

Classifications

EN ISO 3580-A	AWS A5.5 / SFA-5.5
E Z CrMoWVNb9,0,5 2 B 4 2 H5	E9015-B92 H4
	E9015-G

Characteristics and typical fields of application

Thermanit MTS 616 is a core wire alloyed covered electrode with basic coating for shielded metal arc welding. The 9Cr-1.8W-0.5Mo-V-Nb type weld metal exhibits a fully tempered martensitic microstructure with favorable mechanical properties in post weld heat treated condition. The range of application covers joint welding of similar alloyed creep strength enhanced ferritic steels like ASTM grade 92 tube, pipe, plate and forgings used in the thermal power industry. Thanks to the controlled Mn+Ni content, the A_{C1} Temperature is certainly above 780 °C.

The chemical composition of Thermanit MTS 616 is optimized in order to provide a high creep resistant and ductile weld metal after post weld heat treatment along with low level of trace elements. Its basic coating guarantees low level of diffusible hydrogen in the weld metal.

Base materials

Similar alloyed creep resistant steels and castings like

1.4901 – X10CrWMoVNb9-2

ASTM A213 Gr. T 92; A355 Gr. P92; A187 F92, A369 FP92; A1017 Gr 92

KA-STBA29; KA-STPA29

NF 616

Typical analysis


	C	Si	Mn	Cr	Ni	Mo	W	V	Nb	N
wt.-%	0.11	0.2	0.6	8.8	0.6	0.5	1.7	0.2	0.04	0.04

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength $R_{p0.2}$		Tensile strength R_m		Elongation A ($L_0=5d_0$)		Impact energy ISO-V KV J
	MPa 20 °C	MPa 600 °C	MPa 20 °C	MPa 600 °C	% 20 °C	% 600 °C	
T	660 (≥ 560)	360 (≥ 248)	790 (≥ 720)	450 (≥ 328)	18 (≥ 15)	18 (≥ 15)	50 (≥ 41)

T: tempered (760 °C / 2 h)

Operating data

	Polarity	DC +	Dimension mm	Current A
	Electrode identification	Thermanit MTS 616 9015-B92	2.5 × 300	70 – 100
	Redrying	300 - 350 °C / 2 h	3.2 × 350	90 – 135
			4.0 × 350	130 – 170
			5.0 × 450	160 – 240

Preheat and interpassttemperature should be controlled between 200 and 300 °C. In order to optimize impact energy a welding technique that ensures small layer thickness and low heat input is recommended. After welding the weld seam must be cooled below 100 °C in order to complete the martensitic transformation prior to PWHT commonly carried out between 750 and 770 °C for at least 2 h. The un-tempered martensitic microstructure is very sensitive to cold and stress corrosion cracking. Residual welding and external stresses must be reduced to a minimum. Any exposure to moisture must be avoided in the as welded condition. Keeping a temperature above the dew point or storage in humidity controlled atmosphere is highly recommended bridging the gap between welding and final post weld heat treatment. For heavy wall components conducting a dehydrogenating heat treatment between 260 and 400 °C before cooling down to room temperature can be recommended.

Approvals

TÜV (09289.), CE