HIGH PERFORMANCE MATERIALS FOR HIGH PERFORMANCE TOOLS

SPEED SKILLS

voestalpine BÖHLER Edelstahl GmbH & Co KG is your partner of choice, if you require High Speed Steel that is capable of defining new limits in tool life connected with consistent quality and the passion to go the extra mile.

MICROCLEAN
Powder Metallurgy high performance steels

ISO RAPID
Electro Slag Remelted steels (ESR quality)

CONVENTIONAL HIGH SPEED STEEL
High Speed Steels that are produced with conventional ingot casting.
KUNSTSTOFFFORMENSTÄHLE

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HIGH SPEED STEEL

POWDER METALLURGY
3 QUALITY LEVELS
3 TECHNOLOGIES

BÖHLER HIGH SPEED STEELS

3 QUALITY LEVELS
3 TECHNOLOGIES

Microstructure BÖHLER S600 in ESR quality
PM materials

THE "STANDARD" MATERIAL
FOR ORDINARY STRESS,
NORMAL LEVEL WITH:
- Structural conditions
- Carbide distribution
- Homogeneity
- Individual carbides
- Degree of purity
- Toughness

IMPROVED SERVICE LIFE DUE TO:
- The least possible inclusion content
- Lower micro and macro segregation
- Good homogeneity and a higher degree of purity
- A homogenic structure throughout the entire cross-section and bar length
- Producing larger bar dimensions at a constant carbide distribution
- Uniform dimensional stability
- A broad range of application owing to a high degree of toughness

Electro Slag Remelting
Production

FOR THE HIGHEST DEMANDS:
- Segregation free high performance steel
- The finest carbide distribution
- The highest metallurgical purity
- Isotropic properties
- Maximum wear resistance with a simultaneously higher toughness
- A high degree of hardness
- Very good dimensional stability
- High compressive strength

Powder Metallurgical Production
MICROCLEAN

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**Electro Slag Remelting Production**

**ISO RAPID**

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**Microstructure**

BÖHLER 5600 in ESR quality

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**Conventional Production**

**THE „STANDARD“ MATERIAL FOR ORDINARY STRESS, NORMAL LEVEL WITH:**

- Structural conditions
- Carbide distribution
- Homogeneity
- Individual carbides
- Degree of purity
- Toughness

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**Microstructure**

BÖHLER 5600
BÖHLER HAS IMPROVED THE PRODUCTION PROCESS FOR POWDER METALLURGY STEELS AND TOOL STEELS. MICROCLEAN MATERIALS OF THE 3RD GENERATION WITH IMPROVED PERFORMANCE FEATURES ARE PRODUCED IN KAPFENBERG ON THE MOST MODERN UNIT WORLDWIDE. A WIDE RANGE OF HIGH SPEED STEELS PROVIDES OUR CUSTOMERS WITH A DEFINITIVE COMPETITIVE ADVANTAGE.

Image of the powderstructure
BÖHLER-S390 MICROCLEAN
OUR SPECIALTY

MICROCLEAN®

BÖHLER MICROCLEAN STEELS OFFER YOU THE FOLLOWING BENEFITS:

» Extremely high wear resistance
» The best grindability
» High degree of toughness
» Low isotopic dimensional changes
» Reproducible production sequences
» Better resistance to oscillation
» More resistance to mechanical impacts

Your advantage                      The result
The highest precision parts        Better in productivity
The longest tool service life       Lower unit costs
Predictable tool service life       Greater chances on the market with a greater yield

HIGHEST PRODUCTIVITY

Image of the microstructure
BÖHLER-S390 MICROCLEAN
This range of products shows the master brands of our High Speed Steel. You can quickly and clearly find the most suitable quality for your application.

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Chemical composition in %</th>
<th>Standards</th>
</tr>
</thead>
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CONVENTIONAL HIGH SPEED STEEL

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<tr>
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1) also available in the BHT execution
2) also available with sulphur as S392 MICROCLEAN, S592 MICROCLEAN, S692 MICROCLEAN, S792 MICROCLEAN;
3) BÖHLER Patent
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COMPARISON
OF THE MAJOR
STEEL PROPERTIES

Overview for first orientation. Please contact us for our expertise.
# Comparison of the Major Steel Properties

