille Mounting

1. Hood
2. Grille
3. Nameplate
4. T30 Torx Screw
5. Self-Threading Hexnut
6. Flatwasher
7. Nameplate Gasket
8. Well Nut

Fig. 1, Hood-Mounted Grille Installation

Grille Removal and Installation

2. With the hood in the normal, driving position, use a Torx screwdriver (T30) to remove the grille-to-hood screws.
3. Remove the grille.

INSTALLATION

NOTE: If the grille is being replaced, transfer the nameplate and gasket to the new grille.

1. Place the grille in the hood opening and align the screw holes.
2. Install the screws and use a Torx screwdriver (T30) to tighten them securely.

Radiator-Mounted (Fixed) Grille (See Fig. 2)

REMOVAL

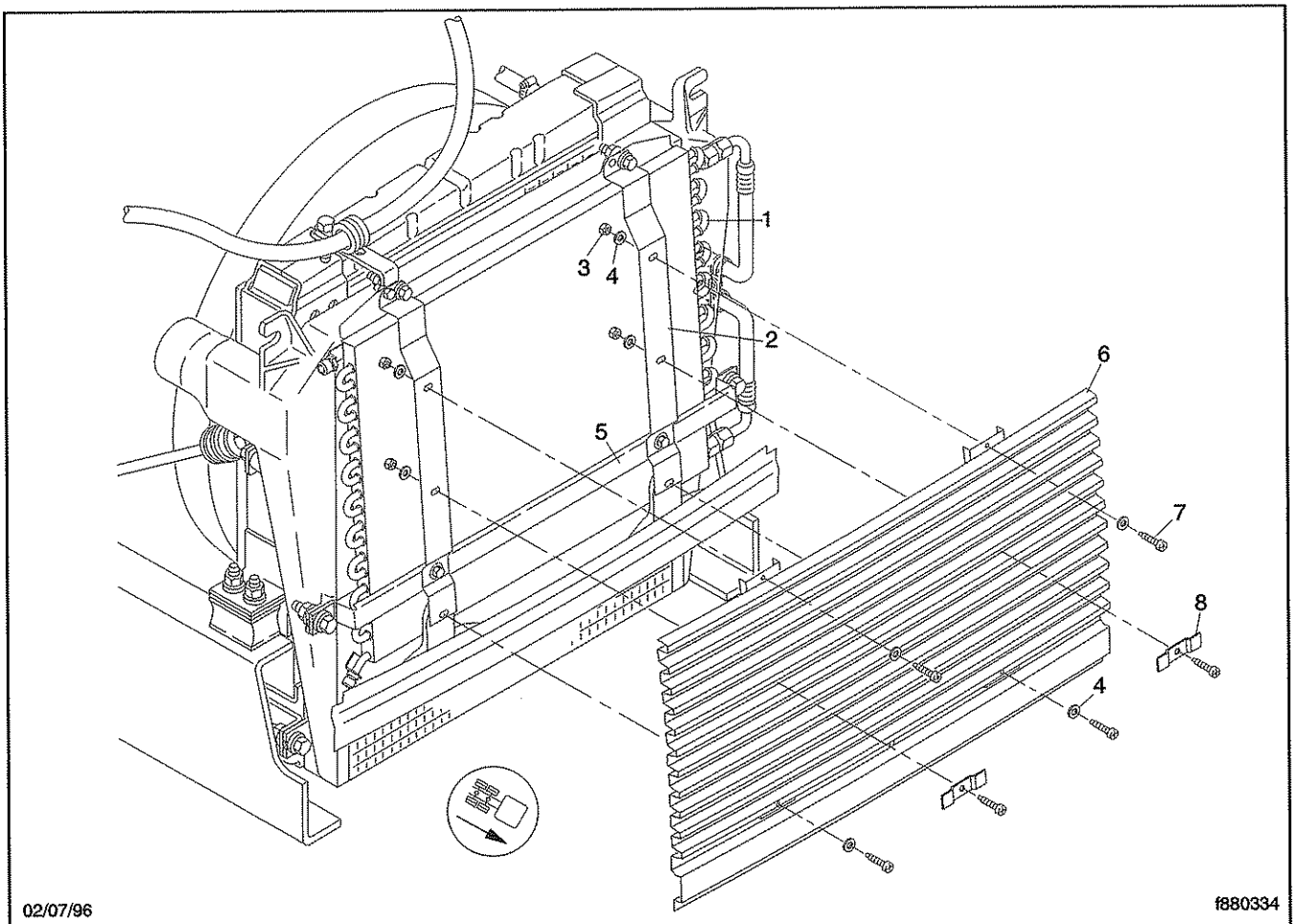
NOTE: The hood must be tilted forward to access grille fasteners. If equipment mounted on the front of the vehicle interferes with hood tilting, that equipment must be removed before attempting grille removal.

1. Apply the parking brakes.
2. Tilt the hood forward.
3. Loosen the grille retaining screws using a Phillips screwdriver, while holding the retaining screw nuts with a box wrench.
4. Remove the screws, grille retainer brackets, flat-washers, and nuts.
5. Remove the grille.

INSTALLATION

1. Position the grille against its mounting brackets and align the screw holes.
2. Insert the grille retaining screws, making sure to install flatwashers on the screws at the four corner positions and retainer brackets on the screws at the middle positions.
3. Install flatwashers and nuts on the retaining screws and tighten the screws securely using a Phillips screwdriver.

Grille Removal and Installation



NOTE: Hood assembly removed for clarity. Also, grille shown is for vehicles without front PTO. On PTO-equipped vehicles, the grille is shorter.

1. A/C Condenser
2. Grille Mounting Bracket
3. Self-Locking Hexnut
4. Flatwasher
5. Channel
6. Grille
7. Phillips Screw
8. Grille Retainer Bracket

Fig. 2, Radiator-Mounted (fixed) Grille Installation

Grille Trim Removal and Installation (Fixed-Grille Models)

On fixed-grille versions of the Business Class Truck, three pieces of argent colored trim border the top and sides of the grille. These trim pieces are made of formed sheet steel and mount to the hood assembly. **See Fig. 1.**

Removal

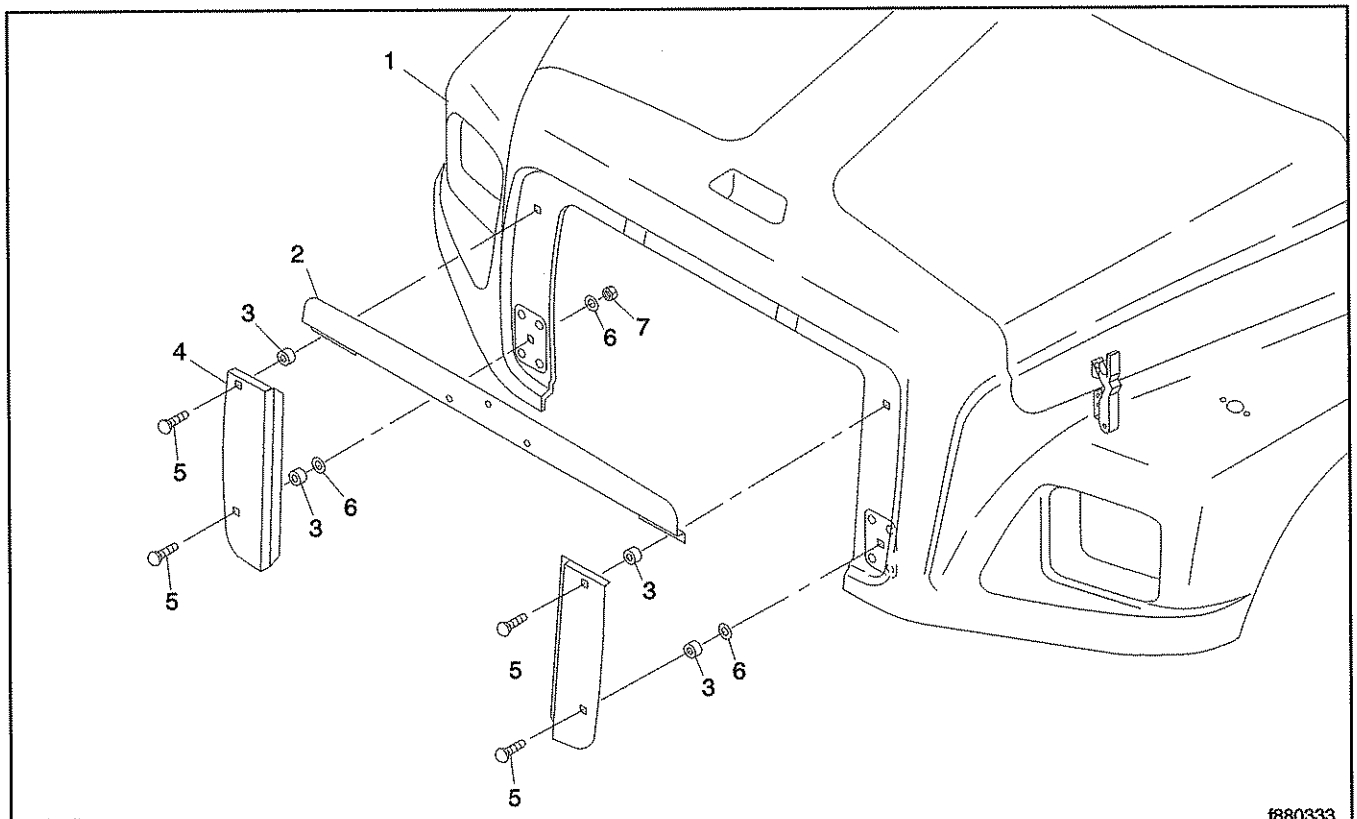
NOTE: The hood must be tilted forward to access grille trim fasteners. If equipment mounted on the front of the vehicle interferes with hood tilting, that equipment must be removed before attempting grille trim removal.

1. Apply the parking brakes.
2. Tilt the hood forward.
3. Loosen the grille trim retaining nuts using a socket wrench, while holding the retaining screw head against the grille trim piece with your hand. (The round-head retaining screws have square shanks, which mate with square holes in the trim pieces.)
4. Remove the screws, spacers, flatwashers, and nuts.
5. Remove the grille trim.

Installation

NOTE: If the upper trim piece is being replaced, transfer the nameplate and gasket to the new trim piece.

1. Insert the round-head screws in the side trim pieces, and install spacers and flatwashers on the screws. **See Fig. 1.**



12/05/95

1. Hood
2. Grille Trim, Upper
3. Spacer
4. Grille Trim, Side
5. Round Head Screw
6. Flatwasher
7. Nut

Fig. 1, Radiator-Mounted (fixed) Grille Trim Installation

Grille Trim Removal and Installation (Fixed-Grille Models)

2. Position the upper trim piece against the hood and align the screw holes.
3. Install the grille trim side pieces on the hood.
4. Install flatwashers and nuts on the retaining screws and tighten the nuts securely using a socket wrench.

Splash Shield Removal and Installation

Removal

1. Apply the parking brakes and chock the rear tires.
2. Tilt the hood.
3. To remove the *right-hand splash shield*, remove the 1/4-turn stud that attaches the rear of the shield to its bracket on the rear hood-support bracket. See **Fig. 1**. Lift the rear of the shield about 1 in (25 mm), then pull it rearward about 1 in (25 mm). Lift it over the tire.

   To remove the *left-hand splash shield*, pull the upper edge of the splash shield sound-absorbent liner down far enough to access the splash shield rivets. Then use a drill and bit to remove the rivets and fender washers that attach the shield to the hood. See **Fig. 2**. Remove the shield.

Installation

1. To install the *right-hand splash shield*, position the tabs on the front mounting bracket in the slots in the front of the splash shield, then lower the rear of the shield until the tab on the rear inner mounting bracket is installed in the slot in the lower edge of the shield. See **Fig. 1**. Install the 1/4-turn stud.

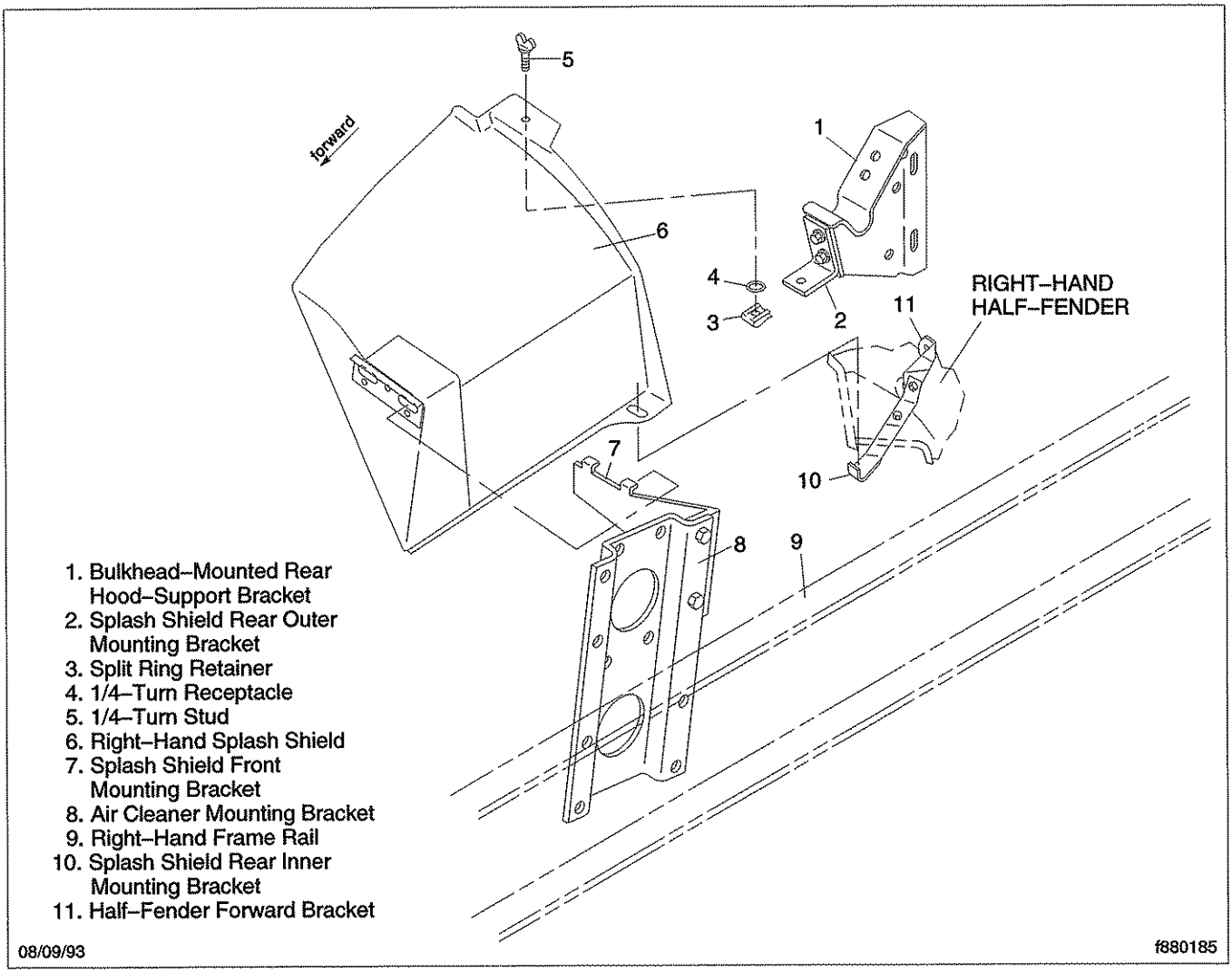


Fig. 1

Splash Shield Removal and Installation

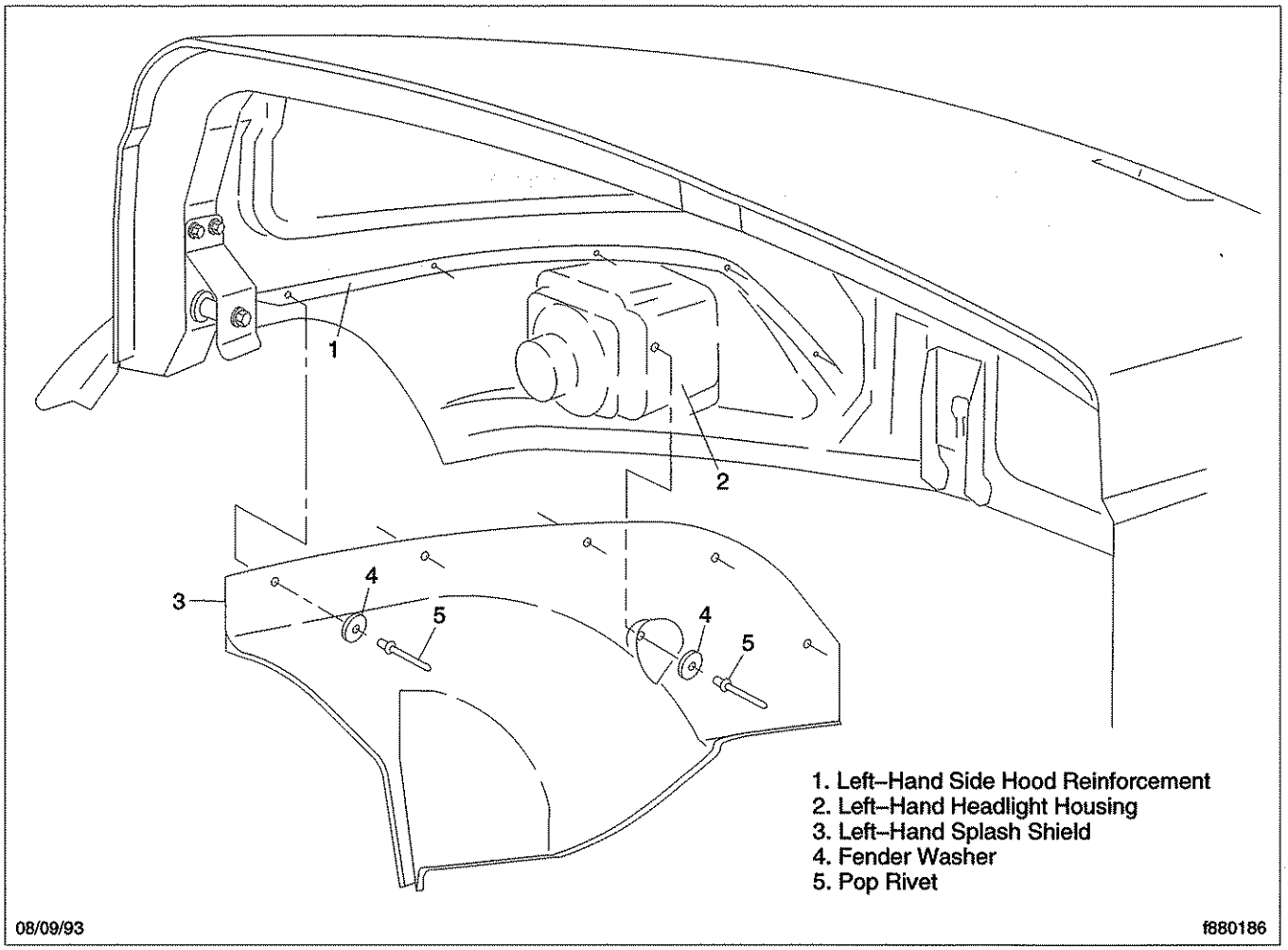


Fig. 2

To install the *left-hand splash shield*, position the shield against the reinforcement under the hood, and align the rivet holes. See **Fig. 2.** At each of the six holes, position the fender washer, then install a pop rivet to attach the shield to the reinforcement. Push the splash shield sound-absorbent liner into place.

