

Hot work tool steel with high hot wear resistance

Chemical composition

Standard analysis in mass -%

C	Si	Mn	Cr	Mo	V
0.4	1.0	0.4	5.3	1.4	1.0

Standards and designations

DIN EN ISO 4967	SEL	AISI	B.S. ¹	AFNOR ¹	JIS	GOST	UNE ¹	SS ¹
X40CrMoV5-1	1.2344	H13	BH13	Z40CDV5	SKD61	4Ch5MF1S	F.5318	2242

¹ obsolete standard

Properties

- Cr-Mo-V alloyed hot work tool steel with extras fine structure
- Very high hot strength
- Very good hot wear resistance
- High toughness
- Very good thermal shock resistance

Applications

- Hot work tool steel for universal use
- Die casting tools and moulds
- Extrusion dies
- Forging dies and inserts
- Extruder screws and cylinders
- Hot shear gauges
- Ejector pins

Physical properties

Coefficient of thermal expansion in $10^{-6}/K$

20 - 100 °C	10.9
20 - 200 °C	11.9
20 - 300 °C	12.3
20 - 400 °C	12.7
20 - 500 °C	13.0
20 - 600 °C	13.3
20 - 700 °C	13.5

Thermal conductivity in W/(mK)

	annealed	Hardened and tempered
20 °C	27.2	25.5
350 °C	30.5	27.6
700 °C	33.4	30.3

Technical datasheet

Thermodur®2344 EFS

Thermodur®2344 EFS Superclean

Heat treatment

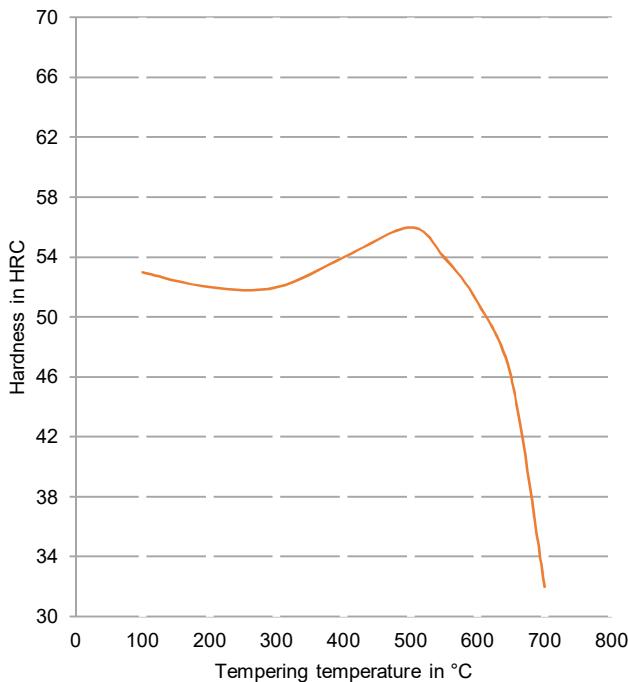
Heat treatment parameters

	Temperature	Cooling / Quenching	Hardness
Soft annealing	750 – 800 °C	furnace	max. 229 BHN
Hardening	1010 – 1030 °C	Air, oil, salt bath (500 – 550 °C)	54 HRC (after quenching)

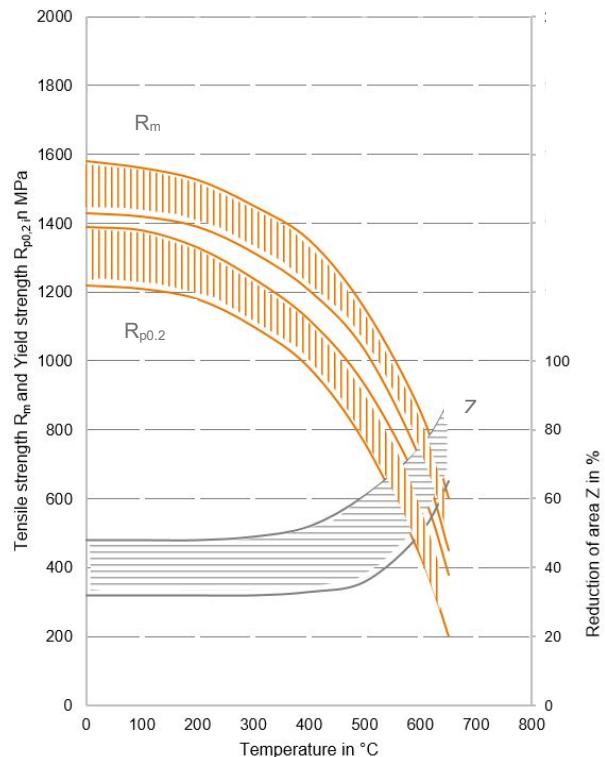
Tempering

Temperature in °C	100	200	300	400	500	550	600	650	700
Hardness in HRC	53	52	52	54	56	54	50	42	32

