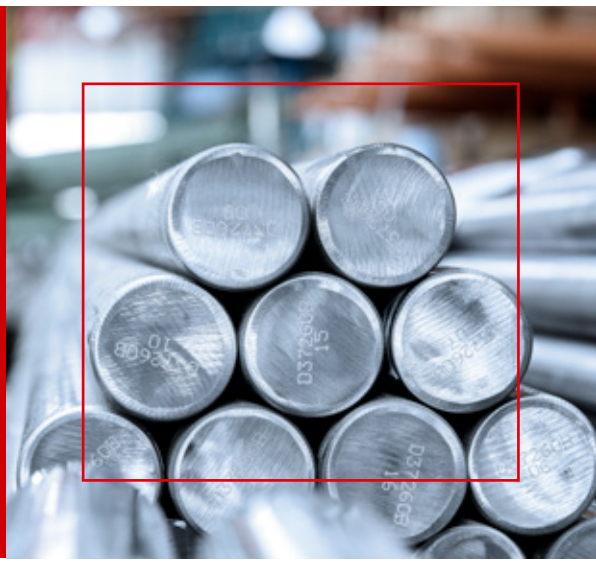
Cronidur® 30 – 推动创新 – Drive for Innovation

材料编号 / Mat.-No.: 1.4108 – X30CrMoN15-1



Cronidur® 30结合了众多独特的性能用来开发很多创新的产品，满足航空航天，汽车制造，机械工程，医疗和制药领域，食品制造工业，以及高价值消耗品的最大需求。
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是一种高氮马氏体冷作工具钢，在>58 HRC下具有优异的抗腐蚀性能和延展性。通过压力电渣重熔（PESR）工艺，将氮在环境压力下高于其溶解度水平进行合金化。
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.
关于重熔过程，均匀的金相结构由非常纯的金属基质组成，该基质含有非常细小且均匀分布的碳氮化物，因此材料有出色的抛光性能，优异的耐磨性以及经过热处理后的很高的尺寸稳定性。
Regarding the remelting process, the homogenous microstructure consists of a very pure metallic matrix containing very fine and homogenously distributed carbonitrides, leading to outstanding polishability, excellent wear resistance, and high dimensional stability after heat treatment.

提高氮含量的积极效果不仅赋予了材料出色的抗腐蚀性能，它对钢的机械性也能产生积极影响，提高了材料的机械性能使其兼得高强度和高断裂韧性以及高达475°C的回火抗力。
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.

以下标准皆可提供 / AVAILABLE ACCORDING TO:
- SAE AMS 5898
- ASTM F 899
- UNS S42027

突出的优势 / OUTSTANDING ADVANTAGES:
这是兼具了高硬度、高抗磨以及刃口保持性能的特种钢。淬火和回火在>58 HRC的条件下具有非常出色的抗腐蚀性能。
Specialty steel with high hardness, wear resistance and edge-holding properties.
Very good corrosion resistance in hardened and tempered condition >58 HRC.

主要应用领域 / MAIN FIELDS OF APPLICATION:
工业领域 / Industries:
航天航空、医疗器械、汽车、赛车以及机械制造、制药和食品工业。
Aerospace and aeronautics, medical, automotive, racing and mechanical engineering, pharmaceutical and food industries.
零部件 / Parts:
高精密轴承、滚珠螺丝、主轴、挤压机芯轴、泵、阀门、工业刀具等。
High-precision bearings, ball screws, spindles, extruder shafts, pumps, valves, industrial knives, etc.

特性 / PROPERTIES:
- 焊接性 / Welding ability: 非常有限 / Very limited
- 加工性 / Machinability:
  9分 (1分 = 差 / bad – 10分 = 非常好 / very good)
- 抗磨性 / Wear resistance:
  8分 (1分= 低 / low – 10分= 非常好 / very good)
- 抛光性 / Polishability: 非常好 / Very good
- 抗腐蚀性 / Corrosion resistance:
  5分 (0 分= 低 / low – 5分 = 非常好 / very good)

化学成分分析 / CHEMICAL ANALYSIS:

1.4108 X30CrMoN15-1	C	Si	Mn	Cr	Mo	Ni	N
最小值 / Min.	0.25	–	–	14.0	0.85	–	0.3
最大值 / Max.	0.35	1.00	1.00	16.0	1.10	0.5	0.5

产品范围 / PRODUCT RANGE:

1.4108 X30CrMoN15-1	圆棒 Bars Ø	片材 Sheet	板材 Plate	热轧线材 Hot-rolled wire Ø
最大 / Min.	5 mm	3 mm	20 mm	5 mm
最小 / Max.	350 mm	20 mm	340 mm	21 mm
最小起订量 / MOQ	600–1200 kg	700 kg	250–1000 kg	600 kg

可按客户要求非标定做。/ Customer-specific products available on request.