2. Lower the hood, and remove the chocks.

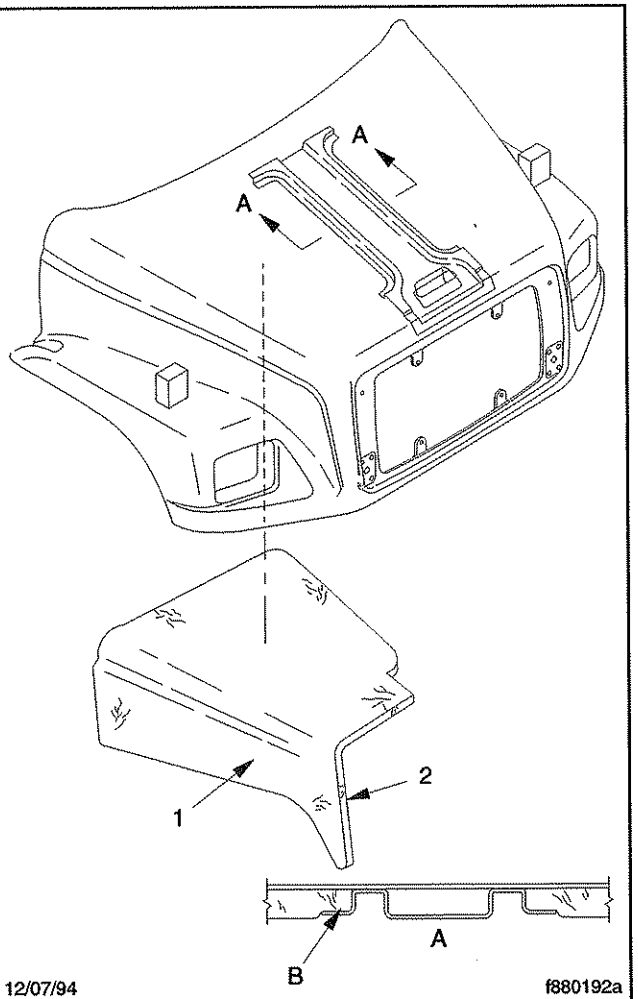
Hood Liner Replacement (See Fig. 1 and Fig. 2)

Some Business Class Trucks equipped with diesel engines have noise insulation liners fitted to the underside of the hood. The liners are made of 1-inch-thick (25 mm) foam and have a polymer facing on both sides.

On vehicles equipped with a one-piece hood, 2 liners are attached to the underside of the hood.

On vehicles equipped with a dual access door hood, a liner is fitted to each access door.

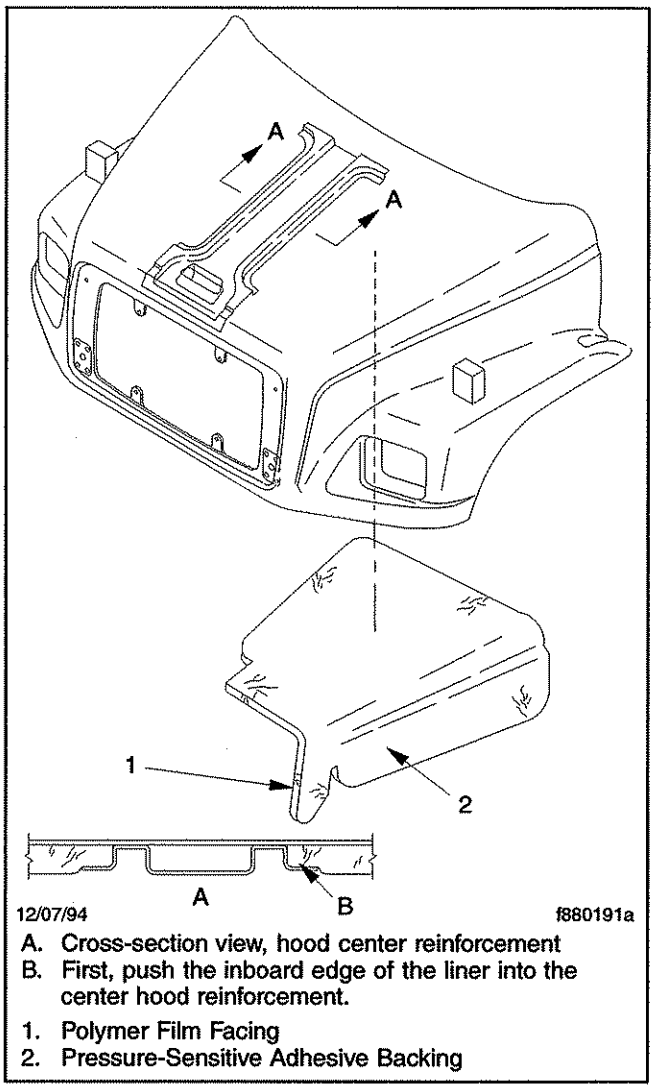
1. Apply the parking brakes and chock the rear tires.
2. If replacing either side hood liner **(see Fig. 1 or Fig. 2),** remove the grille; if necessary, refer to **Subject 100.**
3. Tilt the hood.
4. Remove the entire liner that is being replaced.
5. Use a wire brush to clean the area that was covered by the liner; then, thoroughly steam clean the area, and allow it to air dry.
6. Push the pressure-sensitive-adhesive side of the new liner into place, starting at one edge and working the liner into place from that edge toward the opposite edge. If installing either side hood liner, start by pushing the inboard edge of the liner into the center hood reinforcement. **See Fig. 1** or **Fig. 2,** Section A-A.
7. Lower the hood. If it was removed, install the grille; refer to **Subject 100** for information.
8. Remove the chocks from the tires.



A. Cross-section view, hood center reinforcement
B. First, push the inboard edge of the liner into the center hood reinforcement.
1. Pressure-Sensitive Adhesive Backing
2. Polymer Film Facing

Fig. 1, Right-Hand Side Hood Liner

Hood Liner Replacement



A. Cross-section view, hood center reinforcement
B. First, push the inboard edge of the liner into the center hood reinforcement.

1. Polymer Film Facing
2. Pressure-Sensitive Adhesive Backing

Fig. 2, Left-Hand Side Hood Liner

Half-Fender Removal and Installation

Removal (See Fig. 1 and Fig. 2)

1. Apply the parking brakes and chock the rear tires.
2. Tilt the hood.
3. Remove the fasteners that attach the half-fender to the forward and rear brackets.
4. Remove the fasteners that attach the half-fender to the cab. Remove the half-fender.
5. If the half-fender is being replaced, remove the hood latch bracket and half-fender reinforcement for installation on the new half-fender. Also, if replacing a right-hand half-fender, remove and save the splash shield rear inner mounting bracket.

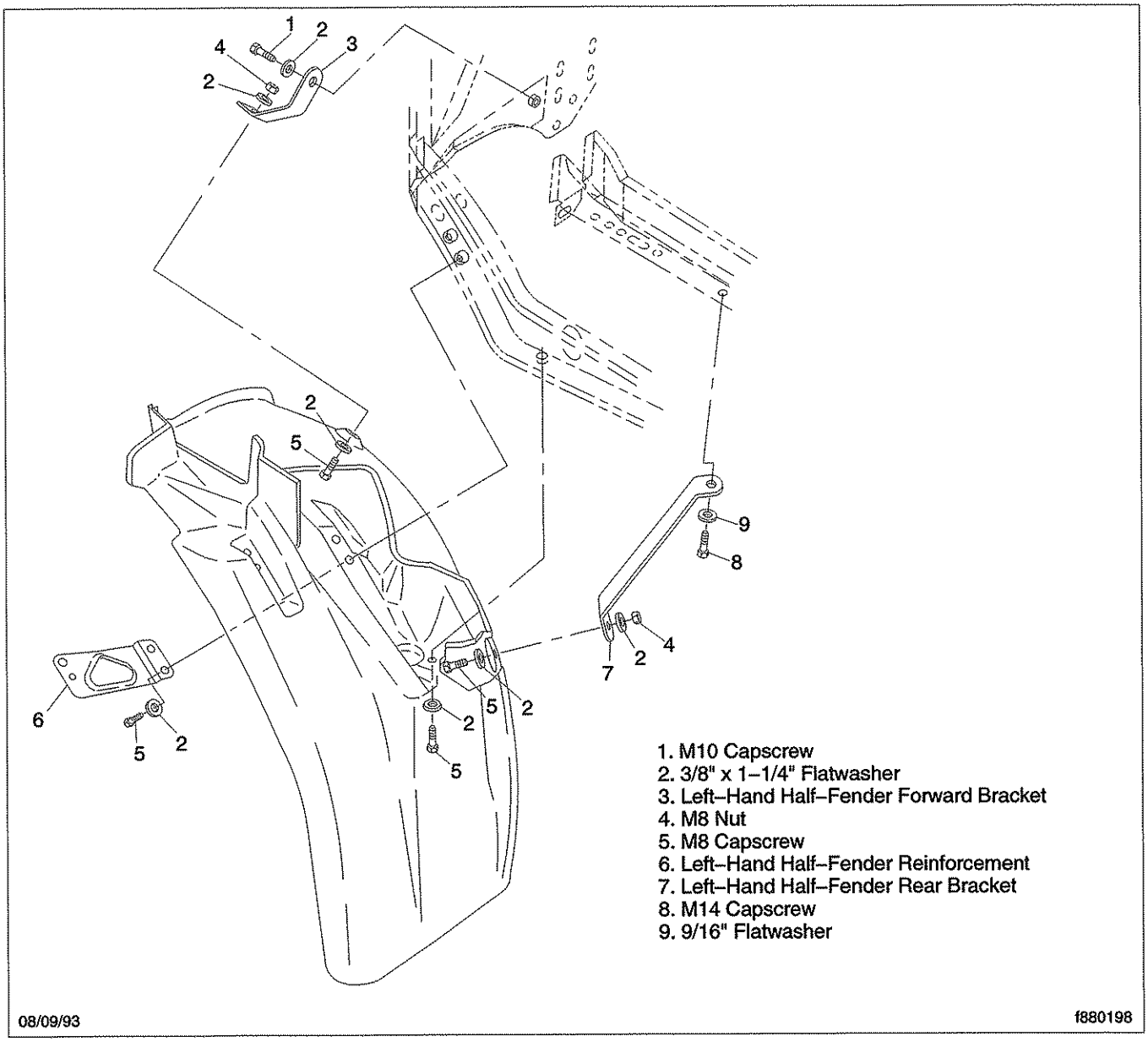
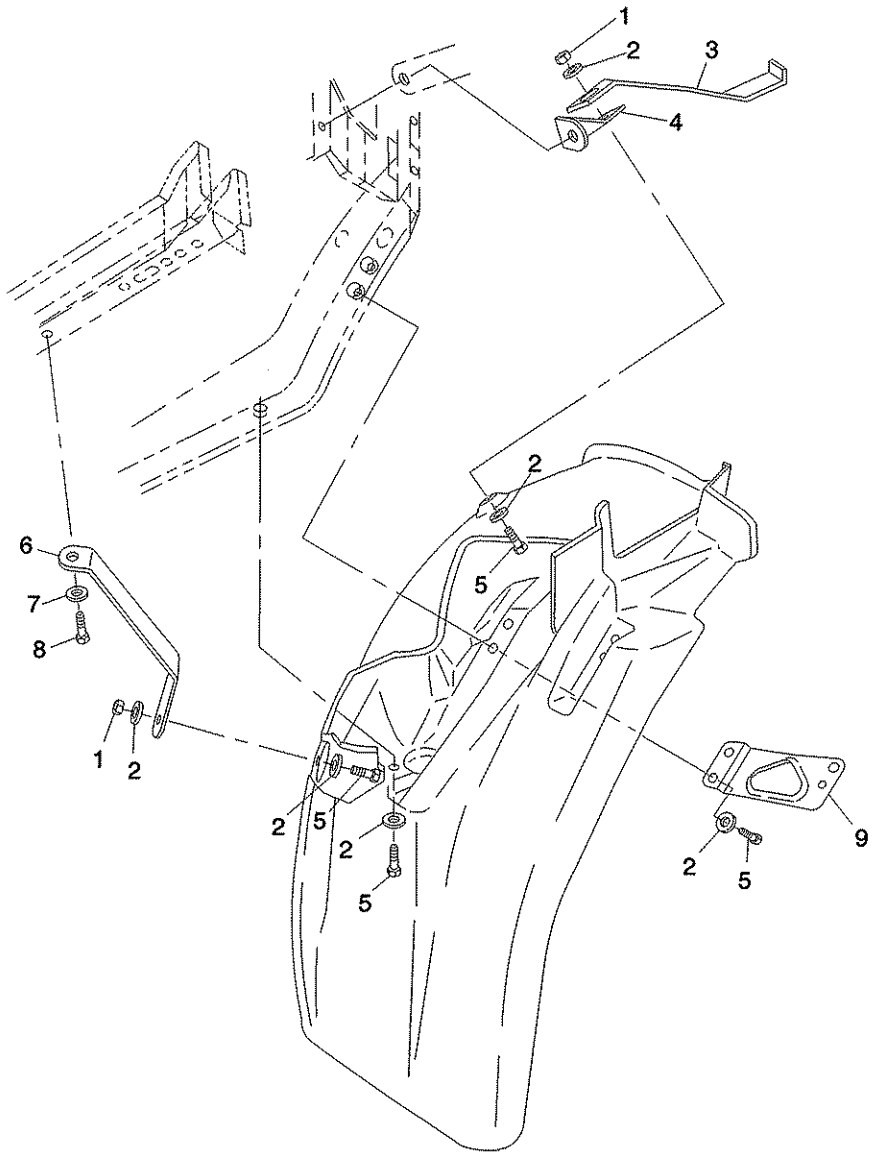


Fig. 1, Left-Hand Half-Fender Installation

Half-Fender Removal and Installation



1. M8 Nut
2. 3/8" x 1–1/4" Flatwasher
3. Splash Shield Rear Inner Mounting Bracket
4. Right–Hand Half–Fender Forward Bracket
5. M8 Capscrew
6. Right–Hand Half–Fender Rear Bracket
7. 9/16" Flatwasher
8. M14 Capscrew
9. Right–Hand Half–Fender Reinforcement

Fig. 2, Right-Hand Half-Fender Installation

Installation (See Fig. 1 and Fig. 2)

1. If the half-fender was replaced, install the hood latch bracket, half-fender reinforcement, and (if so equipped) the splash shield rear inner mounting bracket on the new half-fender. Tighten the 1/4–20 locknuts 1080 N·cm (96 lbf·in).
2. Position the new half-fender against the cab, and install, finger-tight, the fasteners that attach the fender and fender reinforcement to the cab.
3. Install the fasteners that attach the half-fender to the forward and rear brackets.
4. Tighten all M8 capscrews and nuts 21 N·m (16 lbf·ft).

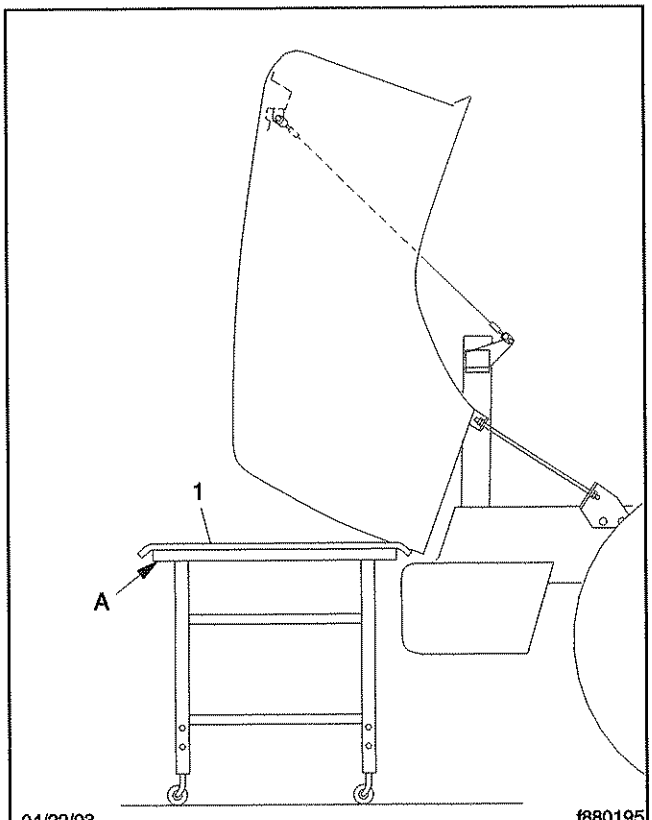
5. Lower the hood, and remove the chocks.

Hood Removal and Installation

Removal

1. Apply the parking brakes and chock the rear tires.
2. Tilt the hood.
3. Place a support between the floor and the front of the hood. See **Fig. 1**.

   The support should be as wide and as long as the front of the hood, and should be the same height as the lowest edge of the hood. Place cardboard, carpet, rags, or other padding on top of the support to protect the hood.
4. Disconnect the headlight and turn-signal/parking light connectors behind the bumper on both sides of the vehicle. See **Fig. 2**.



A. Top of support should be at same height as lowest edge of hood.
1. Cardboard, Carpet, or Furniture Pad

Fig. 1

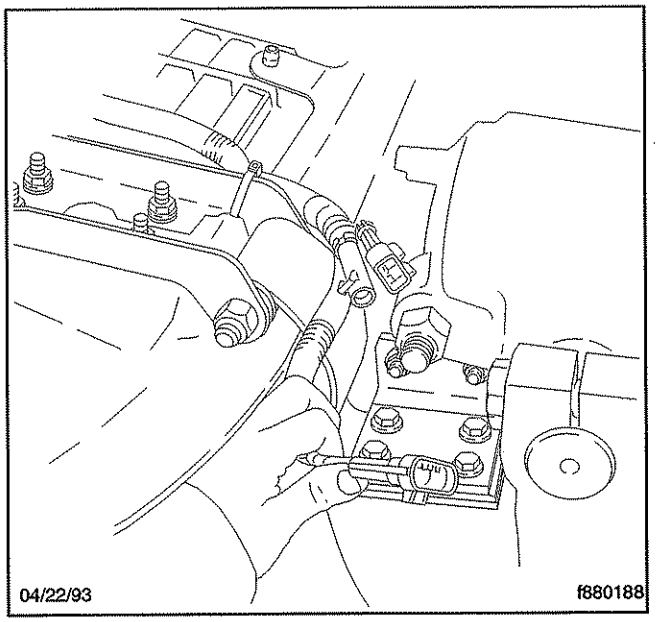


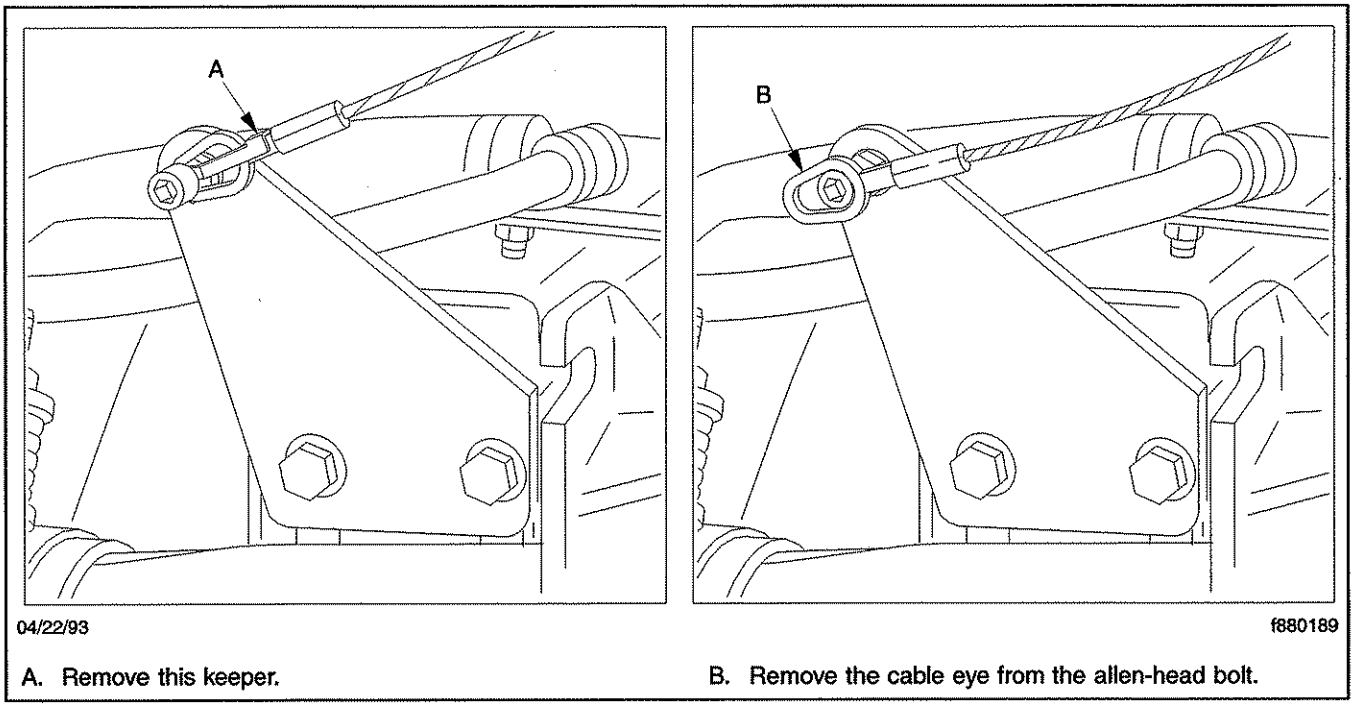
Fig. 2

5. Lower the hood until it is balanced over the pivots to relieve tension on the stop cables (and, if so equipped, the tilt-assist assemblies). Have a co-worker hold the hood in this position.
6. Disconnect the stop cables, and if so equipped, the tilt-assist assemblies from the brackets on the radiator. See **Fig. 3** and **Fig. 4**.
7. Carefully tilt the hood onto the support.
8. Remove the prevailing torque locknuts from the hood-pivot bolts. See **Fig. 5**. Drive out both hood-pivot bolts.
9. Carefully roll or slide the hood support away from the vehicle; don't try to lift the hood.

