

Johnson Controls Automotive Experience
Global Supplier Standards Manual
Metal Prototype Welding Operator Qualifications and Procedures
May 2013

PURPOSE

- The purpose of the Global Supplier Standards Manual is to communicate Johnson Controls Inc. metal prototype weld fixture design requirements to the suppliers in our Automotive Experience Division that provide prototype parts. It is the expectation of Johnson Controls Inc. that all suppliers comply with all of the requirements and expectations documented in this manual.

SCOPE

Geographic Applicability-

- This policy applies globally to all JCI Automotive Experience (AE) Manufacturing and Parts Distributions locations that are involved in the purchase of products and services for use internally or resale.
- All elements listed in the document are required unless expressly written in the request for quote or the purchase order from Johnson Controls.

Welding Equipment Type and Validation

Basic Equipment

- Weld wire type: AWS grade ER70 S6. .035' dia. (or other as directed by JCI)
Preferred brand- ESAB SpoolArc 86.
- Allowable substitute with JCI consent: Lincoln SuperArc L-56.
- Shielding gas: 90% Ar/10% CO², 40–45 cfh. delivery volume.
- Power Supply: Inverter type with visual outputs for basic parameters of voltage and current values. Process is Short
- Circuit Arc mode (unless directed otherwise by JCI).
- Wire feeder: Dual or single drive roll with visual output for wire feed speed.

Maintenance Checks and Tooling

- Validate ground connection to weld fixture and/or parts to be welded. Direct ground to part is preferred.
- Ensure use of new, correct size torch contact tip before welding.
- Validate condition of (and/or replace) wire conduit (liner).
- Clean wire feeder drive rolls and adjust for proper tension.
- Ensure there are no kinks or radical bends in torch cable from wire feeder to point of welding.
- All welding is to be performed in the “flat, down-hand” position. No welding of assemblies at an angle greater than 15o relative to the floor. No vertical up/down, or upside-down welds are allowed.
- If product requires welds on opposite side of part in the flat position, provision must be made for indexing or rotating the assembly to position it within stated limits.

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- All weld joints must be accessible for torch clearance to allow for the basic torch to weld joint angles of: 45o to weld
- root (fillet joint), 10o lead, or “push” angle relative to work. Flare Bevel joints require a shallower angle approach. Flare
- Vee joints are to be bisected. All welds to be performed as “push” in torch travel direction.

Personal Protective Equipment (PPE) and Health and Safety Guideline

- Proper and adequate work lighting is to be provided for the operator at the point of work.
- Fixtures are to be positioned to allow for comfortable reach to weld areas without straining or fatigue.
- Ensure correct/adequate personal protective equipment has been issued to operators and is being properly used.
- The use of auto-darkening weld helmets is mandated.
- Use of vision correction lenses is mandated if normally worn.

Weld Operator Certification:

- Identify specific operators that will perform the welding operation on JCI products.
- Gather surrogate material representative of the type and gauge typically used in JCI assemblies.
- Using the surrogate material which is grounded in the same fashion as the actual parts to be welded, each operator is to tune the power supply to his/her unique welding technique.
- Wire “stick out” beyond contact tip is limited to 12-15 mm max.
- Examples are to include variables of thick/thin material combinations.
- Make samples of each type of weld joint to be encountered.
- Evaluate the welded parts via cut & etch and /or destructive testing as dictated by the individual customer requirements to ensure compliance.
- If necessary, make any needed adjustments to weld parameters or equipment and repeat the cut & etch and/or destructive testing and visual defect evaluation until satisfactory welds are achieved.
- Record the date, operator’s name, and retain the weld sample for each joint type as part of the individual operator’s