

# Corrosion-resistant alloys

## Nicrofer 6020 hMo – alloy 625

## Nicrofer 5923 hMo – alloy 59

## Nicrofer 5621 hMoW – alloy C-22

Sheet/strip    Tube/pipe    Rod/bar    Sheet/strip    Tube/pipe    Rod/bar    Sheet/strip    Tube/pipe    Rod/bar

### DESIGNATIONS AND SPECIFICATIONS

D	Designation	NiCr22Mo9Nb			NiCr23Mo16Al				NiCr21Mo14W			
	Material N.	2.4856			2.4605				2.4602			
	VdTUV	499	499	499	505	-	-	479		479	479	
USA	UNS	N 06625			N 06059			N 06022				
	ASTM(B)ASME(SB)	443	444/704/705	446	575	619/622/626	574	575	619/622/626	574		
GB	Designation BS	NA21			-	-	-	-	-	-	-	-
	BS	3072		3076	-	-	-	-	-	-	-	-
F	AFNOR	NU 22 DNb			-	-	-	-	-	-	-	-

### CHEMICAL COMPOSITION (%)

	Nicrofer 6020 hMo – alloy 625	Nicrofer 5923 hMo – alloy 59	Nicrofer 5621 hMoW – alloy C-22
Nickel	Balance	Balance	Balance
Chromium	21 - 23	22 - 24	20 - 22.5
Iron	Max. 3	Max. 1.5	2 - 6
Silicon	-	Max. 0.1	Max. 0.08
Others	-	Al: 0.1 - 0.4	Mn: Max. 0.5
Molybdenum	8 - 10	15 - 16.5	12.5 - 14.5
Cobalt	-	Max. 0.3	Max. 2.5
Niobium	3.2 - 10	-	-
Tungsten	-	-	2.5 - 3.5
Vanadium	-	-	Max. 0.35
Carbon	Max. 0.025	Max. 0.010	Max. 0.010

### MECHANICAL PROPERTIES (N/mm<sup>2</sup>, %)

Temperature (°C)	Nicrofer 6020 hMo – alloy 625				Nicrofer 5923 hMo – alloy 59				Nicrofer 5621 hMoW – alloy C-22			
	Rp 0.2	Rp 1.0	Rm	A5	Rp 0.2	Rp 1.0	Rm	A5	Rp 0.2	Rp 1.0	Rm	A5
20	Min. 415	Min. 445	Min. 830	Min. 35	Min. 340	Min. 380	Min. 690	Min. 40	Min. 310	Min. 335	Min. 690	Min. 45
100	Min. 350	-	740	-	Min. 290	Min. 330	650	50	Min. 270	Min. 290	-	-
200	Min. 320	-	700	-	Min. 250	Min. 290	615	50	Min. 225	Min. 245	-	-
300	Min. 300	-	685	-	Min. 220	Min. 260	580	50	Min. 195	Min. 215	-	-
400	Min. 280	-	670	-	Min. 190	Min. 230	545	50	Min. 175	Min. 195	-	-
450	Min. 270	-	660	-	Min. 175	Min. 215	525	50	-	-	-	-

### PHYSICAL PROPERTIES AT ROOM TEMPERATURE OR AS INDICATED

	Nicrofer 6020 hMo – alloy 625	Nicrofer 5923 hMo – alloy 59	Nicrofer 5621 hMoW – alloy C-22	
Density	g/cm <sup>3</sup>	8.5	8.6	8.7
Specific heat	J/Kg K	415	414	406
Thermal conductivity	W/m K	9.8	10.4	9.4
Electrical resistivity	μΩ	128	126	114
Thermal expansion	10 <sup>-6</sup> /K	13.4	12.5	12.5
20-300°C				
Modulus of elasticity	kN/mm <sup>2</sup>	209	210	206

### FABRICATION CHARACTERISTICS

Formability	Good	Good	Good
Weldability	Good	Good	Good

### WELDING PRODUCTS

Filler wire	Nicrofer S 6020 - FM 625	Nicrofer S 5923 - FM 59	Nicrofer S 5621 - FM 22	S 5923 - FM 59
Covered electrode	2.4621	2.4609	2.4635	2.4609
	EL-NiCr20Mo9Nb    AWS ENiCrMo-3	EL-NiCr22Mo16	SG-NiCr21Mo14W    EL-NiCr22Mo16	AWSA 5.14

### MATERIAL DESCRIPTION, MAIN CHARACTERISTICS

Low-carbon nickel-chromium-molybdenum alloy with a niobium addition. Excellent resistance to pitting, crevice corrosion and stress-corrosion cracking. Excellent resistance to corrosion-fatigue and erosion-corrosion. Highly resistant in a wide range of organic and mineral acids. Good resistance to high temperature corrosion in some oxidizing sulfur/chloride media. Good mechanical properties at temperatures up to 450°C (840°F).

Nickel-chromium-molybdenum alloy with extremely low carbon and silicon contents and tungsten-free.

Outstanding resistance to a large number of corrosive media under both oxidizing and reducing conditions. Excellent resistance to mineral acids such as nitric, phosphoric, sulfuric and hydrochloric acids, even when contaminated. Very high metallurgical stability.

Nickel-chromium-molybdenum alloy with a tungsten addition and extremely low carbon and silicon contents.

Outstanding resistance to crevice corrosion, pitting and stress-corrosion cracking. Excellent resistance to a wide range of chemical media under both oxidizing and reducing conditions. Good metallurgical stability.