Installation

1. With the hood in the forward-tilt position and resting on the support at about the same height as the top of the bumper, move the support and hood into alignment with the front of the vehicle. Don't try to lift the hood.
2. Align the bolt holes of the hood hinge brackets with those in the lower hood hinges. Push the hood-pivot bolts into place from the inboard side. See **Fig. 5**. Install the prevailing torque locknuts, then tighten them 130 lbf·ft (176 N·m).

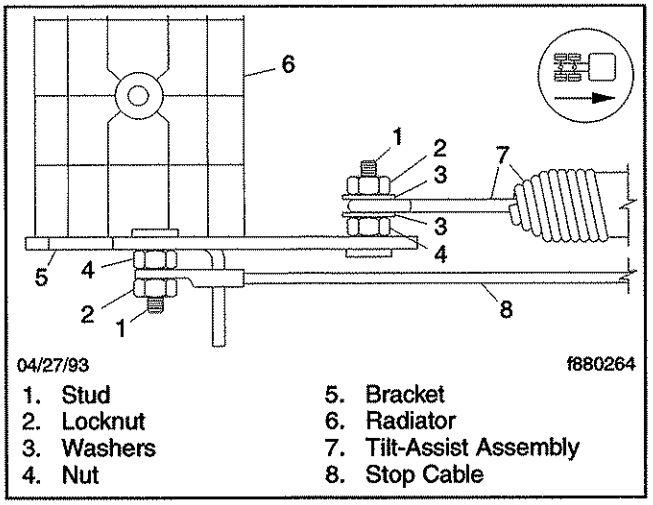
Hood Removal and Installation



A. Remove this keeper.

B. Remove the cable eye from the allen-head bolt.

Fig. 3



1. Stud
2. Locknut
3. Washers
4. Nut
5. Bracket
6. Radiator
7. Tilt-Assist Assembly
8. Stop Cable

Fig. 4, Top View

3. Lower the hood until it is balanced over the pivots, then have a co-worker hold the hood in this position.
4. Connect the stop-cable assemblies to the brackets on top of the radiator. If so equipped, install the keepers to prevent the cable eyes from coming off the ends of the allen-head bolts. See **Fig. 3.**

   If equipped with tilt-assist assemblies, install each stop cable on the stud farthest back on the radiator bracket. Install locknuts (**Fig. 4**), tighten them until all the parts are flush against each other, then back off the locknuts 1/4 turn.

   Install each tilt-assist assembly to the forward stud on the radiator side-channel brackets, using a washer on each side of the tilt-assist cable hook, then a locknut. See **Fig. 4.** Tighten the locknuts until all the parts are flush against each other, then back off the locknuts 1/4 turn.
5. Remove the hood support from the front of the vehicle and tilt the hood all the way open.
6. Connect the headlight and turn-signal/parking light cables on both sides of the vehicle.
7. Lower the hood. Check the hood adjustment, and adjust the hood if needed. See **Subject 150** for instructions.
8. Remove the chocks from the tires.

Hood Removal and Installation

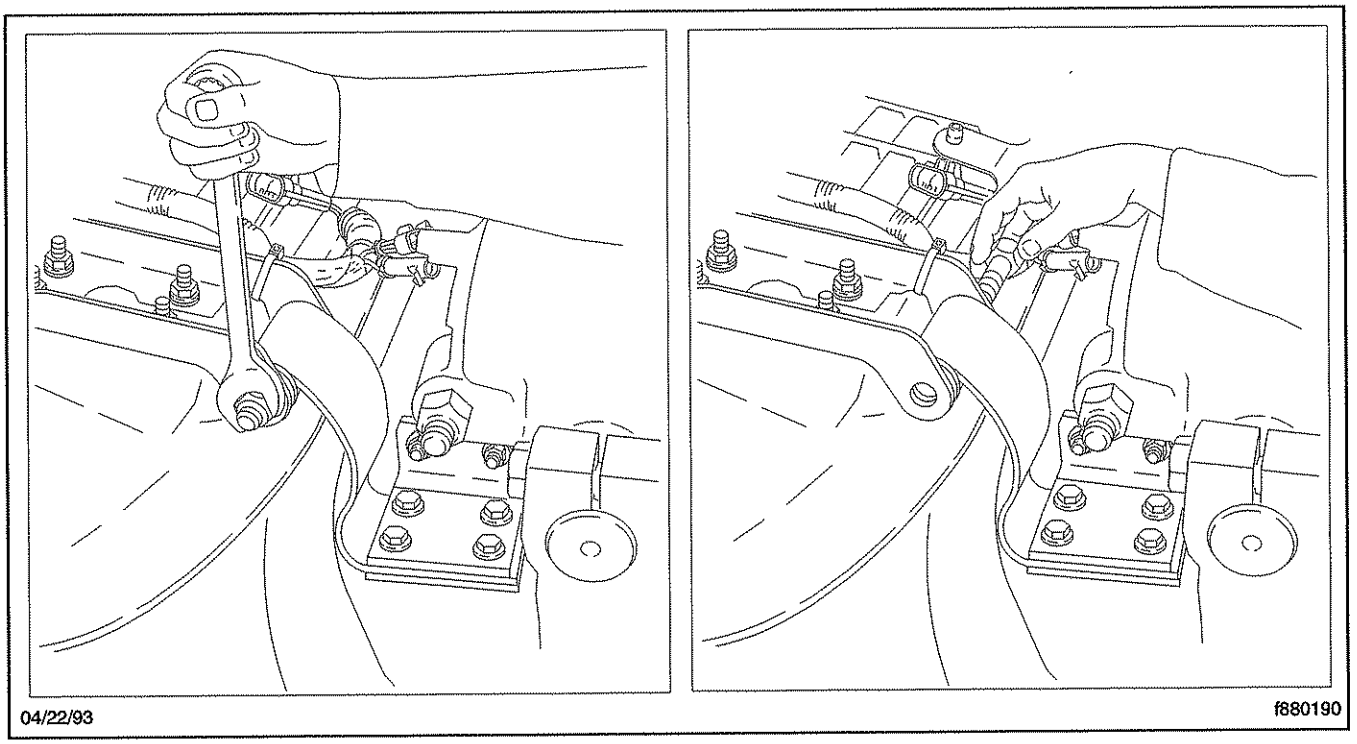
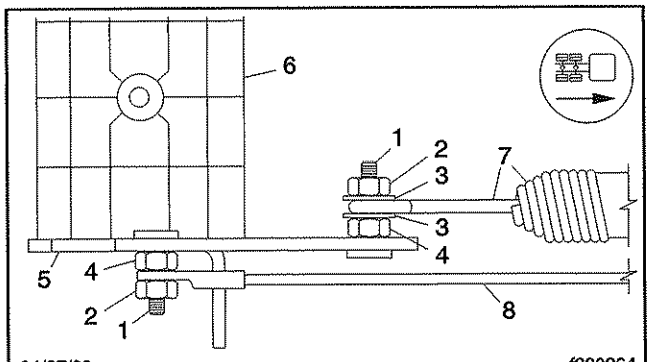


Fig. 5

Hood Tilt-Assist Replacement

Replacement

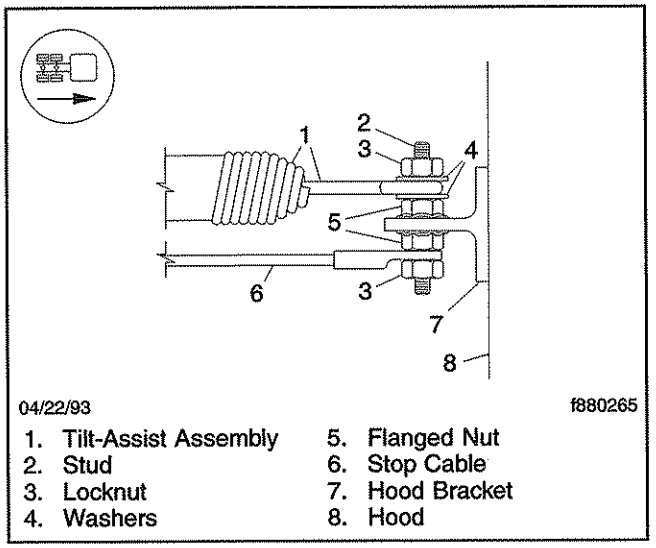
1. Apply the parking brakes and chock the rear tires.
2. Tilt the hood.
3. Remove the tilt-assist assembly.
   - 3.1 Loosen and remove the locknut and washer holding the tilt-assist assembly to the bracket on the radiator side-channel. See **Fig. 1.**
   - 3.2 Loosen and remove the locknut holding the tilt-assist assembly to the stud on the hood bracket. See **Fig. 2.**
4. Remove the old tilt-assist assembly from the vehicle.
5. Install the new tilt-assist assembly.
   - 5.1 If there is none present, install a washer on the forward stud on the radiator side-channel bracket. Hook one end of the new tilt-assist assembly over the stud. See **Fig. 1.**
   - 5.2 Install a second washer and locknut on the stud; then tighten the locknut until all parts are flush against each other. Back off the nut 1/4 turn, to allow the tilt-assist assembly to rotate.
   - 5.3 If there is none present, install a washer on the stud in the hood bracket. Hook the other end of the tilt-assist assembly over the stud .See **Fig. 2.**
   - 5.4 Install a second washer and locknut on the stud; then tighten the locknut until all the parts are flush against each other. Back off the nut 1/4 turn to allow the hood tilt-assist assembly to rotate.
6. If replacing both tilt-assist assemblies, repeat the procedure for the other side of the vehicle.
7. Lower the hood. Check the hood adjustment, and adjust the hood if needed. See **Subject 150** for instructions.
8. Remove the chocks from the tires.



04/27/93 f880264

1. Stud
2. Locknut
3. Washers
4. Nut
5. Bracket
6. Radiator
7. Tilt-Assist Assembly
8. Stop Cable

Fig. 1, Top View



04/22/93 f880265

1. Tilt-Assist Assembly
2. Stud
3. Locknut
4. Washers
5. Flanged Nut
6. Stop Cable
7. Hood Bracket
8. Hood

Fig. 2, Top View

Hood Alignment Adjustment

Adjustment

1. Drive the vehicle back and forth to settle the frame and suspension. Park the vehicle on a flat, level surface.
2. With the hood in the operating position, and both hood latches latched, check the gap between the top of the bumper and the bottom edge of the hood on both sides. The edges should be parallel. **See Fig. 1.**

   If the edges *are parallel*, proceed to the next step.

   If the edges are *not* parallel, adjust the height of the front of the hood.

   2.1 With the hood latched, on the side of the hood that's low, loosen the two sets of locknuts and capscrews that attach the hood-pivot support bracket to the frame rail. **Refer to Fig. 2**, Refs. 3 and 9.

   2.2 Raise that side of the hood until both sides are parallel. From its lowest to its highest position, each hood-pivot support bracket will adjust 9.0 mm (11/32 in). Tighten the fasteners 95 N·m (70 lbf·ft).

   2.3 If you can't move that side up enough to make both sides parallel, loosen the hood-pivot support bracket fasteners on the other side of the hood, and lower that side of the hood until both sides are parallel. Tighten the fasteners 95 N·m (70 lbf·ft).

   Go to the next step.

3. With the hood in the operating position, and both hood latches latched, measure the gap between the rear vertical edge of the hood and the front outer vertical edge of the cowl at both sides of the vehicle. **Refer to Fig. 3.** The gap should be between 10 and 16 mm (3/8 to 5/8 in).

   If the gap on both sides is within specifications, go to the step for checking the alignment of the hood/cab character lines.

   If the gap is *not* within specifications on one or both sides, adjust the fore-and-aft position of the hood.

   3.1 Determine the amount that the hood must be moved at one or both sides, to correct the gap.

   3.2 Unlatch and tilt the hood.

   3.3 At the side(s) of the hood that must be moved, loosen the three capscrews that attach the rear hood support assembly to the hood, just enough to allow the hood to slide fore and aft for adjustment. **Refer to Fig. 4**, Ref 3.

   On the side(s) to be moved, loosen the four locknuts and capscrews that attach the lower hood-hinge pivot to the hood-pivot support bracket. **Refer to Fig. 2**, Refs. 1 and 7. Slide that side(s) of the hood fore or aft the amount determined earlier.

   Tighten the lower hood-hinge pivot locknuts 55 N·m (40 lbf·ft).

   3.4 Return the hood to the operating position, and fasten the latches.

   3.5 Again, check the gap at both sides of the hood. **Refer to Fig. 3.**

   If the gap is *not* within specifications, repeat the above procedure.

   When the gap is within specifications at both sides of the hood, go to the next step.

4. With the hood in the operating position, and both hood latches latched, check alignment of the cab and hood character lines. **Refer to Fig. 3.** Or, if so equipped, check alignment of the cab and hood paint stripes.

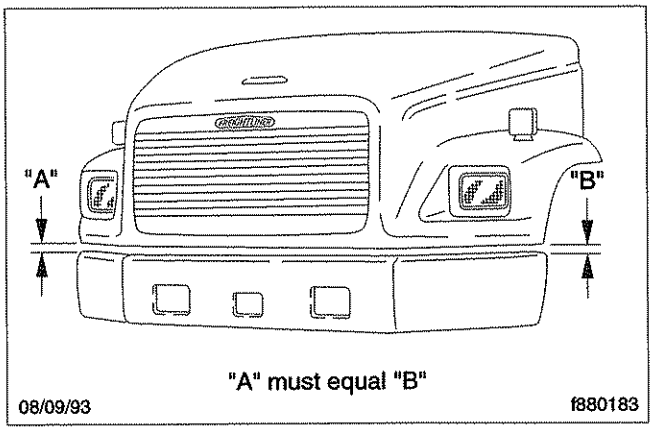
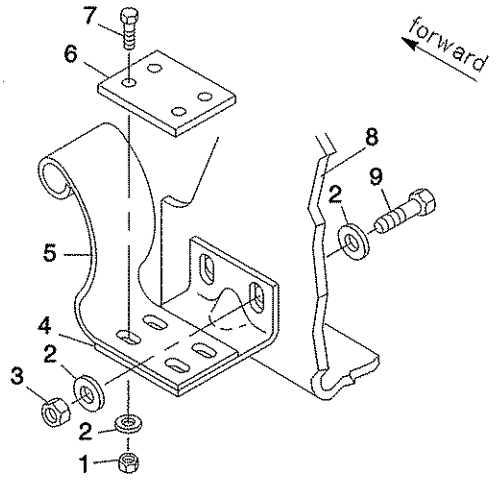


Fig. 1

Hood Alignment Adjustment



1. Lower Hood–Hinge Pivot Locknut
2. Flatwasher
3. Hood–Pivot Support Bracket Locknut
4. Hood–Pivot Support Bracket
5. Lower Hood–Hinge Pivot
6. Lower Hood–Hinge Reinforcement
7. 3/8–16 Capscrew
8. Frame Rail
9. 1/2–13 Capscrew

08/09/93 f880184

Fig. 2

If the character lines (or paint stripes) are aligned, go to the step for tightening the rear hood assembly capscrews.

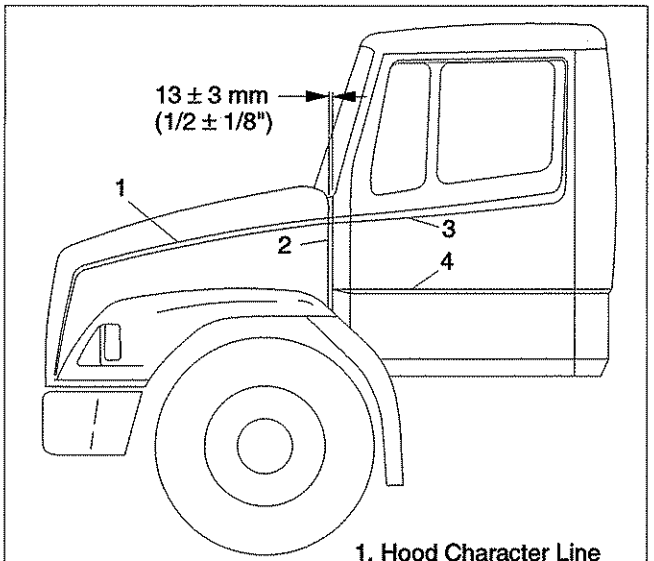
If the character lines (or paint stripes) are misaligned, adjust the up-and-down position of the rear of the hood.

4.1 Unlatch and tilt the hood.

4.2 If not already done, at the side(s) of the hood that must be moved, loosen the three capscrews that attach the rear hood support assembly to the hood, just enough to allow the hood support assembly to slide fore and aft for adjustment. **Refer to Fig. 4.**

NOTE: Complete the steps for up-and-down adjustment of one side, before doing the other side.

4.3 At the side of the hood that must be moved, loosen the capscrews that attach the rear hood support bracket and hood support brace to the bulkhead. Also, loosen the locknut that attaches the hood support brace to the rear hood support bracket. **Refer to Fig. 5.**



1. Hood Character Line
2. Cab Cowl
3. Cab Character Line
4. Cab Feature Line

08/09/93 f600400

Fig. 3

4.4 Push the rear hood support bracket upward as far as it will go.

4.5 Return the hood to the operating position, but latch only the side that is *not* being adjusted.

4.6 At the side of the hood that's being adjusted, push down on the top of the hood until the character lines (or paint stripes) are aligned.

4.7 Carefully tilt the hood, without changing the position of the rear hood support bracket. Tighten 55 N·m (40 lbf·ft) the capscrews and locknuts for the rear hood support bracket and the hood support brace. **Refer to Fig. 5.**

NOTE: If the other side of the hood needs to be adjusted, repeat required steps for up-and-down adjustment.

