

## MATERIAL NO.:

1.2083 / 1.2083 ESR\*

### DESIGNATION:

**DIN:** X 40 Cr 14  
**AFNOR:** Z 40 C 14  
**UNI:** -  
**AISI:** 420 / 420 ESR

### TECHNICAL TIP:

- » Cold-work steel
- » Must be tempered several times after hardening (max. 52 HRC). The demand for "max. hardness" often ends in material breakage.
- » Mould temperature max. 200 °C
- » Not corrosion-resistant until after hardening
- » The **\*ESR quality** guarantees an extremely pure and homogeneous microstructure, especially for mirror polishing.

### INDICATORY ANALYSIS:

C 0.40  
 Si 0.40  
 Mn 0.30  
 Cr 13.00

### STRENGTH:

max. 240 HB  
 (≈ max. 800 N/mm<sup>2</sup>)

### THERMAL CONDUCTIVITY AT 100 °C:

23.5  $\frac{W}{m K}$

### COEFFICIENT OF THERMAL EXPANSION [10<sup>-6</sup>/K]

100 °C	200 °C	300 °C	400 °C	500 °C	600 °C	700 °C
10.5	11.0	11.5	11.8			

### CHARACTER:

- » Low corrosion, high-alloy, low warpage steel **for through hardening** with excellent properties for polishing as well as good photo etching, good machinability, high wear resistance and high dimensional stability

### APPLICATION:

- » Cavity plates and inserts for working with chemically aggressive plastics; because of excellent polishability, suitable for optical and medical products

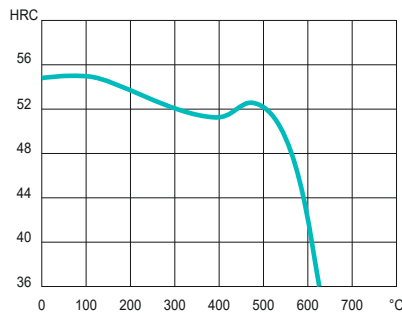
### TREATMENT BY:

- » Polishing:  
can be polished in the annealed and hardened state; good preliminary; surface preparation work is decisive for a good polish
- » Etching:  
good photo etching (graining)
- » EDM:  
in the hardened and tempered condition, treat again for stress relief about 20 °C below the last temperature
- » Nitriding, hard chrome plating:  
not recommended

### HEAT TREATMENT:

- » Soft annealing:  
750 to 800 °C for about 2 to 5 hours  
slow controlled cooling of 10 to 20 °C per hour to about 650 °C; further cooling in air, **max. 200 HB**
- » Hardening:  
1000 to 1050 °C  
keep curing temperature for 15 to 30 minutes  
quenching in oil/compressed gas/hot bath  
obtainable hardness: **53 - 56 HRC**
- » Tempering:  
slow heating to tempering temperature immediately after hardening  
minimum time in furnace: 2 hours per 20 mm part thickness  
double tempering is recommended

### TEMPERING CHART:



ESR)\* Electro-Slag Remelted