Thermanit MTS 616

TIG rod / wire, creep resistant

Classifications

EN ISO 21952-A	AWS A5.28 / SFA-5.28
W Z CrMoWVNb 9 0,5 1,5	ER90S-B92

Characteristics and typical fields of application

TIG rod / wire of type W Z CrMoWVNb 9 0,5 1,5 / ER90S-B92 for manual and automatic gas tungsten arc welding. The 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. It is approved for long-term service at temperatures up to 650 °C.
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.

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.-%	0.1	0.40	0.5	8.5	0.5	0.4	1.6	0.19	0.06	0.04

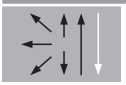
Structure: Martensite, suitable for quenching and tempering

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	% 20 °C	20 °C
s	690 (≥ 560)	390 (≥ 248)	800 (≥ 720)	455 (≥ 328)	19 (≥ 15)	19 (≥ 15)	145 (≥ 41)

s heat treated, tempered 760 °C / 2 h - shielding gas I1

Operating data



Polarity	DC -
Shielding gas (EN ISO 14175)	I1
Rod marking	+ ER90S-B92 / P 92

Dimension mm
0.8
1.0
2.0 × 1000
2.4 × 1000
3.2 × 1000

Preheat and interpass temperature should be controlled between 200 and 300 °C. In order to optimize impact energy, a multi-layer 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 which is typically carried out between 750 and 770 °C for at least 0.5 h for thin section tube welds and at least 2 h for thicker sections. 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.

Approvals

TÜV (09290), CE