4.8 Go to the next step.

5. If loosened, tighten the capscrews that attach the rear hood support assembly to the hood 55 N·m (40 lbf·ft). **Refer to Fig. 4.**

Hood Alignment Adjustment

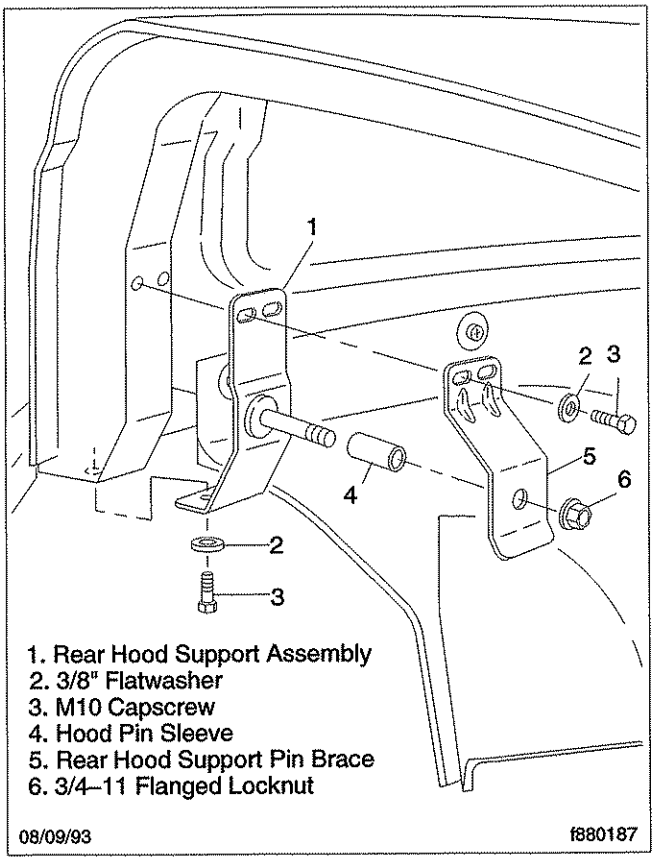


Fig. 4

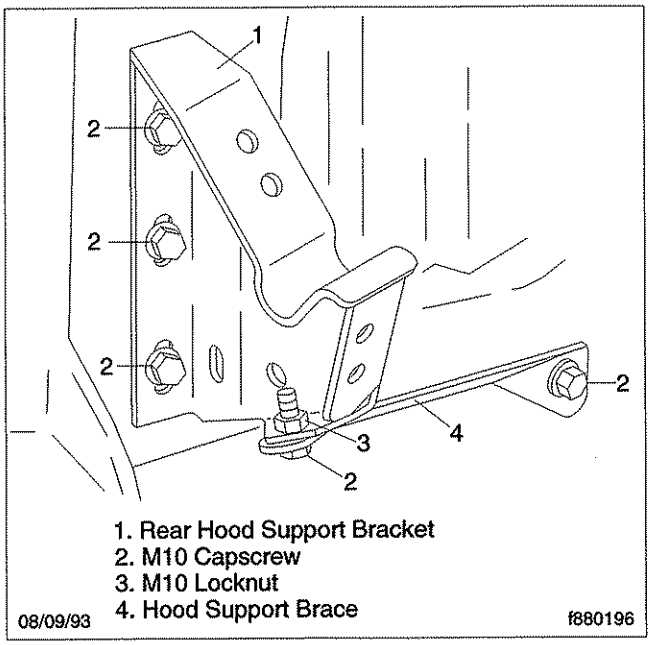


Fig. 5

Repair Safety Precautions

Before performing any fiberglass repairs, read the following precautions. Observe any additional precautions given by the manufacturers of the repair materials used.

1. All of the raw materials used in repairing fiberglass are harmful to the eyes and could cause blindness. Wear goggles or other protective eye shields to reduce the chances of splash contacting your eyes.
2. Wear protective gloves, as some people may have skin sensitivity to resin. Also, don't allow the hardener to contact your skin; the hardener can be a skin irritant.

IMPORTANT: In case the hardener or resin contacts your skin, wash with soap and water. If the hardener or resin should contact your eyes, rinse with plenty of water (15 minutes), and call a doctor.

3. When working with fiberglass materials, wear old clothing, since the resin may damage the cloth. Wash the clothing before wearing it again.
4. Most of the liquids involved in fiberglass repair and cleanup (especially when using acetone as a solvent) are flammable; some are also toxic. Don't perform repairs in areas where exposed (or stored) flammable liquids may contact an open flame or any burning material, such as a cigarette. Don't perform repairs in areas that are not well ventilated.

⚠ WARNING

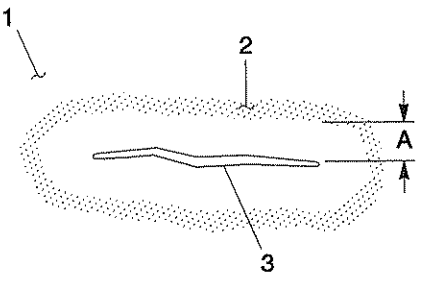
WARNING: Do fiberglass repairs in a safe workshop area to prevent severe personal injury due to explosion of flammable liquids or breathing of toxic fumes.

5. Do not use electric tools when the fumes of flammable solvents are present. The heat or sparks generated by the tools could create a fire hazard.
6. When grinding or sanding fiberglass surfaces, wear goggles or other protective eye shields, and also use an air purifying respirator, either a throwaway type or one with a replaceable particulate filter(s). Don't breathe grinding dust or particles, otherwise irritation may occur. Also, during grinding and sanding operations, wear a disposable (paper) shop coat to keep dust and fiber slivers off your clothing.
7. Because fiberglass dust can shorten the life of electrical units, air-powered tools are preferred (for frequent use).
8. Unless fiberglass repairs are done on a regular (daily) basis, don't save leftover liquids. If liquids must be saved, store them in cool, dark areas, away from direct sunlight.

Surface Damage Repair

Surface damage refers to scratches, chips, or nicks on the outer surface of the hood or half-fender. Use the following instructions to repair surface damage:

1. Examine the damaged area. If there are cracks, see if they go all the way through the hood or half-fender. If they do, see "Structural Damage Repair" for instructions.
2. Clean the area with xylene, acetone, or an equivalent grease- and wax-removing solvent. Inspect the area closely.
3. Using 220-grit or finer sandpaper, remove all of the paint around the damaged area to a distance of about 1-1/2 inches (4 cm). See **Fig. 1**.
4. Using an air nozzle, blow off all dust.
5. Apply Ashland Pliogrip 7775L self-leveling urethane adhesive over the non-coated area and



A. Remove paint and primer 1-1/2 inches (4 cm) around the damaged area. Use 220-grit or finer sandpaper.
1. Paint
2. Primer
3. Scratch

Fig. 1, Damaged Area with Paint and In-Mold Coating Removed

spread a thin layer using a squeegee applicator. Cover the entire damaged area, overlapping onto the painted surface. Leave a crowned excess of adhesive, slightly higher than the painted surface.

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

6. After the adhesive dries (about 50 minutes), sand it with a hand-held disc pad. Use 320-grit or finer sandpaper. Feather the edges of the fill so there are no visible sharp edges.
7. Clean the area with compressed air. Mask the area, then spot prime and paint it. Use Sherwin Williams BB–11 black conductive primer. See **Group 98** for spot-painting instructions.

Structural Damage Repair

The Preform FRP (fiberglass reinforced plastic) hood consists of a one-piece hood and fender assembly. Inner reinforcements are bonded to the engine-side of the hood with a structural adhesive. See **Fig. 2.** If the hood is damaged, determine which parts are affected.

If there is damage to any of the reinforcements, the damage is not repairable. For example, if the grille area of the hood is damaged so badly that the reinforcement bonded inside the grille area is also damaged, replace the entire hood assembly.

If a joint between two reinforcements, or between a reinforcement and the hood skin, has separated and there is no damage at the joint area, the parts can be rebonded. Or, if a part of the hood skin is damaged and its adjoining reinforcement(s) aren't damaged, the reinforcement can be separated from the damaged part, the damaged part can be patched, and the reinforcement(s) rebonded in place.

If a half-fender has a small crack or hole, it can be repaired; if it has a puncture or large fracture, it must be replaced.

For rebonding parts, see "Hood Reinforcement Rebonding."

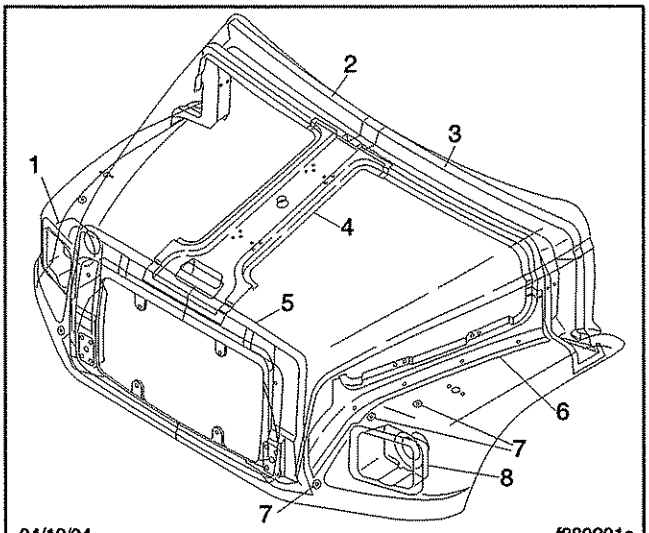
For damage in the form of a crack or small hole, see "Crack or Small Hole Repair."

For larger damaged areas, see "Puncture or Large Fracture Repair."

HOOD REINFORCEMENT REBONDING

1. If rebonding a joint that has partially separated, completely separate the reinforcement from the hood using a heat gun and putty knife. Remove as much of the old adhesive as possible. The heat gun will soften the adhesive and allow it to be peeled off the FRP.

   If the parts cannot be separated, work folded medium-grit sandpaper or a section of a steel hacksaw blade between the two surfaces to remove the old adhesive.
2. Scuff the surfaces with 80- to 220-grit sandpaper.
3. Clean the surfaces to be bonded with Ashland 6036 solvent or methylene chloride. Inspect the area closely to be sure all of the old adhesive, dirt, water, grease, and oils are removed.
4. If replacing a large part, align the part on the hood and clamp it in place. Drill holes through the bonding surfaces and install clamping bolts in the holes. Use two washers, one on each side of the joint. See **Fig. 3.** There should be enough



1. Right-Hand Headlight Housing
2. Right-Hand Rear Hood Reinforcement
3. Left-Hand Rear Hood Reinforcement
4. Center Hood Reinforcement
5. Front Hood Reinforcement
6. Left-Hand Side Hood Reinforcement
7. Bonded Fasteners
8. Left-Hand Headlight Housing

Fig. 2, Hood Assembly Components

clamping bolts to hold the hood in place and keep the bonding surfaces together, or at least one bolt every 12 to 18 inches (30 to 45 cm). Remove the part for application of adhesive.

5. Following the manufacturer's instructions, use enough adhesive to bond the parts together. Use Ashland Pliogrip urethane cartridge materials 7773 or 7779.

NOTE: When using Ashland Pliogrip 7773 or 7779, insert the two tubes of adhesive into the applicator and dispense a 3/8-inch (10 mm) diameter bead of uniform green-colored adhesive at the bonding surface. Discard any adhesive that does not show this uniform green color.

6. Within three and one half minutes (7773) or within 10 minutes (7779) of applying the bead, align the part on the hood and clamp it firmly in place. If it is a large part install the clamping bolts. Tighten the clamps or clamping bolts just enough to ensure that a uniform amount of pressure is applied along the seam. Ideally, the adhesive should be compressed to form a bondline one inch (25 mm) wide and 0.030 inch (0.76 mm) thick. This thickness can be ensured by sprinkling 0.030 inch (0.76 mm) glass beads into the adhesive before mating the parts.

7. Before it cures, remove any excess adhesive that squeezes out the edges of the bond.

8. Remove the clamps after the adhesive has cured for 30 minutes (7773) or for 60 minutes (7779).

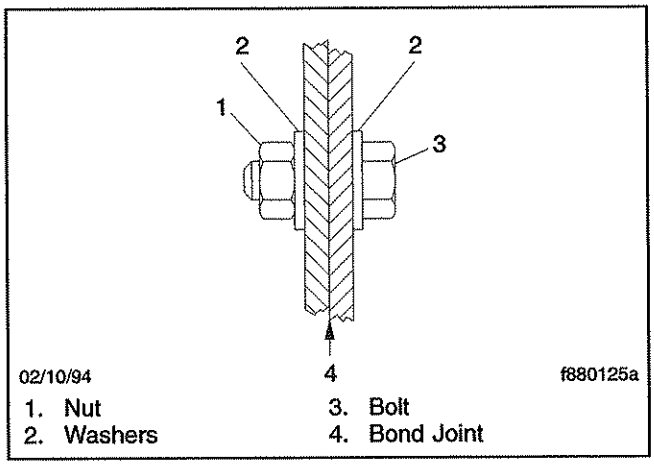


Fig. 3, Clamping Bolt at Bond Joint

9. If holes were drilled for clamping bolts, repair them using the instructions under "Crack or Small Hole Repair."

10. If necessary, prime and paint the repair area using the instructions under "Surface Damage Repair."

CRACK OR SMALL HOLE REPAIR

A crack (fracture) or small hole through the laminate requires repair with a fiberglass-reinforced patch.

1. Examine the damage to the hood or half-fender. Apply hand pressure all around the damaged area to check for any concealed damage.

2. If a sound-absorbent liner is present on the underside of the damaged area, peel away the liner to provide an adequate working area.

3. Clean the damaged area on both sides of the hood or half-fender with xylene, acetone, or equivalent grease- and wax-removing solvent. Inspect the area closely. All dirt, water, grease, and oils must be removed.

4. If repairing a crack, use a 1/8-inch (3-mm) diameter bit to drill a hole completely through the uncracked laminate 1/8 inch (3 mm) from each end of the crack, to prevent the crack from lengthening. See **Fig. 4.**

5. On the engine side of the hood (or underside of the half-fender), use a router bit (on a grinder or a drill) to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward from all sides of the damage. Taper the outside edge of the ground area. See **Fig. 5.**

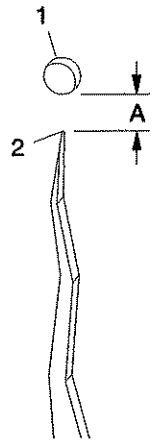
   If repairing a crack, grind outward to the drilled hole at the end of the crack, but not beyond. See **Fig. 6**, Ref. A.

6. Use 80- to 220-grit sandpaper to scuff an area at least one inch (25 mm) away from the fracture on all sides. Be sure to scuff thoroughly, since this will give the patch a surface to which it can stick. See **Fig. 6**, Ref. B.

7. Blow the dust away with compressed air and wipe the area with a clean cloth.

8. If necessary, align the panel sections on both sides of the crack, using weights or clamps to re-establish the original panel profile.

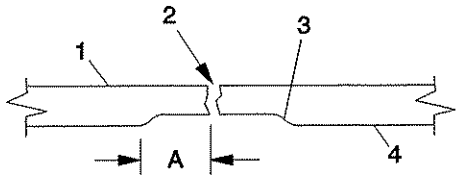
Hood and Half-Fender Repair



05/04/94 f880222b

A. 1/8 inch (3 mm)
1. Drilled 1/8-inch (3-mm) Hole
2. End of Crack

Fig. 4, Drilling a Hole to Prevent the Crack From Lengthening



05/04/94 f880227b

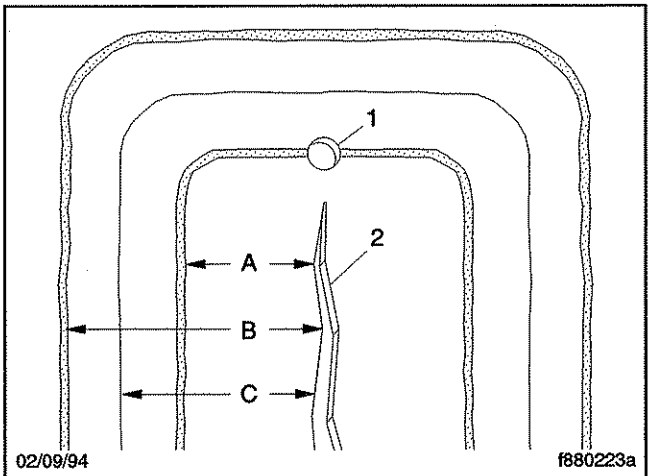
A. Grind a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward in all directions from the damaged area.
1. Laminate
2. Crack
3. Slight Taper
4. Engine Side of Hood (or underside of half-fender)

Fig. 5, Recessed Area (cross-sectional view)

9. With a razor-blade knife, cut a section of woven fiberglass cloth to fully cover the crack and to overlay about 3/4 inch (20 mm). See **Fig. 6**, Ref. C.

10. To bond the fiberglass cloth to the damaged panel, use Ashland Pliogrip 7775L urethane adhesive.

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.



02/09/94 f880223a

A. Use a router to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward from the damage. If repairing a crack, don't grind past the hole drilled at the end of the crack.
B. Use 80- to 220-grit sandpaper to scuff the area one inch (25 mm) around the damage.
C. Cut the fiberglass cloth to fully cover the damage, and overlay about 3/4 inch (20 mm).
1. Hole 2. Crack

Fig. 6, Preparing the Damaged Area on the Engine Side of the Hood

11. Lay the cut section of fiberglass cloth on the repair area, centered over the damage. Using a fiberglass roller, press the cloth down firmly into the layer of adhesive to completely saturate the glass fibers.

12. Apply another layer of adhesive over the glass cloth. Spread the adhesive evenly using the fiberglass roller.

13. After two to five minutes, the adhesive will start to jell. It may take more time when cool, less when warm.

IMPORTANT: To avoid pre-jelling or skin-over, mate the FRP parts to be bonded within one to four minutes after dispensing the adhesive.

NOTE: To get a smoother surface, press a piece of masking tape, wider than the repair, directly over the wet adhesive and smooth it before it hardens. The tape

can be removed after five minutes when the adhesive has set.

14. The patch should be hard enough in 50 minutes to allow sanding to a smooth flat surface if required.

15. Repair the damage on the outside surface of the hood or half-fender, using the instructions in "Surface Damage Repair." Prime and paint both surfaces, using the instructions in **Group 98.**

PUNCTURE AND LARGE FRACTURE REPAIR (SECTION REPLACEMENT)

If a half-fender has a puncture or large fracture, replace the half-fender.

On very large damaged areas (for example, structural damage on the side surface of the hood covering an area of a square foot or more) it may be easier to do a section replacement rather than make a patch. Fenders and headlight reinforcements may be used in section replacements. Also, a second damaged hood with the needed section intact may be available as scrap.

IMPORTANT: A piece of Preform FRP laminate from a Short Conventional hood must be used for section replacement. Use of any other material may not allow the necessary bonding for the repair.

1. Push in on the area immediately surrounding and underneath the damaged area to determine the extent of damage.

2. If a sound-absorbent liner is present on the underside of the damaged area, peel away the liner to provide an adequate working area.

3. Clean the damaged area on both sides of the hood with xylene, acetone, or an equivalent grease- and wax-removing solvent. Inspect the area closely. All dirt, water, grease, and oils must be removed.

4. Using a sabre saw, cut out a large, straight-sided panel containing the damaged area. See **Fig. 7**, Ref. A.

   If the damage extends to a joint where a reinforcement is bonded to the hood, completely separate the reinforcement with a heat gun and putty knife before cutting. See "Hood Reinforcement Rebonding" for instructions.

⚠ WARNING

WARNING: Wear goggles and an air purifying respirator when grinding, cutting, or sanding during all fiberglass repairs. The ground dust and particles could cause temporary or permanent damage to your eyes and, if inhaled, could cause throat or lung irritation.

5. From a scrap hood, cut a section replacement panel from the same area, only slightly larger than the cut-out in the damaged hood. See **Fig. 7**, Ref. B. Then, trim the section replacement to fit both the size and contour of the original cutout.

   If the damage is next to a headlight reinforcement, but doesn't include the reinforcement, remove the headlight reinforcement from the replacement section (scrap hood), not the damaged hood.

6. After the trimming is completed, sand the edges to allow a 1/16- to 1/8-inch (2- to 3-mm) gap around the cutout.

7. On the engine side of the hood, use a router bit (on a grinder or drill) to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward from all sides of the cutout area. See **Fig. 8**, Ref. A.

   Also, grind 1/2 inch (13 mm) inward from all edges on the engine side of the section replacement. See **Fig. 8**, Ref. C.

   Slightly taper the outside edge of the ground area on the hood and the inside edge of the ground area on the section replacement. See **Fig. 9**, Ref. 3.

