Martensitic Stainless Steel
EN 1.4057, QT 800

A hardenable stainless steel

Typical analysis %	C 0,20	Cr 16	Ni 2
Norms	**Steel grade**		
EN 10088-3 QT 800	1.4057		
ASTM A276	(Type 431)		
Delivery condition	Quenched and tempered		

Physical properties acc. to EN 10088

Temperature	20° C	100° C	200° C	300° C	400° C
Density kg/dm^3	7,7				
Modulus of elasticity GPa	215	212	205	200	190
Mean coeff. of thermal expansion 20°C –Temp. x $10^{-6} \cdot K^{-1}$.	-	10,0	10,5	10,5	10,5
Thermal conductivity W/m · K	25				
Electrical resistivity Ω · mm^2/m	0,7				
Spec. heat J/kg · K	460				

Scaling temperature in air approx. 850° C.

Mechanical properties

Values at room temperature - QT 800

Tensile strength Rm	N/mm^2	800 - 950
Proof strength Rp_{02}	N/mm^2	min 600
Elongation A_5	%	min 14*
Impact energy KV	J/cm^2	min 20
Hardness	HB	appr. 290

* > Ø 60 mm : 12%

EN 1.4057 is a hardenable stainless steel containing 16 % chrome and 2 % nickel. In the hardened and tempered condition it features :

⇒ high tensile strength
⇒ good corrosion resistance
⇒ magnetism

Corrosion resistance

EN 1.4057 has a good resistance in severe atmospherical conditions and is resistive to strong oxidizing acids e.g. nitric acid.

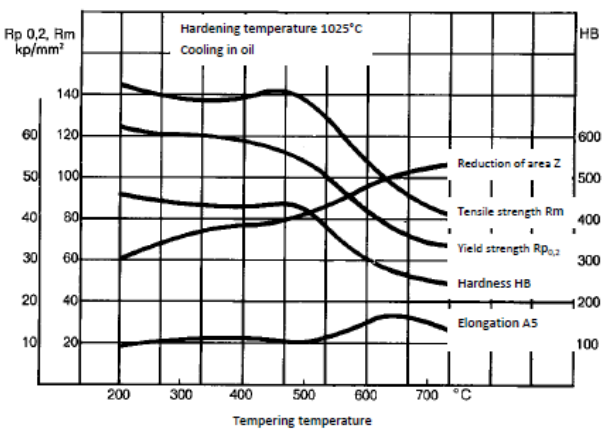
Typical application areas:

- Shafting
- Spindles
- Pump parts
- Valve parts
- Piston rods
- Armatures
- Stirrers
- Nut
- Bolts

Heat treatment

Hardening
1050 - 950° C. Holding time at hardening temperature 30 min. and subsequent cooling in oil or air.

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 used as a guideline.)
QT 900 ~ 620°C, QT 800 ~ 660°C



Fabrication

Hot forming

Hot forming should be carried out in the temperature range 1100-800°C. It is important that the entire workpiece has been exposed to a sufficiently high temperature. Slow cooling after hot forming. A full heat treatment i.e. quenching and tempering is recommended after hot forming.

Machining

Martensitic stainless steels such as **EN 1.4057** are generally easier to machine than "conventional" austenitic steels and high alloy austenitic steels. Machinability is of course depending of heat treatment condition, if material is annealed or hardened and tempered.

Welding

Alt 1.

a) To arrive at an optimal welding result the steel should be austenitized at 980° C during approx. 10 minutes.
b) Then cool to approx. 300 - 200° C.
c) Start welding at that temperature..
d) After welding cool to 50 - 60° C.
e) Then temper according to the graph shown under "Heat treatment".

Alt 2.

If heating to 980^0 C is impossible welding should be performed as follows:

a) Start welding at 300 - 200° C.
b) Then cool to 50 - 60° C.
c) Temper at temperature approx. 10° C **below** the one at which the material has been tempered previously.

Welding consumables should in both alternatives be similar to that of the parent material. 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 1.4057 is available with peeled surface.

Stock standard

Please refer to products stock standard: www.valbrunanordic.se

Technical support

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

MATERIAL STANDARDS

SS-EN 10088-3	Stainless steels-Semi-finished products, bars, rods, sections for general purposes
ASTM A 276/ ASME SA-276	Stainless steel bars for general purposes