Cronifer® 1925 hMo – alloy 926

Material Data Sheet No. 5002
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Corrosion-resistant alloy

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Cronifer® 1925 hMo – alloy 926

Cronifer 1925 hMo is a superaustenitic stainless steel developed by ThyssenKrupp VDM. By increasing the molybdenum and nitrogen contents of Cronifer 1925 LC, a material with markedly improved properties was obtained. In particular, Cronifer 1925 hMo shows significantly higher resistance to localized corrosion in halide media, with superior mechanical properties.

Cronifer 1925 hMo is characterized by:

- very high resistance to pitting and crevice corrosion in halide media and in H_2S containing sour environments
- virtual immunity under practical conditions to chloride-ion stress-corrosion cracking
- excellent general corrosion resistance in a wide range of media, both oxidizing and reducing
- improved mechanical properties over Cronifer 1925 LC – alloy 904 L
- improved metallurgical stability over similar grades with only 18 % nickel
- approved for pressure vessels by VdTÜV from -196 to 400 °C (-320 to 750 °F), and by ASME

Designations and standards

Country National standards	Material designation	Specification							
		Chemical composition	Tube and pipe seamless	Tube and pipe welded	Sheet and plate	Rod and bar	Strip	Wire	Forgings
D	**W.-Nr. 1.4529** X1NiCrMoCuN 25-20-7								
DIN EN		10028-7 10088-1			10028-7 10088-2	10088-3	10088-2	10088-3	
VdTÜV		502	502		502	502			502
BAM	Material listed in Sec. 6 of the BAM List								
F NF EN	X1NiCrMoCuN 25-20-7	10088-1			10088-2	10088-3	10088-2	10088-3	
UK BS EN	X1NiCrMoCuN 25-20-7	10088-1			10088-2	10088-3	10088-2	10088-3	
USA	UNS N08926								
ASTM			B 677	B 673/674	B 625	B 649	B 625		
ASME			SB 677	SB 673/674	SB 625	SB 649	SB 625		
ASME Code Case			N 453 2120	N 453 2120	N 454 2120	N 454 2120	2120		N 455 2120
NACE	Material listed in MR 0175								
ISO									

Table 1 – Designations and standards.

Chemical composition

	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	P	S	N
min.	24.0	20.0	balance				0.5	6.0			0.15
max.	26.0	21.0		0.020	1.0	0.50	1.5	7.0	0.030	0.010	0.25
Some compositional limits of other specifications may vary slightly.											

Table 2 – Chemical composition (wt.-%) according to VdTÜV 502.

Physical properties

Density Melting range	8.1 g/cm³ 1320 – 1390 °C	0.293 lb/in.³ 2400 – 2530 °F
Permeability at 20°C/68°F	1.01	

Temperature (T)		Specific heat		Thermal conductivity		Electrical resistivity		Modulus of elasticity		Coefficient of thermal expansion between room temperature and T	
°C	°F	$\frac{J}{kg\ K}$	$\frac{Btu}{lb\ °F}$	$\frac{W}{m\ K}$	$\frac{Btu\ in.}{ft^2\ h\ °F}$	μ Ω cm	$\frac{Ω\ circ\ mil}{ft}$	$\frac{kN}{mm^2}$	10^3 ksi	$\frac{10^{-6}}{K}$	$\frac{10^{-6}}{°F}$
0	32										
20	**68**	415	0.098	12.0	**83**	96	577	193	28		
93	**200**		0.103		89		594		27	16.6	9.2
100	212	435		12.9		99		186		16.6	9.2
200	392	470		14.4		104		179		16.6	9.2
204	**400**		0.112		100		626		26	16.6	9.2
300	572	495		16.5		108		173		16.6	9.2
316	**600**		0.118		117		656		25	16.6	9.2
400	752	510		18.5		112		168		16.6	9.2
427	**800**		0.122		131		679		24	16.7	9.3
500	932	520		20.1		115		163		16.9	9.4
538	**1000**		0.124		143		695		23	17.0	9.4
600	1112	525		21.6		117				17.3	9.6

Table 3 – Typical physical properties at room and elevated temperatures.

Mechanical properties

The following properties are applicable to Cronifer 1925 hMo in the solution-annealed condition.

