

Cast Iron Exhaust Manifold Repair Kit Instructions



Metal Preparation

Thoroughly clean the cast iron surface. Remove all oil, grease, rust, paint, JB Weld, previous rod material, engine sealants, and contaminants. A bright, shiny surface created with a grinder or sanding disc provides optimal penetration and bonding.

If welding over an existing weld, completely remove the prior weld material. Electrodes perform best on clean, un-welded surfaces.

Be aware of engine sealants before welding, as they may contaminate the weld.

Bevel the Joint

- Bevel the joint before welding.
- Drill holes 1/2" from each end of the crack to stop crack propagation.
- Tack weld to retain alignment before completing the weld.

Machine Setup

- Use **AC or DC reverse polarity (electrode positive)**.

Amperage Guidelines

Rod Size	72 Burnt Cast Iron Electrode	77 Electrode
3/32" diameter	50-70	50-70
1/8" diameter	70-110	60-110
5/32" diameter	95-140	90-140

- If the rod undercuts, decrease amperage.
- If the rod appears ropey or does not penetrate, increase amperage.
- If penetration is insufficient, also check ground and machine settings
- Many welders prefer 3/32" rods to help maintain lower heat input.

Welding Technique

- Maintain a short arc.
- Make short passes.
- Peen each pass promptly to remove slag before cooling.
- Continue back whipping and overlapping until deposits are fully connected.
- Cool naturally.
- Never weld more than 2 inches at a time.
- For some cast irons, weld 1 inch or less and allow 1 minute cooling between passes.
- Low and slow is the key to a sound cast iron weld.
- Never cool cast iron with water.
- Avoid welding in windy conditions.

Preheating/Heat Management

- **Gently preheat the cast iron if possible.**
- It is not necessary to heat it red hot.
- Light preheating helps the bead lay flatter.
- Preheating removes moisture to prevent pinholes and porosity.
- Do not excessively heat or preheat cast iron. Cast iron welds are susceptible to cracking from rapid hot-to-cool temperature changes.

TIG Welding

Soaking electrodes in water will help remove the coating for TIG welding.

Typical TIG rod selection:

- 3/32" rods for thinner cast
- 1/8" rods for heavier sections

Most TIG welders prefer 3/32" rods.

Electrode Selection (72 vs 77)

77 Cast Iron Electrode

- Preferred when machining is required after welding.
- Good crack resistance.

72 Burnt Cast Iron Electrode

- Designed for anchoring into burnt cast iron.
- Use 72 first on heat-affected cast iron.
- Follow with 77 for crack-resistance and machinability.

Repair Applications

- A mild steel patch may be used over large holes.
- 72, 75, and 77 electrodes will all bond steel to cast iron.
- If machining is required after welding, use the 77 electrode.
- Remove any JB Weld or previous rod before welding.

Exhaust Manifold-Specific Welding Guidance

Exhaust manifolds see extreme heat cycles. Keep these additional points in mind:

- **Manifolds expand and contract constantly.** Keep input low to reduce stress.
- **Do not overweld.** Short passes reduce internal stress.
- If manifold is off the engine **weld with it supported in its natural position** to avoid distortion.
- If possible, **allow the manifold to cool slowly** in still air after repair,
- Check flange surfaces after welding for warpage **before reinstalling.**
- For long cracks, **alternate weld locations** to distribute heat.
- **Always inspect** for additional hairline cracks before finishing.

Most exhaust manifold failures are caused by stress and heat cycling. **Patience during welding prevents repeat cracking.**

Post-Weld Considerations

- Allow the weld to cool naturally.
- Do not force cooling, as rapid temperature changes may induce cracking.
- Inspect the repair for full deposit connection before proceeding with additional machining or finishing steps.

SAFETY GUIDELINES

Respiratory Protection

Use an air purifying dust respirator when welding or brazing in a confined space, or when local exhaust or ventilation is not sufficient to keep exposure values within safe limits.

Hands Protection

Wear appropriate gloves to prevent skin contact.

EN 12477: Protection gloves for welders

Type B gloves are recommended when high dexterity is required as for TIG welding, while type A gloves are recommended for other welding processes. The contact temp (°C) is 100 and the threshold time (seconds) >15.


Eyes Protection

Welder's helmet or face shield with color absorbing lenses. Shield and filter to provide protection from harmful UV radiation, infra red and molten metal approved to standard EN379. Filter shade to be a minimum of shade 9.

Skin Protection

Heat-resistant protective clothing. Wear safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry. Clothing should be selected to suit the level, duration and purpose of the welding activity.

California Proposition 65

 **WARNING:** This product contains chemicals including [Nickel], which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Ventilation

Work in ventilated spaces to disperse flux fumes. Avoid confined areas without extraction.

Fire Safety

Keep a fire extinguisher nearby when working around flammable surroundings.

Liability

Follow AWS-compliant brazing safety standards.

Muggy Weld LLC shall not be liable for any loss, injury, claim, liability, or damage of any kind resulting in any way from (a) your use of Muggy Weld products, (b) any errors in or omissions from these instructions.

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FIRST AID MEASURES

Inhalation

Remove to fresh air immediately or administer oxygen. Get medical attention immediately.

Skin

Flush skin with large amounts of water and soap. If irritation develops and persists, get medical attention.

Eyes

Flush eyes with water for at least 15 minutes. Get medical attention.

Ingestion

Obtain medical attention immediately if ingested.

Electric Shock

Disconnect and turn off the power. Use a non-conductive material to pull victim away from contact with live parts or wires. Immediately contact a physician.

FIREFIGHTING MEASURES

Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning material and fire situation.

Unsuitable Extinguishing Media

Do not use water on molten metal. Large fires may be flooded with water from a distance.

Specific Hazards Arising From Chemical

Keep away from heat/spark/open flames/hot surfaces. No smoking. Hydrogen fluoride, Calcium oxide, Iron oxides, Carbon oxides, Strontium oxides, Manganese/manganese oxides, Barium oxide, Nickel/nickel oxides, Aluminum oxide, Sodium oxides, Silicon oxides

Protective Equipment

Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

ACCIDENTAL RELEASE MEASURES

Cleaning Measures

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

HANDLING AND STORAGE

Precautions for Safe Handling

Handle with care to avoid stings or cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Conditions for Safe Storage

Store in dry place in closed packages. Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions. Ground/bond container and receiving equipment.

EXPOSURE CONTROLS/ PERSONAL PROTECTION

Engineering Controls

Avoid exposure to welding fumes, spatter, electric shock, heated materials and dust. Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep work place and condition of protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Exposure Limits

Use industrial hygiene equipment to ensure that exposure does not exceed applicable national exposure limits. Unless noted, all values are for 8 hour time weighted average.

Biological Limits

No available data