

Premium tool steel for  
wear-intensive applications

# Cr7V-L



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A premium steel that is particularly suitable for applications in hot forming with high requirements for wear resistance. In particular in the production of steel components with high series sizes, this premium tool steel shows its advantages to the full.

Due to the alloying concept of Cr7V-L in conjunction with an adapted hardness a very long tool life, e.g. for tough cold-work applications and wear-intensive hot-work applications can be achieved.

- Excellent wear resistance
- Very high high-temperature strength
- High working hardness up to 56 HRC possible
- Good machinability

## Kind&Co

For over 130 years, we have been producing high-quality tool steel exclusively at our site in Bielstein. Kind&Co is still a family owned business today. We stand for sophisticated material solutions, highest quality, reliable service and competent advice - tailored to the respective application. We have particularly strong application expertise in the areas of die casting, hot stamping, extrusion and die forging.

## Increasing requirements from production

To be competitive as a producer, cost optimization has always been one of the top priorities. In the area of metal forming the increase in tool life can be a significant lever, especially in the series production. Besides setting the right production parameters the selection of materials and the working hardness of the tools used in production are important factors.

Especially the metalworking industry is undergoing major change and is under constant pressure by global competition and the mobility transformation that is already taking place. This affects all producers of major series, which have to compete with rival manufacturing processes and the elimination of components due to the conversion to electric drives. In all sectors from the forging industry, through hot-stamping to applications in cold-work such as cutting, bending and stamping, the economic pressure demands that production costs per component be to be continuously reduced.



One of the main factors influencing tool life is the wear of the tools, especially of the tool surfaces. Even though the use of standard tool steels has proven itself for decades, these are increasingly no longer able to meet the increasing requirements. In this area, Kind&Co's premium tool steels with their improved property concepts can help to maintain or even improve profitability through improved tool life.



## Cr7V-L – premium tool steel with customized property combination for highest wear demands

Cr7V-L is a high Cr-alloyed premium steel with additives of Mo and V and is characterized by excellent hot wear resistance with very high high-temperature strength and good thermal shock resistance. The steel is suitable for the use in hot- and cold-work applications.

### Delivery condition

- soft annealed condition with max. 240 HB
- Good machinability
- Delivery in quenched and tempered condition with variable strength possible
- pre-milled, pre-turned version on request
- Ready machined parts according to drawing on request



### Hot-work

- Forging dies and die inserts for forging presses
- Cross wedge rolling
- Hot forming tools (hot-stamping)
- Extrusion dies
- Hot forging dies
- Deburring tools
- Hot shear blades
- Drawing rollers  
(e.g. for the production of seamless steel bottles)



### Cold-work

- Rollers
- Bending tools
- Punches and shear knives
- Straightening rollers

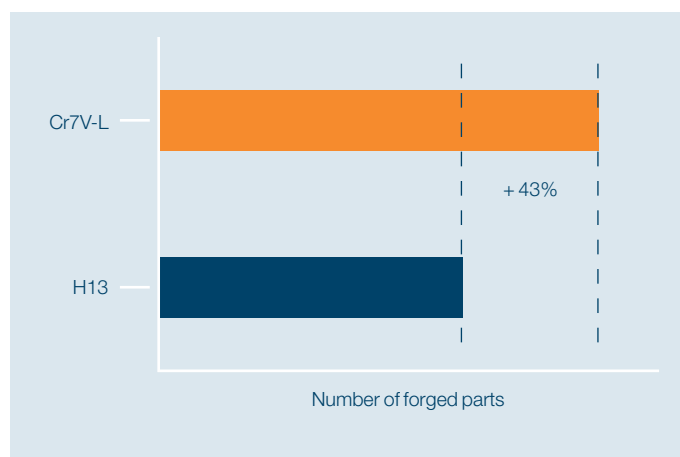
## Application die forging

Especially in series production on hot forging presses the costs for the falling component are in the foreground. To reduce these costs, an essential factor is to increase the service life of the dies used. Here, not only the costs for the dies used are decisive, but also the downtimes caused by the necessary die changes because of wear and tear.

In particular, blocker dies in steel processing are exposed to high thermal and abrasive stress. Here, the premium steel Cr7V-L convinces with its excellent property combination. By using this material, especially in the manufacture of steel components such as crankshafts, transmission parts, rings, connecting rods, etc., the service life can be significantly increased even with deep engravings, which reduces the cost of the individual component.



### 43% tool life improvement with Cr7V-L



## Application drawing rollers

Cr7V-L is ideal for applications where a sufficient level of toughness is required in addition to high wear resistance. When used as a drawing roll, Cr7V-L offers improved hot wear resistance and high-temperature strength compared to typical standard steels. In addition to through hardening and tempering to 48-52 HRC, the steel can also be surface hardened up to 57-60 HRC for this application.

### Application hot-stamping

Due to the high series sizes and, among other things, the typical coatings of the high-strength sheets during hot-stamping, the requirement for wear resistance of the forming tools is very high. Due to its working hardness of up to 56 HRC, the premium steel Cr7V-L is especially resistant to wear - without an additional surface treatment such as nitriding or PVD coatings. Thus, Cr7V-L can help to reduce cost and increase the service life of the die segments compared to standard grades.



