

# KOUDVERVORMSTAAL

## Beschikbare uitvoeringen

|           |                  |           |                |       |
|-----------|------------------|-----------|----------------|-------|
| Flat Bar  | Ground Flat      | Stafstaal | vrijvormsmeden | Plaat |
| Round Bar | Round Ground Bar |           |                |       |

## Product omschrijving

BÖHLER K890 MICROCLEAN - Het poedermetallurgische koudwerkstaal munt uit door goede taaiheid, zeer goede drukbelastbaarheid en uitstekende vermoeidheidssterkte.

## Eigenschappen

- > Toughness & Ductility: very high
- > Good toughness means safety against cracking of the molds in use: very high
- > Uniformly high strength and toughness, even with large dimensions: very high
- > Wear Resistance: good
- > Compressive strength: high
- > Dimensional stability: very high
- > Excellent homogeneity and isotropy: very high
- > Fine carbide structure: very high
- > Homogeneous microstructure: very high

## Toepassingen

- > Machinale messen (voor fabrikanten)
- > Coining
- > Algemene componenten voor werktuigbouw
- > Fijn stanswerk / ponsen / stampen
- > Walsen
- > Persen van poeders
- > Componenten voor de recyclingindustrie
- > Cold Forming
- > Slijtstukken
- > Pill punching dies

## Chemische samenstelling

| C    | Si   | Mn  | Cr   | Mo  | V   | W    | Co  |
|------|------|-----|------|-----|-----|------|-----|
| 0,85 | 0,55 | 0,4 | 4,35 | 2,8 | 2,1 | 2,55 | 4,5 |

## Materiaaleigenschappen

|                                   | Compressive strength | Dimensional stability during heat treatment | Taatheid | Wear resistance abrasive | Wear resistance adhesive |
|-----------------------------------|----------------------|---|----------|--------------------------|--------------------------|
| <b>BÖHLER K890</b><br>MICROCLEAN® | ★★★★                 | ★★★★★                                       | ★★★★★    | ★★★                      | ★★★                      |
| <b>BÖHLER K100</b>                | ★★                   | ★★  | ★        | ★★★                      | ★★                       |
| <b>BÖHLER K105</b>                | ★★                   | ★★  | ★        | ★★                       | ★★                       |
| <b>BÖHLER K107</b>                | ★★                   | ★★  | ★        | ★★★                      | ★★                       |
| <b>BÖHLER K110</b>                | ★★                   | ★★★   | ★        | ★★★                      | ★★                       |
| <b>BÖHLER K190</b><br>MICROCLEAN® | ★★★★                 | ★★★★★                                       | ★★★★     | ★★★★                     | ★★★★                     |
| <b>BÖHLER K294</b><br>MICROCLEAN® | ★★★★★                | ★★★★★                                       | ★★★      | ★★★★★                    | ★★★★★                    |
| <b>BÖHLER K340</b><br>ISODUR®     | ★★★                  | ★★★★  | ★★★      | ★★★                      | ★★★★                     |
| <b>BÖHLER K340</b><br>ECOSTAR®    | ★★★                  | ★★★   | ★★       | ★★                       | ★★                       |
| <b>BÖHLER K360</b><br>ISODUR®     | ★★★                  | ★★★★  | ★★★      | ★★★★                     | ★★★★                     |
| <b>BÖHLER K346</b>                | ★★★                  | ★★★   | ★★★      | ★★★★                     | ★★                       |
| <b>BÖHLER K353</b>                | ★★                   | ★★★   | ★★       | ★★                       | ★★                       |
| <b>BÖHLER K390</b><br>MICROCLEAN® | ★★★★★                | ★★★★★                                       | ★★★★     | ★★★★★                    | ★★★★★                    |
| <b>BÖHLER K490</b><br>MICROCLEAN® | ★★★★                 | ★★★★★                                       | ★★★★     | ★★★★                     | ★★★★                     |
| <b>BÖHLER K497</b><br>MICROCLEAN® | ★★★★★                | ★★★★★                                       | ★★★      | ★★★★★                    | ★★★★★                    |

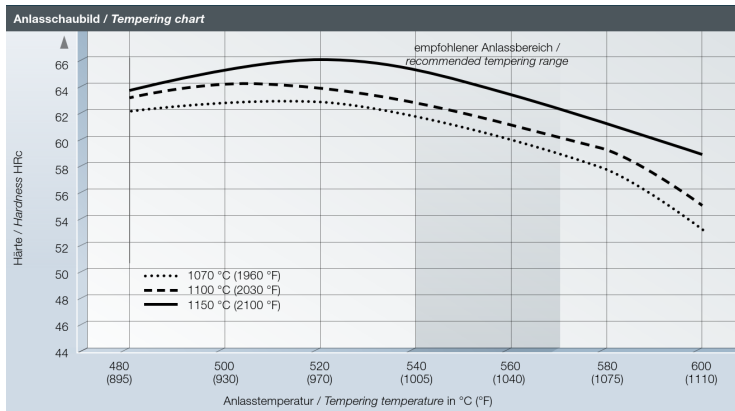
## Leveringsconditie

| gegloeid |             |
|----------|-------------|
| Hardness | max. 280 HB |

## Warmtebehandeling

| Soft annealing     |              |  |
|--------------------|--------------|--|
| Temperatuur (°C)   | 650 to 700   | Depending on the application, hardness can be adjusted by using specialized annealing treatment.   |
| Stress relieving   |              |  |
| Temperatuur (°C)   | 650 to 700   | After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Slow cooling in furnace.   |
| Harden en ontlaten |              |  |
| Temperatuur (°C)   | 1070 to 1150 | Following temperature equalisation: 20-30 minutes for a hardening temperature of 1070 - 1100 °C (1960 - 2010 °F) 6 minutes for a hardening temperature of 1150 °C (2100 °F) After hardening, tempering to the desired working hardness, see tempering chart. |

## Tempering chart



### Tempering:

Hardening temperature:  
 ••• 1070°C/1960°F  
 - - - 1100°C/2030°F  
 ——— 1150°C/2100°F

Slow heating to tempering temperature immediately after hardening.

Dwell time in the oven 1 hour per 20 mm workpiece thickness, but at least 2 hours.

Slow cooling to room temperature after each tempering step is recommended.

Tempering at 540-570 °C at least three times is recommended.

Please refer to the tempering diagram for guide values for the achievable hardness after tempering. Tempering for stress relieving 30 to 50°C below the highest tempering temperature.

## Physical Properties

|   |      |
|---|------|
| Temperatuur (°C)  | 20   |
| Soortelijk gewicht (kg/dm <sup>3</sup> )                  | 7,85 |
| Thermische conductiviteit (W/(m.K))                       | 22,5 |
| Soortelijke warmte (J/(kg.K))                             | 450  |
| Specifieke elektrische weerstand (Ohm.mm <sup>2</sup> /m) | 0,5  |
| Elasticiteitsmodus (10 <sup>3</sup> N/mm <sup>2</sup> )   | 218  |

## Thermische expansie

| Temperatuur (°C)                               | 100  | 200 | 300  | 400  | 500  | 600  | 700  |
|--|------|-----|------|------|------|------|------|
| Thermische expansie (10 <sup>-6</sup> m/(m.K)) | 10,5 | 11  | 11,3 | 11,7 | 12,1 | 12,4 | 12,9 |

Voor meer informatie zie [www.voestalpine.com/bohler-edelstahl](http://www.voestalpine.com/bohler-edelstahl)

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ONE STEP AHEAD.