The values are valid for longitudinal and transverse (if size is sufficiently large) specimens.

Product	0.2 % Yield strength $R_{p0.2}$ N/mm^2	ksi	1.0 % Yield strength $R_{p1.0}$ N/mm^2	ksi	Tensile strength R_m N/mm^2	ksi	Elongation A_{50} %
Sheet & plate Strip Rod & bar	295	43	340	49	650	94	35
Wire	290 – 340	42 – 49			620 – 830	90 – 120	40

Table 4 – Minimum mechanical properties (except for wire products) in the solution-annealed condition at room temperature according to ASTM.

Temperature °C	°F	0.2 % Yield strength $R_{p0.2}$ N/mm^2	ksi	1.0 % Yield strength $R_{p1.0}$ N/mm^2	ksi
93	200	<235>	<34.1>	<284>	<41.2>
100	212	230	33.4	270	39.1
200	392	190	27.6	225	32.6
204	400	<189>	<27.4>	<224>	<32.5>
300	572	170	24.7	205	29.7
316	600	<169>	<24.5>	<202>	<29.3>
400	752	160	23.2	190	27.6

< > values determined by interpolation or from graphs/diagrams

Table 5 – Minimum short-time mechanical properties in the solution-annealed condition at elevated temperatures according to VdTÜV data sheet 502.

ISO V-notch impact toughness

Average value at RT:
longitudinal and transverse 150 J/cm^2

Temperature °C	°F	Max. allowable stress values N/mm^2	N/mm^2 [1]	ksi	ksi [1]
38	100			26.9	23.5
93	200			24.1	26.9
100	212	<163>	<185>	<23.6>	<26.8>
149	300			21.5	26.2
200	392	<138>	<172>	<19.9>	<24.9>
204	400			19.7	24.8
260	500			18.7	23.7
300	572	<125>	<159>	<18.2>	<23.0>
316	600			18.0	22.8
343	650			17.7	22.4
371	700			17.5	22.0
400	752	<120>	<149>	17.4	21.6

Notes:
< > values determined by interpolation or from graphs/diagrams

[1] Due to the relatively low yield strength of this material, the higher stress values were established at temperatures where the short-time tensile properties govern to permit the use of these alloys where slightly greater deformation is acceptable. The higher stress values exceed 66 2/3 %, but do not exceed 90 % of the yield strength at temperature. Use of these stresses may result in dimen sional changes due to permanent strain. The higher stress values are not recommended for flanges of gasketed joints or other applications where slight amounts of distortion can cause leakage or malfunction.

Table 6 – Maximum allowable stress values in tension according to ASME Code Case 2120.

Metallurgical structure
Cronifer 1925 hMo has a face-centered cubic structure.

Corrosion resistance
Cronifer 1925 hMo is an austenitic stainless steel with a basic chemical composition similar to that of alloy 904 L, but with nitrogen increased to about 0.2 %, and molybdenum to about 6.5 %. These further additions of nitrogen and molybdenum give substantially improved resistance to pitting and crevice corrosion in halide media. This is shown in Fig. 1, which relates critical pitting temperatures, as determined in the standard ferric chloride test, to pitting resistance equivalent (PRE).

At the same time, the nickel and nitrogen contents give a high degree of metallurgical stability, and thus a reduced tendency to precipitation of intermetallic phases during hot working or welding operations compared to alloys with lower contents of these elements (Fig. 2).

The nickel content of 25 %, combined with the alloy's excellent resistance to localized corrosion, give Cronifer 1925 hMo particularly high resistance to chloride-ion stress-corrosion cracking.

Exposure testing in various FGD limestone scrubber slurry average chloride levels ranging from about 10,000 to 70,000 ppm and exhibiting pH values and temperatures varying from 5 to 6 and 50 to 68 °C (120-155°F) respectively for 1 to 2 years duration have shown the alloy to be essentially resistant against pitting and crevice corrosion.

