



MATERIAL EXPERTISE DOWN TO THE SMALLEST DETAIL

**BÖHLER high performance metals
for fine blanking**

BLANKING AND FINE-BLANKING THE TOOLING STEEL MAKES THE DIFFERENCE

COMPLEXITY AND HIGH DEMANDS

Technical products are becoming more and more complex and very often seemingly petty matters are decisive for their acceptance on the market. Main factors for product acceptance are price, compatibility, design as well as product properties. In order to fulfill these requirements an integrated approach is necessary. For a high product quality especially mechanical processing is essential. One of the most demanding shaping processes for manufacturing of high quality products is the so-called fine-blanking.

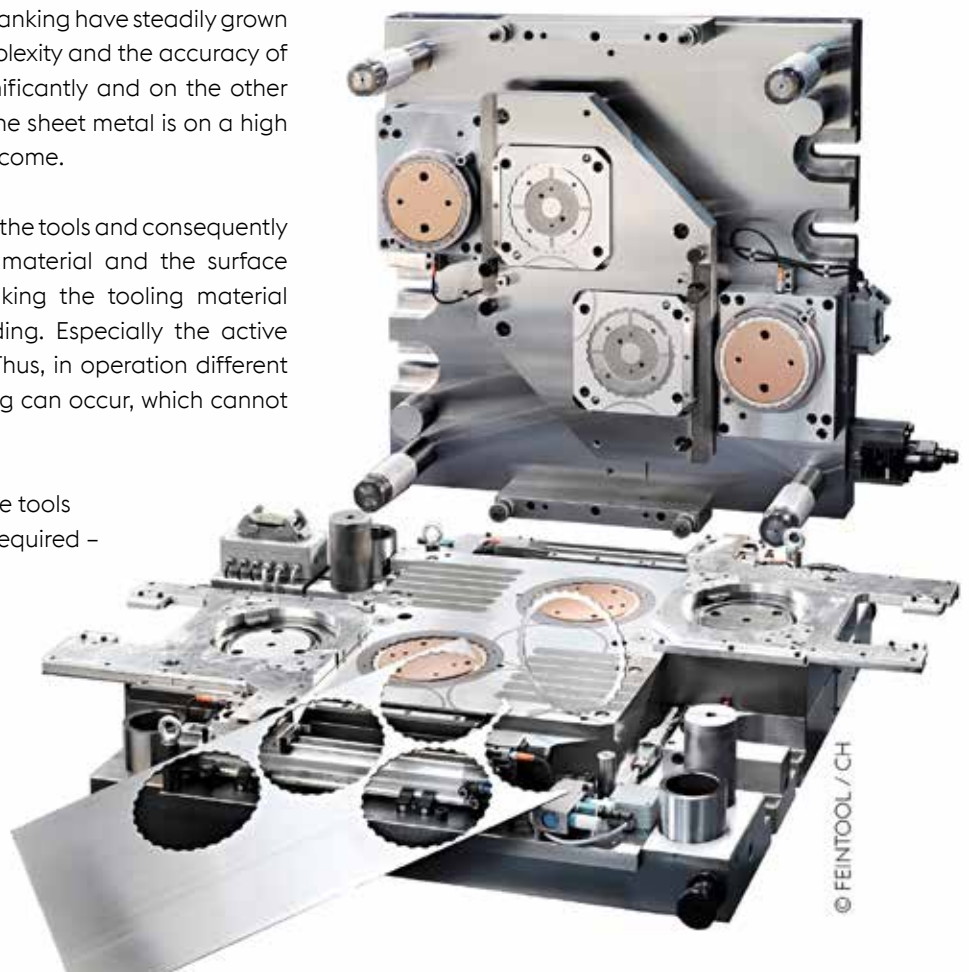
In general, blanking has proven to be the appropriate shaping process for serial production for many years and, in addition, modern powerful presses help to enhance productivity. Nevertheless, the fine-blanking becomes more and more important, as the flush-cut helps to avoid expensive post processing. Modern presses in combination with high precision tools enable blanking of thin as well as thick sheet material with high speed and high quality.

Due to the development of new presses, better quality of processed materials and advanced tool making capabilities, the blanking process as such has changed from a quite rough to a highly precise technology.

The requirements for blanking and fine-blanking have steadily grown over the years. On the one hand the complexity and the accuracy of the parts produced have increased significantly and on the other hand the strength and the thickness of the sheet metal is on a high level, but will rise even more the years to come.

All those facts lead to a higher loading on the tools and consequently to higher requirements on the tooling material and the surface quality. During blanking and fine blanking the tooling material has to withstand high mechanical loading. Especially the active parts are exposed to highest loadings. Thus, in operation different wear mechanisms, break-outs or chipping can occur, which cannot completely be avoided.

