

# ES 275 K

Name:  
**45 NiCrMo 16**

Material No.:  
1.2767

Typical analysis in %:  
C Cr Mo Ni  
0.45 1.4 0.3 4.0

As-supplied condition:  
Soft-annealed to max. 285 HB  
(965 N/mm<sup>2</sup>)

Characteristics:  
Through-hardening steel with the highest toughness, low distortion, good polishability

General fields of application:

Solid coining dies for the highest toughness requirements, extremely highly loaded cutlery presses, tools for heavy cold forming, hobbing tools, shearing blades and cutters for cutting very thick material; plastic, compression and injection moulds, which require high hardness combined with the highest toughness

Special note:

Also available in EST and ESR grades.

**If grained only ES 275 K in EST grade should be used.**

## Heat treatment data:

	Temperature	Duration	Cooling
Soft annealing	620 - 650 °C	2 - 5 h	furnace
Stress-relief annealing	600 - 650 °C	min. 4 h	furnace
Hardening	840 - 870 °C	Group II	oil, air, WB 200 °C
Tempering	180 - 600 °C see tempering curve	min. 2 h depending on cross section	still air

## Physical characteristics:

Coefficient of thermal expansion: between 20 °C and:

10 <sup>-6</sup> x m	100	200	300	400	500	600	700 °C
m x K	11.8	12.5	12.8	13.1	13.4	13.8	13.6

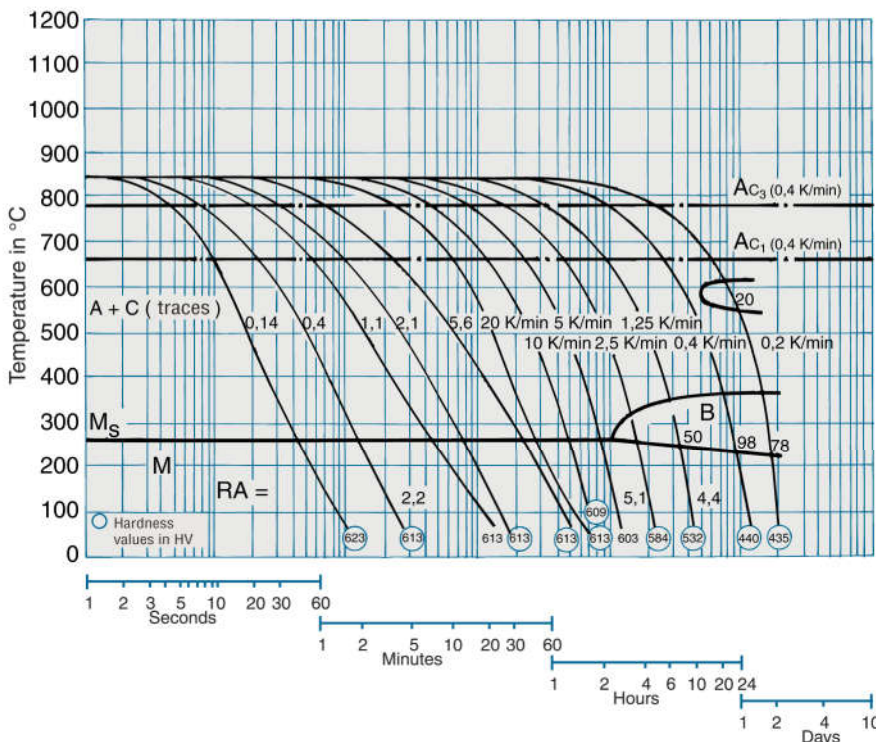
Thermal conductivity:  $\frac{W}{m \times K}$

	20	350	700 °C
	30.0	30.5	32.0

Normal working hardness: 50 - 56 HRC

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## Continuous time-temperature-transformation diagram



## Tempering curve

