Wire and Welding products

HAYNES Wire Company

HASTELLOY® B-3® Welding Data

Typical Welding Parameters - Flat Position:

	ELECTRODE DIAMETER, in. (mm)	ARC VOLTAGE, volts	WELDING CURRENT, amps
SMAW	3/32 (2.4)	22-24	55-75
	1/8 (3.2)	22-24	80-100
	5/32 (4.0)	22-25	125-150
	3/16 (4.8)	24-26	150-180

	JOINT THICKNESS, in. (mm)	TUNGSTEN ELECTRODE* DIAMETER,in. (mm)	FILLER WIRE DIAMETER	WELDING CURRENT, amps	ARC VOLTAGE, volts
GTAW	1/32-1/16 (0.8-1.6)	1/16 (1.6)	1/16"	15-60	9-12
	1/16-1/8 (1.6-3.2)	1/16 or 3/32 (1.6 or 2.4)	1/16" or 3/32"	50-95	9-12
	1/8-1/4 (3.2-6.4)	3/32 or 1/8 (2.4 or 3.2)	3/32" or 1/8"	75-130	10-13
	>1/4 (6.4)	3/32 or 1/8 (2.4 or 3.2)	3/32" or 1/8"	95-150	10-13

*2% Thoriated tungsten

Shielding gas 100% Argon, flow rate ~ 25 ft³/hr (12 L/min)

		WIRE DIAMETER, in (mm)	SHIELDING* GAS	WELDING CURRENT, amps	ARC VOLTAGE,volts	TRAVEL SPEED in. (mm)/min
GMAW	SHORT CIRCUITING TRANSFER	0.035 (0.9)	75%Ar-25%He	70-90	18-20	8-10 (200-250)
		0.045 (1.1)	75%Ar-25%He (Helistar SS or NiCoBrite)**	100-150	19-22	8-10 (200-250)
	FIXED FREQUENCY	0.045 (1.1)	75%Ar-25%He (Helistar SS or NiCoBrite)**	120-150	18-20	10-15 (250-380)
	SYNERGIC	0.035 (0.9)	75%Ar-25%He	50-125	-	10-15 (250-380)
		0.045 (1.1)	75%Ar-25%He (Helistar SS or NiCoBrite)**	100-175	-	10-15 (250-380)
	SPRAY	0.045 (1.1)	100%Ar	190-250	30-32	10-15 (250-380)

*Flow Rate ~ 35 ft³/hr (16 L/min) **(Argon + Helium + < 1%CO_2)

POLARITY: SMAW and GMAW - DCRP - Electrode Positive
GTAW - DCSP - Electrode Negative

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Typical All Weld Metal Tensile Data*:

Welding Process	Test Temperature °F (°C)	Ultimate Tensile Strength Ksi (MPa)	Yield Strength at 0.2% Offset, Ksi (MPa)	Elongation %
GTAW	Room	118 (813)	80 (515)	45
GMAW**	Room	121 (834)	78 (537)	46
SMAW	Room	112 (772)	69 (475)	49
GTAW	500 (260)	103 (710)	68 (469)	40
GTAW	1000 (538)	100 (689)	66 (455)	45

*1/2 in. (12.7 mm) thick, **Synergic

Typical Weld Metal V-Notch Impact Strength (Room Temperature):

Typical Weld Metal V-Notch Impact Strength (Room Temperature)	
GTAW	165 ft-lb (224 joules)
SMAW	86 ft-lb (118 joules)
GMAW	140 ft-lb (191 joules)
Density (Room Temperature)	0.333 lb/in^3 (9.22 gm/cm$^{3)}$

Suggested Practice:

•Establish safe working conditions prior to the start of welding. Areas to consider should includeprotection of personnel, ventilation, and welding in confined spaces. The recommendations ofthe American National Standard ANSI/ASC Z49.1, "Safety in Welding and Cutting", should befollowed.

▪The welding surface and adjacent area on each side of the joint should be thoroughly cleanedand degreased prior to welding.

▪Oxy-acetylene welding and cutting are not recommended.

▪Covered electrodes used from an unopened can require no further drying. Unused electrodes should be stored in a temperature controlled oven held in the range 250-400°F (121-200°C).

▪Backing gas (100% argon) should always be used for the root pass when welding by either GTAW or GMAW. For SMAW, grinding of the back side of the root pass is necessary.▪For optimum corrosion resistance of the finished weldment, excessive heat input should beavoided by:

- minimizing weave bead techniques (i.e. use 'stringer' beads with some manipulation).
- avoiding slow travel speeds, especially on thin parts.
- controlling interpass temperatures, generally 200°F (93°C) or less.

▪For GTAW, a constant-current power supply equipped with a high frequency start anddownslope control is recommended. Torches with gas diffuser lenses provide the optimum gascoverage.

▪Postweld stress relieving in the 1200°F (650°C) range is not recommended for HASTELLOYC-276 alloy. If required, solution heat-treatment of this material is accomplished at 2050°F(1121°C) for an appropriate time followed by a water quench or rapid air cool (depending onsection thickness)

.▪If shielding gases containing CO2 are used during GMAW welding, grinding of the weld beadbetween each pass is recommended.

▪Water cooled torches are recommended for GMAW spray transfer and synergic transfer (above120 amps) modes.

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