Therefore, for an adequate life time of the tools improved or new material concepts are required – a challenge for steel developer!



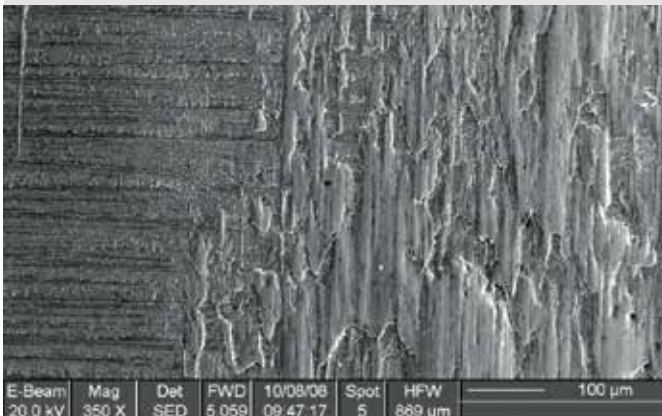
COMPETENCE IN TOOLING STEEL GOES HAND IN HAND WITH ENHANCED PRODUCTIVITY

Higher numbers of strokes and higher productivity are not only a question of faster presses. It also strongly depends on the right tool and consequently on the tooling material used. Only the right choice leads to an optimized performance.

Therefore, it is extremely important to scrutinize the material selection too and not only the design of the blanking tool. Why do we use powder metallurgical produced tool steel instead of conventionally produced material? Why is the recommended hardness important?

Different damage mechanisms
which can occur during blanking or fine-blanking.

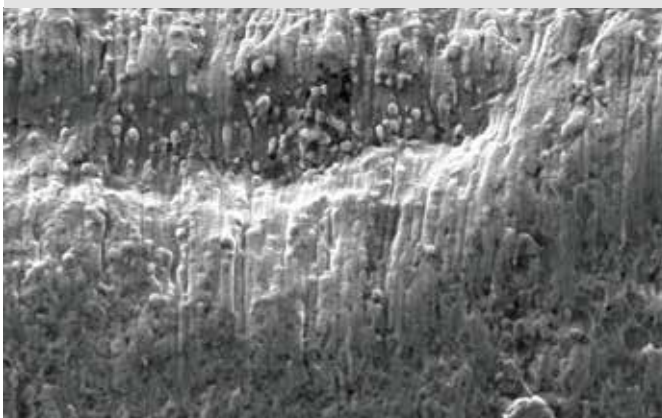
Adhesive wear



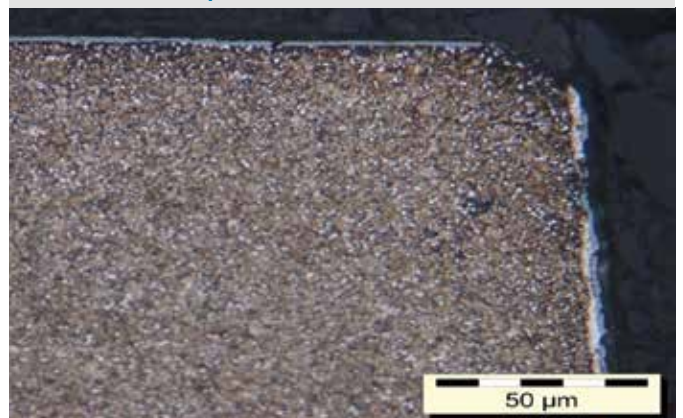
Materials fatigue (chipping)



