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MAKE YOUR BUSINESS MORE COMPETITIVE

Plastic injection moulding solutions

voestalpine High Performance Metals GmbH
www.voestalpine.com/hpm

voestalpine
ONE STEP AHEAD.

TOOLING SOLUTIONS THAT STRENGTHEN YOUR COMPETITIVE EDGE

AI GENERATED



As material requirements intensify, cycle times shorten, and sustainability expectations increase, tooling performance becomes a decisive competitive factor.

At voestalpine, our purpose is clear: to make you more competitive. We deliver high performance plastic injection moulding solutions that help you increase productivity, improve reliability, and secure long term profitability – built on deep material expertise and a thorough understanding of real production environments. By working closely with you, we identify the factors that truly limit performance – wear, corrosion, process instability, extensive maintenance, and insufficient tool life. These challenges are transformed into application specific solutions that increase uptime, reduce operational risk, and enable more efficient and predictable production.

By intelligently combining advanced tool steels, additive manufacturing, optimized heat treatment, surface technologies, and global technical support, we help you achieve faster, more stable, and more cost efficient operations. The result is longer tool life, consistent quality, lower total cost of ownership, reduced waste, and a stronger position in highly competitive markets.

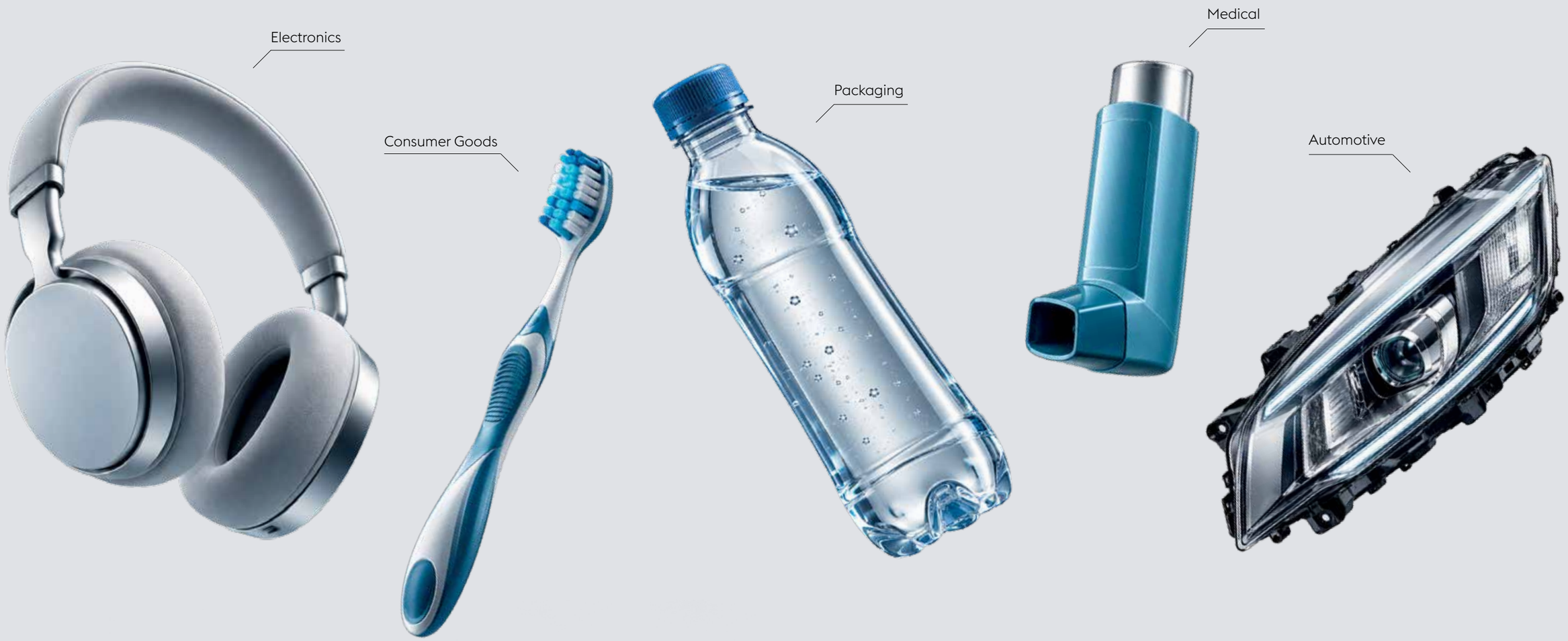
YOUR CHALLENGE. OUR EXPERTISE. ONE SOLUTION – TO MAKE YOU MORE COMPETITIVE.