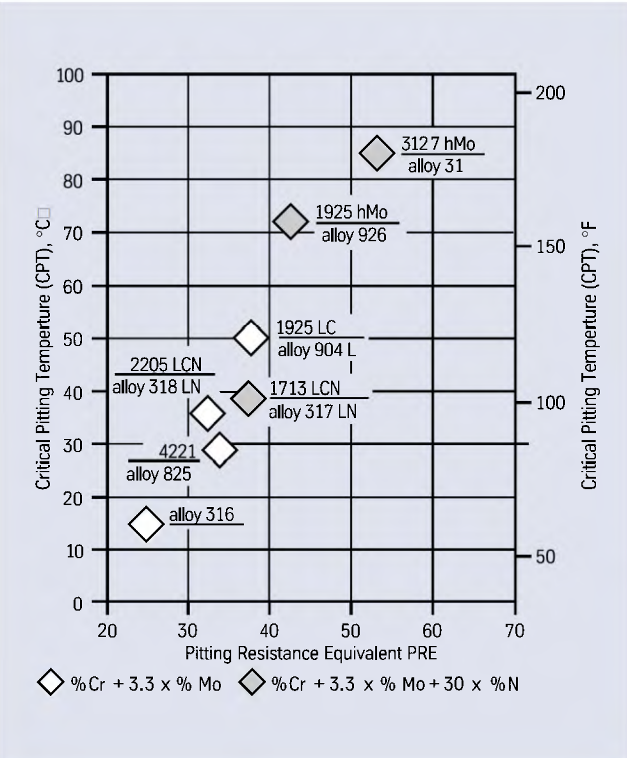

Fig. 1 – Critical Pitting Temperature (CPT) of Cronifer 1925 hMo in 10 % $FeCl_3 \cdot 6\ H_2O$ test (acc. to ASTM G-48 C), compared to selected stainless steels and nickel alloys.

Cronifer 1925 hMo is also characterized by excellent resistance to a wide range of chemical media, even at higher temperatures and concentrations, including sulphuric acid, wet-process phosphoric acid, sour gas, seawater, salts and organic acids. Its corrosion resistance in lightly aerated, technical grade sulphuric acid is shown in Fig. 3. The diagram shows that Cronifer 1925 hMo exhibits excellent corrosion resistance (< 0.1 mm/a) in lightly aerated, technical grade sulphuric acid up to a concentration af approx. 60 % and temperatures up to 80 °C (176 °F).

Cronifer 1925 hMo is furthermore listed in Section 6 of the BAM List ("Requirements for tanks for the transport of dangerous goods") which is issued by the Federal Institute for Materials, Research and Testing (BAM = Bundesanstalt für Materialforschung und -prüfung) in Berlin, Germany.

Optimum corrosion resistance is given only if the material is in the correct metallurgical condition and clean.

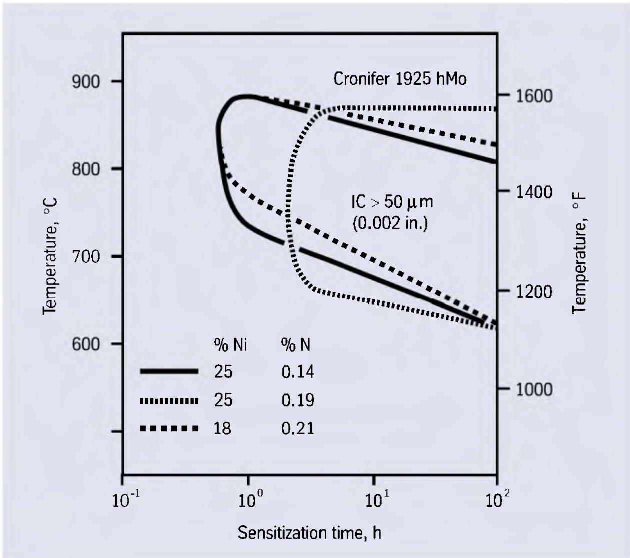

Fig. 2 – Time-temperature-sensitization (TTS) diagram of three austenitic 6%-molybdenum stainless steels alloyed with different nickel and nitrogen contents, tested according to SEP 1877 (II).

