

3M Tech Talk: Troubleshooting Weld Bonding and Weld Sealing

3M Automotive Aftermarket Division Offers Top Tips and Products for Welding

An improper weld can create long-term issues with an automotive repair, resulting in come-backs and additional repairs. The technical experts at 3M Automotive Aftermarket Division have addressed the top issues in typical welding applications and offer key tips for resolving difficulties with Squeeze Type Resistance Spot Welding (STRSW) through 3M adhesives or seam sealers. In addition, they outline the 3M adhesives and seam sealers that are approved for direct-to-bare metal and weld-bonding or weld-sealing applications.

“It is essential that your equipment be in good condition and that it is set up correctly,” said Shawn Collins, Advanced Applications Specialist for 3M Automotive Aftermarket Division. “As the use of spot welds increase, technicians need to be trained on how to perform this repair correctly and use the appropriate products for the job. We’ve done a tremendous amount of testing at our lab to develop products specifically for this type of repair along with the standard operating procedures (SOP) for it.”

Before you begin your repair, Collins recommends:

- Check the welder parameters and settings to ensure that the machine is providing the required squeeze pressure and current.
- Check the compressed air source to confirm required welder squeeze pressure is achieved.
- Check welder power source to confirm required welder current is achieved.

Collins outlines the top challenges faced in spot welding:

Problem: *The Squeeze Type Resistance Spot Welder (STRSW) is welding poorly or will not weld at all.*

Solution:

1. Ensure that there is clean, bare metal where the welder contact tips make direct contact to the flange. Also, remove the E-Coat from between the flanges before applying the seam sealer or adhesive.
2. Shunt the current. The adhesive acts as an insulator between the panels and can cause poor current flow, particularly on the very first weld which acts as the electrical conduit for subsequent welds. To shunt the current use a shunt clamp (see figure 2) or clean locking pliers to act as a conductor between the panels. The clamp must be in contact with clean, bare steel on both panels so that the current will travel through the clamp (see figure 1) to allow current flow through both layers of steel. This is most critical on the first weld, after which the current will use the previous weld to conduct through. The clamp must be as close to the first weld as possible – 1 to 2 inches is ideal. If you skip to a new location away from the initial welds, reposition the clamp near the new weld site. Failure to do this will result in a very poor first weld and will negatively affect current flow through subsequent welds.
3. Make sure the contact tips are very clean and correctly shaped so you get good **flat** contact to the steel. The 3M™ File Belt Sander with a 3M™ Cubitron II™ or Scotch-Brite™ belt works well to occasionally clean the tips as you continue to make welds. Even the highest-quality machine available will not make proper welds with dirty or mis-shaped tips. Most welding manufacturers have a pneumatic tip dressing tool available for when the tips need re-shaping.

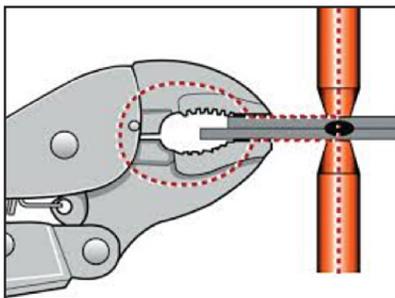


Figure 1



Figure 2

Problem: *Blowing adhesive or sealer out of the weld joint.*

Solution: Avoid welding too close to the edge of the flange. The current and heat radiates outward from the center of the weld. If welding close to the edge, the heat and current are confined to a smaller space and may overheat the adhesive/sealer in the joint resulting in blow-out.

Problem: Poor welds or blowing holes in the steel.

Solution: Tight panel fit-up. If the fit-up of the flanges isn't adequately tight, it increases the resistance at the weld location, which creates excessive heat, causing blow-out of the adhesive or holes in the flange. Make sure fit-up is tight and if necessary, on areas with gaps, use a vise grip clamp very near each weld location. Never rely on the welder contact tips to pull the panels together because as the weld area becomes molten, the pressure of the panels will force them apart creating a hole around the contact tip.

Problem: Excessive sparking or overheated welds.

Solution: Use grade 80 or finer abrasive to sand the flanges prior to application of the adhesive. A Scotch-Brite™ belt also works excellent. If you use a coarse abrasive (coarser than grade 80) it forms air pockets between the scratches that create resistance which creates excessive heat that can cause sparks, a poor weld and/or blow-out.

Problem: Poor adhesion.

Solution: Apply bonding adhesive to only clean bare metal. Do not to use a weld-through primer where the adhesive will be applied. Weld-through primer has poor adhesive properties. Apply the adhesive to clean bare metal.

Please visit 3MCollision.com for more product and process information on troubleshooting weld-bonding and weld-sealing.

Spot Welding Product Guide

3M™ Urethane Seam Sealer Cartridges

Part No.	Name/Description	Color	Container Size	Units/Case	Paint Time (solvent-based)	Paint Time (water-based)
08362	3M™ Urethane Seam Sealer	Grey	10.5 fl.oz. / 310 mL	12	30 min	45 min
08365	3M™ Urethane Seam Sealer	Beige	10.5 fl.oz. / 310 mL	12	30 min	45 min
08367	3M™ Urethane Seam Sealer	Black	10.5 fl.oz. / 310 mL	12	30 min	45 min
08368	3M™ Urethane Seam Sealer	White	10.5 fl.oz. / 310 mL	12	30 min	45 min

Related 3M™ Seam Sealers

Part No.	Name/Description	Color	Size	Format
08360	3M™ Urethane Seam Sealer	White	10.5 fl. oz. / 310mL	Flex Pack
08361	3M™ Urethane Seam Sealer	Grey	10.5 fl. oz. / 310mL	Flex Pack
08364	3M™ Urethane Seam Sealer	Beige	10.5 fl. oz. / 310mL	Flex Pack
08369	3M™ MSP Seam Sealer	White	10.5 fl. oz. / 310mL	Flex Pack
08370	3M™ MSP Seam Sealer	Grey	10.5 fl. oz. / 310mL	Flex Pack

IMPORTANT NOTE: *There are many factors that can affect an individual repair, so the technician and repair facility need to evaluate each specific application and repair process and determine what's appropriate. 3M recommends referring to relevant vehicle repair and OEM guidelines prior to starting all repairs.*

