

# Wire and Welding products

## HAYNES International



## HASTELLOY® B-3® Welding Data

### Typical Welding Parameters - Flat Position:

	ELECTRODE DIAMETER, in. (mm)	ARC VOLTAGE, volts	WELDING CURRENT, amps		
S	3/32 (2.4)	22-24	55-75		
M	1/8 (3.2)	22-24	80-100		
A	5/32 (4.0)	22-25	125-150		
W	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
G	1/32-1/16 (0.8-1.6)	1/16 (1.6)	1/16"	15-60	9-12
T	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
A	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
W	>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 ft<sup>3</sup>/hr (12 L/min)

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

\*Flow Rate ~ 35 ft<sup>3</sup>/hr (16 L/min)

\*\* (Argon + Helium + < 1%CO<sub>2</sub>)

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

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# HASTELLOY® B-3® Welding Data

## 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 <sup>3</sup> (9.22 gm/cm <sup>3</sup> )

## Suggested Practice:

- Establish safe working conditions prior to the start of welding. Areas to consider should include protection of personnel, ventilation, and welding in confined spaces. The recommendations of the American National Standard ANSI/ASC Z49.1, "Safety in Welding and Cutting", should be followed.
- The welding surface and adjacent area on each side of the joint should be thoroughly cleaned and 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 be avoided 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 and downslope control is recommended. Torches with gas diffuser lenses provide the optimum gas coverage.
- Postweld stress relieving in the 1200°F (650°C) range is not recommended for HASTELLOY B-3 alloy. If required, solution heat-treatment of this material is accomplished at 1950°F (1066°C) for an appropriate time followed by a water quench or rapid air cool (depending on section thickness).
- If shielding gases containing CO<sub>2</sub> are used during GMAW welding, grinding of the weld bead between each pass is recommended.
- Water cooled torches are recommended for GMAW spray transfer and synergic transfer (above 120 amps) modes.

HW-2112