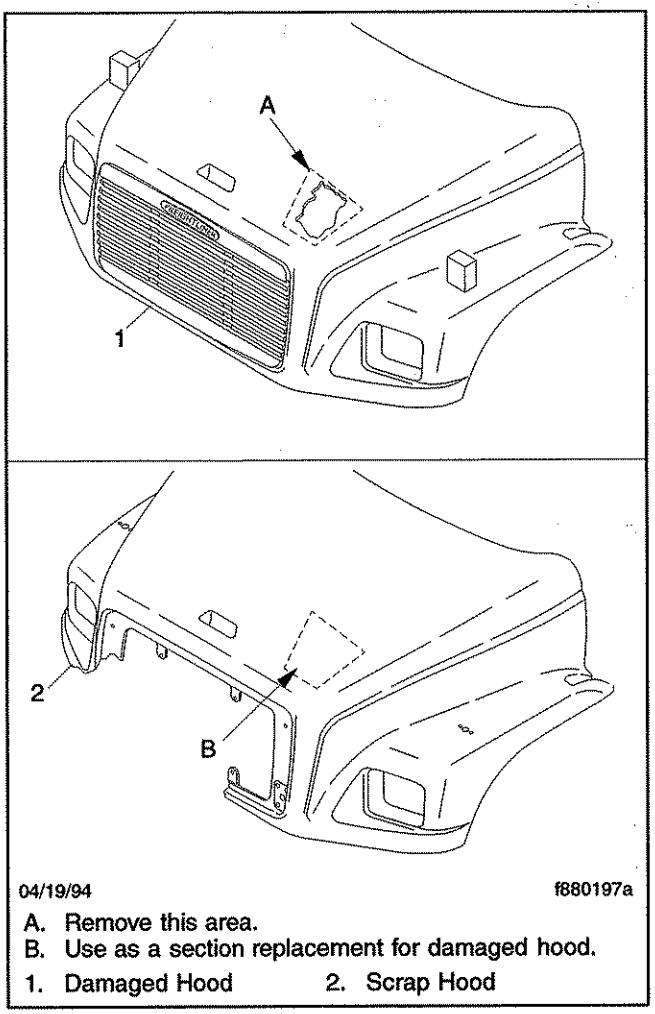
8. Use 80- to 220-grit sandpaper to scuff an area at least one inch (25 mm) out from all sides of the cutout area. See **Fig. 8**, Ref. B.

   Also, scuff at least one inch (25 mm) in from all sides of the section replacement. See **Fig. 8**, Ref. D.

   Scuff thoroughly, since this will give the section replacement a surface to which it can stick. Be sure to completely sand off any undercoating sprayed on these areas.

9. On the outer sides of both the cutout and the section replacement, bevel the edges about 45 degrees. See **Fig. 10.**

Hood and Half-Fender Repair



A. Remove this area.
B. Use as a section replacement for damaged hood.
1. Damaged Hood 2. Scrap Hood

Fig. 7, Section Replacement of a Damaged Fiberglass Hood

10. Gently feather the outer painted surfaces back about 1/2 inch (13 mm) beyond the edges of the repair areas (on both the cutout and the section replacement), using 220-grit or finer sandpaper.

11. Blow the dust away with compressed air, and wipe the area with a clean cloth.

12. If the section replacement is close enough to an edge, use clamps to temporarily secure it during the repair.

    If the replacement is too far from an edge to use clamps, use bond strips. See **Fig. 11**.

    12.1 Cut some scrap FRP into strips. Make enough strips to hold the section replacement in position; about one every six inches (15 cm). If the surface of the replacement panel is contoured or curved, use many small bond strips; larger strips could deform the curves.

    12.2 On the engine side of the repair, use 220-grit sandpaper to scuff sand the areas on the hood and section replacement panels where you plan to bond the strips.

    12.3 If a joint between the hood and a reinforcement was separated for the repair, rebond the joint. See "Hood Reinforcement Rebonding" for instructions.

    12.4 Holding the section replacement in position, bond the strips to both hood and replacement panels in the area already scuffed. Use Ashland Pliogrip 7773 to bond the strips.

    NOTE: When using Ashland Pliogrip 7773, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

    12.5 After the adhesive has hardened, use 80- to 220-grit sandpaper to scuff the bond strips.

    12.6 Blow the dust away with compressed air, and wipe the area with a clean cloth.

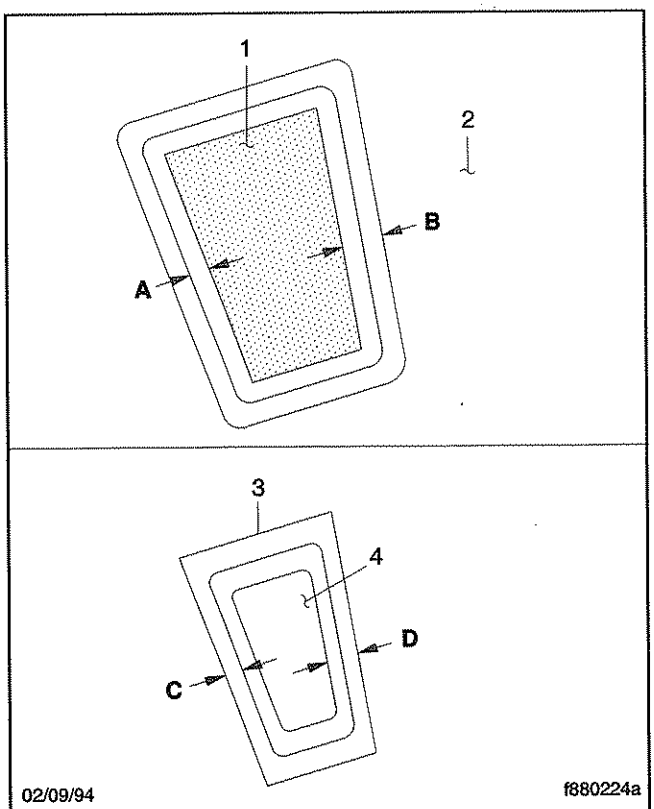
13. With a razor-blade knife, cut sections of woven fiberglass cloth to fully cover the gap between the cutout and the section replacement, all the way around the damaged area. The cloth should overlay about 3/4 inch (20 mm) on both sides of the gap. See **Fig. 12**.

14. To bond the fiberglass cloth to the damaged panel, use Ashland Pliogrip 7775L urethane adhesive.

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

15. Use a plastic or metal device to spread a thin layer of adhesive over the scuffed area.

16. Lay the cut sections of fiberglass cloth on the repair area, centered over the damage. Using a fiberglass roller, press the cloth down firmly into



02/09/94 f880224a

A and C: Use a router to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) away from the edge.
B and D: Use 80- to 220-grit sandpaper to scuff the area one inch (25 mm) around the damage.

1. Cutout Hole
2. Engine Side of Hood
3. Section Replacement
4. Engine Side of Section Replacement

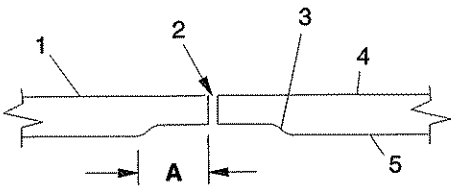
Fig. 8, Preparing the Section Replacement and Hood Cutout on the Unexposed Side

the layer of adhesive to completely saturate the glass fibers.

17. Apply another layer of adhesive over the glass cloth. Spread the adhesive evenly using the fiberglass roller.

18. After two to five minutes, the adhesive will start to jell. It may take more time when cool, less when warm.

IMPORTANT: To avoid pre-jelling or skin-over, the FRP parts to be bonded should be mated within one to four minutes after the adhesive is dispensed.

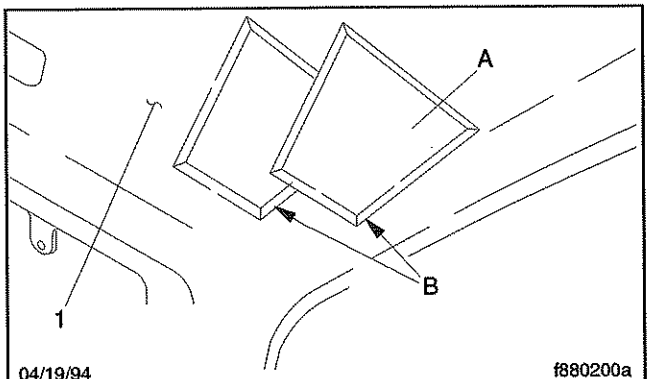


05/04/94 f880226b

A. Grind a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward in all directions from the damaged area.

1. Section Replacement
2. Gap
3. Slight Taper
4. Hood
5. Engine Side of Hood

Fig. 9, Cutout Area (cross-sectional view)



04/19/94 f880200a

A. Insert section replacement.
B. Bevel outer surface edges on all sides.

1. Exposed Side of Hood

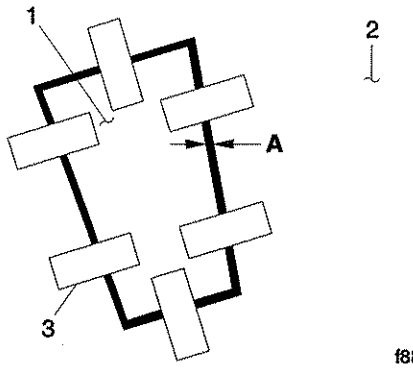
Fig. 10, Areas to be Beveled

NOTE: To get a smoother surface, press a piece of masking tape, wider than the repair, directly over the wet adhesive and smooth it before it hardens. The tape can be removed after five minutes when the adhesive has set.

19. The patch should be hard enough in 50 minutes to allow sanding to a smooth flat surface, if desired.

20. Repair the damage on the outside surface of the hood and paint the surface on both sides, using the instructions in "Surface Damage Repair."

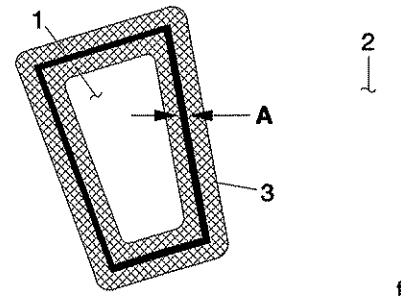
Hood and Half-Fender Repair



A. Gap of 1/16 inch to 1/8 inch (2 to 3 mm)

1. Section Replacement
2. Engine Side of Hood
3. Bond Strip

Fig. 11, Securing the Section Replacement to the Hood Using Bond Strips



NOTE: The fiberglass cloth should overlay about 3/4 inch (20 mm) on both sides of the gap.

A. Gap of 1/16 inch to 1/8 inch (2 to 3 mm)

1. Section Replacement
2. Engine Side of Hood
3. Fiberglass Cloth

Fig. 12, Overlaying the Gap with Fiberglass Cloth

Engine Access Door Removal and Installation

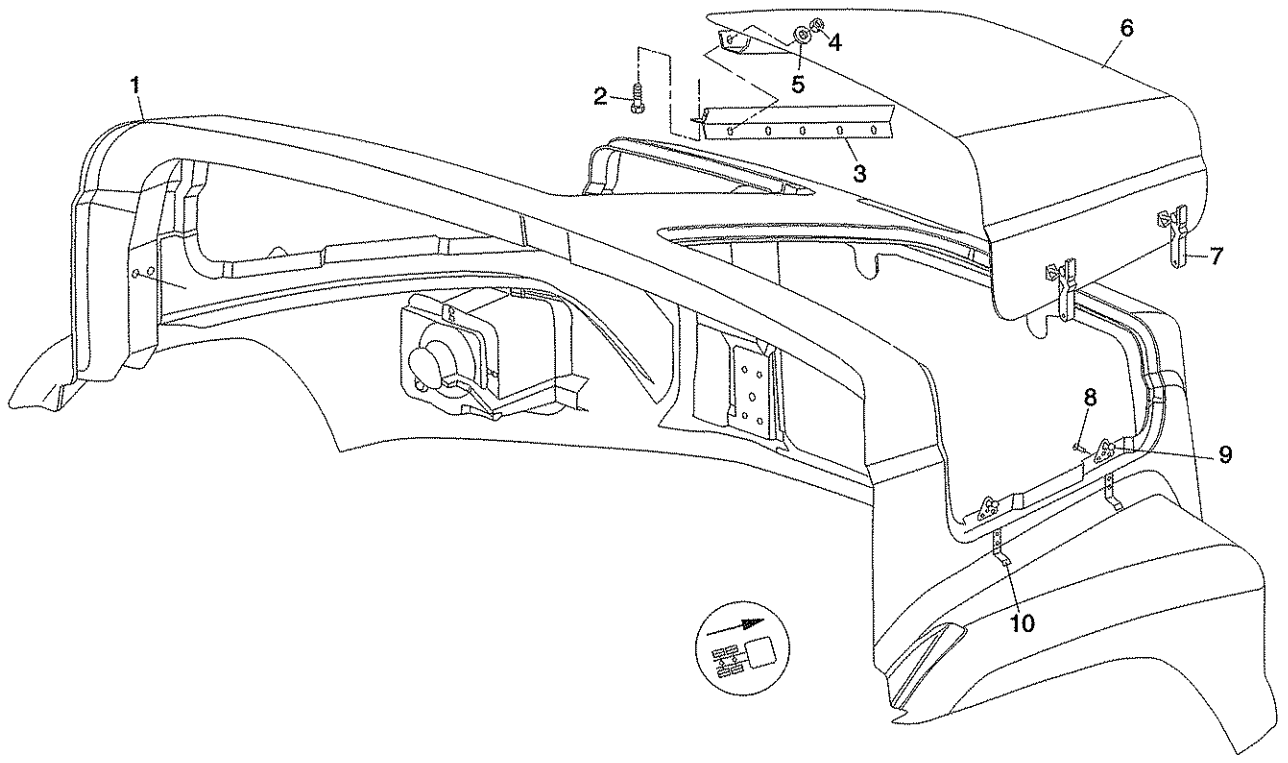
Some Severe-Duty Business Class Trucks are fitted with front mounted PTOs, snow plows, etc. which limit or prevent hood opening. A hood with dual access doors is available for these applications to allow routine engine maintenance and service without requiring PTO or plow removal. This hood is sometimes referred to as the butterfly hood. **See Fig. 1.**

The access doors are made of the same fiberglass reinforced plastic (FRP) as the main hood and are attached to the hood along its centerline by piano-type hinges.

Two rubber over-center latches are fitted to each door to hold it in the closed position. A prop rod, fastened to the inside of each door, can be unclipped and used to hold the door open.

Access Door Removal

1. Apply the parking brakes and chock the rear tires.
2. Unlatch, but do not open, the door that is being removed.
3. Unlatch, open, and prop up the door that is *not* being removed.
4. Working through the open access door, remove the five bolts that secure the door hinge to the hood center reinforcement for the door that is being removed.
5. Remove the access door.



1. Butterfly Hood
2. Hinge Mounting Bolt
3. Hinge
4. Nut
5. Flatwasher
6. Engine Access Door, Right-Hand
7. Rubber Latch
8. Rivet
9. Door Stop Bracket
10. Latch Hook

Fig. 1, Engine Access Door Components

Engine Access Door Removal and Installation

Access Door Installation

NOTE: If the access door is being replaced, transfer all mounting and latching hardware to the new door before installing it.

1. Place the access door in the hood opening.
2. Position the door, as necessary, to line up the door stop brackets and latch components.
3. Connect the latches to hold the door in place.
4. Working through the open door on the other side of the vehicle, install the five bolts that secure the door hinge to the hood center reinforcement.
5. Unlatch the newly installed door and open it to check the adjustment.
6. Remove the chocks from the tires.

Repair Tools and Materials List

SURFACE DAMAGE REPAIR

The following are required for surface damage repair:

- Xylene, acetone, or equivalent solvent
- Hand-held disc pad
- Self-leveling adhesive[3]
- Applicator squeegee
- 220- or finer grit sandpaper
- 320- or finer grit sandpaper
- Primer[4]

HOOD REINFORCEMENT REBONDING

The following are required for hood reinforcement rebonding:

- Heat gun
- Putty knife
- Hacksaw blade
- 80- to 220-grit sandpaper
- Solvent[5]
- Adhesive[6]
- Clamps, clamping bolts with washers
- Primer[4]
- 0.030 in (0.76 mm) glass beads (if needed)

CRACK OR SMALL HOLE REPAIR

The following are required for repair of cracks or small holes:

- Xylene, acetone, or equivalent solvent
- Drill and 1/8-inch (3-mm) diameter bit
- Router bit and grinder, or drill
- 80- to 220-grit sandpaper
- 220- or finer grit sandpaper
- 320- or finer grit sandpaper
- Woven fiberglass cloth
- Wooden stir stick
- Clamps
- Self-leveling adhesive[3]
- Applicator squeegee
- Hand-held disc pad
- Razor-blade knife
- Primer[4]

PUNCTURE OR LARGE FRACTURE REPAIR

The following are required for repair of punctures or large fractures:

- Suitable section of Preform FRP from scrap hood
- Xylene, acetone, or equivalent solvent
- Sabre saw
- Heat gun
- Putty knife
- Router bit and grinder, or drill
- 80- to 220-grit sandpaper
- 220- or finer grit sandpaper
- Solvent[5]
- Adhesive[6]
- Razor-blade knife
- Woven fiberglass cloth

[3] Use Ashland Pliogrip 7775L self-leveling urethane adhesive. Premeasured tubes of adhesive, mixing nozzles, and caulking gun applicators are available through Freightliner PDCs. See **Table 2** and **Table 3.**

[4] Use Sherwin Williams BB—11 black conductive primer. Contact your local Sherwin Williams automotive paint distributor to purchase this primer.

[5] Use Ashland 6036 solvent or methylene chloride. Contact Ashland Merchandising Group, telephone (419) 289-9588, to purchase this solvent.

[6] Use Ashland Pliogrip 7700 series adhesives. Part numbers 7773 and 7779 are those products refered to in the instructions above. Part numbers 7771 and 7770 may be substituted. A heat gun or paint oven may be used to speed curing times but do not heat these adhesives above 180°F (82°C). These products are available through Freightliner PDCs. See **Table 2.**

Specifications

- Wooden stir stick
- Self-leveling adhesive[3]
- Applicator squeegee
- Hand-held disc pad
- Clamps
- Primer[4]

NOTE: Ashland Pliogrip 7700 and 8000 Series repair adhesives and accessories are available through Freightliner PDCs. The 7700 Series two-part urethane adhesives are specially formulated and packaged for repair of hoods and other fiber-reinforced plastics. Ashland Pliogrip 8000 Series two-part urethane adhesives are also available for those who prefer to use these earlier generation adhesives. The 7775L adhesive is a self-leveling mixture that is appropriate when a surface filler or glass fabric reinforcement repair is required.

The descriptions, working times, and curing times (sanding and repainting) of the different adhesives are shown below. See **Table 2** and **Table 4**. All working and curing times correspond to an ambient temperature of 73°F (23°C) in the workshop. Curing times may be shortened by using a heat gun or paint oven. Humidity does not affect these adhesives. All the adhesives develop the same bonding strength. Substitutions can be made to change working times.

See **Table 3** and **Table 5** for Ashland adhesive accessories.

IMPORTANT: To ensure a successful repair, do not heat these adhesives above 180°F (82°C).

