

Crown HSS-10 & HSS-20

Gas Tungsten Arc Welding
(GTAW) TIG Alloy

Shielded Metal Arc Welding
(SMAW) Stick Electrode

Tool Steel



Premium High Speed Tool Steel (M-2)

Typical Applications

Crown HSS-10 (GTAW) and HSS-20 (SMAW) are 5% molybdenum, chromium and tungsten high-speed tool steel welding alloys that produce heat-treatable deposits which resist abrasion, frictional wear and mild impact. **Crown HSS-10 & HSS-20** weld deposits match the hardening characteristics of M-1 and M-2 base metals and can also be used for joining and building-up of M-1 through M-44 tool steels. Some specific applications include repairs and alterations to high-speed tool steel shear blades, cutting dies and similar tools where cutting edge retention is critical. It is also ideal for applications where high temperature combines with severe abrasion and metal-to-metal wear such as hot shear blades and trimming, punching and blanking dies. Other applications include build-up and hard facing of molding plates, mandrels, reamers, turning and planning tools, circle cutting tools, stencils, cams, broaches, drills, lathe tools, mill cutters and sliding surfaces. These alloys are also well suited for upgrading wear areas on lower type alloys including composite dies. The deposit retains its hardness even at elevated temperatures of 1100°F. The weld deposit is air-hardening and is machinable only after annealing.

Specifications

AISI M-2

Identifying Color:
Blue End

- Hardness 60-63 (Rockwell C) as welded.
- Preheat 1000°F for all high speed tool steels. All other alloys, preheat according to base metal.
- Forging Temps. Initial - 1900°F to 2025°F
Finish - 1600°F to 1700°F
- Annealing 1450°F to 1550°F
- Hardening 2150°F to 2250°F
- Drawing 950°F to 1100°F
- Heat Treatment Use M-2 procedure

Procedure

The following procedure must be followed whether using the **HSS-10** or the **HSS-20**:

Clean base metal. Remove all fatigued metal & any sharp radii. Preheat according to above chart. Interpass temperature should at least match the preheat temperature. Deposit stringer beads. Peen while hot. Cool in still air to 400°F. If necessary, temper at 1000°F for one hour per inch of thickness upon reaching the tempering temperature. It is advisable to double temper.

HSS-10 Welding Parameters: TIG (GTAW)

Manual Welding – DC straight polarity (DCEN) – Use Argon Shielding Gas

Tungsten: Traditional choice is a 2% thoriated tungsten (Red Band), however, the more recent and safer introductions of 2% ceriated tungsten (Orange Band) or 1.5% lanthanated tungsten (Gold Band) have demonstrated superior performance in most applications.

Material Thickness (inches)	Tungsten Diameter	Filler Rod Diameter	Arc Voltage (volts)	Welding Current (amperage)	Gas Flow (cfh)
.035 to .045	.040	.045	7 – 14	60 – 100	15 – 20
1/16 to 3/32	1/16	1/16	9 – 14	100 – 160	20
1/8	3/32	1/16	12 – 15	125 – 200	20
3/16	3/32	3/32	12 – 17	130 – 195	25
3/16 to 1/2	1/8	1/8	15 – 20	150 – 300	25

All suggested settings are approximate. Inverter-based welders generally require lower amps. Welds should be tested to comply to your specifications.

HSS-20 Welding Parameters: Stick Electrode (SMAW)

Welding current can be DC reverse polarity (DCEP) or AC. However, DCEP ensures the best weldability & penetration.

Electrode Diameter (inches)	Welding Current (amperage)
3/32	50 – 90
1/8	75 – 135
5/32	100 – 180

Sizes and Part Numbers

TIG Diameter	Part Numbers	
	1# Package	5# Package
.045 x 36"	TTHSS/TG-BP	TTHSS/TG
1/16 x 36"	TTHSS/TL-BP	TTHSS/TL
3/32 x 36"	TTHSS/TN-BP	TTHSS/TN
1/8 x 36"	TTHSS/TO-BP	TTHSS/TO

Electrode Diameter	Part Numbers	
	1# Package	5# Package
3/32	TEHSS/EN-BP	TEHSS/EN
1/8	TEHSS/EO-BP	TEHSS/EO
5/32	TEHSS/EP-BP	TEHSS/EP



!!!! WARNING !!!!



WELDING FUMES AND GASES CAN BE DANGEROUS TO YOUR HEALTH.

BEFORE USING THIS PRODUCT THE WELDER (END-USER) MUST READ AND UNDERSTAND THE COMPLETE PRODUCT WARNING LABEL AND THE NEW 16 SECTION SAFETY DATA SHEET (SDS).

THE SAFETY DATA SHEET (SDS) WHICH OUTLINES THE POTENTIAL HEALTH HAZARDS AND SAFETY INFORMATION RELATED TO THIS PRODUCT CAN BE DOWNLOADED FROM THE SDS PORTION OF THIS WEBSITE. IT IS ALSO AVAILABLE FROM YOUR EMPLOYER AND WELDING SUPPLY DISTRIBUTOR.

DO NOT PROCEED WITH USE OF THIS PRODUCT UNTIL YOU READ AND UNDERSTAND THE SAFETY DATA SHEET (SDS) AND PRODUCT WARNING STATEMENT.

BE SURE TO CONSULT THE LATEST VERSION OF THE SDS.

SEE THE PRODUCT WARNING LABEL AND SDS FOR COMPLETE WARNING INFORMATION.