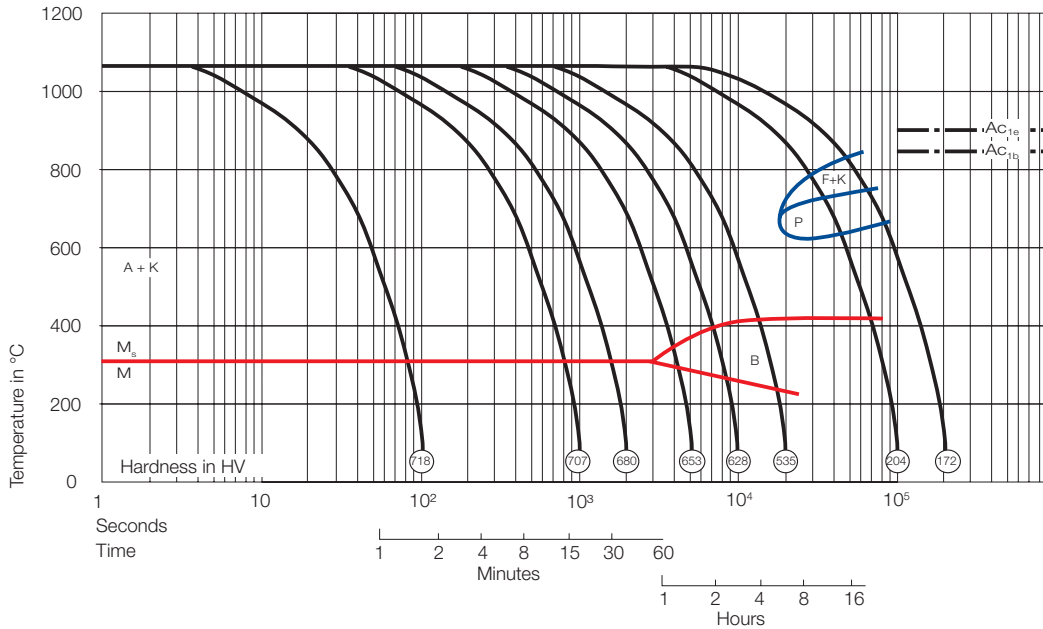
### Application cold-work

With its outstanding property concept, the premium steel Cr7V-L can also be used in cold-work. In the field of cold-work, 12% chromium steels or medium-alloyed tool steels are often used. These are characterized by very high wear resistance, but usually have low toughness due to their alloying concept. Therefore, the tools often fail by cracking and chipping, sometimes even so massive that reworking is no longer possible.

The bridge to the alternatively very tough but usually less wear-resistant hot-work tool steels builds the premium steel Cr7V-L. This material combines the properties from the worlds of cold-work and hot-work steels and offers excellent toughness for cold-work with good wear resistance. This makes Cr7V-L suitable especially for rollers, bending tools, punches, thin-walled dies, shear blades, and more.

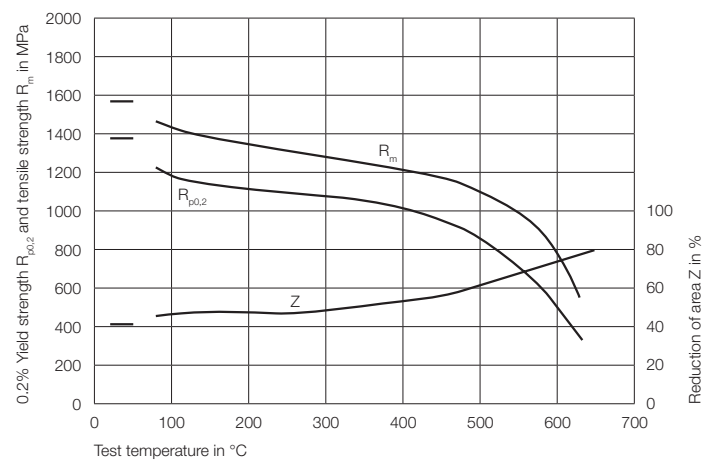
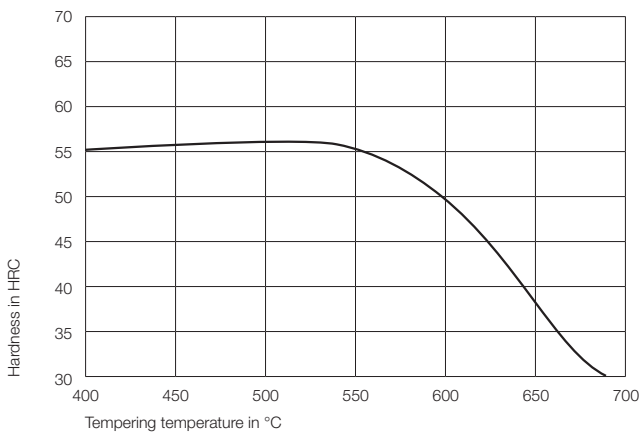
## Continuous time-temperature-transformation graph

Austenitizing temperature 1050 °C



## Tempering diagram

## High-temperature strength graph



## Physical properties

Temperature in °C	20 - 100	20 - 200	20 - 400	20 - 600
Thermal expansion in $10^{-6}/m/m \times K$	11,4	11,9	12,5	13,1
Temperature in °C	20	200	400	
Thermal conductivity in $W/m \times K$	26,7	29,8	30,8	
Temperature in °C	20			
Density in $g/cm^3$	7,60			

## Production processes

Melting

Forging

Heat treatment

Mechanical processing

Vacuum hardening

Surface treatment

## Products

Hot-work tool steels

Cold-work tool steels

Die forging steels

Plastic mould steels

## Industries

Die casting

Extrusion

Die forging

Pipe technology

Plastics technology

Hot-stamping

Special applications

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