1.2344 ESR

Hot Work Tool Steel

TECHNICAL SHEET

1 Comparision Standards

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

2 Chemical Composition

C	Si	Mn	P (max)	S (max)	Cr	Mo	V	Supply Condition	Supply Hardness (HB)
≤ 0.39	≤ 1.00	≤ 0.40	≤ 0.015	≤ 0.003	≤ 5.0	≤ 1.30	≤ 1.00	Annealed	240

3 Main Characteristics and Applications

High-performance hot-working steel is ideal for applications requiring exceptional wear resistance, such as polished plastic molds. Its excellent machinability in the annealed state allows for precise tooling, followed by a hardening process to achieve optimal durability. This steel exhibits superior toughness, thermal shock resistance, and thermal fatigue resistance. To further enhance tool life, a nitriding surface treatment can be applied. For optimal performance, tools should be preheated to 250-300°C before use.

Applications:

- PDC Dies
- Hot Work Shear Blades
- Rolls for Profiling Tools
- Tooling for the Extrusion of Light Alloys
- Wear Resistance Plastic Moulds
- Dies for the Pressure Casting of Light Alloys

4 Production Route

Electro-slag-remelting (ESR) - 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/mm2)	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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SandeepEnterprises STEEL SOLUTIONS

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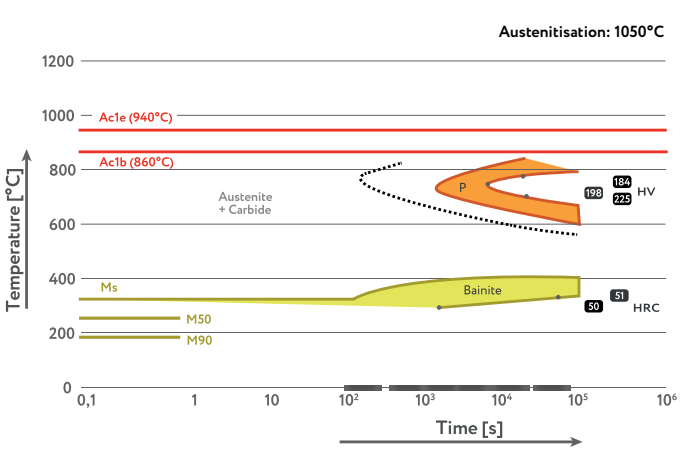
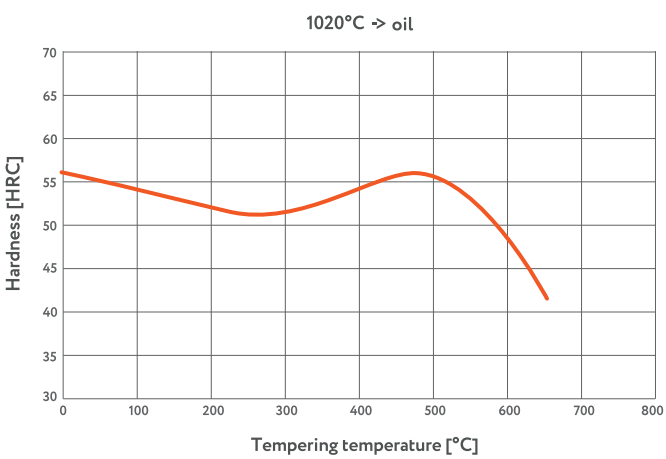
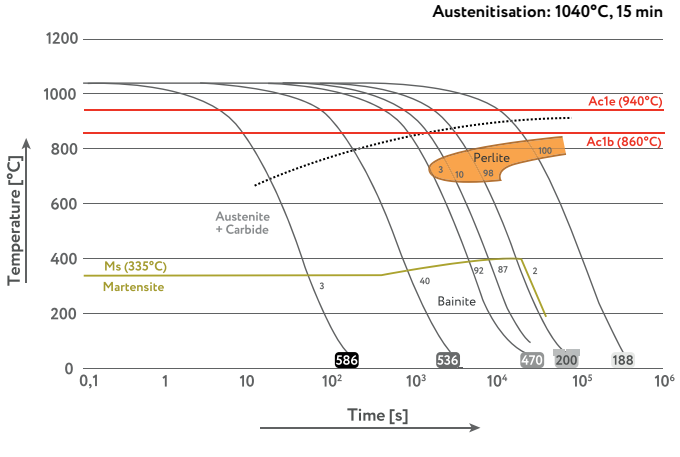
TECHNICAL SHEET

7 Tempering Curve





8 C.C.T. Curve



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