Abrasive wear



EDM – white layer

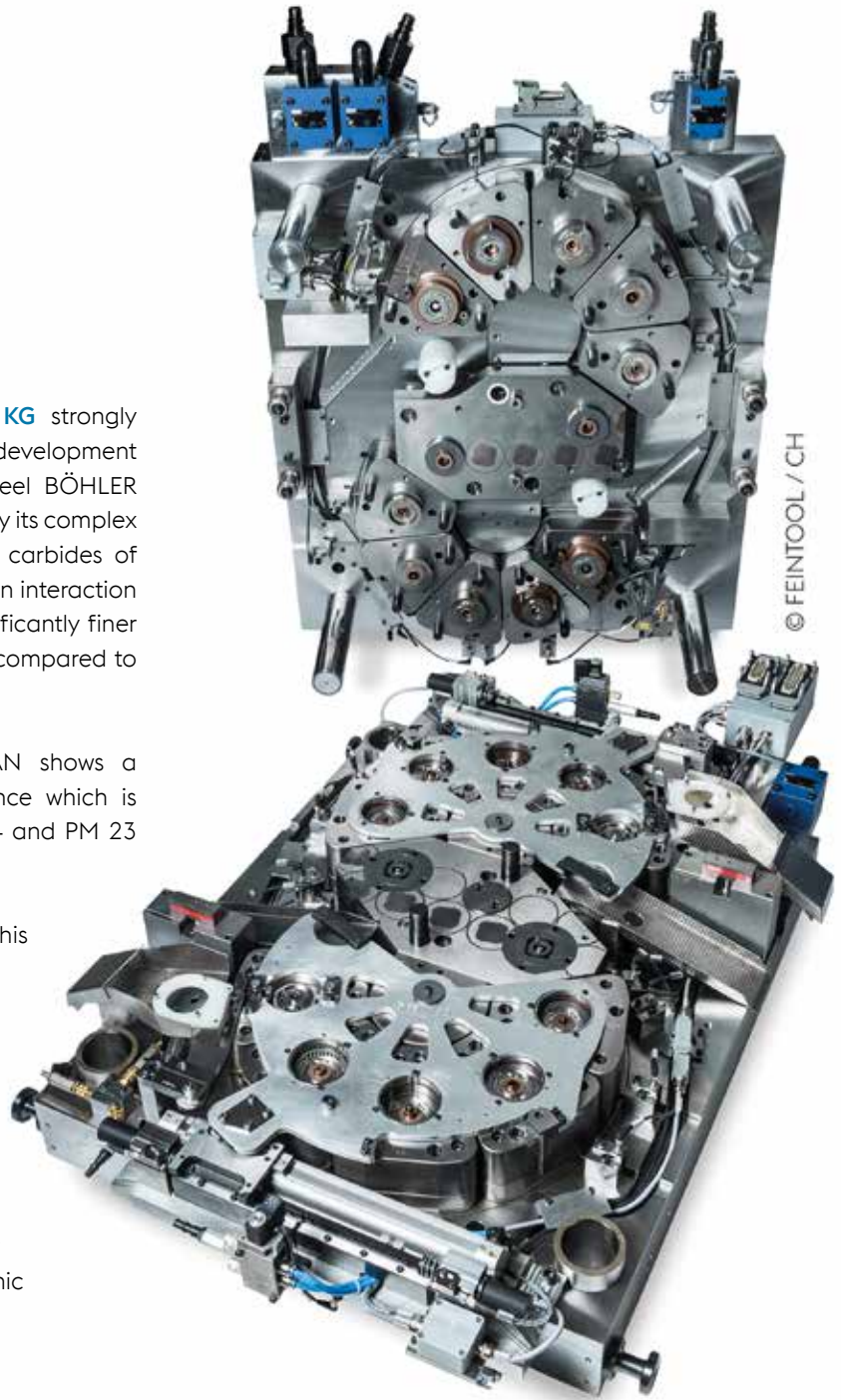


BÖHLER K490 MICROCLEAR

voestalpine BÖHLER Edelstahl GmbH & Co KG strongly demonstrates metallurgical competence with the development of the powder-metallurgical cold work tool steel BÖHLER K490 MICROCLEAR. This steel grade convinces by its complex microstructure with a volume of hard primary carbides of about 10%. The specific composition results in an interaction of several types of primary carbides and a significantly finer microstructure with a reduced carbide spacing compared to PM 23.

Furthermore, the BÖHLER K490 MICROCLEAR shows a toughness at the same level of wear resistance which is doubled when compared to the PM-grades M4 and PM 23 (see info graphic, page 5).

Moreover, the specific chemical composition of this powder-metallurgical steel grade ensures an optimal machining with a high flexibility in heat treatment without substantially changing any other of its mechanical-technological properties. Successful usage in different applications also revealed that the BÖHLER K490 MICROCLEAR also stands for a flexible, fast and efficient tool manufacturing. Therefore, this steel grade combines an excellent wear resistance with high toughness and economic processing at the highest level.



BÖHLER K490
MICROCLEAR®

used for the active parts
for production of
Feintool seat slide adjusters.

HEAT TREATMENT

For an optimal performance of the tooling material BÖHLER K490 MICROCLEAR the proper heat treatment is absolutely necessary, right to the slogan: "only the proper heat treatment leads to optimized results".

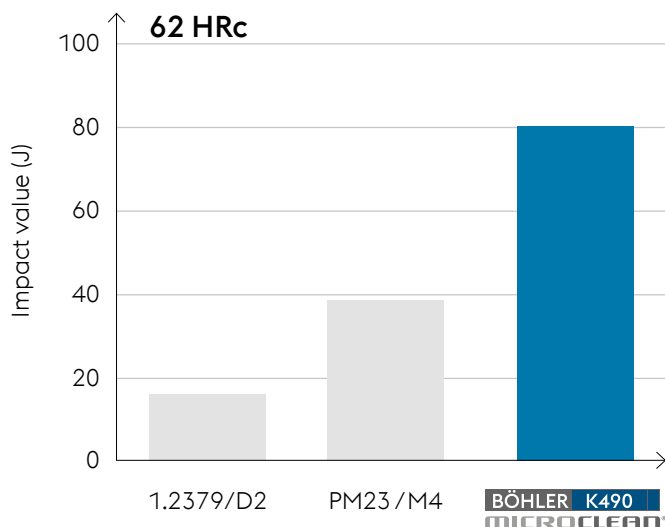
voestalpine BÖHLER Edelstahl GmbH & CoKG recommend a stress relieve treatment at 650 to 700°C after machining. The soaking-time after through- heating is 2 hours, followed by a subsequent slow cooling in the furnace. To achieve the desired working conditions hardening at 1030 to 1080°C has to be done.

