

EN 10088-3 – 1.4021- QT 700

A hardenable stainless steel

Typical analysis %	C 0,20	Cr 13,0	
Norms	Steel grade		
EN 10088-3/95 QT 700	1.4021		
ASTM A276	(Type 420)		
Delivery condition	Quenched and tempered		

(Replaces SS 2303 -05)

EN 1.4021 is a hardenable stainless steel containing 13% chrome. In the quenched and tempered condition it features:

- ⇒ high tensile strength
- ⇒ good corrosion resistance
- ⇒ magnetism

Corrosion Resistance

EN 1.4021 has a good resistance to e.g. air, water steam, freshwater, certain alkaline solutions and other mildly aggressive chemicals.

Typical application areas

- Shafting
- Spindles
- Pump parts
- Valve parts
- Piston rods
- Fittings
- Stirrers
- Bolts
- Nuts

Mechanical properties

Values at room temperature in condition QT 700

Tensile strength Rm	N/mm ²	700 - 850
Proof strength Rp ₀₂	N/mm ²	min 500
Elongation	%	min 13
Impact energy Kv	J/cm ²	min 25
Hardness	HB	ca 220

Physical properties

Temperature	20° C	100° C	200° C	400° C
Density kg/dm ³	7,7			
Modulus of elasticity kN/mm ²	215	212	205	190
Mean coefficient of thermal expansion 10 ⁻⁶ x K ⁻¹ 20 ⁰ C	-	10,5	11	12
Thermal conductivity W/m x K	30			
Electrical resistivity Ohm mm ² /m	0,6			
Specific thermal capacity J/kg x K	460			

Scaling temperature in air approx. 825° C.

Heat treatment

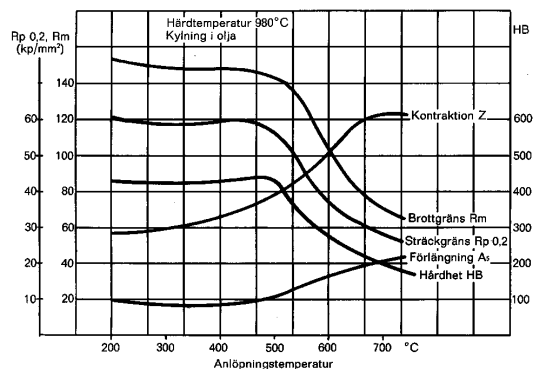
Hardening

1020 - 980° C. Holding time at hardening temperature approx. 30 min. and subsequent cooling in in oil.

Tempering

The temperature is chosen according to the below graph to reach required strength.. Holding time 2 hours. Cooling in air.

(N.B. The graph represents a specific heat and should only be seen as a guideline.)



Machining

Turning	Cemented carbide tools	
	Rough	Fine
ISO machining group	P20-P35	P10-P15
Cutting depth mm	2 - 5	0,5 - 2
Feed rate mm/r	0,3 - 0,6	0,05 - 0,3
Cutting speed m/min	120 - 180	180 - 240
	High speed steel tools	
Cutting depth mm	0,5 - 2	
Feed rate mm/r	0,05 - 0,2	
Cutting speed m/min	25 - 30	

Thread turning	Cemented carbide tools	
	Exterior	Interior
	100 - 130	70 - 90
	High speed steel tools	
	Exterior	Interior
	25 - 30	18 - 25

Drilling				
Drill diameter mm	5 - 10	10 - 20	20 - 30	30 - 40
Uncoated HSS				
Cutting speed m/min	15 - 20	15 - 20	15 - 20	15 - 20
Feed rate mm/r	0,1-0,2	0,2-0,3	0,3-0,35	0,35-0,4
Coated HSS				
Cutting speed m/min	20 - 25	20 - 25	20 - 25	20 - 25
Feed rate mm/r	0,1-0,2	0,2-0,3	0,3-0,35	0,35-0,4
Short range drill				
Cutting speed m/min			160-200	160-200
Feed rate mm/r			0,08-0,12	0,1-0,14

• Milling	• Tap threading
• Sawing	• Cutting off

Welding**Alt 1.**

- To arrive at an optimal welding result the steel should be austenitized at 980° C during approx. 10 minutes.
- Then cool to approx. 400 - 300° C.
- Start welding at that temperature.
- After welding cool to 60 - 80° C.
- Then temper according to the graph shown under - " Heat treatment".

Alt 2.

If heating to 980° C under circumstances is impossible welding should be performed as follows:

- Start welding at 400 - 300° C.
- Then cool to 60 - 80° C.
- Temper at temperature approx. 10° C *below* the one at which the material has been tempered previously.

Welding consumables should in both alternatives above be similar to that of the parent one. If the material strength is of subordinate importance or if preheating under circumstances is impossible welding should be performed using austenitic consumables. After cooling, temper in accordance with Alt.2 -c) above.

Surface finish

EN 1.4021 is available with peeled surface.

Stock standard

Please refer to our stock standard leaflet.

Technical support

VALBRUNA NORDIC AB will be helpful in giving further advice and recommendations concerning choice of materials, cutting data, welding, heat treatment etc.