

Weld-Bonding

General Equipment

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|---|
| 3 Phase Inverter Spot Welder 254-00002 |
| Compuspot 700F Welder 190-50080 |
| I4 Inverter Spot Welder 254-00014 |
| Inverter Welder with MIG Welder 254-00015 |

Material

| Item | Specification |
|---|---------------|
| Metal Bonding Adhesive TA-1 | — |
| Motorcraft® Premium Undercoating PM-25-A | — |
| Motorcraft® Rust Inhibitor Aerosol PM-24-A | — |
| Seam Sealer TA-2 | — |

Weld-Bonding — Squeeze-Type Resistance Spot Welding (STRW) Method



WARNING: Never install used or reconditioned parts (as specified below) from pre-owned, salvaged or damaged vehicles. The use of such parts could lead to serious injury.

Never use non-Ford parts or accessories for completing repairs.

Ford Motor Company does not approve or recognize body and structural repair procedures, tools, parts or anything but new genuine Ford equipment. Ford cannot attest to the safety, quality, durability or legality of non-Ford parts or accessories. Use of such parts could lead to serious personal injury as they may contain damage which is not visible.

Ford does not approve use of the following:

- Salvaged or used parts
- Major body clips or assemblies from salvage vehicles
- Aftermarket structural or body components
- Salvaged or reconditioned wheels
- Used supplemental restraint system (SRS) components
 - air bags
 - restraint system modules
 - safety belts, buckles or retractors
 - crash sensors

Returning a vehicle to pre-accident condition can only be assured if repair procedures are carried out by skilled technicians using new genuine Ford parts and Ford-approved methods. Structural component repair procedures approved by Ford, using genuine Ford parts, have been validated by Ford Motor Company engineers.

Ford Motor Company does not endorse, cannot attest to, and makes no representations regarding structural repairs (frames, rails, aprons and body panels) carried out using non-genuine Ford Motor

Company parts or non-Ford-approved methods. In particular, Ford makes no representations that the vehicle will meet any crash safety or anti-corrosion performance requirement. Such parts and methods have not been tested by Ford, and may not meet Ford's requirements for safety, performance, strength, quality, durability and corrosion protection.

Ford Motor Company bears no responsibility or liability of any kind if repairs are performed using alternative structural component repair procedures and/or parts.



WARNING: Invisible ultraviolet and infrared rays emitted in welding can injure unprotected eyes and skin. Always use protection such as a welder's helmet with dark-colored filter lenses of the correct density. Electric welding will produce intense radiation, therefore, filter plate lenses of the deepest shade providing adequate visibility are recommended. It is strongly recommended that persons working in the weld area wear flash safety goggles. Also wear protective clothing. Failure to follow these instructions may result in serious personal injury.



WARNING: Always refer to Material Safety Data Sheet (MSDS) when handling chemicals and wear protective equipment as directed. Examples may include but are not limited to respirators and chemically resistant gloves. Failure to follow these instructions may result in serious personal injury.



WARNING: Always wear protective equipment including eye protection with side shields, and a dust mask when sanding or grinding. Failure to follow these instructions may result in serious personal injury.

NOTE: Corrosion protection needs to be restored whenever it is necessary to grind through painted surfaces or E-coat, or when bare metal repairs are made. For additional information, refer to [Restoring Corrosion Protection Following Repair](#) in this section.

NOTE: On door shells that are manufactured with structural adhesives only, weld bonding door skins is not recommended. Only metal bonding adhesive should be used.

NOTE: Weld-bonding is a method used to join metals using Squeeze-Type Resistance Spot Welding (STRW) or Metal Inert Gas (MIG) and structural adhesive. The steps listed in this procedure apply to both types of welding. [STRW](#) is the preferred method. [MIG](#) welding should only be used when areas to be welded cannot be accessed using [STRW](#)-type machinery.

NOTE: Factory spot welds should be substituted with either resistance spot welds or [MIG](#) plug welds. Spot/plug welds should equal factory welds in both location and quantity. Do not place a new spot weld directly over an original weld location. Plug weld hole should equal 8 mm (0.31 in) diameter.

