VDM® FM 60

N04060 (UNS) · 2.4377 (Material No.)

VDM® FM 60 is a cupronickel filler material for seam welding VDM® Alloy 400. It possesses good corrosion resistance in brine and alkaline salt solutions and is frequently used in offshore installations, ship building and the chemical industry.

Designations & standards

ISO 18274	S Ni 4060, NiCu30Mn3Ti
AWS A5.14	ERNiCu-7, ABS
VdTÜV	Data sheet no. 01545, 01547

Typical chemical composition, values in %

Ni	Cu	Mn	Fe	Ti
Bal.	29	3.2	1	2.4

Mechanical properties at ambient temperature

Yield strength $R_{p\,0.2}$ (MPa) (Ksi) (Ksi)	Tensile strength R_m (MPa) (Ksi) (Ksi)	**Elongation** A_5 (%)	**ISO V-notch impact strength** (J) (ft-lbs)
> 200 (> 29)	> 460 (> 66.7)	> 30	> 100 (> 73.8)

Applications

Filler material for the welding of VDM® Alloy 400, VDM® Alloy K-500 as well as steels that have been roll clad or explosive clad in these Ni-Cu alloys. Also suitable for weld cladding on carbon steel; if required, using a buffer layer of VDM® FM 61.

Special notes for the welding process
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. The welding process should be particularly carefully screened using shielding gas. VDM® FM 60 is also suitable for the submerged arc process.

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	I1, R1 max. 3 % H_2	≈ 11	90–140	10–15 3.94–5.91
Comment	*Root welding up to 110 A*			
v-TIG 141, 145	I1, R1 max. 3 % H_2	≈10	≈ 150	≈ 25 ≈ 9.84
v-TIG HW 141 H, 145 H	I1, R1 max. 3 % H_2	11–12	180–220	40–80 15.7–31.5
MIG 131	R1 max. 3 % H_2	23–27	130–150	20–30 7.87–11.8
Comment	*from approx. 8 mm (0.315 in) work piece thickness*			
Plasma (PAW) 15	R1 max. 3 % H_2 (Shielding gas & Plasma gas)	≈ 25	165–200	25 9.84
Comment	*up to approx. 8 mm (0.315 in) work piece thickness*			