

Welding in the Food Industry

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Welding is Fundamental Process of Industry and the Economy



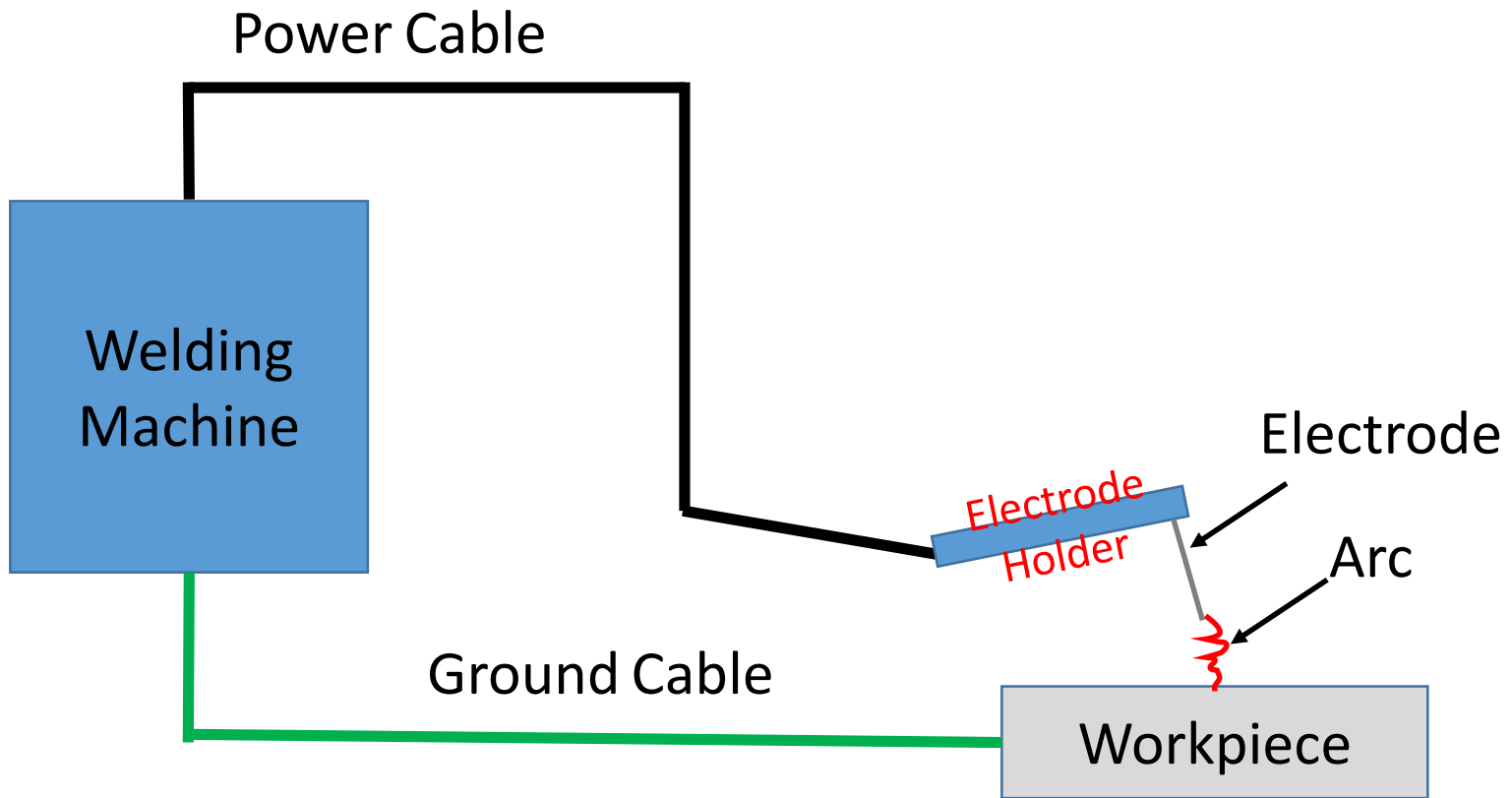
Welding in Food industry



Welding is a fabrication process used to join metals together using the heat of an electrical arc. The melting point of stainless steels is between 2417 and 2786 °F (1325 to 1530 °C) depend on the type of stainless.