Learn more about tooling solutions



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INDUSTRY LEADERSHIP



DELIVERING PREMIUM TOOLING SOLUTIONS GLOBALLY

Plastic injection moulding shapes the products we use every day – from automotive parts and smartphones to eyewear and electronics. Behind every high-performance mould is a material built to withstand extreme demands.

Choosing the right tool steel effects:

- **Tool life and reliability**
- **Cycle time and part quality**
- **Surface finish and corrosion resistance**
- **Maintenance frequency and total cost of ownership**



World Class Tool Steel & Specialty Alloys



Heat Treatment Services



Additive Manufacturing



PVD Coating



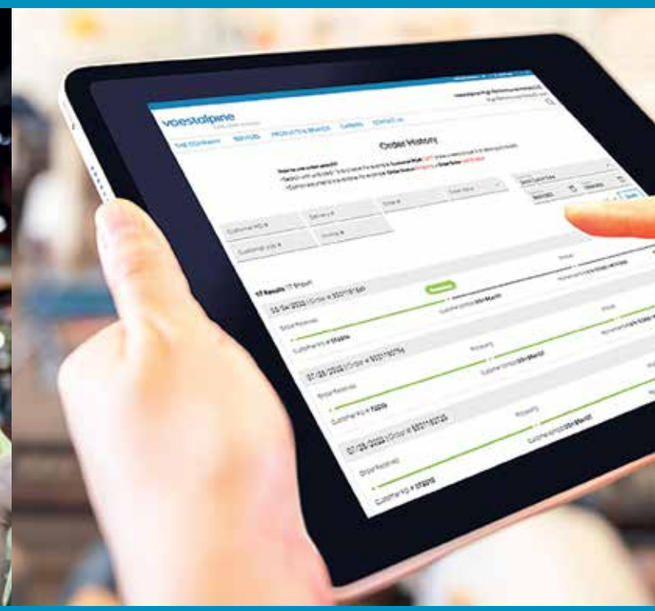
Machining Capabilities



Surface Texturing



Technical Consulting & Advice



Customer Portal & Online Ordering

High Performance Steel and Services for Mould Making Excellence

voestalpine High Performance Metals is a global leader in premium tool steel solutions and advanced steel services. We combine state of the art materials with value adding services such as heat treatment, PVD coatings, and surface texturing, all precisely tailored to the demanding requirements of mould making. The result is reliable performance, exceptional durability, and consistent quality throughout the entire production process.

Expertise That Drives Performance in Plastic Moulding

As specialists in high performance steels for demanding applications, we provide the technical expertise required to meet the highest expectations in plastic moulding. Our experts in heat treatment, machining, polishing, and surface engineering work closely with customers to address application specific challenges and optimize tool performance. Supported by a worldwide network of facilities and specialists, we ensure expert assistance is available wherever and whenever it is needed.

Learn more about industry leadership

DISTINCTIVE THROUGH STRONG BRANDS

BÖHLER, **Uddeholm** and **Villares Metals** represent the backbone of our global production network, each operating state of the art steel mills that combine deep metallurgical tradition with continuous innovation. What unites all three is their pioneering use of advanced technologies such as **Electro Slag Remelting (ESR)**, enabling the production of ultra clean, high performance steels that meet the stringent demands of the plastic moulding industry and other high end tooling applications.

BÖHLER



UDDEHOLM
a voestalpine company



BÖHLER and **Uddeholm** are globally recognized leaders in tool steels, setting industry benchmarks for quality, precision, and sustainability. Their ongoing investments in metallurgy, process control, and environmental responsibility ensure consistent performance and reliability for customers worldwide.

VILLARES METALS
a voestalpine company

Villares Metals complements this expertise as a leading special steel producer in Latin America, with more than eight decades of experience serving demanding applications such as plastic moulds, hot and cold work tools, and high speed steels.



PREMIUM TOOL STEEL PRODUCTION

AIR MELTED TOOL STEELS



Air Melted Production

» Produced with high cleanliness and homogeneity using the electric arc melting process.

REMELTED TOOL STEELS



ESR / PESR Manufacture

» Produced using Electro Slag Refining (ESR) and Pressure Electro Slag Refining (PESR) for steels requiring high level of cleanliness, toughness, and uniformity.
» Produces cleaner, more homogeneous metal. Reduces non-metallic inclusions.
» Improves mechanical properties and surface finish.

