

## Classifications

AWS A5.28 / SFA-5.28

ER90S-G

## Characteristics and typical fields of application

Welding rod for gas tungsten arc welding. The 2.25Cr-1Mo-0.25V type weld metal exhibits a bainitic microstructure with favorable mechanical properties in tempered condition. The range of application covers joint welding of similar alloyed creep resistant steel for the fabrication of thick walled pressure vessel in the petrochemical industry. Impact energy is excellent down to temperatures < -30 °C. Due to the low content of residual and tramp elements, the weld metal offers a Brucato factor < 10. Thus, being resistant to temper embrittlement and complies with the requirements on step-cooling testing.

## Base materials

2.25Cr-1Mo-0.25V steels

1.7703 – 13CrMoV9-10

ASTM SA 542 type D Cl. 4a; SA 832 Gr. 22V; SA 336 Gr. F22V; SA 541 Gr. 22V; SA 182 Gr. 22V

## Typical analysis

|       | C    | Si   | Mn   | Cr   | Mo  | V    | Nb    |
|-------|------|------|------|------|-----|------|-------|
| wt.-% | 0.09 | 0.05 | 1.20 | 2.30 | 1.0 | 0.28 | 0.015 |

## 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<br>KV J | Hardness |
|---------------|---------------------------|------------------------|-----------------------------|-----------------------------|----------|
|               | MPa                       | MPa                    | %                           | - 30 °C                     |          |
| 705 °C / 8 h  | 570 (415 - 620)           | 660 (585 - 760)        | 21 (> 18)                   | 290 (> 54)                  | (< 248)  |
| 705 °C / 32 h | 495 (415 - 620)           | 610 (585 - 760)        | 24 (> 18)                   | 290 (> 54)                  | (< 248)  |

## Operating data

|  |   |         |                     |
|--|---|---------|---------------------|
|  | <b>Polarity</b>                         | DC-     | <b>Dimension mm</b> |
|  | <b>Shielding gas<br/>(EN ISO 14175)</b> | I1      | 2.4 × 1000          |
|  | <b>Rod marking</b>                      | WCRMO2V |                     |

Preheating, interpass temperature, and post-weld heat treatment as required by the base metal. Preheating and interpass temperature can be recommended being in a range of 180-250 °C. Common post weld heat treatments are carried out at 705 °C +/- 14 °C for 8 h. Before cooling down to room temperature the weldment should be intermediate stress relieved in a temperature range from 650-680°C or a dehydrogenating treatment at 350 - 425 °C for at least 4h should be carried out direct from the welding heat in order to minimize the risk for hydrogen assisted cold cracking. In order to optimize impact energy values a welding technique aiming on small layer thickness should be applied.

## Approvals

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