


ER 90S-B9 (P91)

CATEGORY	GMAW-GTAW Solid wires																																	
TYPE	Medium alloyed, high-strength 9% Chromium alloy.																																	
APPLICATIONS	Designed for welding equivalent type 91~ 9% Cr Steels modified with small additions of Niobium, Vanadium and Nitrogen to offer improved long term creep properties. This alloy is specially intended for high integrity structural service at elevated temperature such as: Headers, main steam piping and turbine casings, gasification plants etc.																																	
PROPERTIES	Filler metal specifically intended for high integrity structural service at elevated temperature so the minor alloy additions responsible for its creep strength are kept above the minimum considered necessary to ensure satisfactory performance.																																	
CLASSIFICATION	AWS	A-5.28: ER90S-B9																																
	EN ISO	21952-A: G CrMo 9 1																																
	DIN: W.Nr.	1.4903																																
	DIN	8575: SG CrMoVNb91																																
SUITABLE FOR	A 213 T91 (seamless tubes), A 335 P91 (seamless tubes), A 387 Gr91 (plates), A 182 / A336 F91 (forgings), X10CrMoVNb 91, 1503 Gr91, AFNOR NF A-49213/A-49219 Gr TU Z 10, CDVNb 09-01																																	
APPROVALS	CE approved																																	
WELDING POSITIONS:																																		
WELD METAL ANALYSIS % (TYPICAL)	<table border="1"> <thead> <tr> <th>C</th> <th>Mn</th> <th>Si</th> <th>S</th> <th>P</th> <th>Cr</th> <th>Ni</th> <th>Mo</th> <th>V</th> <th>Al</th> <th>Cu</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>0.1</td> <td>0.80</td> <td>0.32</td> <td>0.008</td> <td>0.008</td> <td>9.0</td> <td>0.6</td> <td>1.0</td> <td>0.2</td> <td>0.02</td> <td>0.10</td> <td>< 0.50</td> </tr> </tbody> </table>		C	Mn	Si	S	P	Cr	Ni	Mo	V	Al	Cu	Other	0.1	0.80	0.32	0.008	0.008	9.0	0.6	1.0	0.2	0.02	0.10	< 0.50								
C	Mn	Si	S	P	Cr	Ni	Mo	V	Al	Cu	Other																							
0.1	0.80	0.32	0.008	0.008	9.0	0.6	1.0	0.2	0.02	0.10	< 0.50																							
MECHANICAL PROPERTIES	<table border="1"> <thead> <tr> <th rowspan="2">Heat Treatment</th> <th rowspan="2">R_{p0.2} (N/mm²)</th> <th rowspan="2">R_m (N/mm²)</th> <th colspan="2">A5</th> <th colspan="2">A4</th> <th colspan="2">Impact Energy (J) ISO-V</th> <th rowspan="2">Hardness HV</th> </tr> <tr> <th>(%)</th> <th>(%)</th> <th>20°C</th> <th>-20°C</th> </tr> </thead> <tbody> <tr> <td>Min</td> <td>415</td> <td>620</td> <td>16</td> <td>17</td> <td></td> <td></td> <td></td> <td>265</td> </tr> <tr> <td>SR</td> <td>700</td> <td>800</td> <td>22</td> <td>19</td> <td>220</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Heat Treatment	R _{p0.2} (N/mm ²)	R _m (N/mm ²)	A5		A4		Impact Energy (J) ISO-V		Hardness HV	(%)	(%)	20°C	-20°C	Min	415	620	16	17				265	SR	700	800	22	19	220			
Heat Treatment	R _{p0.2} (N/mm ²)	R _m (N/mm ²)				A5		A4		Impact Energy (J) ISO-V			Hardness HV																					
			(%)	(%)	20°C	-20°C																												
Min	415	620	16	17				265																										
SR	700	800	22	19	220																													
Min. : minimum values, SR: stress relieved PWHT 750°C-760°C / 2-3Hr																																		
WELDING PARAMETERS / PACKING	<table border="1"> <thead> <tr> <th rowspan="2">D (mm)</th> <th colspan="3">Welding Parameters</th> <th colspan="2">Packing</th> </tr> <tr> <th>Voltage (V)</th> <th>Current (A)</th> <th>spool type</th> <th>kg / spool</th> <th>kg / pallet</th> </tr> </thead> <tbody> <tr> <td>0.8</td> <td>15-24</td> <td>60-210</td> <td>S/D 300</td> <td>15</td> <td>1080</td> </tr> <tr> <td>1.0</td> <td>18-28</td> <td>80-280</td> <td>S/D 300</td> <td>15</td> <td>1080</td> </tr> <tr> <td>1.2</td> <td>20-33</td> <td>120-350</td> <td>S/D 300</td> <td>15</td> <td>1080</td> </tr> </tbody> </table>		D (mm)	Welding Parameters			Packing		Voltage (V)	Current (A)	spool type	kg / spool	kg / pallet	0.8	15-24	60-210	S/D 300	15	1080	1.0	18-28	80-280	S/D 300	15	1080	1.2	20-33	120-350	S/D 300	15	1080			
D (mm)	Welding Parameters			Packing																														
	Voltage (V)	Current (A)	spool type	kg / spool	kg / pallet																													
0.8	15-24	60-210	S/D 300	15	1080																													
1.0	18-28	80-280	S/D 300	15	1080																													
1.2	20-33	120-350	S/D 300	15	1080																													
REDRYING TEMPERATURE	not required																																	
GAS ACC. EN ISO: 14175	M13																																	