1. Verify the vehicle is dimensionally correct on a frame machine. Straighten if necessary.
2. Remove damaged panels with an air saw or air chisel. Remove only large portions of the damaged panel. Avoid cutting into mating flanges or adjacent parts.
3. Drill out the spot welds using an appropriate spot-weld cutter and remove the remaining portions of the panel to be replaced.
4. Prepare any damaged flanges on the vehicle using a hammer and dolly.
5. Grind the mating surface of the original flanges not greater than 25 mm (0.98 in) where the metal bonding adhesive will be applied.
 - Be sure to remove galvanizing on metal. Metal should have a shiny appearance.
 - Be careful not to damage the corners or thin the metal. The E-coat should also be removed on the opposite side of the flange only where the spot welds are to be placed.
6. Dry-fit and clamp the replacement service parts to verify a correct fit.
 - Remove the service part after verifying correct fit and alignment.
7. The ends of welding clamps should be insulated on the ends using tape or similar material when welding is carried out. Follow manufacturer's prescribed welding procedures and settings.

8. **NOTE:** Refer to product label for preparation and handling instructions.

Prepare the adhesive. Dispense a small amount of metal bonding adhesive from the cartridge to make sure of an even flow of both components. Attach the mixing tip and dispense a mixing tip length of adhesive to make sure of a correct mix ratio.

9. **NOTE:** Welding can be carried out anytime during the adhesive curing process, or after the adhesive is fully cured. Welder settings will vary when welding through wet adhesive versus welding through fully cured adhesive. Refer to welder manufacturer's recommended settings for welding through fully cured adhesive. It is recommended to place a shunt weld in an area with no adhesive to make sure of conductivity, particularly when welding through fully cured adhesive.

Create a test sample.

1. Prepare the metal and adhesive as described. Apply a 6-9 mm (0.23-0.35 in) bead of adhesive and weld the sample.
 2. Place the welded sample in a vise and carry out destructive weld tests by peeling the scrap metal apart using large lock-type pliers. Measure the weld nugget to determine that the nugget meets Ford weld nugget requirements. If the weld nugget does not meet required size, adjust welder settings until the correct weld nugget size is achieved.
 3. When the correct weld nugget size is achieved, the service part can be weld-bonded. For additional information, refer to Specifications in this section.
10. Apply a 6-9 mm (0.23-0.35 in) bead of metal bonding adhesive to the vehicle prepared flange surface.
11. Place the service part(s) in the correct position on the vehicle.
- When positioned, do not pull the component away from the vehicle. If repositioning is necessary, slide the service part(s). This will make sure of correct contact between the components and adhesive.
12. Clamp evenly and tightly. The adhesive contains glass beads which will prevent over-clamping the component.
13. **NOTE:** If welding will not be carried out immediately, allow a minimum of 1.5 to 2 hours of adhesive cure time at 21°C (70°F) before removing clamps. Cure time at lower temperatures should be increased. Clamps may be removed immediately after the component is welded.
- Wipe excess adhesive from the panel before it cures.
14. Finish any cosmetic section seams with fiber-filled body filler. Rough sand the filler, after the adhesive cures, apply conventional body filler and block-sand the area.
15. Use seam sealer wherever a cosmetic seam sealer is required.
16. Mix and apply primer surfacer per paint manufacturer's recommendations.
17. Mix and apply basecoat per Ford-approved paint recommendations.
18. Mix and apply clearcoat per Ford-approved paint recommendations. Refinishing materials may be forced-dried following paint manufacturer's recommendations.
19. Apply corrosion protection to the repair area as required.

Weld-Bonding — Metal Inert Gas (MIG) Welding Method



WARNING: Invisible ultraviolet and infrared rays emitted in welding can injure unprotected eyes and skin. Always use protection such as a welder's helmet with dark-colored filter lenses of the correct density. Electric welding will produce intense radiation, therefore, filter plate lenses of the deepest shade providing adequate visibility are recommended. It is strongly recommended that persons working in the weld area wear flash safety goggles. Also wear protective clothing. Failure to follow these instructions may result in serious personal injury.



WARNING: Always refer to Material Safety Data Sheet (MSDS) when handling chemicals and wear protective equipment as directed. Examples may include but are not limited to respirators and chemically resistant gloves. Failure to follow these instructions may result in serious personal injury.