Welding Circuit



GTAW- Gas Tungsten Arc Welding

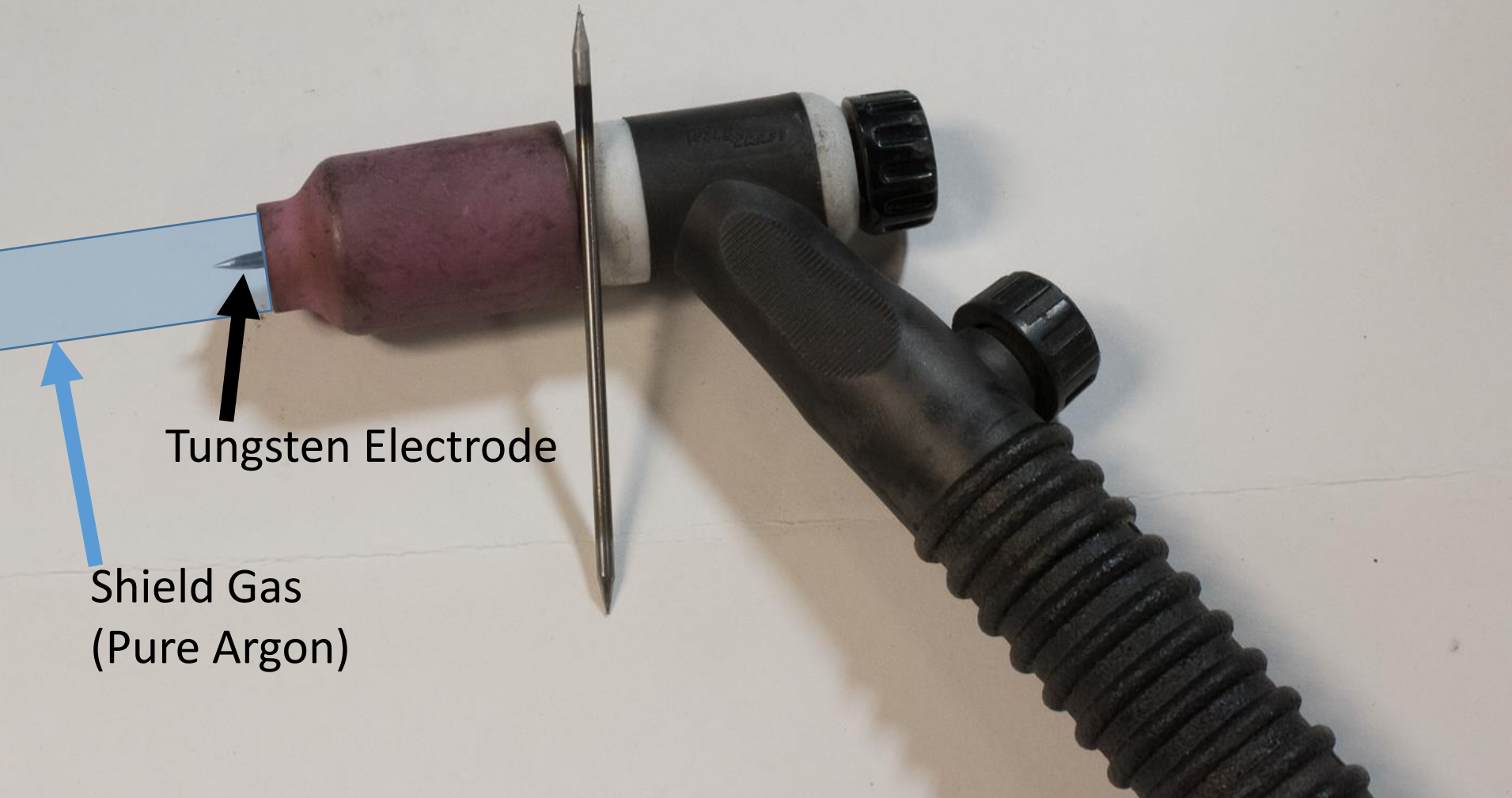
TIG Welding Machine



Controls

- Voltage
- Current (amperage)

