

W 1.2083

W 1.2083 grade is a mould steel with improved corrosion resistance properties.

The grade is generally delivered annealed (with a hardness < 230 HB). It can also be delivered in prehardened condition with a typical hardness of 320 HB.

Main characteristics of this grade are :

- a good atmospheric corrosion resistance,
- an excellent polishability,
- a good machinability in annealed condition,
- a high hardenability
- a good wear resistance.

Properties

According to standard

- > DIN EN 4957 X42Cr13
- > WERKSTOFF W 1.2083
- > AISI 420

Chemical Analysis (% Weight).

	C	S	P	Si	Mn	Cr
Min	0.36	-	-	-	-	12.5
Typical	0.40	0.001	0.020	0.4	0.6	13.0
Max	0.42	0.030	0.030	1.0	1.0	14.5

Mechanical Properties (typical values).

The grade is generally delivered annealed (< 230 HB). It can also be delivered prehardened at 280-320 HB.

Hardness	Rp 0.2 Yield Strength		Rm Tensile strength		Elongation	Reduction of area	KCV 20°C		Elastic modulus	
HB	MPa	ksi	MPa	ksi	%	Z%	J /cm ²	Ft.Lbs	GPa	ksi
320	905	132	1100	160	10	21	13	8	207	30000

Physical Properties (typical values).

Thermal conductivity W.m ⁻¹ .K ⁻¹	Thermal expansion Coefficient (10 ⁻⁶ .K ⁻¹)				Specific heat J/kg.°C
20°C	20/100°C	20/200°C	20/400°C		
20	10.5	11.1	11.5	460	

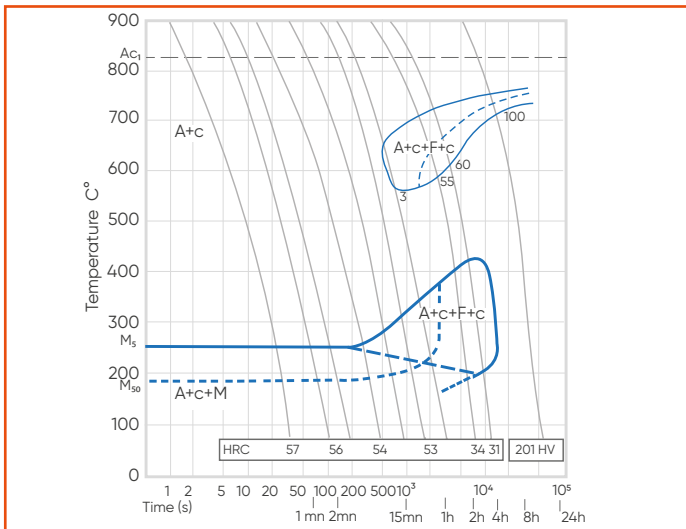
Metallurgical properties

Transformation point

AC ₁	AC ₃	M _s
850°C 1400°F	900°C 1796°F	250°C 235°F

CCT Diagram

Autenitizing temperature : 1000°C



Corrosion resistance

W 1.2083 has a good corrosion resistance against water, steam and weak acids. It has also a good resistance to rusting and atmospheric corrosion.

Gloss polishing after heat treatment improves the corrosion resistance of this steel.

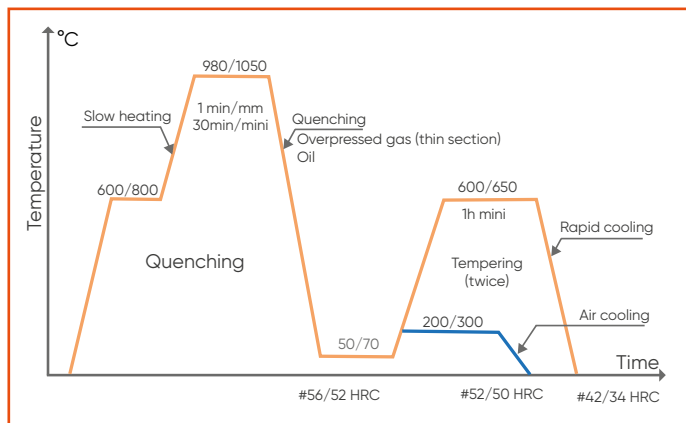
Plate processing

Heat treatment

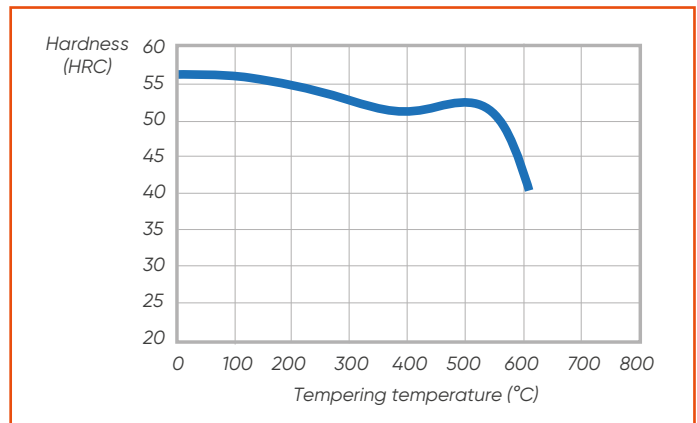
When **W 1.2083** is delivered annealed, it has to be hardened after rough machining.

Heat treatment chart :

Vacuum furnaces or controlled protective gas atmosphere :



Tempering curve:



Tempering

• If high hardness is required, a low tempering temperature gives the best combination of hardness and corrosion resistance : Temper twice at 200°C/300°C.

• For lower hardnesses and better toughnesses, temper twice above 600°C to avoid loss of corrosion resistance between 400 and 600°C.

Dimensional changes

To minimize distortions during heat treatments, it is strongly recommended to follow the following advices :

Quenching

- Minimize retained austenite (avoid overheating),
- Heat slowly,
- Preheat the part at 600/800°C before austenitization,
- Limit the quenching cooling rate to the necessary.

Tempering:

- Avoid the 400°C/600°C tempering range

Welding

Welding procedure

Welding of **W 1.2083** must be done under very severe precautions in order to avoid any crack in the welded area. Risk of cracking high on sharp edges due to stresses.

Filler metal :

AWS A5-9/ER standard (C=0.25/0.40% - Cr=12/14% - Ni=0.6% max. - Mo=0.75% max - Mn=0.6% - Si=0.5% max - P=0.03% - Cu=0.75% max).

- Preheating at 150°C/ 200° C (more than 50°C under the Ms point)
- Interpass temperature must be kept < 200°C
- Post welding heat treatment (PWHT) when possible at maximum 50°C
- Postheating 200° C during minimum 2 hours is advised when no PWHT has been done.

Dimensions

Typical delivery sizes

Manufacturing process	Thickness
Ingot casting hot rolled	15- 140 mm

Your contact

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Technical data and information are to the best of our knowledge at the time of printing. However, they may be subject to some slight variations due to our ongoing research programme on steels. Therefore, we suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.