

## ES 245 W

**Name:**  
**X 40 CrMoV 5-1**

**Material No.:**  
1.2344

**Typical analysis in %:**

C	Si	Cr	Mo	V
0.4	1.0	5.3	1.4	1.0

**As-supplied condition:**  
Soft-annealed to max. 229 HB  
(770 N/mm<sup>2</sup>)

**Characteristics:**  
CrMoV alloyed hot work steel with excellent high temperature strength and good toughness, good high temperature wear resistance, highest thermal shock resistance, very good cleanliness factor

and excellent homogeneity, nitridable

**General fields of application:**

Tools for forging machines, dies, die inserts, extrusion tools, hot shearing knives and tools for plastics processing

**Special note:**

If nitrided, the nitriding depth should not be too deep otherwise increased thermal cracking may occur.

Preheating to 200 - 300 °C before starting work is recommended.

Also available in EST and ESR grades.

If grained or polished only ES 245 W in EST grade should be used.

We recommend ES 245 W steel in ESR grade for highly polished mirrored finishes.

**Heat treatment data:**

	Temperature	Duration	Cooling
Soft annealing	800 - 860 °C	2 - 5 h	furnace
Stress-relief annealing	600 - 650 °C	min. 4 h	furnace
Hardening	1020 - 1060 °C	Group II	oil, air WB 500 °C
Tempering	530 - 700 °C 3 x, 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	10.9	11.9	12.3	12.7	13.0	13.3	13.5

**Thermal conductivity:**

W	20	350	700 °C
m x K	24.5	26.8	28.8

**Normal working hardness:** 30 - 54 HRC (1000 - 1900 N/mm<sup>2</sup>)

**Continuous time-temperature-transformation diagram**

**Tempering curve**