TIG Welding Torch (electrode holder)



Argon Gas for Shield Gas and Purge Gas

- Pressure Regulator
- Dual Flowmeters



Hygienic Tubing



Manual and Orbital Tube Welding



Argon Purge of Tubing

TIG Tube Welding



Documentation & Inspection

No Cracks, Crevices or Pits

- Standards
 - AWS D18.1 -
 - AWS D18.2 – Guide to Weld Discoloration of Sanitary Tubing
 - AWS D18.3 – Welding of Tanks, Vessels and other Equipment is Sanitary Applications
- PQR – Procedure Qualification Record
- WPS – Welding Procedure Specification
- WOP – Welder Operator Performance Record
- Weld Coupons
- Boroscope

Good Orbital Weld

- Good Purge
- Proper ID Weld
Oxidation Color
- Full Penetration
- Proper Convexity
- Proper Concavity
- Optimal Uniformity



Good Manual Weld

- Good Purge
- Proper ID Weld
Oxidation Color
- Full Penetration
- Proper Convexity
- Proper Concavity



High Hygienic Purged Tack

- Good Purge
- Proper ID Weld
Oxidation (Color)



Good Non-Purged Tack



Tack not consumed



No Backup Gas Purge



ID Concave Weld



ID Concave Weld



Incomplete Penetration Off-center



Incomplete Penetration
Inconsistent Width




