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## ER90S-B9 DATA SHEET

### Pinnacle Alloys ER90S-B9

AWS CLASS ER90S-B9

#### CODE AND SPECIFICATION DATA:

AWS A5.28 ASME SFA 5.28

#### DESCRIPTION:

Pinnacle Alloys ER90S-B9 is a copper-free wire with low nickel concentration (less than 0.20%) and suitable for the welding of creep resistant steel. Long term creep properties get improved thanks to small additions of niobium, vanadium, and nitrogen. The wire is designed for elevated temperature service up to 650°C. Pinnacle Alloys ER90S-B9 is suitable in the petro-chemical industry for welding P91 steels and in fossil fuel power generating plants for components such as headers, main steam piping, and turbine castings.

#### BASE MATERIALS TO BE WELDED:

- A182 Gr F91
- A199 Gr T91
- A200 Gr T91
- A213 Gr T91
- A217 C12A
- A234 WP91
- A335 Gr P91
- A336 Gr F91
- A369 FP91
- A387 Gr 91

**DIAMETERS:** .035", .045", 1/16", 3/32", 1/8", 5/32"

**WELDING POSITIONS:** All positions

**WELDING GUIDELINES:** Preheat and interpass temperature 390°F-570°F (200°C-300°C). PWHT at 1400°F (760°C) for two hours. In multipass welding it is recommended to accurately clean the surface of the material to be welded by grinding off the surface layer of chrome oxide.

#### TYPICAL DEPOSIT COMPOSITION (Wt %):

Carbon (C)	0.09
Chromium (Cr)	8.80
Copper (Cu)	0.03
Manganese (Mn)	0.60
Molybdenum (Mo)	0.95
Nickel (Ni)	0.03
Niobium (Nb)	0.08
Nitrogen (N)	0.05
Phosphorous (P)	0.002
Silicon (Si)	0.20
Sulfur (S)	0.007
Vanadium (V)	0.20



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**TYPICAL MECHANICAL PROPERTIES (after PWHT):**

Ultimate Tensile Strength (psi)	104,430 psi (720 MPa)
Yield Strength (psi)	91,380 psi (630 MPa)
Percent Elongation	18%
CVN (ft•lb <sub>f</sub> ) @ 68°F (20°C)	50 ft•lbs (60 Joules)

**TYPICAL WELDING PARAMETERS:**

	Diameter	Amperage	Volts	Shielding Gas
<b>GTAW</b>	.035"	50-70	10-12	100% Ar
	.045"	70-100	10-12	
	1/16"	100-125	12-15	
	3/32"	125-175	15-20	
	1/8"	175-250	15-20	
	5/32"	175-250	15-20	
<b>GMAW – Spray Transfer</b>	.035"	165-200	28-32	80-85% Ar/ Bal CO <sub>2</sub> 95-98% Ar/ Bal O <sub>2</sub>
	.045"	180-220	30-34	
	1/16"	230-260	30-34	
<b>GMAW – Short Circuiting Transfer</b>	.035"	100-140	22-25	100% CO <sub>2</sub> * 75% Ar/ 25% CO <sub>2</sub> **
	.045"	120-150	23-26	

\*With 100% CO<sub>2</sub> gas shielding, weld metal undergoes short circuit or globular transfer.

\*\*Only facilitates short circuit or globular transfer.

**NOTICE:** The results reported are based upon testing of the product under controlled laboratory conditions in accordance with American Welding Society Standards. Actual use of the product may produce different results due to varying conditions. An example of such conditions would be electrode size, plate chemistry, environment, weldment design, fabrication methods, welding procedure and service requirements. Thus the results are not guarantees for the use in the field. The manufacturer disclaims any warranty of merchantability of fitness for any particular purpose with respect to its products.

**CAUTION:** Consumers should be thoroughly familiar with the safety precautions on the warning label posted in each shipment and in the American National Standards A49.1, "Safety in Welding and Cutting," published by the American Welding Society, 550 NW LeJune Road, Miami, FL 33126: OSHA Safety and Health Standards 29 CFR 1910 is available from the U.S. Department of Labor, Washington, D.C. 20210.

Pinnacle Alloys MSDS sheet may be obtained at [www.pinnaclealloys.com](http://www.pinnaclealloys.com).