

ER120S-1

Low-Alloy Steel

SPECIFICATION/CLASSIFICATION: AWS A5.28 & ASME SFA-5.28 / ER120S-1

Description/Application:

Weldcote 120S-1 deposits a high strength where very tough weld metal may be needed on a variety of steels in critical applications. 120S-1 developed for high yield steels such as T-1, HY-100 and other quenched and tempered steels often exceeds the 120,000 psi tensile strengths. Application includes pressure vessels, shipbuilding, military equipment and general high strength fabrication. Weld metal yields a high ductility with a great strength and impact resistance while offering high notch toughness to -60°F. 120S-1 preheat and interpass temperature of 275-350°F may be required. Weld deposit mechanical properties will vary depending on heat input used.

Typical Filler Wire/Rod Chemistry in weight percent:

| | C | Mn | Si | S | P | Ti | Cr | Ni | Mo | V | Zr | Cu |
|------------------|------|------------|-------------|-------|-------|-------|------|-----------|-----------|-------|-------|------|
| AWS ¹ | 0.10 | 1.40 -1.80 | 0.25 - 0.60 | 0.010 | 0.010 | 0.10 | 0.60 | 2.00-2.80 | 0.30-0.65 | 0.03 | 0.10 | 0.25 |
| Result | 0.07 | 1.65 | 0.50 | 0.008 | 0.007 | 0.018 | 0.38 | 2.13 | 0.37 | 0.025 | 0.006 | 0.20 |

AWS¹ Chemical Composition Requirements Range with single value maximum. Cu includes any copper coating. Al = 0.10% max

Typical Mechanical Properties of Weld Metal:

| | Typical Result | AWS Requirements ² |
|-------------------------|----------------|-------------------------------|
| Tensile Strength (psi) | 126,150 | 120,000 |
| Yield Strength (psi) | 108,460 | 105,000 |
| Elongation % in 2" | 16% | 14 % |
| Charpy V-notch ft. lbs. | 59 | 50 |

AWS Requirements² single value minimum. Charpy V-notch ft. lbs for Impact Test done at the required -60°F

RECOMMENDED WELDING PARAMETERS: ER 120S-1

GMAW (MIG) Parameters (DC Reverse Polarity) Electrode Positive Short Circuit Transfer

| Wire Diameter | Amps | Volts | 75% Argon/25% CO ² | Wire Feed (ipm) |
|---------------|---------|---------------|-----------------------------------|-----------------|
| .030 | 45-135 | 14-20 | 25 | 110-335 |
| .035 | 85-180 | 15-21 | 25-30 | 160-360 |
| .045 | 110-225 | 17-20 | 30-35 | 115-210 |
| .035 | 180-245 | 24-27 (Spray) | 25-30 (98% Ar/2% O ₂) | 365-545 |
| .045 | 200-365 | 24-29 ↓ | 30-35 ↓ | 270-515 |
| 1/16" | 275-425 | 25-35 | 30-40 | 195-295 |

GTAW (TIG) Parameters (DCSP) 2% Thoriated Tungsten Electrode negative⁽³⁾

| Material | Tungsten dia ⁽³⁾ | Filler Wire Size | Amps | Gas Cup | Argon (cfh) |
|----------|-----------------------------|------------------|---------|---------|-------------|
| 1/16" | 1/16" | 1/16" | 100-140 | 3/8 | 20 |
| 3/32" | 1/16" | 1/16" | 100-160 | 3/8 | 20 |
| 1/8" | 3/32" | 1/16" | 125-200 | 7/16 | 20 |
| 3/16" | 3/32" | 3/32" | 150-250 | 7/16 | 25 |
| 1/4" | 1/8" | 1/8" | 150-250 | 1/2 | 25 |
| 3/8" | 1/8" | 1/8" | 150-275 | 1/2 | 25 |
| 1/2" | 1/8" | 1/8" | 150-300 | 1/2 | 25 |

F-Number of 6 ; A-Number of 12

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Weldcote Metals believes this data to be accurate and to reflect qualified opinion regarding research.

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All parameters are suggested as basic guidelines and will vary depending on joint design, number of passes, and other factors.