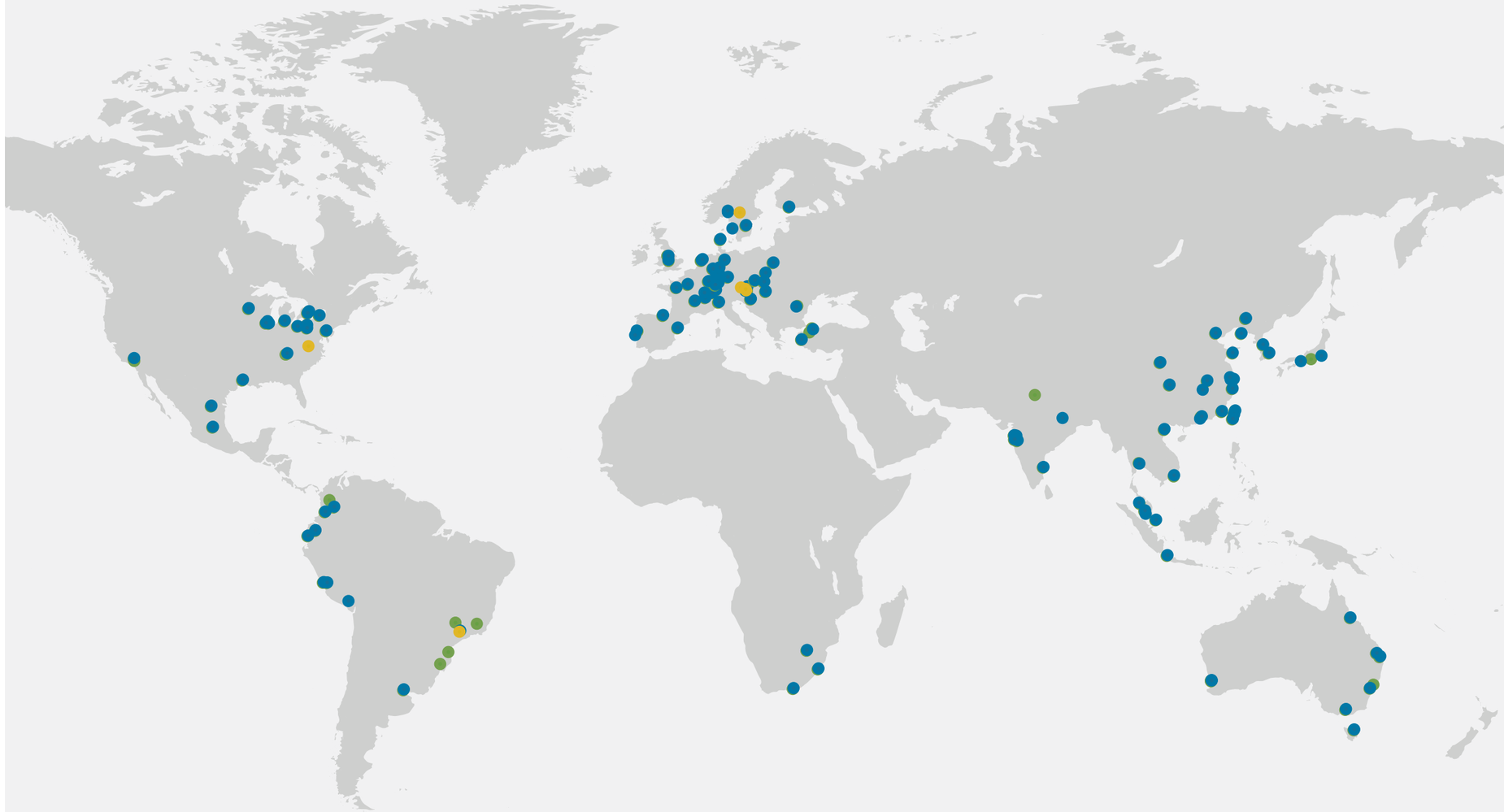
POWDER METALLURGICAL TOOL STEELS



Powder Metallurgical Production

» Produced using powder metallurgy manufacturing techniques for high alloyed steels requiring optimum homogeneity, hardness, microstructure, and toughness.

