Thermanit MTS 3 LNi

Solid wire, creep resistant

Classifications

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

Characteristics and typical fields of application

Solid filler wire electrode for gas metal 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. 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. X-factor < 15 ppm.
Thanks to the restricted Mn+Ni content of less than 1.0 wt. % the A_{c1} temperature is certainly above 780ºC.

Base materials

Similar alloyed creep resistant 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

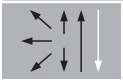
	C	Si	Mn	Cr	Ni	Mo	V	Nb	N
wt.-%	0.11	0.25	0.65	9.0	< 0.15	0.95	0.2	0.06	0.045

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	590 (≥ 520)	735 (≥ 620)	20 (≥ 17)	50 (≥ 32)

s heat treated, tempered 760 °C / 2 h - shielding gas Ar + 2.5 % CO_2

Operating data



Polarity	DC +	Dimension mm
Shielding gas (EN ISO 14175)	M12	0.9
	M13	1.2

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 100ºC in order to complete the martensitic transformation prior to PWHT which is typically carried out between 750 and 770ºC 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 PWHT. For heavy wall components conducting a dehydrogenating heat treatment between 260 and 400ºC before cooling down to room temperature can be recommended.

Approvals

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