

VDM® FM 59

N06059 (UNS) · 2.4607 (Werkstoff-Nr.)



VDM® FM 59 is a nickel-chromium-molybdenum filler material with a low carbon content for the over-alloyed seam welding of high-performance alloys in the area of wet chemistry. It possesses exceptionally high stability in hot acid and chloride-containing media and is frequently used in the chemical industry and environmental technologies.

Designations & standards

| | |
|-----------|-----------------------------|
| ISO 18274 | S Ni 6059, NiCr23Mo16 |
| AWS A5.14 | ERNiCrMo-13, ABS |
| VdTÜV | Data sheet no. 06013, 06014 |

Typical chemical composition, values in %

| Ni | Cr | Mo | Fe | C |
|------|------|----|-----|--------|
| Bal. | 22.5 | 16 | 0.5 | < 0.01 |

Mechanical properties at ambient temperature

(in condition "U" – unannealed)

| Yield strength $R_{p0.2}$ (MPa) (Ksi) (Ksi) | Tensile strength R_m (MPa) (Ksi) (Ksi) | Elongation A_5 (%) | ISO V-notch impact strength (J) (ft-lbs) |
|---|---|-------------------------|--|
| > 450 (> 65.3) | > 720 (> 104) | > 35 | > 70 (> 51.6) |

Applications

Filler material for the welding of VDM® Alloy 59, VDM® Alloy C-4, VDM® Alloy C-276, VDM® Alloy 22, VDM® Alloy 31, VDM Alloy 31 Plus® and VDM® Alloy 926. Additional material combinations and fields of application are available on request.

Special notes for the welding process

VDM® FM 59 exhibits an exceptional weldability and a high resistance to sensitization. A low heat input and fast heat removal must be ensured. The interpass temperature should not exceed 150 °C (302 °F). When using the gas-shielded metal-arc process, pulsed welding is the preferable method. No preheating or reheating is required to achieve the weld metal properties. If required, the weld can be solution annealed after welding to optimize the corrosion resistance. This brings the mechanical and technological values into line with those of the base material VDM® Alloy 59.

Example welding processes and parameters for homogeneous seam welding in Position 1G

| Welding process as per ISO 4063 | Shielding gas as per ISO 14175 | Welding parameters | | |
|--------------------------------------|---|--------------------|---------|------------------------|
| | | U (V) | I (A) | V (cm/min) (in/min) |
| m-TIG 141, 145 | l1, R1 max. 3 % H ₂ | 10–12 | 90–140 | 11–16 4.33–6.30 |
| <i>Comment</i> | <i>Root welding up to 110 A</i> | | | |
| v-TIG 141, 145 | l1, R1 max. 3 % H ₂ | ≈ 12 | 150–180 | 25 9.84 |
| v-TIG HW 141 H, 145 H | l1, R1 max. 3 % H ₂ | 11–12 | 180–220 | 40–80 15.7–31.5 |
| MSGp (MIG/MAG) 131, 135 | l1, l3-ArHe 30, Z-ArHeHc 30/2/0.05 Z-ArHeHc 30 / 2 / 0,12 | 23–27 | 130–150 | 24–30 9.45–11.8 |
| <i>Comment</i> | <i>from approx. 8 mm (0.315 in) work piece thickness</i> | | | |
| Plasma (PAW) 15 | l1, R1 max. 3 % | ≈ 25 | 200–220 | ≈ 26 ≈ 10.2 |
| <i>Comment</i> | <i>up to approx. 8 mm (0.315 in) work piece thickness</i> | | | |