Incomplete Penetration Narrow Weld Bead



Pit in weld
Abrupt Tail-off





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Welding Inspection

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Sanitary Tank Welding







Tank TIG Welding Video

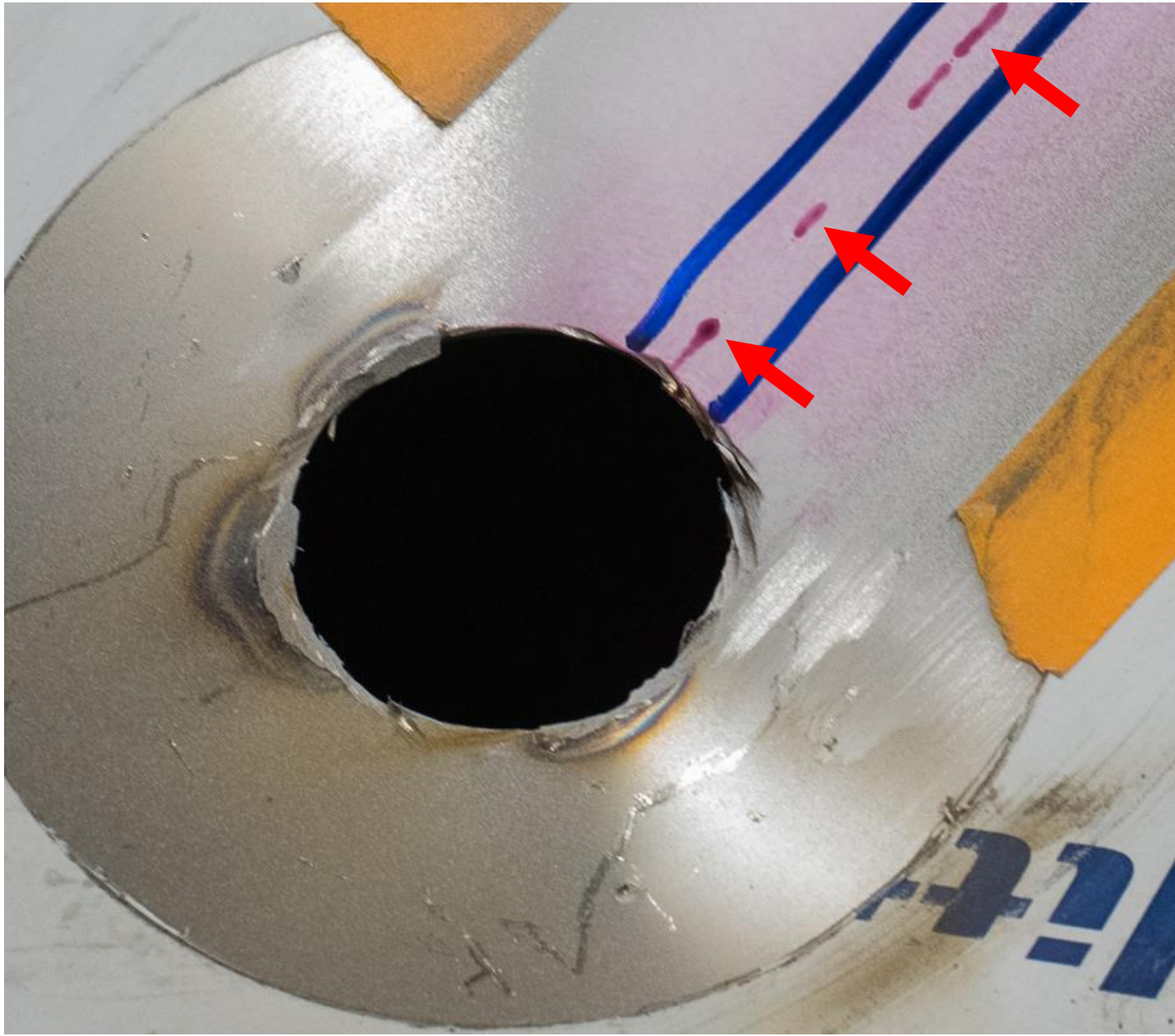


Tank Weld in Process

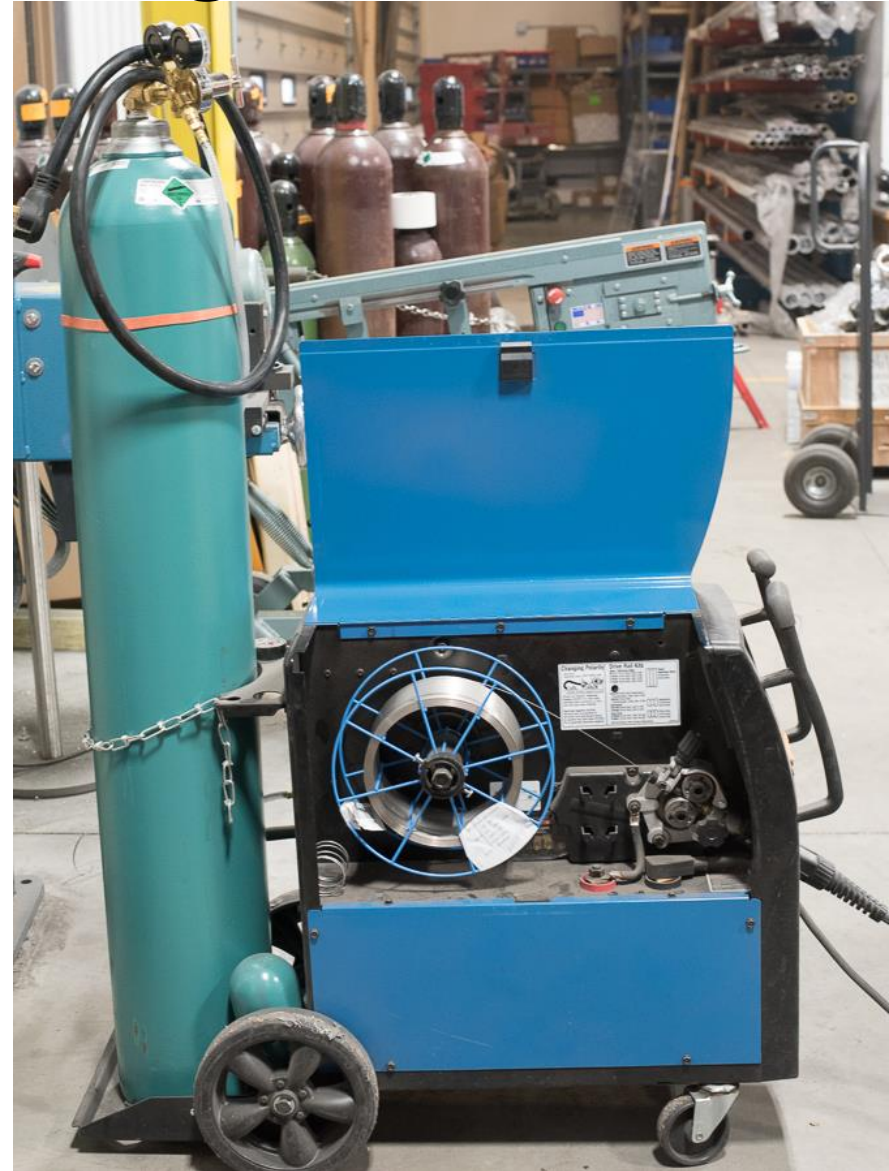