Essential in this connection is the exact cooling to room temperature, especially when highest hardness is required. Depending on the requested hardness (58 to 64HRC) multiple tempering in the temperature range 520 to 580°C has to be performed and a slow heating to the tempering temperature immediately after hardening is recommended.

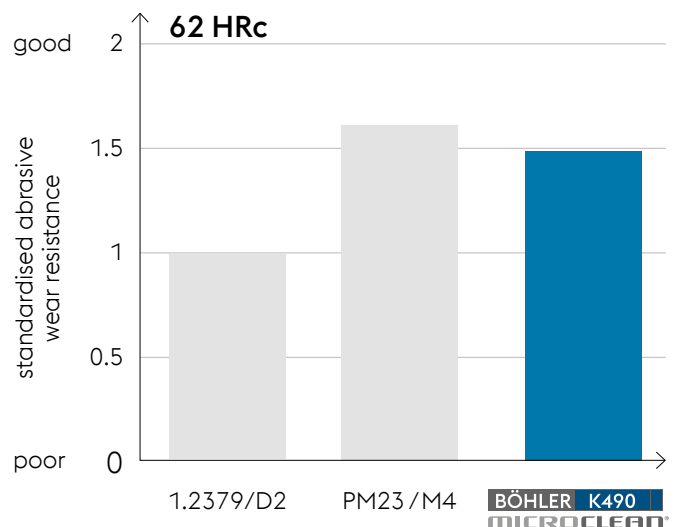
The real potential of a tooling material can be seen in application only. When it comes to performance tests of newly developed steel grades, the Swiss company Feintool Technologie AG has been an innovative and open-minded partner of voestalpine BÖHLER Edelstahl GmbH & CoKG for many years. In this case the BÖHLER K490 MICROCLEAR was used for the active parts for production of seat slide adjusters. The proper heat treatment in combination with tool manufacturing competences of Feintool resulted in outstanding tool lifes. BÖHLER K490 MICROCLEAR is an excellent choice for the challenges in fine blanking applications.

We at voestalpine BÖHLER Edelstahl GmbH & Co KG are convinced that due to its properties profile and further performance tests BÖHLER K490 MICROCLEAR is an excellent choice for other challenging cold forming applications, too.

Impact energy (unnotched)



Abrasive wear resistance



ABOUT THE AUTHORS:

voestalpine Böhler Edelstahl is worldwide one of the leading Special Steel and Special materials supplier. We develop, produce and deliver high speed steels, tool steels and special materials worldwide, to provide our customers with exemplary solutions.



HARALD LEITNER

PRODUCT DEVELOPMENT /
SENIOR EXPERT TOOLSTEEL & HSS

Harald Leitner has over 25 years experience in the field of tooling materials and high speed steels. He holds a degree in material science after his PhD he was a group leader at the Department of Physical Metallurgy and Materials Testing at the Montanuniversität Leoben. In the year 2013 he moved to voestalpine BÖHLER Edelstahl in the leading position of the R&D manager. Since 2018 he is Senior Expert and in charge of product development in the fields on tool steels and high speed steels.

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JOHANNA GECKLE

PRODUCT & KEY ACCOUNT MANAGER
BÖHLER COLD WORK TOOL STEEL

Johanna Geckle studied Economic and Social Science with topic marketing at the Karl-Franzens-University in Graz. 1992 she started her career in the sales department for Tool and High Speed Steels at voestalpine BÖHLER Edelstahl. At that time she successfully coordinated the market introduction of K340 ISODUR. From 1996 up to 2011 she was in charge of the product management for plastic mold steels and for one year for hot work tool steels as well. She significantly characterized the BÖHLER product program of the BÖHLER plastic mold steels. After 15 years she changed her responsibility and has found her new challenge as product & key account manager of the BÖHLER cold work tool steels.

voestalpine BÖHLER Edelstahl has the optimum material for every challenge in the fine blanking industry. Wear resistance, high hardness and compressive strength, paired with good toughness, are the excellent characteristics of BÖHLER cold work and high-speed steels. By choosing BÖHLER steels, especially for highly stressed fine blanking applications, the service life of tools will be greatly extended.

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