

DIN - Material - No.

1.2365

Code

X32CrMoV33

Comparable standards

AISI: H10, EU: 30CrMoV1211

Chemical composition

(Typical analysis %)

C	Si	Mn	Cr	Mo	V
0.32	0.25	0.30	2.95	2.75	0.55

Steel properties

Hot work tool steel. Secondary hardening steel. Good tempering resistance. It maintains high hardness and strength at elevated temperatures. Resistance to thermal fatigue, erosion and wear. Very high toughness. Good ductility and hardenability - air cooling. Tools can be water cooled.

Physical properties

Thermal conductivity W/(m.K)	20	500	600°C
	30	30.1	29.7
Density g/cm ³	20	500	600°C
	7.88	7.71	7.65

Coefficient of linear thermal expansion

10 ⁻⁶ °C ⁻¹	20-100	20-200	20-300	20-400	20-500	20-600	20-700
	12.6	13.3	13.8	14.2	14.6	15.1	15.4

Applications

Dies, tools for the production of screws & forging machines, highly stressed extruding tools for light metal processing - mandrels, pressing die cast moulds. For the highest requirements we recommend UTOP33 ESR EFS.

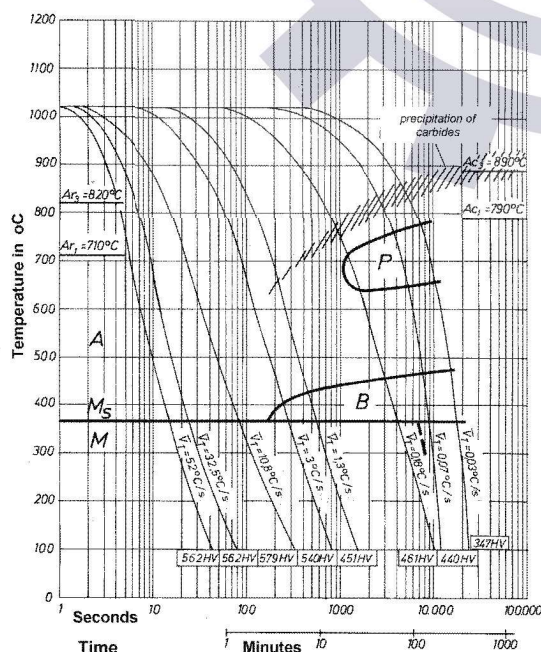
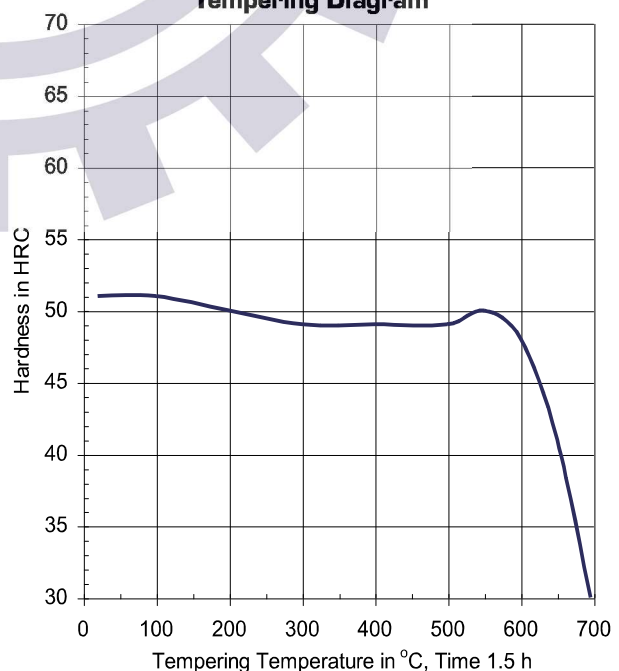
Stress Relieving

Holding at approx 600 - 650° C for one hour.

Heat treatment

Soft annealing°C	Cooling	Hardness HB
780 - 810	furnace	max. 229
Hardening from°C	in	Hardness after quenching HRC
1010 - 1050	oil, air, thermal bath ca. 450 - 550°C	44 - 54

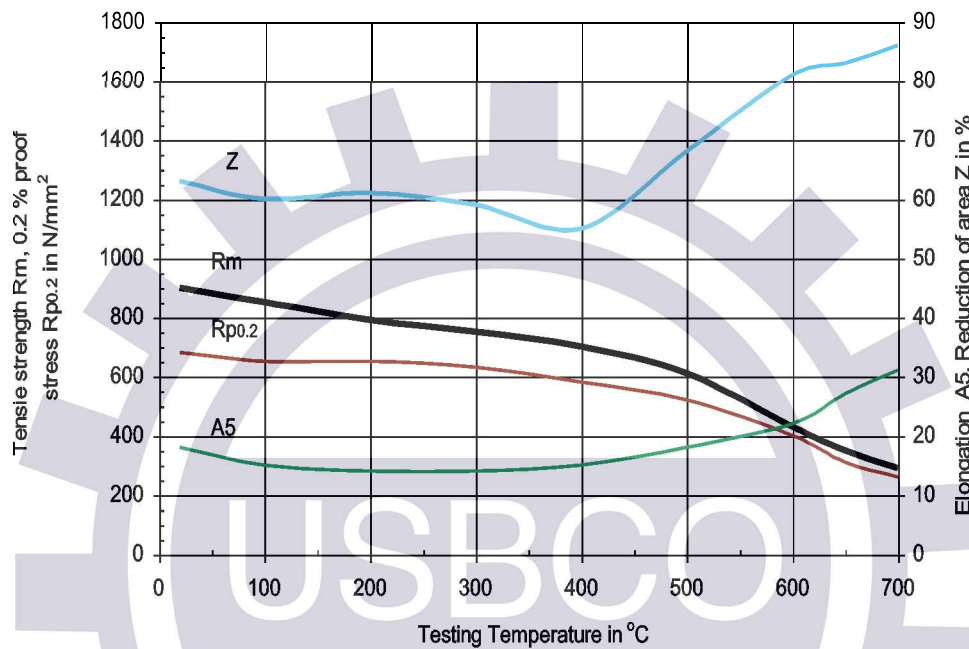
Tempering °C	100	200	300	400	500	550	600	650	700
HRC	51	50	49	49	49	50	48	41	29
N/mm ²	1730	1680	1620	1620	1620	1680	1570	1300	940

Time - Temperature - Transformation - Diagram

Tempering Diagram


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Mechanical properties at elevated temperature

hardened and tempered on 900 N/mm²



hardened and tempered on 1650 N/mm²

