

1.2343 ESR

Hot working steel



1 Main characteristics and applications

Hot working special steel with high wear resistance associated with special thermal fatigue properties. Steel can be air hardened or pressure gas (vacuum) which makes it possible to reduce distortion and cracks caused by heat treatment.

At working hardness of 50HRC excellent toughness and is therefore suitable for use in a wide field of operating condition.

This steel is used for tools as:

- dies for the pressure casting of light alloys.
- wear resistance moulds for plastic processing.
- dies for friction and mechanical presses for hot forming of steel, brass, aluminum and its alloys.
- extrusion dies for aluminum processing.
- hot work shear blades.

To raise lifetime of tools this steel can be submitted to surface treatment as thermo-chemical treatments on the tools or nitriding (ion – saline – gaseous).

2 Comparable standards

UNI	W.Nr	DIN	AFNOR	AISI/SAE	BS
(X37CrMoV51KU)	1.2343	~X38CrMoV5-1	Z38CDV5	~H11	~BH11

3 Chemical composition (typical; in weight %)

C	Mn	Si	Cr	Mo	P	S	V
0.39	0.4	1	5	1.2	0.015	0.003	0.4

4 Critical points

Ac1	840 °C
Ac3	880 °C
Ms	260 °C

5 Production technology

Electro-slag-remelting (ESR) - Forging - Heat treatment +EFS

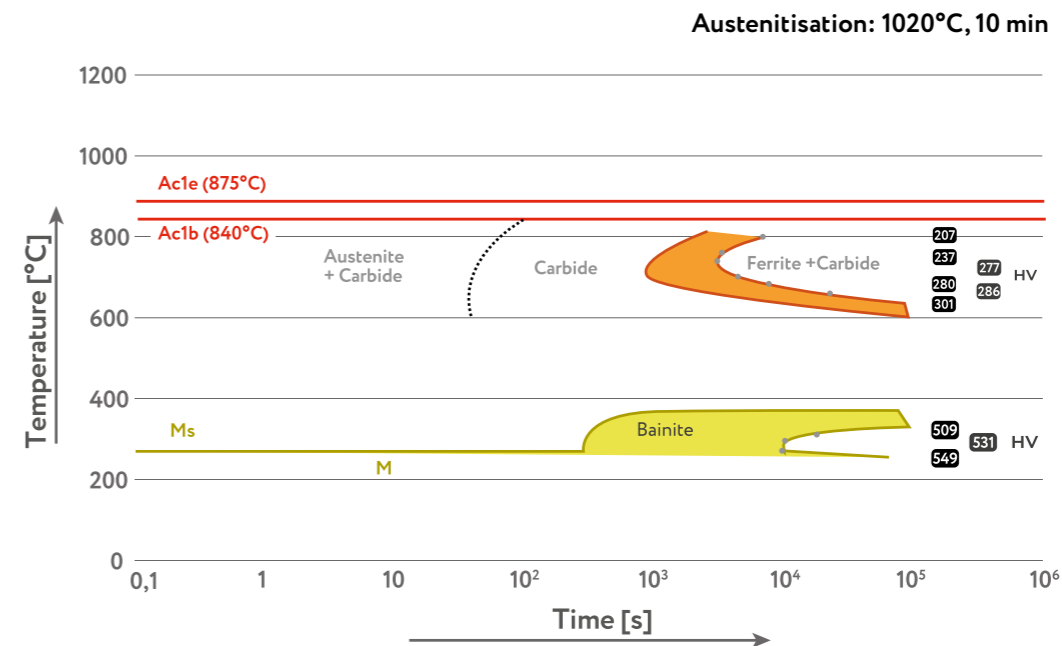
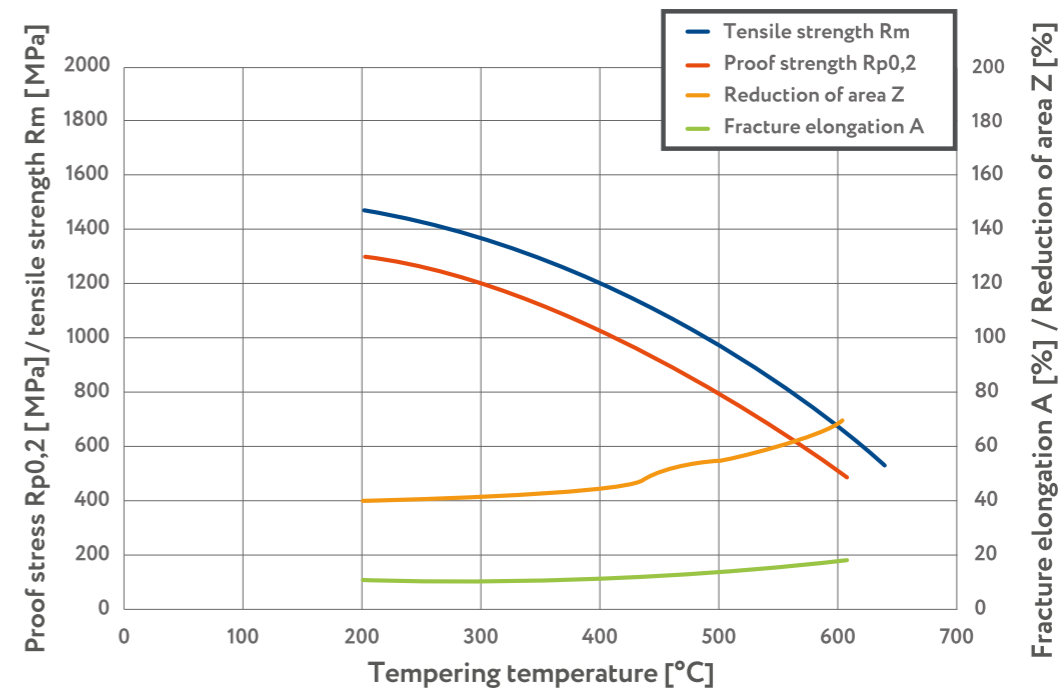
6 US specification