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<thead>
<tr>
<th>BÖHLER grade</th>
<th>Red hardness</th>
<th>Wear resistance</th>
<th>Toughness</th>
<th>Grindability</th>
<th>Compressive strength</th>
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Overview for first orientation. Please contact us for our expertise.
MAIN SEGMENTS
HIGH-SPEED STEEL: CUTTING

Requirements in the cutting industry

» Reamers
» Taps
» Twist drills
» Broaching tools

» Milling tools at increased cutting speed

Red hardness

WEAR RESISTANCE
COMPRESSION STRENGTH
RED HARDNESS
Applications

- Drilling
- Tapping
- Gear cutting tools
- Broaching and reaming
- End milling
- Sawing
MAIN SEGMENTS
HIGH-SPEED STEEL:
COLD WORK

Requirements in the cold forming sector

- **Boehler S290**
- **Boehler S600**
- **Boehler S630**
- **Boehler S390**
- **Boehler S392**
- **Boehler S790**
- **Boehler K110**
- **Boehler K390**
- **Boehler K490**
- **Boehler K890**

- Wear resistance
- Toughness
Applications

Blanking and fine blanking tools
Extrusion tools
Drawing and deep-drawing tools
Stamping tools
Thread rolling tools
Cold rolls for multiple roller stands
Cold pilger tools
Knives
Powder compaction
Cold massive forming
High Speed Steel is being used more and more for the so-called non-tooling applications and is utilized as a component in several different branches of industry.

This is exactly where voestalpine BÖHLER High Speed Steel succeeds with its ability to deal with compressive strength, making it the ideal material for the automotive industry or for pumps and other such components.

**MAIN SEGMENTS HIGH SPEED STEEL: NON TOOLING APPLICATIONS**
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MAIN SEGMENTS HIGH SPEED STEEL:
NON TOOLING APPLICATIONS

Since this segment has been growing steadily and new and challenging applications are becoming available, this is exactly where we at voestalpine BÖHLER Edelstahl feel particularly at home. Because this is where we can show off our unbeatable product quality, our viability and our receptiveness cutting-edge demands to their best advantage, optimally supporting you with customized solutions.
FLOW OF MATERIAL

**Powder Metallurgical Production**
- Melting
- Atomising
- Filling capsules
- Welding
- HIP

**Conventional Production**
- MELTING ➔ SECONDARY METALLURGY ➔ CASTING
- EAF 50t Electric arc furnace
- VOD
- Ladle furnace
- AOD Converter
- ESR Electroslag remelting process
- Ingot casting (electrodes, ingots)

**Electro Slag Remelting Production**
- ISO RAPID
- CONVENTIONAL HIGH SPEED STEEL
The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.
YOU CAN TRUST OUR SPECIALISTS

YOU’VE GOT THE IDEAS AND WE’VE GOT THE SOLUTIONS. ANY PROBLEM THAT ARISES, ANY CUSTOMER REQUIREMENT AT HAND MEANS NEW ANSWERS TO BE FOUND, FOR OVER 100 YEARS NOW. THIS KNOW-HOW IS AVAILABLE TO YOU, WHETHER AS SUPPORT FOR MATERIALS OR AS APPLICATIONS. TECHNICAL CONSULTING IS OUR SUPREME DISCIPLINE AND YOU AS OUR PARTNER CAN CERTAINLY BENEFIT FROM IT.

Our services include:

- On-going responsibility for quality (from the inquiry to issuing the certificate)
- Technical interface between the customer (sales, marketing, ...) and the production
- Technical request handling
- Technical order processing/inspection/monitoring
- Product certification (issuing certificates)
- Product and process approvals/qualifications
- Continuous product optimization throughout the entire production process
- Technical customer advisory service/ applications engineering
- Technical trainings
- Process optimization and development
- Central coordination of testing activities
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The work program for the voestalpine BÖHLER Edelstahl Research and Development departments has turned to innovative product and process development and is oriented towards efficiently living up to market expectations and fulfilling the ever-changing customer needs.

Efficiently implementing the research and development programs is facilitated by the use and development of simulation programs for computer-assisted material and alloy development, by the mathematic simulation of manufacturing and process steps and by the physical simulation of material behavior during the production process and in components to guarantee best possible benefits for our customers.
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**THE RESEARCH AND DEVELOPMENT PROGRAM IS FOCUSED AMONG OTHER ISSUES ON EXPANDING ON OUR CORE COMPETENCES, ONE OF WHICH IS HIGH SPEED STEEL.**