Industeel

W 1.2083

ArcelorMittal

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})			
20°C	20/100°C	20/200°C	20/400°C	Specificheat J/kg.°C
20	10.5	11.1	11.5	460

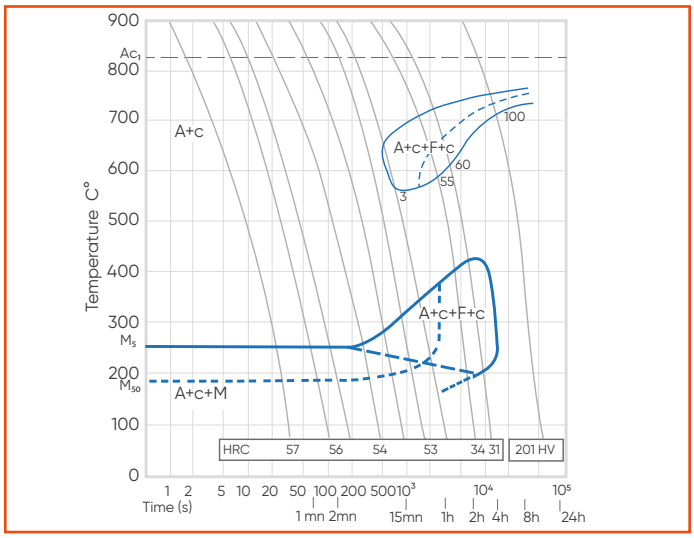
Metallurgical properties

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.

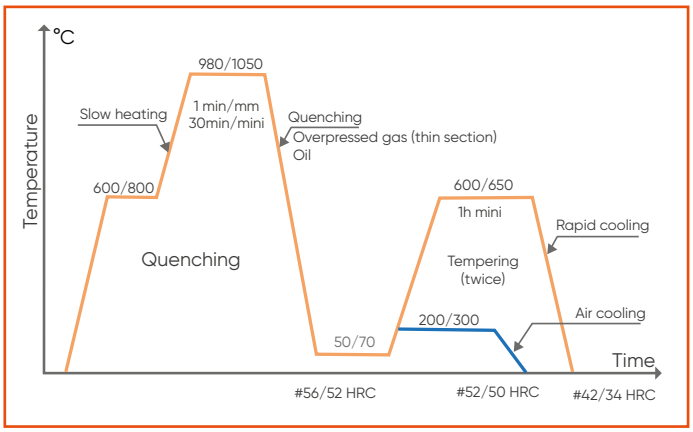
Plate processing

Heat treatment

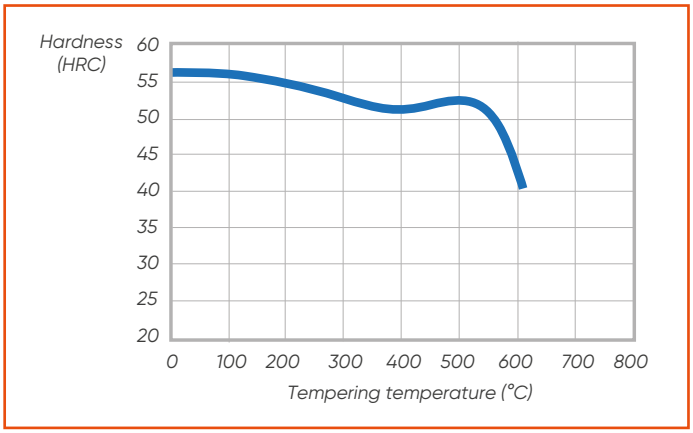
When **W 1.2083** is delivered annealed, it has to be hardened after rough machining.

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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