热处理 / HEAT TREATMENT:

软退火: Cronidur30 应均匀加热到780°C 至820°C之间的温度，在材料芯部温度达到软化退火温度后保温4到8小时。热处理后经过保温4小时，材料硬度水平会<300 HB，热处理后保温8小时，硬度水平则<250HB。
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 <250HB for a holding time of 8 hours.

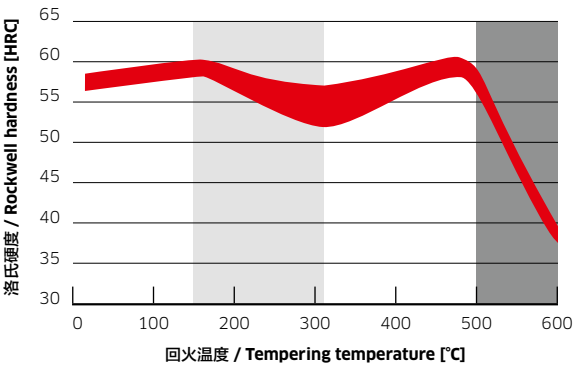
去应力退火: 粗加工后要进行600°C 到650°C的去应力退火。当芯部温度达到去应力退火温度后保温约2小时，然后炉内冷却到约350°C。在空气中进一步冷却到室温是有可能的。
Stress relief annealing between 600°C and 650°C should follow rough machining. The holding time after the material core reaches the annealing temperature is approx. 2 hours followed by cooling down to approx. 350°C in the furnace. Further cooling to room temperature is possible in air.

淬火: 必须采用专业的加热工艺 – 包括在达到选定的奥氏体化温度之前的常见的平衡步骤，该步骤为强制性。复杂零部件的平衡温度通常选定在750°C和780°C之间。材料芯部达到平衡温度后的保持时间为20分钟至40分钟。奥氏体化温度取决于所需实现的产品性能，可在990°C至1030°C之间选择。在真空硬化的情况下，真空炉室内的氮气分压应设定在100毫巴至200毫巴之间，以避免产品表面的任何脱氮。如果无法做到这一点，则选择的磨削加工余量应为约0.2毫米。
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.

淬硬, 可在油中进行。在真空热处理的情况下，淬火气体超压至少为5巴。
Quenching may be performed in oil. In the case of vacuum heat treatment, the quenching gas overpressure should be at least 5 bar.

应在材料芯部达到室温后直接进行回火（假设室温约为20°C）。如果选择的奥氏体化温度高于1000°C，则应在回火之前在等于或低于-80°C的温度下进行深度冷冻，以使残余奥氏体最小化。在材料芯部达到深度冷冻温度后的保持时间应设定至少为60分钟。应进行两次至少两小时的回火循环，以达到所需的材料性能。
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 – 回火曲线 – TEMPERING DIAGRAM



回火温度曲线可实现的性能 / Tempering diagram valid for:

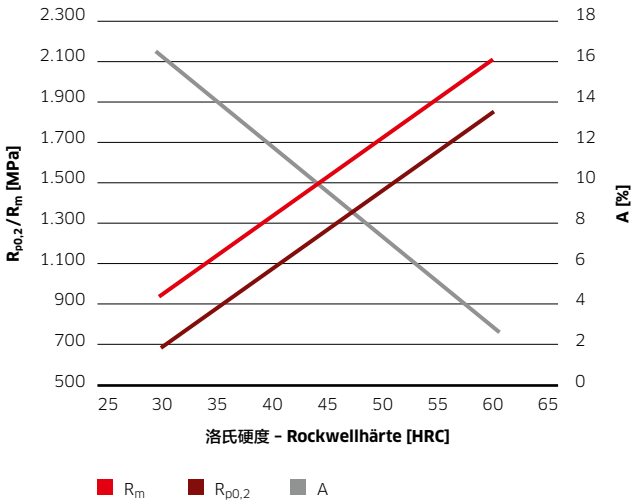
a. 达到奥氏体化温度 1030°C 后按以下参数热处理 / austenitizing at 1030°C followed by
b. 油淬或气淬 / oil or gas quenching and
c. 深冷 / deep cooling at -80°C

非常高的抗腐蚀性能 / Very high corrosion resistance
改善了材料韧性 / Improved toughness

热处理建议 / heat treatment proposals:

1. 1030°C/–80°C/2 x 180°C	
→ 非常高的抗腐蚀性能	达到硬度
→ very good corrosion resistance	at 58 – 60 HRC
2. 1030°C/–80°C/2 x 280°C	
→ 非常高的抗腐蚀性能以及良好的延展性	达到硬度
→ very good corrosion resistance, but better ductility	at 52 – 57 HRC
3. 1030°C/–80°C/2 x 475°C	
→ 用于高温环境	达到硬度
→ for high working temperature	at 58 – 60 HRC

CRONIDUR® 30 – 机械性能 – MECHANICAL PROPERTIES



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