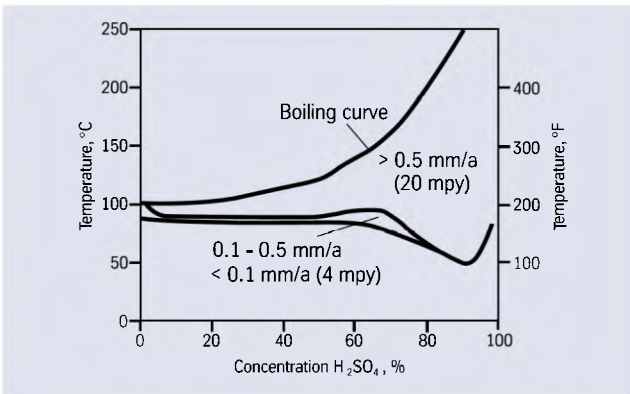

Fig. 3 – Isocorrosion diagram of Cronifer 1925 hMo - alloy 926 in lightly aerated, technical grade sulphuric acid based on immersion test results over at least 120 h.

Applications

Cronifer 1925 hMo is a polyvalent material which finds application in a wide range of industries:

- fire fighting systems, seawater filtration systems and process, hydraulic and reinjection piping systems in the offshore industry
- bleaching plants in cellulose pulp production
- polished rods for corrosive oil wells
- flexible pipe systems for the offshore industry
- tubing and couplings, wire lines and flowline systems in sour gas production. In sour gas environment the alloy is listed in NACE Standard MR0175 (Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment) as acceptable up to Level V in the annealed or cold-worked condition at a hardness level of 35 HRC max.
- components for flue-gas desulphurization plants, such as dampers and stacks.
- evaporators, heat exchangers, filters and mixers used in the manufacture of phosphoric acid
- sulphuric acid distribution systems and coolers
- concentration and crystallization of salts by evaporation
- condensers and piping systems in power stations using polluted cooling waters
- containers for transportation of aggressive chemicals
- production of organic derivatives with acid chloride catalysts
- reverse-osmosis desalination plant

Fabrication and heat treatment

Cronifer 1925 hMo can readily be hot and cold worked and machined. Hot and cold working, however, require high-power machines, owing to the high strength of the material.

Heating

Workpieces must be clean and free from all kinds of contaminants before and during any heat treatment.

Cronifer 1925 hMo may become embrittled if heated in the presence of contaminants such as sulphur, phosphorus, lead and other low-melting-point metals. Sources of such contam-inants include marking and temperature-indicating paints and crayons, lubricating grease, fluids and fuels.

Fuels must be as low in sulphur as possible. Natural and liquified petroleum gases should contain less than 0.1 wt.-% sulphur. Fuel oils with a sulphur content not exceeding 0.5 wt.-% are suitable.

Due to their close control of temperature and freedom from contamination, thermal treatments in electric furnaces under vacuum or an inert gas atmosphere are to be preferred. Treatments in an air atmosphere and alternatively in gas-fired furnaces are acceptable though, if contaminants are at low levels so that a neutral or slightly oxidizing furnace atmosphere is attained. A furnace atmosphere fluctuating between oxidizing and reducing must be avoided as well as direct flame impingement on the metal.

Hot working

Cronifer 1925 hMo may be hot worked in the temperature range 1200 to 900 °C (2190 to 1650 °F), followed by water quenching or rapid air cooling.

For heating up, workpieces may be charged into the furnace at maximum working temperature. When the furnace has returned to temperature, the workpieces should be soaked for 60 minutes per 100 mm (4 in.) of thickness. At the end of
this period it should be withdrawn immediately and worked within the above temperature range.

Solution annealing is required after hot working to ensure maximum corrosion resistance and optimum properties.

Cold working

For cold working the material should be in the solution-anne-aled condition. Like all austenitic chromium-nickel stainless steels, Cronifer 1925 hMo rapidly work hardens. This should be taken into account when selecting forming equipment. Interstage annealing may be necessary with high degrees of cold forming.

After cold reductions of more than 15 %, a solution anneal is required before use.

Heat treatment

Solution heat treatment should be carried out in the temperature range 1150 to 1200 °C (2100 to 2190 °F). Water quenching is recommended for thicknesses above about 1.5 mm (1/16 in.), and is essential for maximum corrosion resistance. Below 1.5 mm, rapid air cooling may suffi-ce.

For any thermal treatment the material should be charged into the furnace at maximum heat treatment temperature observing the precautions concerning cleanliness mentioned earlier under **'Heating'.**

Descaling and pickling

Oxides of Cronifer 1925 hMo and discoloration adjacent to welds are more adherent than on lower alloyed stainless steels. Grinding with very fine abrasive belts or discs is recommended. Care should be taken to prevent tarnishing.