OUR GLOBAL PRESENCE



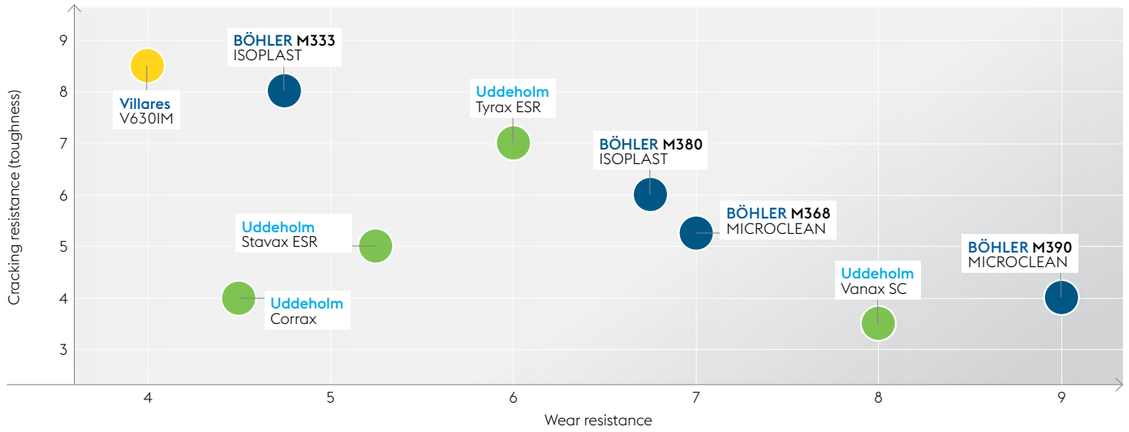
Learn more about voestalpine HPM

OUR PREMIUM MATERIALS

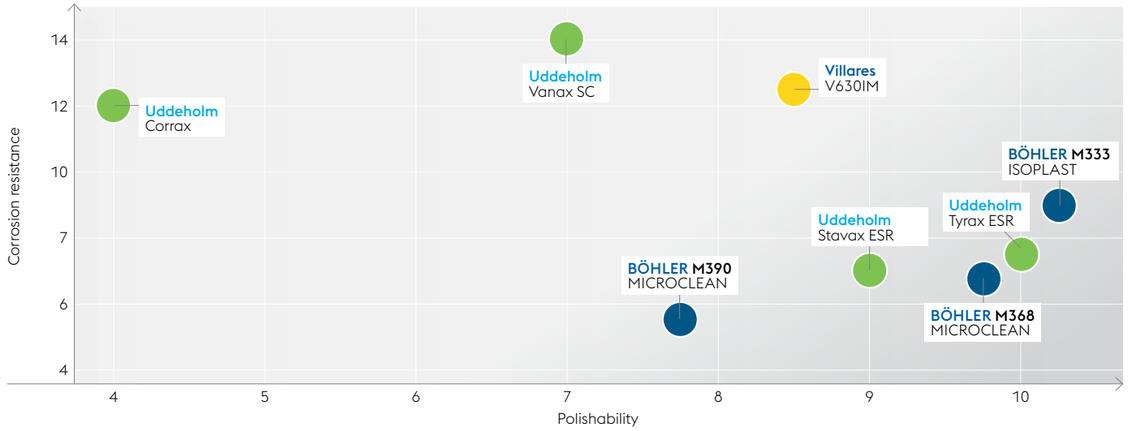
	Grade	Melt Process	Cracking resistance	Polishability	Wear resistance	Corrosion resistance
Corrosion Resistant	Uddeholm Tyrax ESR	PESR	★★★½☆	★★★★★	★★★☆☆	★★★½☆
	Uddeholm Stavax ESR **BÖHLER M310** ISOPLAST Villares VP420IM	(P)ESR	★★½☆☆	★★★★½	★★★☆☆	★★★½☆
	BÖHLER M333 ISOPLAST	PESR	★★★★☆	★★★★★	★★½☆☆	★★★★★
	Uddeholm Mirrax ESR	ESR	★★★☆☆	★★★★☆	★★½☆☆	★★★★½
	Uddeholm Mirrax 40	ESR	★★★☆☆	★★★★☆	★★½☆☆	★★★☆☆
	BÖHLER M390 MICROCLEAN	Powder Metallurgical	★★☆☆☆	★★★★☆	★★★★½	★★★☆☆
	Uddeholm Elmax Superclean	Powder Metallurgical	★½☆☆☆	★★★★☆	★★★★½	★★★☆☆
	BÖHLER M340 ISOPLAST	(P)ESR	★½☆☆☆	★★★½☆	★★★½☆	★★★½☆
	BÖHLER M380 ISOPLAST	PESR	★★★☆☆	★★★★★	★★★½☆	★★★½☆
	BÖHLER M368 MICROCLEAN	Powder Metallurgical	★★½☆☆	★★★★★	★★★½☆	★★★½☆
	Uddeholm Vanax Superclean	Powder Metallurgical	★★☆☆☆	★★★½☆	★★★★☆	★★★★★★★
	Villares V630IM	ESR	★★★★½	★★★★½	★★☆☆☆	★★★★★★½
	Uddeholm Corrax	Conventional	★★☆☆☆	★★☆☆☆	★★½☆☆	★★★★★★
	BÖHLER M303HH	Conventional	★★★★☆	★★★½☆	★★☆☆☆	★★★★½
	Villares V2316MOD	Conventional	★★★★☆	★★★★☆	★★☆☆☆	★★★★½
	Villares VIMCOR	Conventional	★★☆☆☆	★★☆☆☆	½☆☆☆☆	★★★☆☆
	BÖHLER M315 RoyAlloy	Conventional	★★☆☆☆	★★☆☆☆	★☆☆☆☆	★★★☆☆
Non-Corrosion Resistant	**BÖHLER K390** MICROCLEAN	Powder Metallurgical	★★☆☆☆	★★★½☆	★★★★★	–
	Uddeholm Vanadis 4 Extra	Powder Metallurgical	★★☆☆☆	★★★½☆	★★★★½	–
	Uddeholm Caldie	PESR	★★½☆☆	★★★★★	★★★½☆	–
	BÖHLER K888 MATRIX	Powder Metallurgical	★★★☆☆	★★★★☆	★★★½☆	–
	Villares VPATLAS	Conventional	★★★★☆	★★★½☆	★☆☆☆☆	–
	Uddeholm Unimax **BÖHLER W360** Villares VTM Plus	(P)ESR	★★★½☆	★★★★★	★★★☆☆	–
	Uddeholm Orvar Supreme **BÖHLER W302** ISOBLOC Villares VH13IM	(P)ESR	★★★½☆	★★★★½	★★½☆☆	–
	Villares Vector 280	Conventional	★★★½☆	★★☆☆☆	½☆☆☆☆	–
	Villares Tenax 300IM	ESR	★★★★½	★★★★★	★★½☆☆	–
	BÖHLER W400 VMR	VAR	★★★★★	★★★★★	★★☆☆☆	–
	BÖHLER M261	Conventional	★★★½☆	★★★☆☆	★½☆☆☆	–
	BÖHLER M238HH	Conventional	★★★★☆	★★★½☆	★☆☆☆☆	–
	Villares VP20TS	Conventional	★★★★★	★★★☆☆	★☆☆☆☆	–
	Villares VP20ISO	Conventional	★★★★☆	★★★½☆	½☆☆☆☆	–
Copper Alloys	Moldmax HH	Conventional	★½☆☆☆	★★★½☆	★☆☆☆☆	★★★★☆
	Moldmax V	Conventional	★½☆☆☆	★★½☆☆	★☆☆☆☆	★★★☆☆

