Industeel

ArcelorMittal

W 1.2083

W1.2083

W1.2083 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	W1.2083
> AISI	420

CHEMICAL ANALYSIS

	C	S	P	Si	Mn	Cr
Min	0.36	-	-	-	-	12.5
Typical	**0.40**	**0.001**	**0.02**	**0.4**	**0.6**	**13.0**
Max	0.42	0.030	0.03	1.0	1.0	14.5

MECHANICAL PROPERTIES

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

Hardness	Longitudinal direction (20°C-68°F)									
	Rp 0.2 Yield Strength		Rm Tensile strength		Elongation	Reduction of area	KCV		Elastic modulus	
HB	MPa	ksi	MPa	ksi	%	Z%	J/cm²	Ft.Lbs	GPa	ksi
320	905	132	1100	160	10	21	13	8	207	30000

Typical values

PHYSICAL PROPERTIES

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

Typical values

PROPERTIES

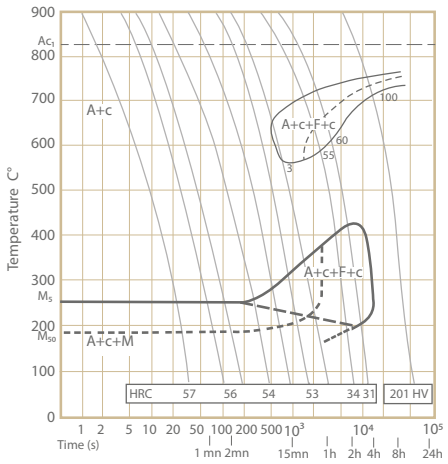
METALLURGICAL PROPERTIES

Transformation point

AC_1 (°C) (°F)	AC_3 (°C) (°F)	Ms (°C) (°F)
850 (1400)	900 (1796)	250 (235)

CCT Diagram

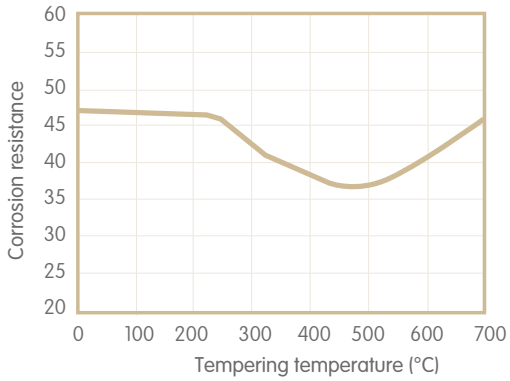
Autenitizing temperature : 1000°C



CORROSION RESISTANCE

W1.2083 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.

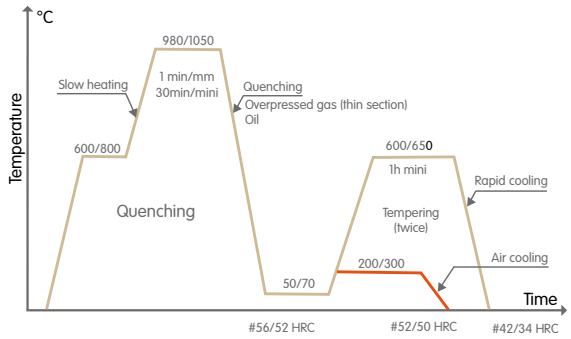


HEAT TREATMENT

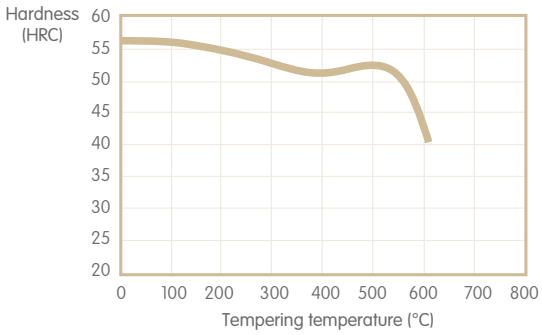
When W1.2083 is delivered annealed, it has to be hardened after rough machining.

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 W1.2083 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.

DIMENSIONAL RANGE

THICKNESS	
15-140 mm	Ingot casting hot rolled.

YOUR CONTACTS

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