Before pickling which may be performed in a nitric/hydrofluoric acid mixture with proper control of pickling time and temperature, the surface oxide layer must be broken up by abrasive blasting or by carefully performed grinding or by pretreatment in a fused salt bath.

Machining

Cronifer 1925 hMo should be machined in the heat-treated condition. As the alloy exhibits a high work-hardening rate only low cutting speeds should be used compared with low-alloyed standard austenitic stainless steels. Tools should be engaged at all times. An adequate depth of cut is important in order to cut below the previously formed work-hardened zone.

Welding

When welding nickel-base alloys and high-alloyed special stainless steels, the following instructions should be adhered to:

Workplace

The workplace should be in a separate location, well away from the areas where carbon steel fabrication takes place. Maximum cleanliness and avoidance of draughts are paramount.

Auxiliaries, clothing

Clean fine leather gloves and clean working clothes should be used.

Tools and machinery

Tools used for nickel-base alloys and stainless steels must not be used for other materials. Brushes should be made of stainless material. Fabricating and working machinery such as shears, presses or rollers should be fitted with means (felt, cardboard, plastic sheet) of avoiding contamination of the metal with ferrous particles, which can be pressed into the surface of the material and thus lead to corrosion.

Cleaning

Cleaning of the base metal in the weld area (both sides) and of the filler metal (e. g. welding rod) should be carried out with acetone.

Trichlorethylene (TRI), perchlorethylene (PER), and carbon tetrachloride (TETRA) must not be used.

Edge preparation

This should preferably be done by mechanical means, i. e. turning, milling or planing; abrasive water jet or plasma cutting is also possible. However, in the latter case the cut edge (the face to be welded) must be finished off cleanly. Careful grinding without overheating is permissible.

Included angle

The different physical characteristics of nickel-base alloys and special stainless steels compared with carbon steel generally manifest themselves in a lower thermal conductivity and a higher rate of thermal expansion. This should be allowed for by means of, among other things, wider root gaps or openings (1 – 3 mm), while larger included angles (60 – 70°), as shown in Fig. 4, should be used for individual butt joints owing to the viscous nature of the molten weld metal and to counteract the pronounced shrinkage tendency.

Striking the arc

The arc should only be struck in the weld area, i. e. on the faces to be welded or on a run-out piece. Striking marks lead to corrosion.

Welding process

Cronifer 1925 hMo can be joined to itself and to many other metals by all conventional welding processes. These include GTAW (TIG), plasma arc, GMAW (MIG/MAG) and SMAW (MMA). Pulsed arc welding is the preferred technique.

For welding, Cronifer 1925 hMo should be in the solution-annealed condition and be free from scale, grease and markings. When welding the root, care should be taken to achieve best-quality root backing (argon 99.99), so that the weld is free from oxides after welding the root. Root backing is also recommended for the first intermediate pass following the initial root pass and in some cases even for the second pass depending on the weld set-up. Any heat tint should be removed preferably by brushing with a stainless steel wire brush while the weld metal is still hot.

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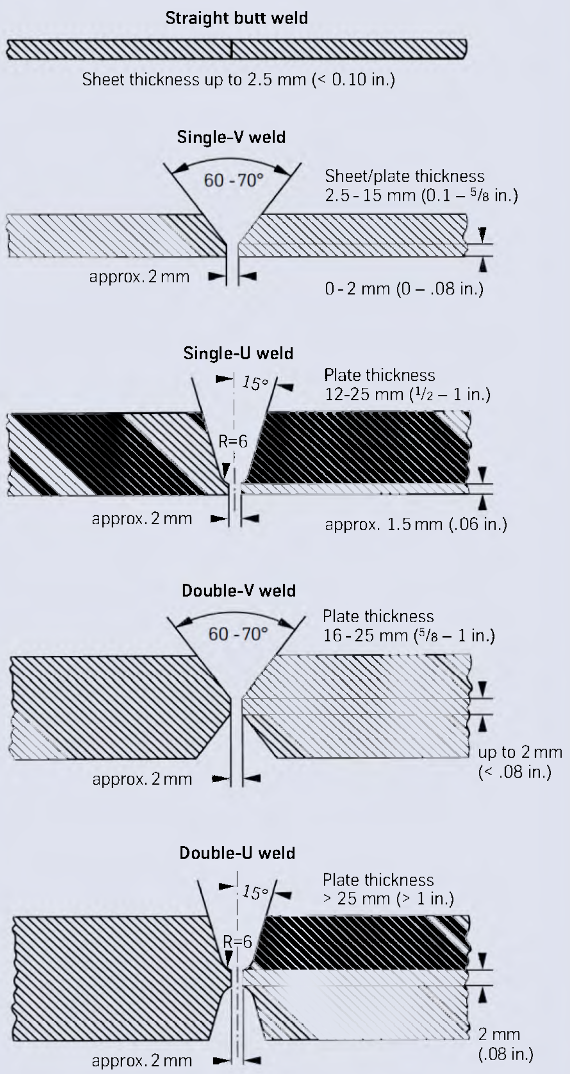

