BÖHLER

BÖHLER K490 MICROCLEAN®

# COLD WORK STEELS

## Available Product Shapes

| | | | | |
|---|---|---|---|---|
| Flat Bar | Ground Flat | Long Products | Open Die Forgings | Plates |
| Round Bar | Round Ground Bar | | | |

## Product Description

BÖHLER's cold work tool steel K490 MICROCLEAN closes the gap in the material demands between wear resistance and the desired high toughness.

## Properties

- High hardness (up to 64 HRC)
- Very good toughness
- High abrasive and adhesive wear resistance
- Excellent hard machinability
- High compressive strength
- Heat treatment together with common cold work tool steels (1.2379, D2) at hardening temperatures from 1030 to 1080 °C (1885 – 1980 °F) possible
- Stable mechanical properties

## Applications

- Machine knife (for producers)
- Coining
- Screws and Barrels
- Rolls
- Rolling
- Fine Blanking, Stamping, Blanking
- Wear parts
- Components for Recycling Industry
- Cold Forming
- Powder Pressing
- General Components for Mechanical Engineering
- Pill punching dies

## Chemical composition (wt. %)

| C | Cr | Mo | V | W | Nb |
|---|---|---|---|---|---|
| 1.40 | 6.40 | 1.50 | 3.70 | 3.50 | + |

## Material characteristics

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

## Delivery condition

### Annealed

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

## Heat treatment

### Stress relieving

| | | |
|---|---|---|
| Temperature (°C \| °F) | 650 \| 1202 to 700 \| 1292 | After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Cool slowly in furnace. |

### Hardening and Tempering

| | | |
|---|---|---|
| Temperature (°C \| °F) | 1030 \| 1886 to 1080 \| 1976 | Oil, $N_2$. Following temperature equalisation: 20 - 30 minutes for a hardening temperature of 1030 - 1080 °C (1885 - 1980 °F). After hardening, tempering to the desired working hardness, see tempering chart. |

## Physical Properties

| Temperature (°C \| °F) | 20 \| 68 |
|---|---|
| Density (kg/dm$^3$ \| lb/in$^3$) | 7.79 \| 0.28 |
| Thermal conductivity (W/(m.K) \| BTU (IT) ft/hr/ft$^2$/F) | 19.6 \| 11.32 |
| Specific heat (J/(kg.K) \| BTU (IT) lb/F) | 450 \| 107.48 |
| Spec. electrical resistance (Ohm.mm$^2$/m \| 10$^{-4}$ Ohm.inch$^2$/ft) | 0.55 \| 2.6 |
| Modulus of elasticity (10$^3$N/mm$^2$ \| 10$^3$ksi) | 223 \| 32.34 |

## Thermal Expansions

| Temperature (°C \| °F) | 100 \| 212 | 200 \| 392 | 300 \| 572 | 400 \| 752 | 500 \| 932 | 600 \| 1112 | 700 \| 1292 |
|---|---|---|---|---|---|---|---|
| Thermal expansion (10$^{-6}$ m/(m.K) \| 10$^{-6}$ inch/(inch.F)) | 10.6 \| 5.889 | 11.1 \| 6.167 | 11.6 \| 6.444 | 11.9 \| 6.611 | 12.3 \| 6.833 | 12.6 \| 7 | 12.8 \| 7.111 |

For more information see www.voestalpine.com/bohler-edelstahl

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ONE STEP AHEAD.