



1.2344

Hot Work Tool Steel

TECHNICAL SHEET

1 Comparison Standards

W.Nr	DIN	JIS equivalent	AISI/SAE	AFNOR	BS	UNI
1.2344	X40CrMoV5-1	SKD61	(H13)	-	(BH13)	(X40CrMoV51.1KU)

2 Chemical Composition

C	Si	Mn	P (max)	S (max)	Cr	Mo	V	Supply Condition	Supply Hardness (HB)
0.35-0.42	0.80-1.20	0.25-0.50	0.03	0.02	4.80-5.50	1.20-1.50	0.85-1.15	Annealed	240

3 Main Characteristics and Applications

High wear resistant hot working steel is also suitable for wear resistant and polished plastic moulds. It is easily machinable in its annealed state but requires hardening before final machining. The steel exhibits excellent toughness and is highly resistant to thermal shock and thermal fatigue. A nitriding surface treatment can be applied to extend the lifespan of tooling.

Applications:

- Extrusion Dies
- Forging Dies
- Wear resistant plastic moulds
- Hot work shear blades
- Rolls for profiling tools (welding area)
- Dies for pressure casting of light alloys

4 Production Route

EAF - LF - VD - Forging - Heat treatment + EFS

5 Physical Properties (Reference Values)

	20°C	100°C	250°C	500°C
Thermal expansion coefficient (10 ⁻⁶ /K)	11.3	11.6	12	13
Thermal Conductivity (W/mk)	18.8	19	22.9	25.1
Young modulus (Kn/mm ²)	212	209	197	175

6 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	It is recommended to eliminate the residual stresses induced by mechanical working after machining
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	Quench hardness 52-56 HRC
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	Typical service hardness: 44-52 HRC



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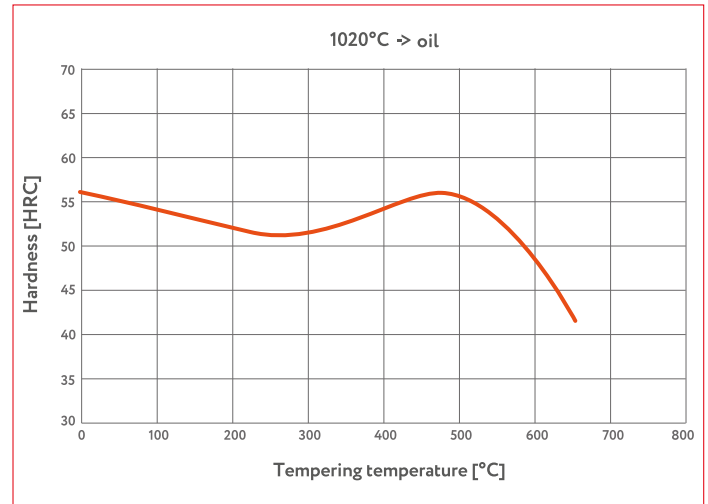
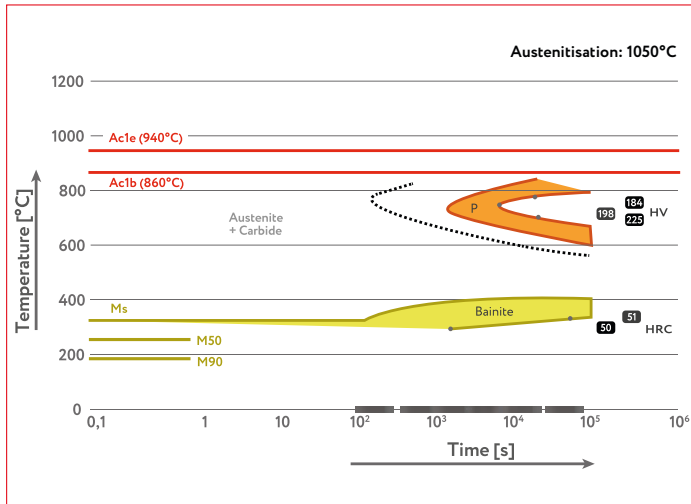


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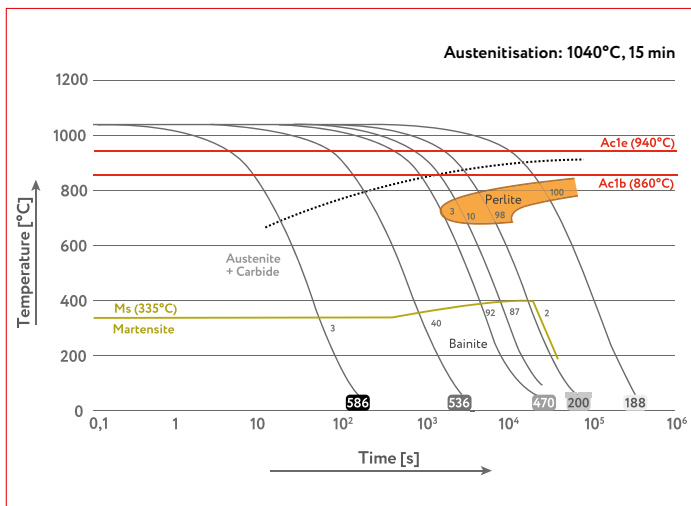
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7 Tempering Curve



8 C.C.T. Curve



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