Fig. 4 – Edge preparation for welding of nickel alloys and special stainless steels.

Filler metal
For the gas-shielded welding processes, the following filler metals are recommended:

Bare electrodes:	Nicrofer S 5923 – FM 59 W.-No. 2.4607 SG-NiCr23Mo16 AWS A5.14: ERNiCrMo-13
	or
	Nicrofer S 6020 – FM 625 W.-No. 2.4831 SG-NiCr21Mo9Nb AWS A5.14: ERNiCrMo-3
Covered electrodes:	W.-No. 2.4609 EL-NiCr22Mo16 AWS A5.11: ENiCrMo-13
	or
	W.-No. 2.4621 EL-NiCr20Mo9Nb AWS A5.11: ENiCrMo-3

Welding parameters and influences (heat input)
Care should be taken that the work is performed with a deliberately chosen, low heat input as indicated in Table 8 by way of example. Use of the stringer bead technique should be aimed at. Interpass temperature should be kept below 150 °C (300 °F).

The welding parameters should be monitored as a matter of principle.

The heat input Q may be calculated as follows:

$$Q = \frac{U \times I \times 60}{v \times 1000} \text{ (kJ/cm)}$$

U = arc voltage, volts
I = welding current, amps
v = welding speed, cm/min.

Consultation with ThyssenKrupp VDM's Welding Laboratory is recommended.

Postweld treatment
(brushing, pickling and thermal treatments)

Brushing with a stainless steel wire brush immediatly after welding, i.e. while the metal is still hot generally results in removal of heat tint and produces the desired surface condition without additional pickling.

Pickling, if required or prescribed, however, would generally be the last operation performed on the weldment. Also refer to the information under **'Descaling and pickling'**.

Neither pre- nor postweld thermal treatments are required.

Sheet/ plate thick- ness	Welding process	Filler metal		Welding parameters				Welding speed	Flux/ shielding gas rate	Plasma- gas rate	Plasma- nozzle diameter
		Diameter	Speed	Root pass		Intermediate and final passes					
mm		mm	m/min.	A	V	A	V	cm/min.	l/min.	l/min.	mm
3.0	Manual GTAW	2.0		90	10	110 – 120	11	10 – 15	Ar W3[1] 8 – 10		
6.0	Manual GTAW	2.0 – 2.4		100 – 110	10	120 – 130	12	10 – 15	Ar W3[1] 8 – 10		
8.0	Manual GTAW	2.4		110 – 120	11	130 – 140	12	10 – 15	Ar W3[1] 8 – 10		
10.0	Manual GTAW	2.4		110 – 120	11	130 – 140	12	10 – 15	Ar W3[1] 8 – 10		
3.0	Autom. GTAW	1.2	0.5	manual		150	10	25	Ar W3[1] 15 – 20		
5.0	Autom. GTAW	1.2	0.5	manual		150	10	25	Ar W3[1] 15 – 20		
2.0	Hot wire GTAW	1.0	0.3			180	10	80	Ar W3[1] 15 – 20		
10.0	Hot wire GTAW	1.2	0.45	manual		250	12	40	Ar W3[1] 15 – 20		
4.0	Plasma arc	1.2	0.5	165	25			25	Ar W3[1] 30	Ar W3[1] 3.0	3.2
6.0	Plasma arc	1.2	0.5	190 – 200	25			25	Ar W3[1] 30	Ar W3[1] 3.5	3.2
8.0	MIG/MAG GMAW	1.0	approx. 8	GTAW		130 – 140	23 – 27	24 – 30	MAG[2] MIG: argon 18 – 20		
10.0	MIG/MAG GMAW	1.2	approx. 5	GTAW		130 – 150	23 – 27	20 – 26	MAG[2] MIG: argon 18 – 20		
12.0	Submerged arc	1.6		and backing GTAW		240 – 280	28	45 – 55	highly basic		
20.0	Submerged arc	1.6		and backing GTAW		240 – 280	28	45 – 55	highly basic		
6.0	SMAW	2.5		40 – 70	approx. 21	40 – 70	approx. 21				
8.0	SMAW	2.5–3.25		40 – 70	approx. 21	70 – 100	aprrox. 22				
16.0	SMAW	4.0				90 – 130	approx. 22				

