Thermanit MTS 3

TIG rod / wire, creep resistant

Classifications

EN ISO 21952-A	AWS A5.28 / SFA-5.28
W CrMo 9 1	ER90S-B91

Characteristics and typical fields of application

TIG rod and wire designed for manual and mechanized gas tungsten arc welding. The 9Cr-1Mo-VNb 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 91 tube, pipe, plate, forgings and castings, used in the thermal power and petrochemical industry. Thermanit MTS 3 is approved for long-term service at temperatures up to 650 ºC. The chemical composition 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 resitant steels and castings like
1.4903 X10CrMoVNb9-1, 1.4955 GX12CrMoVNbN9-1
ASTM Grade 91, T91, P91, F91, FP91, WP91,C12A
10Cr9Mo1VNbN
STPA28, STBA28

Typical analysis

	C	Si	Mn	Cr	Ni	Mo	V	Nb
wt.-%	0.1	0.3	0.5	9.0	0.5	1.0	0.2	0.06

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	MPa	%	20°C
s	660 (≥ 540)	780 (≥ 620)	20 (≥17)	170 (≥ 47)

s tempered (760 °C / 2 h)

Operating data

Polarity	DC -
Shielding gas (EN ISO 14175)	I1
Rod marking	+ WCrMo 9 1 / ER90S-B91

Dimension mm
0.8
1.0
1.6 × 1000
2.0 × 1000
2.4 × 1000
3.2 × 1000
4.0 × 1000

Preheat and interpass temperature should be controlled between 200 and 350 ºC. 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 ºC in order to complete the martensitic transformation prior to PWHT which is typically carried out between 750 and 770 ºC 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.
Previous rod marking: + WCrMo 9 1 / ER 90S-B9

Approvals

TÜV (06166), CE