

HAYNES[®] 556[®] alloy

Welding

HAYNES[®] 556[®] alloy is readily welded by Gas Tungsten Arc (GTAW), Gas Metal Arc (GMAW), Shielded Metal Arc (SMAW), and resistance welding techniques. Submerged Arc welding is not recommended, as this process is characterized by high heat input to the base metal and slow cooling of the weld. These factors can increase weld restraint and promote cracking.

Base Metal Preparation

The joint surface and adjacent area should be thoroughly cleaned before welding. All grease, oil, crayon marks, sulfur compounds, and other foreign matter should be removed. Contact with copper or copper-bearing materials in the joint area should be avoided. It is preferable, but not necessary, that the alloy be in the solution-annealed condition when welded.

Filler Metal Selection

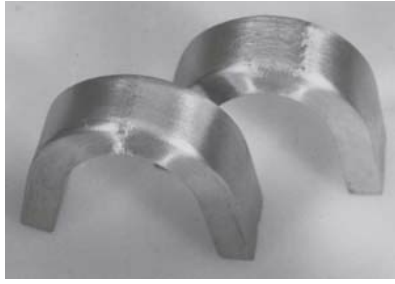
Matching composition filler metal is recommended for joining 556[®] alloy. For shielded metal-arc welding, MULTIMET[®] electrodes (AMS 5795) are suggested. For dissimilar metal joining of 556[®] alloy to nickel- or cobalt-base materials, 556[®] filler metal will generally be a good selection, but HASTELLOY[®] S alloy (AMS 5838) or HASTELLOY[®] W alloy (AMS 5786, 5787) welding products may be used. For dissimilar welding to iron-base materials, 556[®] filler metal is recommended. Please [click here](#) or the Haynes [Welding SmartGuide](#) for more information.

Preheating, Interpass Temperatures, and Postweld Heat Treatment

Preheat is not required. Preheat is generally specified as room temperature (typical shop conditions). Interpass temperature should be maintained below 200°F (93°C). Auxiliary cooling methods may be used between weld passes, as needed, providing that such methods do not introduce contaminants. Postweld heat treatment is not generally required for 188 alloy. For further information, please [click here](#).

Typical Tensile Properties

| Condition | Test Temperature | | Ultimate Tensile Strength | | 0.2% Yield Strength | | Elongation |
|--------------------|------------------|-----|---------------------------|-----|---------------------|-----|------------|
| | °F | °C | ksi | MPa | ksi | MPa | |
| Transverse Tensile | RT | RT | 120.6 | 832 | 63.6 | 439 | 42.8 |
| | 1000 | 540 | 95.6 | 659 | 41.1 | 283 | 50.3 |
| | 1200 | 650 | 84.8 | 585 | 38.3 | 264 | 47.6 |
| | 1400 | 760 | 63.1 | 435 | 34.1 | 235 | 44.8 |
| All Weld Metal | RT | RT | 107.3 | 739 | 67.3 | 464 | 43.1 |
| | 1200 | 650 | 71.4 | 492 | 44.6 | 308 | 39.4 |
| | 1400 | 760 | 55.2 | 381 | 42.4 | 292 | 55.2 |



*Typical crack-free face and root bends for welded HAYNES[®] 556[®] alloy
0.5 inch (13 mm) plate and matching filler metal.
Bend radius was 0.75 inch (19 mm).*

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