[1] Argon or argon + max. 3 % hydrogen
[2] For MAG welding use of the shielding gas Cronigon He30S or Argomag-Ni, for example is recommended.
In all gas-shielded welding operations, ensure adequate back shielding.
These figures are only a guide and are intended to facilitate setting of the welding machines.

Table 7 – Welding parameters (guide values).

Welding process	Heat input per unit length kJ/cm	Welding process	Heat input per unit length kJ/cm
GTAW, manual, fully mechanised	max. 8	GMAW, MIC/MAG, manual, fully mechanised	max. 11
Hot wire GTAW	max. 6	SMAW, manual metal arc (MMA)	max. 7
Plasma arc	max. 10	Submerged arc	max. 10

Table 8 – Heat input per unit length (guide values).

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Availability
Cronifer 1925 hMo is available in the following standard product forms:

Sheet & plate
(for cut-to-length availability, refer to strip)

Conditions:
hot or cold rolled (hr, cr), thermally treated and pickled

Thickness mm	hr / cr	Width[1] mm	Length[1] mm
1.10 – < 1.50	cr	2000	8000
1.50 – < 3.00	cr	2500	8000
3.00 – < 7.50	cr / hr	2500	8000
7.50 – ≤ 25.00	hr	2500	8000[2]
> 25.00[1]	hr	2500[2]	8000[2]
inches		**inches**	**inches**
0.043 – < 0.060	cr	80	320
0.060 – < 0.120	cr	100	320
0.120 – < 0.300	cr / hr	100	320
0.300 – ≤ 1.000	hr	100	320[2]
> 1.000[1]	hr	100[2]	320[2]

[1] other sizes subject to special enquiry
[2] depending on piece weight

Discs and rings
Conditions: hot rolled or forged, thermally treated, pickled or machined

Product	Weight kg	Thickness mm	o. d.[1] mm	i. d.[1] mm
Disc	≤ 10000	≤ 300	≤ 3000	
Ring	≤ 3000	≤ 200	≤ 2500	on request
	lbs	**inches**	**inches**	**inches**
Disc	≤ 22000	≤ 12	≤ 120	
Ring	≤ 6600	≤ 8	≤ 100	on request

[1] other sizes subject to special enquiry

Rod & bar
Conditions: forged, rolled, drawn, thermally treated, pickled, machined, peeled or ground

Product	Forged[1] mm	Rolled[1] mm	Drawn[1] mm
Rod (o. d.)	≤ 600	8 – 60	12 – 50
Bar, square (a)	40 – 600	15 – 280	Not standard
Bar, flat (a x b)	(40 – 80) x (200 – 600)	(5 – 20) x (120 – 600)	(10 – 20) x (30 – 80)
Bar, hexagonal (s)	40 – 80	13 – 41	≤ 50
	inches	**inches**	**inches**
Rod (o. d.)	≤ 24	$^5/_{16}$ – $2\,^3/_8$	$^1/_2$ – 2
Bar, square (a)	$1\,^5/_8$ – 24	$^{10}/_{16}$ – 11	Not standard
Bar, flat (a x b)	($1\,^5/_8$ – $3\,^1/_8$) x (8 – 24)	($^3/_{16}$ – $^3/_4$) x ($4\,^3/_4$ – 24)	($^3/_8$ – $^3/_4$) x ($1\,^1/_4$ – $3\,^1/_8$)
Bar, hexagonal (s)	$1\,^5/_8$ – $3\,^1/_8$	$^1/_2$ – $1\,^5/_8$	≤ 2

[1] other sizes and conditions subject to special enquiry

Forgings
Shapes other than discs, rings, rod and bar are subject to special enquiry. Flanges and hollow shafts may be available up to a piece weight of 10 t.