WARNING: Always wear protective equipment including eye protection with side shields, and a dust mask when sanding or grinding. Failure to follow these instructions may result in serious personal injury.

NOTE: MIG weld-bonding can be substituted as an alternative to STRW method. It may only be used to weld areas that are inaccessible to STRW machinery. However when accessible STRW is the preferred method.

NOTE: Corrosion protection needs to be restored whenever it is necessary to grind through painted surfaces or E-coat, or when bare metal repairs are made. For additional information, refer to [Restoring Corrosion Protection Following Repair](#) in this section.

NOTE: On door shells that are manufactured with structural adhesives only, weld-bonding door skins is not recommended. Only metal bonding adhesive should be used.

NOTE: Factory spot welds should be substituted with either resistance spot welds or MIG plug welds. Spot/plug welds should equal factory welds in both location and quantity. Do not place a new spot weld directly over an original weld location. Plug weld hole should equal 8 mm (0.31 in) diameter.

1. Remove damaged panels with an air saw or air chisel. Remove only large portions of the damaged panel. Avoid cutting into mating flanges or adjacent parts.
 - Drill out the spot welds using an appropriate spot-weld cutter and remove the remaining portions of the panel to be replaced.
2. After removing the damaged sheet metal panel(s), repair any damaged flanges on the vehicle using a hammer and dolly.
3. Using an appropriate grinder, carefully grind around the entire receiving flange area following the original welds. Be sure to remove all E-coat, paint or galvanized coating from the mating surfaces of the joint.
 - Be sure to remove galvanizing on metal. Metal should have a shiny appearance.
 - Be careful not to damage the corners or thin the metal. The E-coat should also be removed on the opposite side of the flange only where the spot welds are to be placed.
4. Repeat the procedure from Step 3 on the mating surface of the replacement service part(s).
5. Prepare the new service panel for plug welds.
 - Using the original panel as a reference, drill or punch 8 mm (0.31 in) diameter holes in the exact number as the original spot welds. The holes should be positioned as close as possible to the original spot weld locations, without lining up exactly on top of an original spot weld site.
 - To make sure of correct weld performance, grind the immediate perimeter of the plug weld hole. Grind only in the area of the plug weld, this will keep corrosion to a minimum.
6. Dry-fit and clamp the replacement service parts to verify a correct fit and alignment.
 - Remove the service part after verifying correct fit and alignment.
7. The vehicle prepared flange areas where plug welds will be located must be kept free of adhesive. Apply 25 mm (0.98 in) tape to the plug weld areas to prevent contamination from the adhesive.
8. **NOTE:** Refer to product label for preparation and handling instructions.

Prepare the adhesive. Dispense a small amount of metal bonding adhesive from the cartridge to make sure of an even flow of both components. Attach the mixing tip and dispense a mixing tip length of adhesive to make sure of correct mix ratio.

9. Apply a 6-9 mm (0.23-0.35 in) bead of adhesive to the vehicle prepared flange surface. Remove the tape from the plug weld areas.

10. Place the service part(s) in the correct position on the vehicle.
 - When positioned, do not pull the component away from the vehicle. If repositioning is necessary, slide the service part(s). This will make sure of correct contact between the components and adhesive.
11. Clamp evenly and tightly. The adhesive contains glass beads which will prevent over-clamping the component.
12. **NOTE:** Welding can be carried out anytime during the adhesive curing process, or after the adhesive is fully cured.

NOTE: If welding will not be carried out immediately, allow a minimum of 1.5 to 2 hours of adhesive cure time at 21°C (70°F) before removing clamps. Cure time at lower temperatures should be increased. Clamps may be removed immediately after the component is welded.

Wipe excess adhesive from the panel before it cures.

13. Finish any cosmetic section seams with fiber-filled body filler. Rough sand the filler, apply conventional body filler after the adhesive cures and block-sand the area.
 14. Use seam sealer wherever a cosmetic seam sealer is required.
 15. Mix and apply primer surfacer per paint manufacturer's recommendations.
 16. Mix and apply basecoat per Ford-approved paint recommendations.
 17. Mix and apply clearcoat per Ford-approved paint recommendations. Refinishing materials may be forced-dried following paint manufacturer's recommendations.
 18. Apply corrosion protection to the repair area as required.
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