

Cronidur® 30 – Drive for Innovation

Mat.-No.: 1.4108 – X30CrMoN15-1



Cronidur® 30 combines unique properties to enable the development of innovative products for maximum operational demands within the aerospace, automotive, mechanical engineering, medical, pharmaceutical and food industries, as well as for high-value consumables.

Cronidur® 30 is a high-nitrogen martensitic cold-work tool steel with exceptional corrosion resistance and ductility at hardness values >58 HRC. Nitrogen is alloyed above its solubility level at ambient pressure by means of the Pressure Electroslag Remelting (PESR) process.

Regarding the remelting process, the homogenous microstructure consists of a very pure metallic matrix containing very fine and homogeneously distributed carbonitrides, leading to outstanding polishability, excellent wear resistance, and high dimensional stability after heat treatment.

The positive effect of the high nitrogen content is not limited to excellent corrosion resistance. Its positive impact on the steel's mechanical properties results in a combination of high strength and high fracture toughness as well as tempering resistance up to 475°C.

AVAILABLE ACCORDING TO:

- SAE AMS 5898
- ASTM F 899
- UNS S42027

OUTSTANDING ADVANTAGES:

- Specialty steel with high hardness, wear resistance and edge-holding properties.
- Very good corrosion resistance in hardened and tempered condition >58 HRC.

MAIN FIELDS OF APPLICATION:

- Aerospace and aeronautics, medical, automotive, racing and mechanical engineering, pharmaceutical and food industries.
- High-precision bearings, ball screws, spindles, extruder shafts, pumps, valves, industrial knives, etc.

PROPERTIES:

- Welding ability: Very limited
- Machinability: 9 (1 = bad - 10 = very good)
- Wear resistance: 8 (1 = low - 10 = very good)
- Polishability: Very good
- Corrosion resistance: 5 (0 = low - 5 = very good)

CHEMICAL ANALYSIS:

1.4108 X30CrMoN15-1	C	Si	Mn	Cr	Mo	Ni	N
Min.	0.25	-	-	14.0	0.85	-	0.3
Max.	0.35	1.00	1.00	16.0	1.10	0.5	0.5

PRODUCT RANGE:

1.4108 X30CrMoN15-1	Bars Ø	Sheet	Plate	Hot-rolled wire Ø
Min.	5 mm	3mm	20mm	5 mm
Max.	350 mm	20 mm	340mm	21 mm
MOQ	600-1200kg	700kg	250-1000kg	600kg

Customer-specific products available on request

HEAT TREATMENT:

Soft annealing: Cronidur® 30 should be heated uniformly to a temperature of between 780°C to 820°C. The holding time after the material core reaches the soft annealing temperature is between 4 to 8 hours. The hardness level after this heat treatment will be <300 HB for a holding time of 4 hours or <250 HB for a holding time of 8 hours.

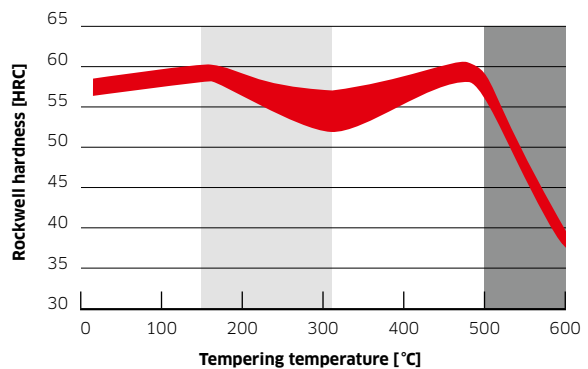
Stress relief annealing between 600°C and 650°C should follow rough machining. The holding time after the material core reaches the annealing temperature is approx. 2 hours followed by cooling down to approx. 350°C in the furnace. Further cooling to room temperature is possible in air.

Hardening: A professional heating-up process – including common equalization steps until the selected austenitization temperature is reached – is obligatory. The equalization temperature for complex parts is usually selected as between 750°C and 780°C. The holding time after the material core has reached the equalization temperature is between 20 min. and 40 min. The austenitization temperature depends on the required product properties and may be selected between 990°C and 1030°C. In the case of vacuum hardening, the partial pressure of nitrogen within the vacuum furnace chamber should be set to between 100 mbar and 200 mbar in order to avoid any denitridation of the product surface. If this is not possible, the grinding allowance chosen should be approx. 0.2 mm.

Quenching may be performed in oil. In the case of vacuum heat treatment, the quenching gas overpressure should be at least 5 bar.

Tempering should be carried out directly after the material core has reached room temperature (RT is assumed to be approx. 20°C). If the austenitization temperature chosen is higher than 1000°C, deep-freezing at a temperature of equal to or lower than -80°C should be carried out prior to tempering in order to minimize retained austenite. The holding time after the material core has reached the deep-freezing temperature is to be set to at least 60 min. Two tempering cycles of at least two hours should be carried out in order to achieve the required material properties.

Cronidur® 30: Tempering diagram



Tempering diagram valid for:

- austenitizing at 1030°C followed by
- oil or gas quenching and
- deep cooling at -80°C

■ Very high corrosion resistance ■ Improved toughness

Heat treatment proposals:

- 1030°C/-80°C/2 x 180°C – very good corrosion resistance; at 58–60 HRC
- 1030°C/-80°C/2 x 280°C – very good corrosion resistance, but better ductility; at 52–57 HRC
- 1030°C/-80°C/2 x 475°C – for high working temperature; at 58–60 HRC

Cronidur® 30: Mechanical properties