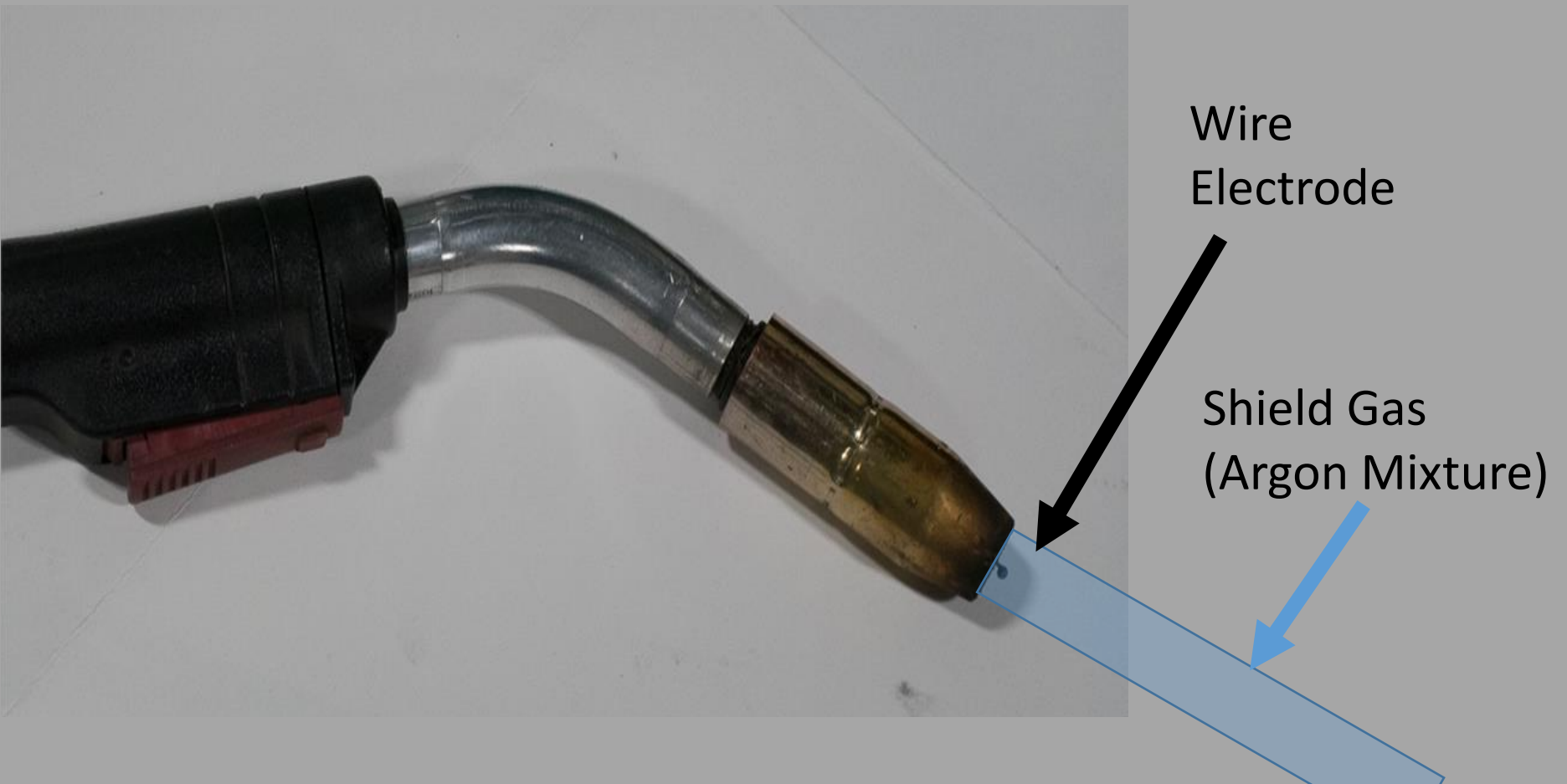
Dye Penetrant Inspection



GMAW - Gas Metal Arc Welding Wirefeed (MIG) Welding Machine



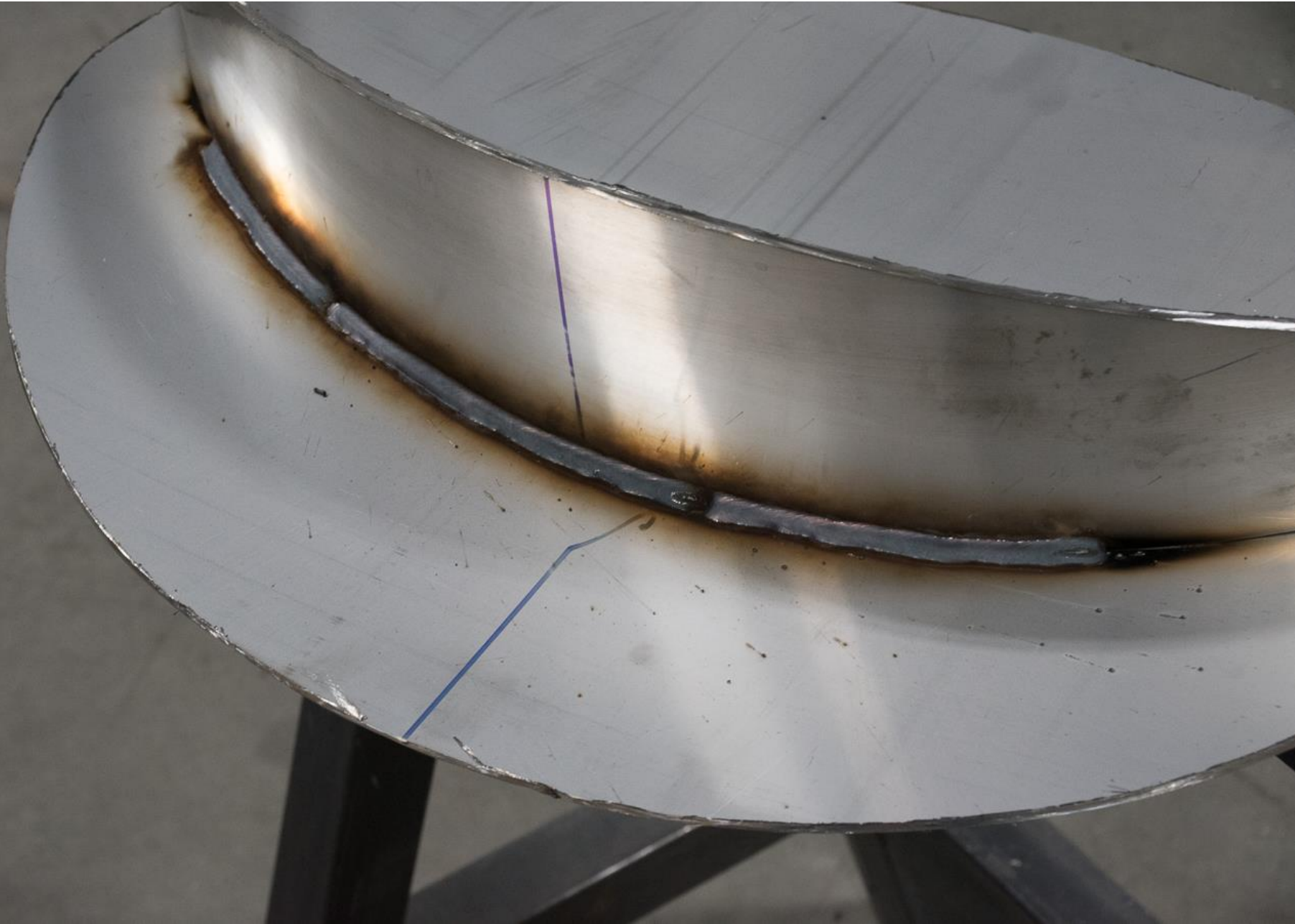
GMAW Wirefeed Torch



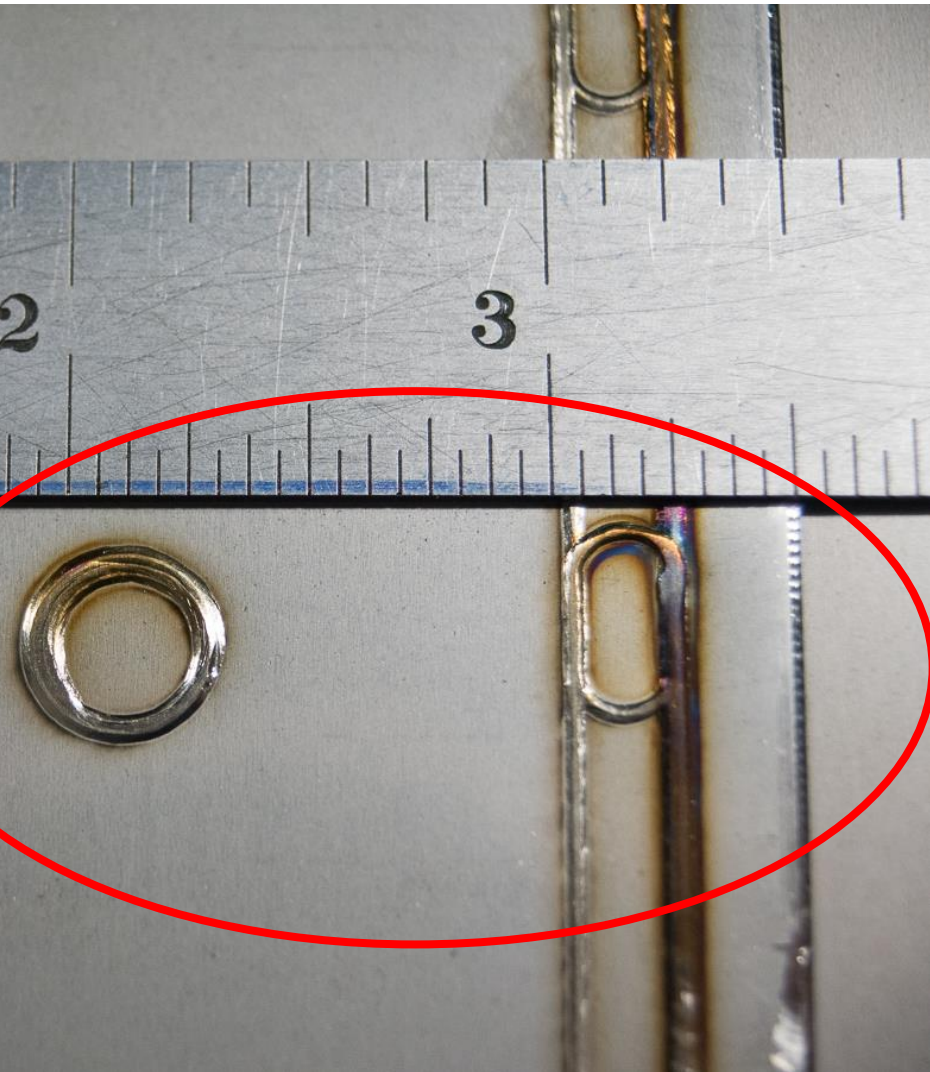
MIG Welding



MIG Weld



Laser Welding



Summary

- Written PQR, WPS and WOR's
- Certified Welders
- Inspection for Cleanability

Questions