

## Classifications

EN ISO 21952-A	EN ISO 21952-B	AWS A5.28	AWS A5.28M
W CrMo91	W 62 I1 9C1MV	ER90S-B9	ER62S-B9

## Characteristics and typical fields of application

GTAW rod for high temperature, creep resistant martensitic 9 – 12 % chromium steels in turbine and boiler fabrication and in the chemical industry. Especially designed for the ASTM steels T91 / P91. Approved in long-term condition up to +650 °C service temperature.

## Base materials

Similar alloyed creep resistant steels

1.4903 X10CrMoVNb9-1, GX12CrMoVNbN9-1

ASTM A 335 Gr. P91, A 336 Gr. F91, A 369 Gr. FP91, A 387 Gr. 91, A 213 Gr. T91

## Typical analysis of the TIG rods (wt.-%)

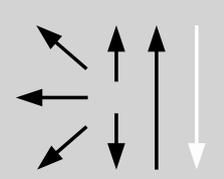
	C	Si	Mn	Cr	Ni	Mo	V	Nb
wt.-%	0.11	0.3	0.5	9.0	0.5	0.9	0.2	0.06

## Mechanical properties of all-weld metal

Condition	Yield strength $R_{p0.2}$	Tensile strength $R_m$	Elongation A ( $L_0=5d_0$ )	Impact work ISO-V KV J
	MPa	MPa	%	+20 °C
a	<b>640</b> (≥ 415)	<b>760</b> (≥ 620)	<b>19</b> (≥ 17)	<b>150</b> (≥ 47)

a annealed 760°C/2 h/furnace down to 300°C/air – shielding gas Argon

## Operating data

	<b>Polarity</b> DC (–)	<b>Shielding gas:</b> 100% Argon	<b>Rod marking:</b> front: ✦ WCrMo91 back: ER 90S-B9	<b>ø (mm)</b> 2.0 2.4
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Preheating and interpass temperature 200 – 300 °C. After welding, the weld joint should cool down below 80 °C to finish the martensite transformation. In case of greater wall thickness or complex components the possibility of residual stresses must be considered.

The following post weld heat treatment is recommended:

annealing 760 °C/min. 2 hrs, max. 10 hrs, heating and cooling rates below 550°C  
max. 150 °C/h, above 550 °C max. 80°C/h.

For optimised toughness values a welding technology should be applied which produces thin welding layers (approx. 2 mm).

## Approvals

TÜV (07106.), NAKS (ø 2.4 mm; ø 3.0 mm), CE