Strip[1]
Conditions: cold rolled, thermally treated and pickled or bright annealed

Thickness mm		Width[3] mm	Coil i. d. mm			
0.02	≤ 0.10	4 – 200[4]	300	400		
> 0.10	≤ 0.20	4 – 350[4]	300	400	500	
> 0.20	≤ 0.25	4 – 750		400	500	600
> 0.25	≤ 0.60	5 – 750		400	500	600
> 0.60	≤ 1.0	8 – 750		400	500	600
> 1.0	≤ 2.0	15 – 750		400	500	600
> 2.0	≤ 3.0 (3.5)[2]	25 – 750		400	500	600
inches		**inches**	**inches**			
0.0008	≤ 0.004	0.16 – 8[4]	12	16		
> 0.004	≤ 0.008	0.16 – 14[4]	12	16	20	
> 0.008	≤ 0.010	0.16 – 30		16	20	24
> 0.010	≤ 0.024	0.24 – 30		16	20	24
> 0.024	≤ 0.040	0.32 – 30		16	20	24
> 0.040	≤ 0.080	0.60 – 30		16	20	24
> 0.080	≤ 0.120[2] ≤ 0.140[2]	1.0 – 30		16	20	24

[1] Cut-to-length available in lengths from 250 to 4000 mm (10 to 158 in.)
[2] Maximum thickness: bright annealed – 3 mm (0.120 in.), cold rolled only – 3.5 mm (0.140 in.)
[3] Wider widths subject to special enquiry
[4] Wider widths up to 730 mm (29 in.) subject to special enquiry.

Wire
Conditions:
bright drawn, 1/4 hard to hard,
bright annealed

Dimensions:
0.01 – 12.0 mm (0.0004 – 0.47 in.) diameter, in coils, pay-off packs, on spools and spiders

Welding filler metals
Suitable welding rods, wire, strip electrodes and electrode core wire are available in all standard sizes.

Seamless tube and pipe
Using ThyssenKrupp VDM cast materials seamless tubes and pipes are produced and available from DMV STAINLESS SAS, Tour Neptune, F-92086 Paris, La Défense Cedex (Fax: +33-1-4796 8141; Tel.: +33-1-4796 8140; E-mail: dmv-hq@dmv-stainless.com).

Welded tube and pipe
Welded tubes and pipes are obtainable from qualified manufacturers using ThyssenKrupp VDM semi-fabricated products.

Technical publications
The following publications, concerning Cronifer 1925 hMo may be obtained from ThyssenKrupp VDM GmbH:

F. E. White, M. B. Rockel:
Experience with two high molybdenum and nitrogen special stainless steels, Proceedings Innovation Stainless Steel, pp 233 - 238, Florence, Italy, 1993

F. E. White:
Superaustenitic stainless steels, Stainless Steel, October 1992

G. K. Grossmann, M. B. Rockel:
Use of high alloy materials under dewpoint corrosion conditions in waste incineration, Metall 45 (1991) No. 9

M. Jasner, M. B. Rockel:
Cronifer 1925 hMo, an advanced high-alloy austenitic stainless steel for offshore, hydrocarbon and seawater applications, VDM Report No. 10/2, July 1992

H. P. Klein, S. J. Haines:
Cronifer 1925 hMo high-strenghth, corrosion-resistant polished rods, VDM Report Nr.11/2, August 1995

R. Kirchheiner, W. Römer:
Corrosion-resistant materials for flue-gas desulfurization systems, VDM Report No. 18, March 1993

M. Jasner, K. Wangnick:
Corrosion-resistant materials for use in desalination plants, in particular for Reverse Osmosis (RO) plants
VDM Report No. 20, March 1992

M. Jasner, G. von Schaewen:
Heavy-wall induction bends in 6 Mo stainless steel Cronifer 1925 hMo for the Snorre subsea installation,
VDM Report No. 21, April 1992

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