Fastener Torques				
Description	Size	Grade	Torque	
			lbf.in (N.cm)	lbf.ft (N.m)
Hood Latch Locknuts	1/4–20	B	96 (1080)	–
Half-Fender Capscrews	M8	8.8	—	16 (21)
Half-Fender Locknuts	M8	—	—	16 (21)
Hood-Pivot Bolt Locknuts	9/16–18	C	—	130 (176)
Hood-Pivot Support Bracket Locknuts	1/2–13	C	—	70 (95)
Lower Hood-Hinge Pivot Locknuts	3/8—16	C	—	40 (55)
Rear Hood Support Assembly Capscrews	M10	10.9	—	40 (55)
Rear Hood Support Bracket Capscrews	M10	10.9	—	40 (55)
Rear Hood Support Brace Locknuts and Capscrews	M10	10.9	—	40 (55)

Table 1, Fastener Torques

7700 Series Adhesives				
Description	Part Number	Working Time in Minutes	Curing Time in Minutes	Curing Time in Hours
Adhesive, two 50 ml Cartridges, 3.4 oz (100 ml)	ACA 7771	1.5	10	—
Adhesive, two 50 ml Cartridges, 3.4 oz (100 ml)	ACA 7773	3.5	30	—
Adhesive, two 300 ml Cartridges, 20 oz (600 ml)	ACA 7773 300	3.5	30	—
Adhesive, two 50 ml Cartridges, 3.4 oz (100 ml)	ACA 7775L	5.0	50	—
Adhesive, two 50 ml Cartridges, 3.4 oz (100 ml)	ACA 7779	10	—	1.0
Adhesive, two 300 ml Cartridges, 20 oz (600 ml)	ACA 7779 300	10	—	1.0

Specifications

7700 Series Adhesives				
Description	**Part Number**	**Working Time in Minutes**	**Curing Time in Minutes**	**Curing Time in Hours**
Adhesive, two 50 ml Cartridges, 3.4 oz (100 ml)	ACA 7770	35	—	3.0
Adhesive, two 300 ml Cartridges, 20 oz (600 ml)	ACA 7770 300	35	—	3.0

Table 2, 7700 Series Adhesives

7700 Series Accessories	
Description	**Part Number**
Manual Applicator Gun for 300 ml Cartridges	ACA TS526C
1/4-in Mixing Nozzles for 50 ml Cartridges (100/box)*	ACA 583 238
Pneumatic Applicator Gun for 300 ml Cartridges	ACA TS525
3/8-in Mixing Nozzles for 300 ml Cartridges (100/box)*	ACA F 771072

* Each adhesive cartridge comes with two mixing nozzles. Once mixed, the adhesive in the nozzle will harden by the end of its working time. If making several small repairs, have extra nozzles on hand.

Table 3, 7700 Series Accessories

8000 Series Adhesives				
Description	**Part Number**	**Working Time in Minutes**	**Curing Time in Minutes**	**Curing Time in Hours**
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8104	4.0	30	—
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8110	10	—	1.0
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8145	50	—	8.0

Table 4, 8000 Series Adhesives

8000 Series Accessories	
Description	**Part Number**
Pneumatic Applicator Gun for 355 ml Cartridges	ACA 582 2241
3/8-in Mixing Nozzles for 8000 Series Cartridges (100/box)*	ACA F 771072

* Each adhesive cartridge comes with two mixing nozzles. Once mixed, the adhesive in the nozzle will harden by the end of its working time. If making several small repairs, have extra nozzles on hand.

Table 5, 8000 Series Accessories

Contents

Subject	Subject Number
General Information	050
Service Operations	
Hood Removal, Installation, and Adjustment	100
Grille Removal and Installation	110
Hood Torsion Bar Tilt-Assist Mechanism Removal and Installation	120
Hood and Half-Fender Repair	130
Half-Fender Removal and Installation	140
Headlight Bezel Assembly Removal and Installation	150
Specifications	400

General Information

NOTE: The information in this section applies only to FL112 vehicles.

The hoods on these vehicles are made of fiberglass, and are manufactured by the spray-up process.

The materials used in fiberglass spray-up hoods are a combination of glass filaments, resin (the binder), catalysts (to initiate the cure), and weather resistance additives. The filaments of pure glass provide strength, dimensional stability, and heat resistance. The resin is a liquid plastic that hardens when combined with another substance, the catalyst. The resin acts as a binder to hold the filaments together; it supplies only a limited amount of additional strength to the structure.

HOOD MOUNTING AND COMPONENTS

The hood assembly mounts at the front to two hood pivot brackets, located on the outside of the frame rails, attached to the front cross-member extension. The hood pivots work in conjunction with the torsion bar tilt-assist mechanism. Two retaining straps allow a forward hood tilt adequate for vehicle service.

In the operating position, the rear of the hood is supported by hood support brackets, which are attached to the cab. These rear brackets hold the hood in the correct position for operation. The hood is held in place with latches, one on each side.

The hood pivot brackets are adjustable forward and backward and side to side. The rear hood support brackets are adjustable up and down.

Each hood assembly is equipped with an injection-molded, argent-colored grille. The grille is attached to the hood with eight fasteners. The hood is also equipped with a headlight bezel assembly, which features a headlight and turn signal/parking light combination, along with side-marker lights, on each fender.

Hood Removal, Installation, and Adjustment

Removal

1. Park the vehicle on a flat, level surface. Chock the tires.

⚠ WARNING

Do not attempt to lift the hood; it weighs about 150 lbs (68 kg). Lifting the hood could result in personal injury or damage to the hood assembly and other components.

2. Remove the grille. For removal instructions, see **Subject 110.**
3. Tilt the hood to the fully-open position.
4. Place a support between the floor and the front of the hood. The support should be as wide and as long as the front of the hood, and should be the same height as the lowest edge of the hood. Place cardboard, carpet, rags, or other padding on top of the support to protect the hood.
5. Disconnect the two headlight bezel wiring connectors at the bumper and the single connector at the side-marker light, from both sides of the hood.
6. Disconnect the two tilt-limiting assist straps by removing the fasteners attached to the inside surface of the hood. Move the hood to a less than full-tilt position to provide some slack in the straps.
7. Remove the torsion bar tilt-assist mechanism. For removal instructions, see **Subject 120.**
8. Remove the shoulder bolts from the hood hinge brackets while continuing to support the hood in position. Use a punch and hammer to tap out the shoulder bolts.
9. Carefully roll or slide the hood support away from the vehicle.

Installation

1. Position the disconnected electrical wiring out of the way to avoid interference during installation.

⚠ WARNING

Do not attempt to lift the hood; it weighs about 150 lbs (68 kg). Lifting the hood could result in personal injury or damage to the hood assembly and other components.

2. With the hood in the forward-tilt position and resting on the support at about the same height as the top of the bumper, move the support and hood into alignment with the front of the vehicle.
3. Apply a lubricant to the shoulder bolts and ensure that the hood pivot bushings are in position.
4. Insert the shoulder bolts and tap them into place with a mallet. Attach the nuts to the bolts. Torque the nuts to 28 lbf·ft (38 N·m).
5. Install the torsion bar tilt-assist mechanism. For installation instructions, see **Subject 120.**
6. Lower the hood until it is balanced over the pivots, then have a co-worker hold the hood in this position.
7. Connect the two tilt-limiting assist straps attached to the inside surface of the hood.
8. Tilt the hood to a full-tilt position.
9. Connect the electrical connectors to the headlight bezel assemblies.
10. Place the hood into the operating position. Latch the hood.
11. Install the grille. For instructions, see **Subject 110.**
12. Remove the chocks from the tires.

Adjustment

NOTE: If the vehicle has had damage to the chassis, the frame must be straightened before adjusting the hood.

1. Drive the vehicle back and forth to settle the frame and suspension. Park the vehicle on a flat, level surface. Chock the tires.
2. Determine whether hood adjustment is necessary by checking, with the hood in the operating position and the hood latches latched, the alignment of the hood character line with the cab character line. **See Fig. 1.** The two lines should approximately match.
3. If it is determined that the hood needs to be vertically adjusted, follow these steps:

Hood Removal, Installation, and Adjustment

3.1 Take note of the difference in the alignment of the character lines on the left and the right sides.

3.2 Tilt the hood to the fully-open position.

3.3 Slightly loosen the bolts securing one of the rear hood support brackets, which are attached to the cab frontwall. **See Fig. 2.**

3.4 Loosen the support brace bolts at the hood support bracket.

3.5 Loosen the support brace bolts at the cab frontwall.

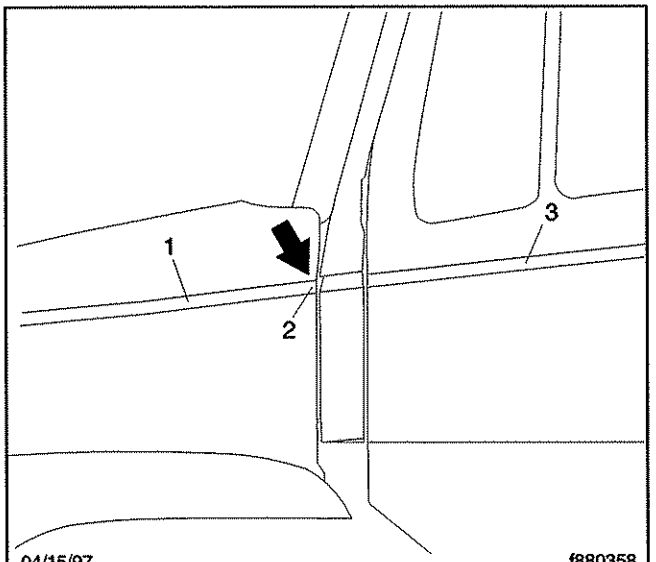
NOTE: It is also necessary to loosen or disconnect the radiator strut rod.

3.6 Either raise or lower the bracket an amount equal to the difference in the character lines.

3.7 Snug down the bracket mounting bolts.

3.8 Close and latch the hood.

3.9 Inspect the alignment. If necessary, repeat the procedure until the lines are approximately the same.



1. Hood Character Line
2. Adjustment Point
3. Cab Character Line

Fig. 1, Hood Adjustment Point

3.10 Unlatch and tilt the hood to the fully-open position.

3.11 Tighten the mounting bolts on the rear hood support bracket, which was just adjusted, and torque them to 29 lbf·ft (40 N·m).

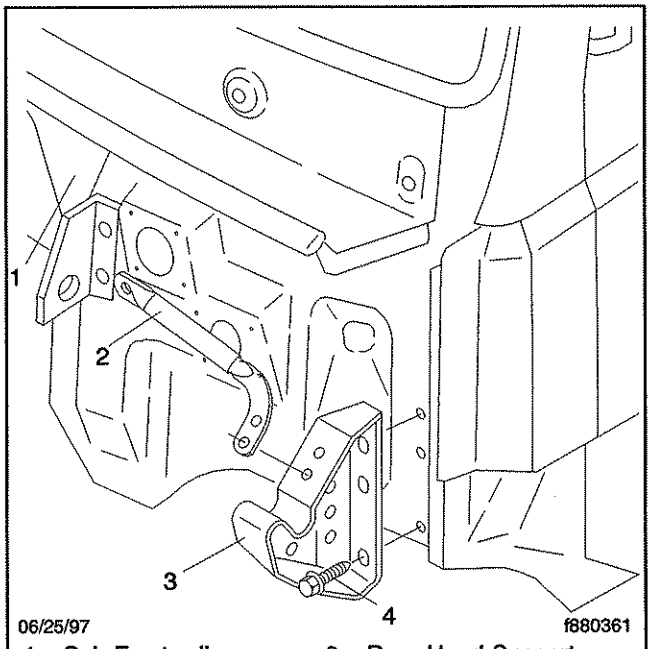
3.12 Tighten the support brace bolts at the support bracket and torque them to 34 lbf·ft (46 N·m).

3.13 Securely tighten the support brace bolts at the cab frontwall.

3.14 Ensure that the radiator strut rod is connected to the rear hood support bracket and that the fasteners are tightened to the proper torque value. See **Section 20.01** in this manual.

3.15 The vertical alignment adjustment should be complete.

3.16 Lower the hood and fasten the hood latches.



1. Cab Frontwall
2. Support Brace
3. Rear Hood Support Bracket
4. Bolt (support bracket)

Fig. 2, Rear Hood Support Bracket

Hood Removal, Installation, and Adjustment

NOTE: The forward and aft adjustment of the hood should be not necessary as the hoods are manufactured to be adjustment-free. However, this adjustment can be performed by loosening the bolts securing the hood pivot brackets to the front crossmember extension and adjusting the position of the pivots.

Grille Removal and Installation

Removal

1. From the front side of the grille, remove the eight Torx® head fasteners that hold the grille to the hood. **See Fig. 1.**
2. Remove the grille from the hood.

Installation

1. Place the grille in position on the hood with the grille fastener holes lined up with the holes on the hood.
2. Install the eight fasteners into the threaded isolators.
3. Tighten the fasteners 96 lbf·in (1080 N·cm).

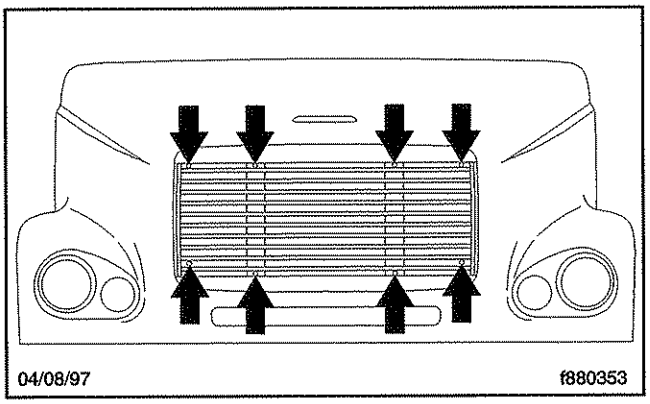


Fig. 1, Location of Grille Fasteners

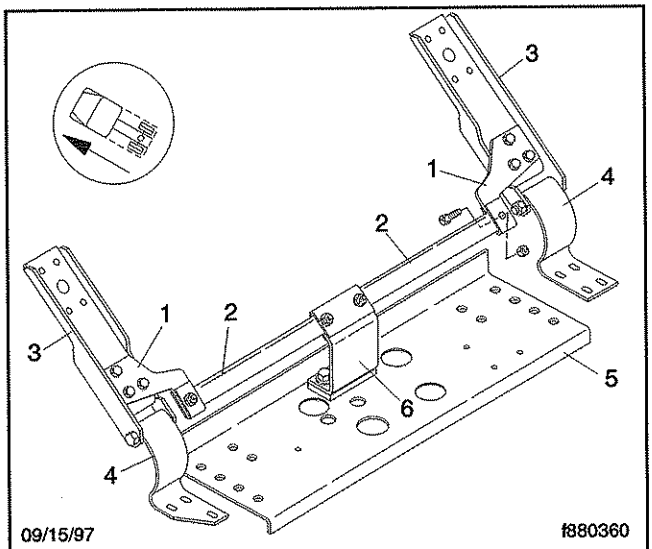
Hood Torsion Bar Tilt-Assist Mechanism Removal and Installation

Removal

1. Apply the parking brakes, and chock the tires.
2. Remove the grille. See **Subject 110** for removal instructions.
3. Release the hood latches, and tilt the hood completely open.
4. Remove the three bolts in both torsion bar outer brackets. See **Fig. 1**.
5. Loosen the bolts and nuts securing the torsion bar outer slotted ends to the outer brackets. Disconnect the outer brackets from the torsion bars.
6. Remove the bolts and nuts securing both torsion bars to the inner torsion bar bracket.
7. Remove the torsion bars.

Installation

NOTE: Tilt and support the hood at an angle of approximately 50 degrees to ease the installation of the torsion bars and the outer brackets.



1. Torsion Bar Outer Bracket
2. Torsion Bar
3. Hood Hinge Bracket
4. Hood Hinge Pivot
5. Front Closing Crossmember
6. Inner Torsion Bar Bracket

Fig. 1, Torsion Bar Tilt-Assist Mechanism

1. Insert the torsion bars (drilled ends) into the inner torsion bar bracket and install the inner torsion bar bolts and nuts.
2. Attach the slotted outer ends of the torsion bars to the outer brackets.
3. Align the holes in the outer torsion bar brackets with the holes in the hood hinge brackets and install the three bolts on each side.
4. Torque the inner torsion bar bolts and nuts to 37 lbf·ft (50 N·m), the outer torsion bar bolts and nuts to 26 lbf·ft (36 N·m), and the outer bracket bolts to 37 lbf·ft (50 N·m).
5. Return the hood to the operating position and fasten both hood latches.
6. Install the grille. See **Subject 110** for installation instructions.
7. Remove the chocks from the tires.

NOTE: The torsion bar tilt-assist mechanism is not adjustable.

Repair Safety Precautions

Before performing any fiberglass repairs, read the following precautions. Observe any additional precautions given by the manufacturers of the repair materials used.

1. All of the raw materials used in repairing fiberglass are harmful to the eyes and could cause blindness. Wear goggles or other protective eye shields to reduce the chances of splash contacting your eyes.
2. Wear protective gloves, as some people may have skin sensitivity to urethane adhesives.

IMPORTANT: In case the hardener or resin contacts your skin, wash with soap and water. If the hardener or resin should contact your eyes, rinse with plenty of water (15 minutes), and call a doctor.

3. When working with fiberglass materials, wear old clothing, since the resin may damage the cloth. Wash the clothing before wearing it again.
4. Most of the liquids involved in fiberglass repair and cleanup (especially when using acetone as a solvent) are flammable; some are also toxic. Don't perform repairs in areas where exposed (or stored) flammable liquids may contact an open flame or any burning material, such as a cigarette. Don't perform repairs in areas that are not well ventilated with fans or an exhaust system.

⚠ WARNING

Do fiberglass repairs in a safe workshop area to prevent severe personal injury due to explosion of flammable liquids or breathing of toxic fumes.

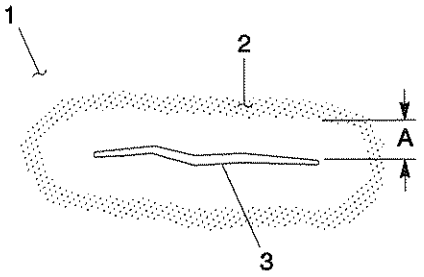
5. Do not use electric tools when the fumes of flammable solvents are present. The heat or sparks generated by the tools could create a fire hazard.
6. When grinding or sanding fiberglass surfaces, wear goggles or other protective eye shields, and also use an air purifying respirator, either a throw-away type or one with a replaceable particulate filter(s). Don't breathe grinding dust or particles, otherwise irritation may occur. Also, during grinding and sanding operations, wear a disposable (paper) shop coat to keep dust and fiber slivers off your clothing.
7. Because fiberglass dust can shorten the life of electrical units, air-powered tools are preferred (for frequent use).

Surface Damage Repair

Surface damage refers to scratches, chips, or nicks on the outer surface of the hood or half-fender. Use the following instructions to repair surface damage:

1. Examine the damaged area. If there are cracks, see if they go all the way through the hood or half-fender. If they do, see "Structural Damage Repair" for instructions.
2. Clean the area with xylene, acetone, or an equivalent grease- and wax-removing solvent. Inspect the area closely.
3. Using 220-grit or finer sandpaper, remove all of the paint around the damaged area to a distance of about 1-1/2 inches (4 cm). See **Fig. 1**.
4. Using an air nozzle, blow off all dust.
5. Apply Ashland Pliogrip 7775L self-leveling urethane adhesive over the non-coated area and spread a thin layer using a squeegee applicator. Cover the entire damaged area, overlapping onto the painted surface. Leave a crowned excess of adhesive, slightly higher than the painted surface.

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a contin-



A. Remove paint and primer 1-1/2 inches (4 cm) around the damaged area. Use 220-grit or finer sandpaper.
1. Paint
2. Primer
3. Scratch

Fig. 1, Damaged Area with Paint and In-Mold Coating Removed

Hood and Half-Fender Repair

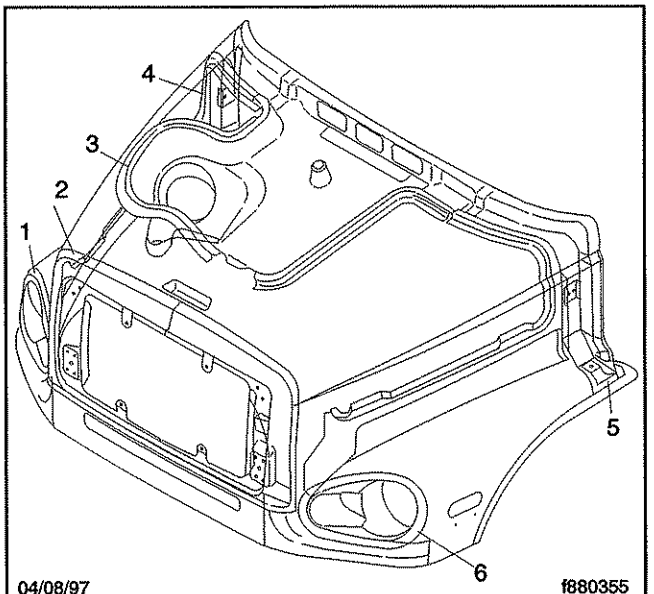
uous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

6. After the adhesive dries (about 50 minutes), sand it with a hand-held disc pad. Use 320-grit or finer sandpaper. Feather the edges of the fill so there are no visible sharp edges.
7. Clean the area with compressed air. Mask the area, then spot prime and paint it. Use Sherwin Williams BB–11 black conductive primer. See **Group 98** for spot-painting instructions.