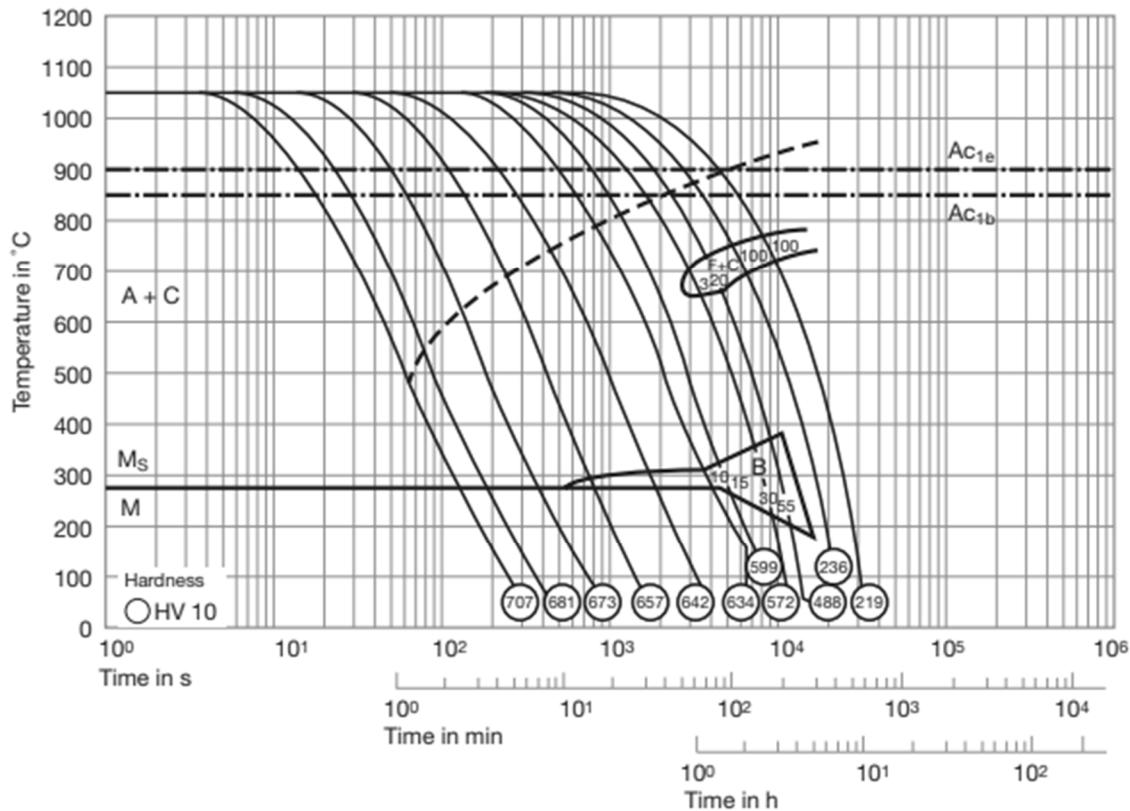
Tempering diagram



Hot wear resistance



Time-temperature-transformation diagram



Condition of delivery

Thermodur®2344 EFS and Thermodur®2344 Superclean are given an extra fine structure (EFS) thanks to the application of the most modern special technological processes from the melting of selected feed materials to heat treatment. Although these processes already provide a high isotropy of material properties, we recommend using the remelted grade Thermodur®2344 Superclean for highest requirements.

Thermodur®2344 EFS and Thermodur®2344 Superclean are usually supplied in normalized and annealed condition with a hardness of max. 229 BHN.

For further info on our product range of tool steel, stainless steel and Engineering steel please visit www.swisssteelgroup.com

Discover our Green Steel portfolio on www.swissgreensteel.com

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Only the information reported on our material certificates is to be considered as relevant. Applications specifically suggested for material described herein are made for the purpose of illustration only to enable the reader to make its own evaluation and are not intended as warranties, either express or implied, of fitness for any purposes.

We reserve the right to make changes and technical improvements without notice. Errors and omissions excepted.
 The desired performance characteristics are only binding if they had been agreed upon exclusively at the time that the contract was made.