In according to standard EN10228-3 Class 4 and standard SEP 1921 Class E/e

7 Delivery condition

W1.2343 is delivered in annealed condition (EFS), with hardness max 230 HB (21 HRC)

12 Tempering curve



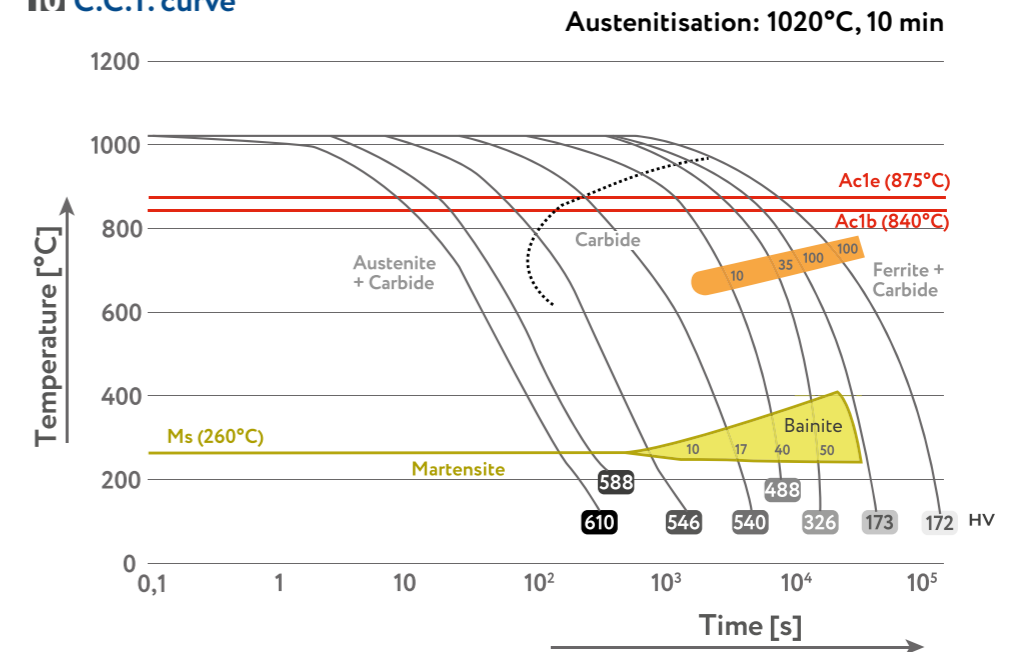
8 Physical properties (reference values)

	20°C	100°C	250°C	500°C
Thermal expansion coefficient (10 ⁻⁶ /K)	11.3	11.7	12.1	13.2
Thermal conductivity (W/mk)	18.8	19	22.9	24.9
Young modulus (Kn/mm ²)	212	209	197	175

9 Heat treatment

TREATMENT	TEMPERATURE	HOLDING TIME (HT)	COOLING	COMMENTS
Annealing	Heat to 850 °C	Min. H.T. for 2 minute /mm	Furnace up to 550°C than in air	-
Stress relieving	Heat to 650-700°C	Min. H.T. for 2 minute /mm	Furnace up to 300-350°C	To be carried out after machining, is recommended to eliminate the residual stresses induced by mechanical working
Hardening	Preheating to 350-400°C Second preheating to 750-850°C Heat to hardening temperature to 1000-1020°C	Min. H.T. for 1 minute /mm	Air or pressure gas by vacuum	Quenched hardness 52-56HRC
Tempering	In the range 550 – 600°C for at least 3 h according to hardness requirements and conditions of use. Tempering must be repeated a second time at a temperature equal to or 20°C lower than the previous. Before tempering, the parts must be preheated to 200 – 300°C		Air	Usual service hardness: 48-52 HRC

10 C.C.T. curve



11 Tempering curve