Structural Damage Repair

The Preform FRP (fiberglass reinforced plastic) hood consists of a one-piece hood and fender assembly. Inner reinforcements are bonded to the engine-side of the hood with a structural adhesive. See **Fig. 2.** If the hood is damaged, determine which parts are affected.

If there is damage to any of the reinforcements, the damage is not repairable. For example, if the grille area of the hood is damaged so badly that the reinforcement bonded inside the grille area is also damaged, replace the entire hood assembly.



1. Right-Hand Headlight Housing
2. Front Hood Reinforcement
3. Rear Air Plenum Reinforcement
4. Right-Hand Side Reinforcement
5. Left-Hand Side Reinforcement
6. Left-Hand Headlight Housing

Fig. 2, Hood Assembly Components

If a joint between two reinforcements, or between a reinforcement and the hood skin, has separated and there is no damage at the joint area, the parts can be rebonded. Or, if a part of the hood skin is damaged and its adjoining reinforcement(s) aren't damaged, the reinforcement can be separated from the damaged part, the damaged part can be patched, and the reinforcement(s) rebonded in place.

If a half-fender has a small crack or hole, it can be repaired; if it has a puncture or large fracture, it must be replaced.

For rebonding parts, see "Hood Reinforcement Rebonding."

For damage in the form of a crack or small hole, see "Crack or Small Hole Repair."

For larger damaged areas, see "Puncture or Large Fracture Repair."

HOOD REINFORCEMENT REBONDING

1. If rebonding a joint that has partially separated, completely separate the reinforcement from the hood using a heat gun and putty knife. Remove as much of the old adhesive as possible. The heat gun will soften the adhesive and allow it to be peeled off the FRP.

   If the parts cannot be separated, work folded medium-grit sandpaper or a section of a steel hacksaw blade between the two surfaces to remove the old adhesive.
2. Scuff the surfaces with 80- to 220-grit sandpaper.
3. Clean the surfaces to be bonded with Ashland 6036 solvent or methylene chloride. Inspect the area closely to be sure all of the old adhesive, dirt, water, grease, and oils are removed.
4. If replacing a large part, align the part on the hood and clamp it in place. Drill holes through the bonding surfaces and install clamping bolts in the holes. Use two washers, one on each side of the joint. See **Fig. 3.** There should be enough clamping bolts to hold the hood in place and keep the bonding surfaces together, or at least one bolt every 12 to 18 inches (30 to 45 cm). Remove the part for application of adhesive.

5. Following the manufacturer's instructions, use enough adhesive to bond the parts together. Use Ashland Pliogrip urethane cartridge materials 7773 or 7779.

NOTE: When using Ashland Pliogrip 7773 or 7779, insert the two tubes of adhesive into the applicator and dispense a 3/8-inch (10-mm) diameter bead of uniform green-colored adhesive at the bonding surface. Discard any adhesive that does not show this uniform green color.

6. Within three and one half minutes (7773) or within 10 minutes (7779) of applying the bead, align the part on the hood and clamp it firmly in place. If it is a large part, install the clamping bolts. Tighten the clamps or clamping bolts just enough to ensure that a uniform amount of pressure is applied along the seam. Ideally, the adhesive should be compressed to form a bondline one inch (25 mm) wide and 0.030 inch (0.76 mm) thick. This thickness can be ensured by sprinkling 0.030 inch (0.76 mm) glass beads into the adhesive before mating the parts.
7. Before it cures, remove any excess adhesive that squeezes out the edges of the bond.
8. Remove the clamps after the adhesive has cured for 30 minutes (7773) or for 60 minutes (7779).
9. If holes were drilled for clamping bolts, repair them using the instructions under "Crack or Small Hole Repair."
10. If necessary, prime and paint the repair area using the instructions under "Surface Damage Repair."

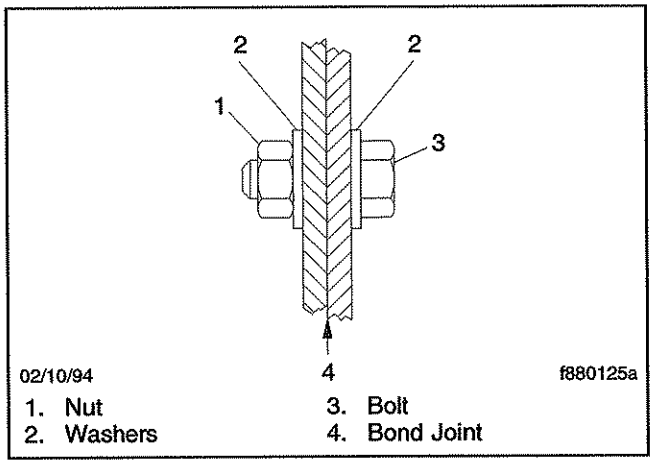


Fig. 3, Clamping Bolt at Bond Joint

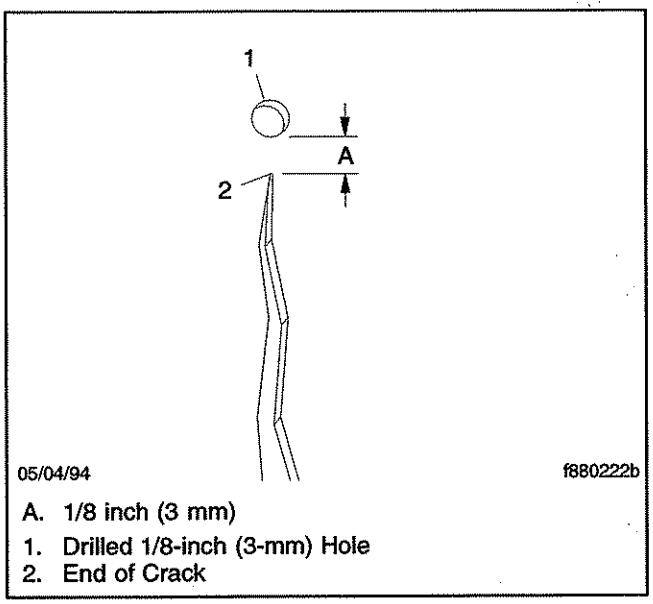
CRACK OR SMALL HOLE REPAIR

A crack (fracture) or small hole through the laminate requires repair with a fiberglass-reinforced patch.

1. Examine the damage to the hood or half-fender. Apply hand pressure all around the damaged area to check for any concealed damage.
2. If a sound-absorbent liner is present on the underside of the damaged area, peel away the liner to provide an adequate working area.
3. Clean the damaged area on both sides of the hood or half-fender with xylene, acetone, or equivalent grease- and wax-removing solvent. Inspect the area closely. All dirt, water, grease, and oils must be removed.
4. If repairing a crack, use a 1/8-inch (3-mm) diameter bit to drill a hole completely through the uncracked laminate 1/8 inch (3 mm) from each end of the crack, to prevent the crack from lengthening. See **Fig. 4**.
5. On the engine side of the hood (or underside of the half-fender), use a router bit (on a grinder or a drill) to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward from all sides of the damage. Taper the outside edge of the ground area. See **Fig. 5**.

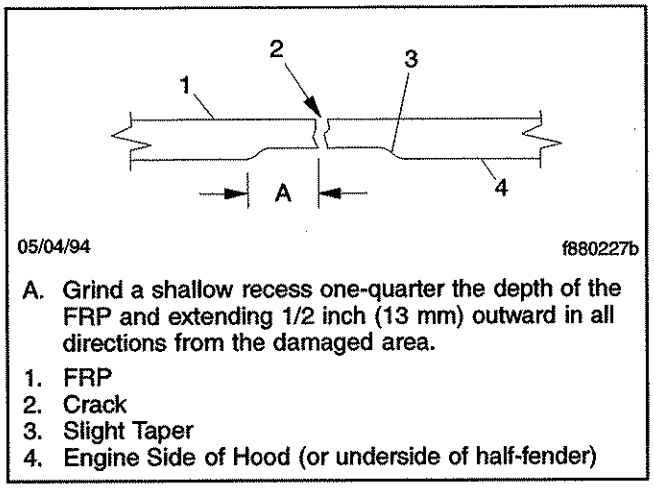
   If repairing a crack, grind outward to the drilled hole at the end of the crack, but not beyond. See **Fig. 6**, Ref. A.
6. Use 80- to 220-grit sandpaper to scuff an area at least one inch (25 mm) away from the fracture on all sides. Be sure to scuff thoroughly, since this will give the patch a surface to which it can stick. See **Fig. 6**, Ref. B.
7. Blow the dust away with compressed air and wipe the area with a clean cloth.
8. If necessary, align the panel sections on both sides of the crack, using weights or clamps to re-establish the original panel profile.
9. With a razor-blade knife, cut a section of woven fiberglass cloth to fully cover the crack and to overlay about 3/4 inch (20 mm). See **Fig. 6**, Ref. C.
10. To bond the fiberglass cloth to the damaged panel, use Ashland Pliogrip 7775L urethane adhesive.

Hood and Half-Fender Repair



A. 1/8 inch (3 mm)
1. Drilled 1/8-inch (3-mm) Hole
2. End of Crack

Fig. 4, Drilling a Hole to Prevent the Crack From Lengthening

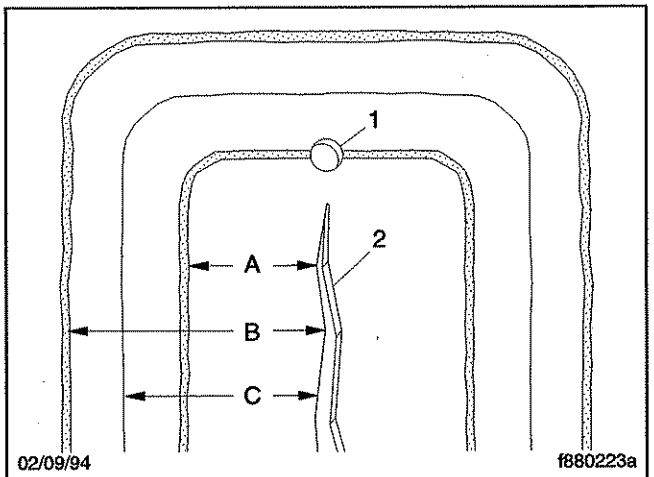


A. Grind a shallow recess one-quarter the depth of the FRP and extending 1/2 inch (13 mm) outward in all directions from the damaged area.
1. FRP
2. Crack
3. Slight Taper
4. Engine Side of Hood (or underside of half-fender)

Fig. 5, Recessed Area (cross-sectional view)

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

11. Lay the cut section of fiberglass cloth on the repair area, centered over the damage. Using a fiberglass roller, press the cloth down firmly into the layer of adhesive to completely saturate the glass fibers.



A. Use a router to grind away a shallow recess one-quarter the depth of the FRP and extending 1/2 inch (13 mm) outward from the damage. If repairing a crack, don't grind past the hole drilled at the end of the crack.
B. Use 80- to 220-grit sandpaper to scuff the area one inch (25 mm) around the damage.
C. Cut the fiberglass cloth to fully cover the damage, and overlay about 3/4 inch (20 mm).
1. Hole 2. Crack

Fig. 6, Preparing the Damaged Area on the Engine Side of the Hood

12. Apply another layer of adhesive over the glass cloth. Spread the adhesive evenly using the fiberglass roller.

13. After two to five minutes, the adhesive will start to jell. It may take more time when cool, less when warm.

IMPORTANT: To avoid pre-jelling or skin-over, mate the FRP parts to be bonded within one to four minutes after dispensing the adhesive.

NOTE: To get a smoother surface, press a piece of masking tape, wider than the repair, directly over the wet adhesive and smooth it before it hardens. The tape can be removed after five minutes when the adhesive has set.

14. The patch should be hard enough in 50 minutes to allow sanding to a smooth flat surface if required.

15. Repair the damage on the outside surface of the hood or half-fender, using the instructions in "Surface Damage Repair." Prime and paint both surfaces, using the instructions in **Group 98.**

PUNCTURE AND LARGE FRACTURE REPAIR (SECTION REPLACEMENT)

If a half-fender has a puncture or large fracture, replace the half-fender.

On very large damaged areas (for example, structural damage on the side surface of the hood covering an area of a square foot or more) it may be easier to do a section replacement rather than make a patch. Fenders and headlight reinforcements may be used in section replacements. Also, a second damaged hood with the needed section intact may be available as scrap.

IMPORTANT: A piece of Preform FRP from another FL112 vehicle hood must be used for section replacement. Use of any other material may not allow the necessary bonding for the repair.

1. Push in on the area immediately surrounding and underneath the damaged area to determine the extent of damage.
2. If a sound-absorbent liner is present on the underside of the damaged area, peel away the liner to provide an adequate working area.
3. Clean the damaged area on both sides of the hood with xylene, acetone, or an equivalent grease- and wax-removing solvent. Inspect the area closely. All dirt, water, grease, and oils must be removed.
4. Using a sabre saw, cut out a large, straight-sided panel containing the damaged area. See **Fig. 7**, Ref. A.

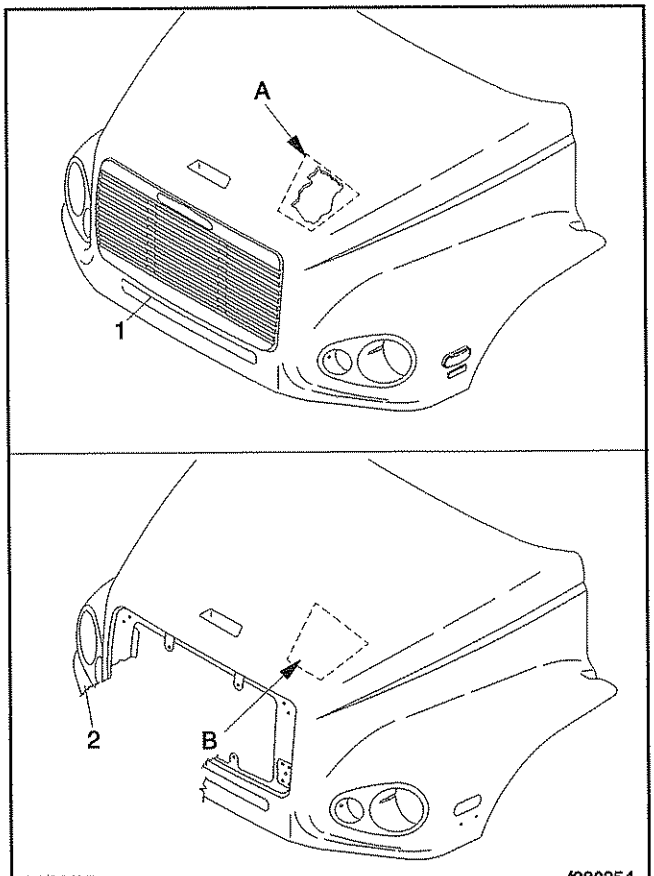
   If the damage extends to a joint where a reinforcement is bonded to the hood, completely separate the reinforcement with a heat gun and putty knife before cutting. See "Hood Reinforcement Rebonding" for instructions.

⚠ WARNING

Wear goggles and an air purifying respirator when grinding, cutting, or sanding during all fiberglass repairs. The ground dust and particles could cause temporary or permanent damage to your eyes and, if inhaled, could cause throat or lung irritation.

5. From a scrap hood, cut a section replacement panel from the same area, only slightly larger than the cut-out in the damaged hood. See **Fig. 7**, Ref. B. Then, trim the section replacement to fit both the size and contour of the original cutout.

   If the damage is next to a headlight reinforcement, but doesn't include the reinforcement, remove the headlight reinforcement from the replacement section (scrap hood), not the damaged hood.
6. After the trimming is completed, sand the edges to allow a 1/16- to 1/8-inch (2- to 3-mm) gap around the cutout.
7. On the engine side of the hood, use a router bit (on a grinder or drill) to grind away a shallow recess one-quarter the depth of the laminate and extending 1/2 inch (13 mm) outward from all sides of the cutout area. See **Fig. 8**, Ref. A.



A. Remove this area.
B. Use as a section replacement for damaged hood.
1. Damaged Hood 2. Scrap Hood

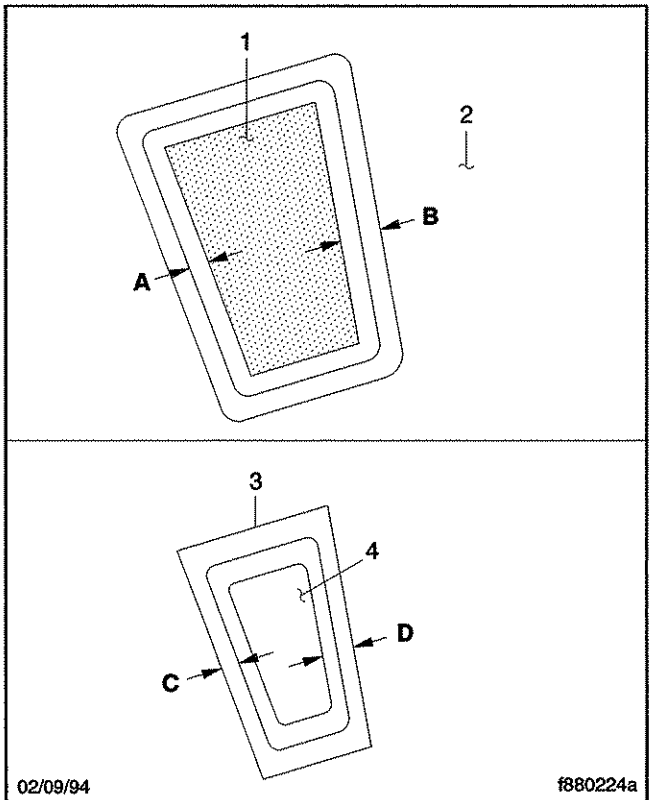
Fig. 7, Section Replacement of a Damaged Fiberglass Hood

Hood and Half-Fender Repair

Also, grind 1/2 inch (13 mm) inward from all edges on the engine side of the section replacement. See **Fig. 8**, Ref. C.

Slightly taper the outside edge of the ground area on the hood and the inside edge of the ground area on the section replacement. See **Fig. 9**, Ref. 3.

8. Use 80- to 220-grit sandpaper to scuff an area at least one inch (25 mm) out from all sides of the cutout area. See **Fig. 8**, Ref. B.



02/09/94 f880224a

A and C: Use a router to grind away a shallow recess one-quarter the depth of the FRP and extending 1/2 inch (13 mm) away from the edge.
B and D: Use 80- to 220-grit sandpaper to scuff the area one inch (25 mm) around the damage.

1. Cutout Hole
2. Engine Side of Hood
3. Section Replacement
4. Engine Side of Section Replacement

Fig. 8, Preparing the Section Replacement and Hood Cutout on the Unexposed Side

Also, scuff at least one inch (25 mm) in from all sides of the section replacement. See **Fig. 8**, Ref. D.

Scuff thoroughly, since this will give the section replacement a surface to which it can stick. Be sure to completely sand off any undercoating sprayed on these areas.

9. On the outer sides of both the cutout and the section replacement, bevel the edges about 45 degrees. See **Fig. 10**.

10. Gently feather the outer painted surfaces back about 1/2 inch (13 mm) beyond the edges of the repair areas (on both the cutout and the section replacement), using 220-grit or finer sandpaper.

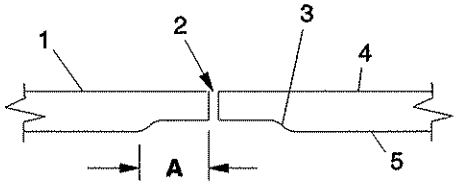
11. Blow the dust away with compressed air, and wipe the area with a clean cloth.

12. If the section replacement is close enough to an edge, use clamps to temporarily secure it during the repair.

    If the replacement is too far from an edge to use clamps, use bond strips. See **Fig. 11**.

    12.1 Cut some scrap FRP into strips. Make enough strips to hold the section replacement in position; about one every six inches (15 cm). If the surface of the replacement panel is contoured or curved, use many small bond strips; larger strips could deform the curves.

    12.2 On the engine side of the repair, use 220-grit sandpaper to scuff sand the areas on

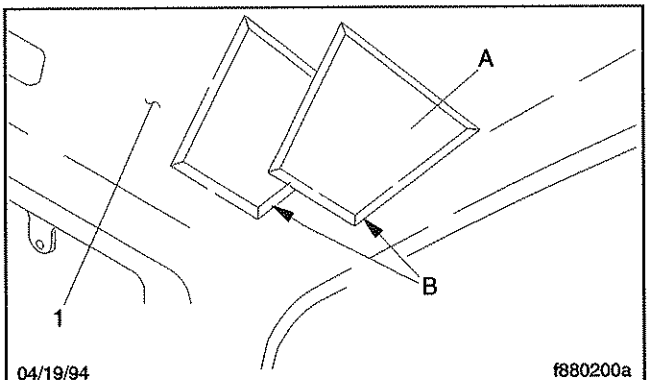


05/04/94 f880226b

A. Grind a shallow recess one-quarter the depth of the FRP and extending 1/2 inch (13 mm) outward in all directions from the damaged area.

1. Section Replacement
2. Gap
3. Slight Taper
4. Hood
5. Engine Side of Hood

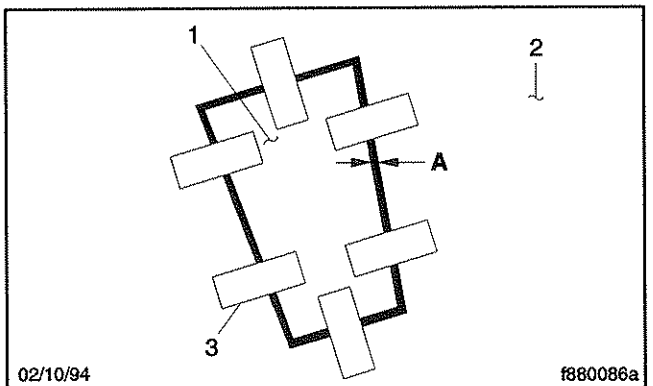
Fig. 9, Cutout Area (cross-sectional view)



04/19/94 f880200a

A. Insert section replacement.
B. Bevel outer surface edges on all sides.
1. Exposed Side of Hood

Fig. 10, Areas to be Beveled



02/10/94 f880086a

A. Gap of 1/16 inch to 1/8 inch (2 to 3 mm)
1. Section Replacement
2. Engine Side of Hood
3. Bond Strip

Fig. 11, Securing the Section Replacement to the Hood Using Bond Strips

the hood and section replacement panels where you plan to bond the strips.

12.3 If a joint between the hood and a reinforcement was separated for the repair, rebond the joint. See "Hood Reinforcement Rebonding" for instructions.

12.4 Holding the section replacement in position, bond the strips to both hood and replacement panels in the area already scuffed. Use Ashland Pliogrip 7773 to bond the strips.

NOTE: When using Ashland Pliogrip 7773, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

12.5 After the adhesive has hardened, use 80- to 220-grit sandpaper to scuff the bond strips.

12.6 Blow the dust away with compressed air, and wipe the area with a clean cloth.

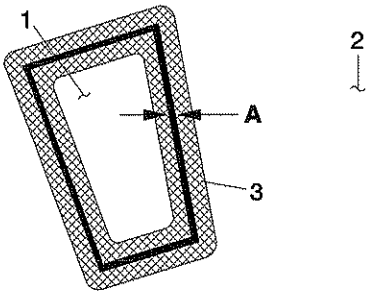
13. With a razor-blade knife, cut sections of woven fiberglass cloth to fully cover the gap between the cutout and the section replacement, all the way around the damaged area. The cloth should overlay about 3/4 inch (20 mm) on both sides of the gap. See **Fig. 12.**

14. To bond the fiberglass cloth to the damaged panel, use Ashland Pliogrip 7775L urethane adhesive.

NOTE: When using Ashland Pliogrip 7775L, dispense the required adhesive from the cartridge in a continuous bead of uniform size and a uniform green color. Discard the initial few inches of discolored bead.

15. Use a plastic or metal device to spread a thin layer of adhesive over the scuffed area.

16. Lay the cut sections of fiberglass cloth on the repair area, centered over the damage. Using a fiberglass roller, press the cloth down firmly into



02/10/94 f880135a

NOTE: The fiberglass cloth should overlay about 3/4 inch (20 mm) on both sides of the gap.

A. Gap of 1/16 inch to 1/8 inch (2 to 3 mm)
1. Section Replacement
2. Engine Side of Hood
3. Fiberglass Cloth

Fig. 12, Overlaying the Gap with Fiberglass Cloth

the layer of adhesive to completely saturate the glass fibers.

17. Apply another layer of adhesive over the glass cloth. Spread the adhesive evenly using the fiberglass roller.
18. After two to five minutes, the adhesive will start to jell. It may take more time when cool, less when warm.

IMPORTANT: To avoid pre-jelling or skin-over, the FRP parts to be bonded should be mated within one to four minutes after the adhesive is dispensed.

NOTE: To get a smoother surface, press a piece of masking tape, wider than the repair, directly over the wet adhesive and smooth it before it hardens. The tape can be removed after five minutes when the adhesive has set.

19. The patch should be hard enough in 50 minutes to allow sanding to a smooth flat surface, if desired.
20. Repair the damage on the outside surface of the hood and paint the surface on both sides, using the instructions in "Surface Damage Repair."

Half-Fender Removal and Installation

Removal (See Fig. 1 and Fig. 2)

1. Apply the parking brakes and chock the tires.
2. Tilt the hood.
3. Remove the two quarter-turn fasteners and the splash shield.
4. Remove the fasteners attaching the half-fender to the forward (lower air cleaner bracket on the right-hand side) and rear brackets.
5. Remove the fasteners attaching the half-fender to the cab, which extend through the fender reinforcements.
6. If the half-fender is being replaced, remove the hood latch bracket and half-fender reinforcement for installation on the new half-fender.

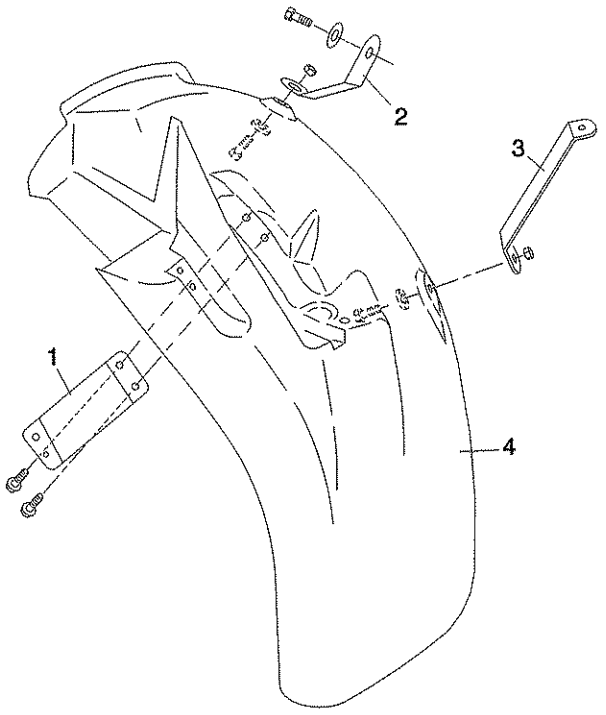


Fig. 1, Left-Hand Half-Fender Installation

NOTE: If replacing a half-fender, remove and save the splash shield rear inner mounting bracket.

7. Remove the vertical fastener in the approximate center of the half-fender, attaching the half-fender to the cab. Remove the half-fender.

NOTE: This vertical fastener is not visible unless viewed directly from below.

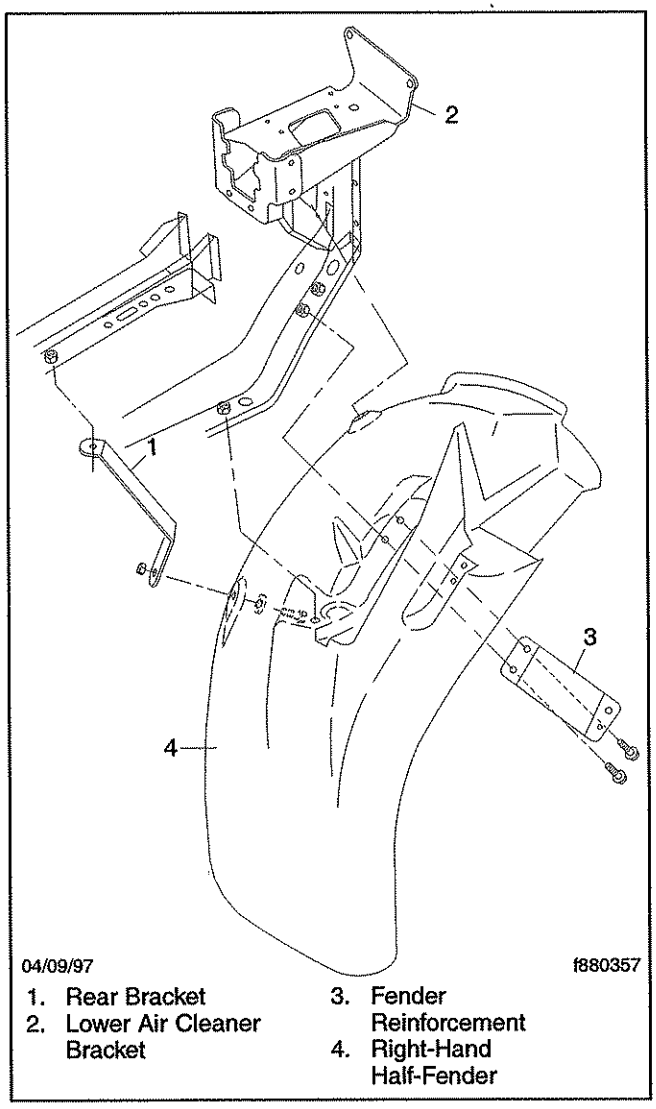


Fig. 2, Right-Hand Half-Fender Installation

Half-Fender Removal and Installation

Installation (See Fig. 1 and Fig. 2)

1. If the half-fender was replaced, install the hood latch bracket, half-fender reinforcement, and the splash shield rear inner mounting bracket onto the new half-fender. Tighten the 1/4–20 locknuts 96 lbf·in (1080 N·cm).
2. Position the new half-fender against the cab. Install the fasteners which attach the fender to the cab, finger-tight only.
3. Install the fasteners that attach the half-fender to the forward bracket (lower air cleaner bracket on the right-hand side) and rear bracket.
4. Torque all the half-fender retaining M8 bolts and nuts to 14 lbf·ft (20 N·m).
5. Install the splash shield and the two quarter-turn fasteners.
6. Lower the hood, and remove the chocks.

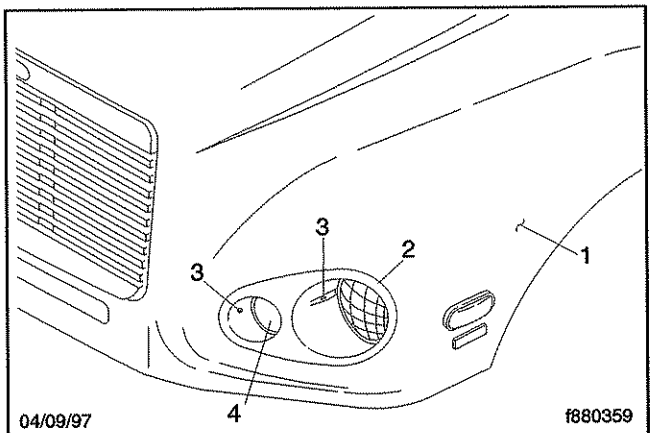
Headlight Bezel Assembly Removal and Installation

Removal

1. Remove the two screws (**Fig. 1**) that attach the headlight bezel assembly to the hood.
2. Withdraw the bezel assembly from its opening in the hood and disconnect the turn signal harness connector.
3. Remove the headlight bezel assembly from the hood.

Installation

1. Connect the turn signal harness connector to the turn signal.
2. Place the headlight bezel assembly in position in its opening in the hood.
3. Install and tighten the two screws until snug.



1. Hood
2. Headlight Bezel
3. Mounting Screw
4. Turn Signal

Fig. 1, Headlight Bezel Assembly-to-Hood Attachment

Repair Tools, Materials

SURFACE DAMAGE

Required tools and materials:

- Xylene, acetone, or equivalent solvent
- 220- or finer grit sandpaper
- 320- or finer grit sandpaper
- Hand-held disc pad
- Self-leveling adhesive[7]
- Applicator squeegee
- Primer[8]

STRUCTURAL DAMAGE

Section Replacement (Punctures and Large Fractures)

Required tools and materials:

- Scrap FRP from a damaged hood
- Xylene, acetone, or equivalent solvent
- Saber saw
- Router bit
- Razor-blade knife
- Woven fiberglass cloth
- Clamps
- 80- to 220-grit sandpaper
- 220- or finer grit sandpaper
- 320- or finer grit sandpaper
- Hand-held disc pad
- Adhesive for bonding strips (if needed)[9]
- Self-leveling adhesive[7]
- Applicator squeegee
- Primer[8]

Crack or Small Hole

Required tools and materials:

- Xylene, acetone, or equivalent solvent
- 1/8-inch diameter drill bit
- Router bit
- Razor-blade knife
- Woven fiberglass cloth
- 80- to 220-grit sandpaper
- 220- or finer grit sandpaper
- 320- or finer grit sandpaper
- Hand-held disc pad
- Self-leveling adhesive[7]
- Applicator squeegee
- Primer[8]

HOOD COMPONENT REBONDING

Required tools and materials:

- Solvent[10]
- 80- to 220-grit sandpaper
- Clamps, clamping bolts with washers
- 0.030" (0.76 mm) diameter glass beads
- Adhesive[9]
- Primer[8]
- Heat gun
- Putty knife, hacksaw blade

[7] Use Ashland Pliogrip 7775L self-leveling urethane adhesive. 7775L has no sag resistance and, therefore, is useful for filling cracks and channels, and for bonding glass-fiber reinforcing fabrics. Ashland products are available through Freightliner dealers. See **Table 2** and **Table 3.**

[8] Use Sherwin Williams BB–11 black conductive primer. Contact your local Sherwin Williams automotive paint distributor to purchase this primer.

[9] Ashland Pliogrip 7773 or 7779 adhesives are recommended for this application, but 7771 and 7770 may be substituted. A heat gun may be used to speed curing times. Ashland products are available through Freightliner dealers. See **Table 2.**

[10] Use Ashland 6036 primer or methylene chloride. Contact Ashland Merchandising Group, telephone (419) 289–9588, to purchase this primer.

Specifications

Torque Values (standard and metric fasteners)				
Description	**Size**	**Grade**	**Torque lbf.ft (N.m)**	**Torque lbf.in (N.cm)**
Hood Pivot Shoulder Bolt Locknuts	3/8–16	C	28 (38)	–
Inner Torsion Bar Locknuts and Bolts	3/8–16	8	37 (50)	–
Outer Bracket to Hood Hinge Bracket Bolts	3/8–16	8	37 (50)	–
Outer Torsion Bar Locknuts and Bolts	3/8–16	5	26 (36)	–
Torsion Bar Inner Bracket Locknuts and Bolts	1/2–13	8	68 (92)	–
Grille Mounting Screws	1/4–20	—	–	96 (1080)
Hood Support Bracket Bolts	M10 X 1.5	9.8	29 (40)	–
Brace Rod Locknuts and Bolts	M10 X 1.5	10.9	34 (46)	–
Half-Fender Locknuts and Bolts	M8 X 1.25	8.8	14 (20)	–

Table 1, Torque Values (standard and metric fasteners)

NOTE: Ashland Pliogrip 7700 and 8000 Series adhesives and accessories are available through Freightliner dealers and PDCs. The 7700 Series adhesives are two-part urethane adhesives, specially formulated and packaged for repair of hoods and other fiber-reinforced plastics. Adhesive 7775L is a self-leveling mixture that is appropriate when a surface filler or glass fabric reinforcement repair is required. The 8000 Series adhesives are also two-part urethane adhesives, available for those who prefer to use these earlier-generation adhesives. Descriptions, working times, and curing times (sanding and repainting) for the various adhesives are shown below in **Table 2** and **Table 4**. Ashland adhesive accessories are listed in **Table 3** and **Table 5**.

NOTE: All of the adhesives develop the same bonding strength; specific adhesives may be preferred to change working times.

NOTE: All working and curing times correspond to an ambient temperature of 73°F (23°C) in the workplace; humidity level will NOT affect working or curing times.

IMPORTANT: While a heat gun may be used to speed adhesive curing time, do not overheat the adhesive. The maximum allowable temperature is 180°F (82°C).

Working and Curing Times for 7700 Series Adhesives				
Description	**Part Number**	**Working Time in Minutes**	**Curing Time in Minutes**	**Curing Time in Hours**
Adhesive, two 1.7 oz (50 ml) cartridges, 3.4 oz (100 ml)	ACA 7771	1.5	10.0	—
Adhesive, two 1.7 oz (50 ml) cartridges, 3.4 oz (100 ml)	ACA 7773	3.5	30.0	—
Adhesive, two 10 oz (300 ml) cartridges, 20 oz (600 ml)	ACA 7773 300	3.5	30.0	—
Adhesive, two 1.7 oz (50 ml) cartridges, 3.4 oz (100 ml)	ACA 7775L	5.0	50.0	—
Adhesive, two 1.7 oz (50 ml) cartridges, 3.4 oz (100 ml)	ACA 7779	10.0	—	1.0
Adhesive, two 10 oz (300 ml) cartridges, 20 oz (600 ml)	ACA 7779 300	10.0	—	1.0
Adhesive, two 1.7 oz (50 ml) cartridges, 3.4 oz (100 ml)	ACA 7770	35.0	—	2.5–3.0
Adhesive, two 10 oz (300 ml) cartridges, 20 oz (600 ml)	ACA 7770 300	35.0	—	2.5–3.0

Table 2, Working and Curing Times for 7700 Series Adhesives

Specifications

7700 Series Accessories	
Description	**Part Number**
Manual Applicator Gun for 10 oz (300 ml) Cartridges	ACA TS526C
1/4" Mixing Nozzles for 1.7 oz (50 ml) Cartridges (100/box)*	ACA 583 238
Pneumatic Applicator Gun for 10 oz (300 ml) Cartridges	ACA TS525
3/8" Mixing Nozzles for 10 oz (300 ml) Cartridges (100/box)*	ACA F 771072

* These are additional mixing nozzles. Each adhesive cartridge comes with two mixing nozzles.

Table 3, 7700 Series Accessories

Working and Curing Times for 8000 Series Adhesives				
Description	**Part Number**	**Working Time in Minutes**	**Curing Time in Minutes**	**Curing Time in Hours**
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8104	4	30	—
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8110	10	—	1
Adhesive, Supermix 4:1, 12 oz (355 ml)	ACA 8145	50	—	5–8

Table 4, Working and Curing Times for 8000 Series Adhesives

8000 Series Accessories	
Description	**Part Number**
Pneumatic Applicator Gun for 12 oz (355 ml) Cartridges	ACA 582 2241
3/8" Mixing Nozzles for 8000 Series Cartridges (100/box)*	ACA F 771072

* These are additional mixing nozzles. Each adhesive cartridge comes with two mixing nozzles.

Table 5, 8000 Series Accessories