Uddeholm BÖHLER Villares

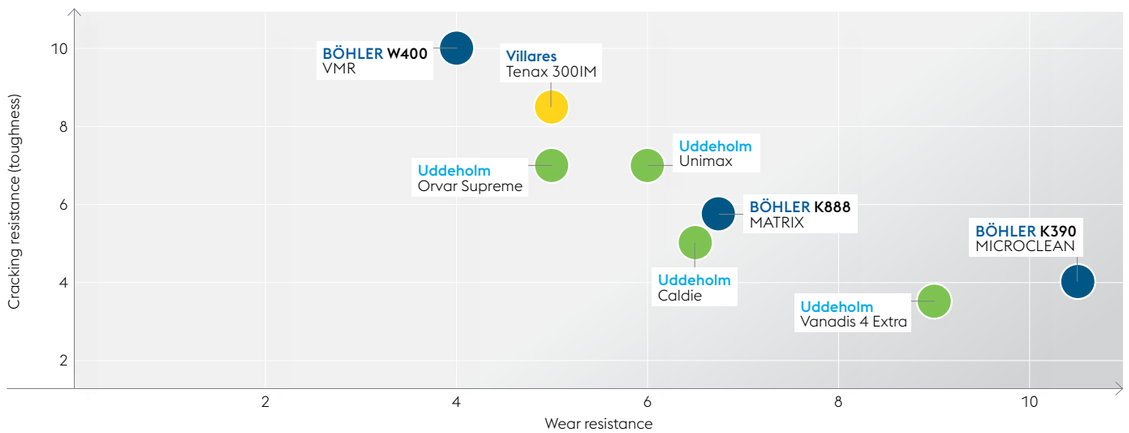
Cracking resistance vs. wear resistance, corrosion resistant tool steels



Polishability vs. corrosion resistance, corrosion resistant tool steels



Wear vs. cracking resistance, non-corrosion resistant tool steels



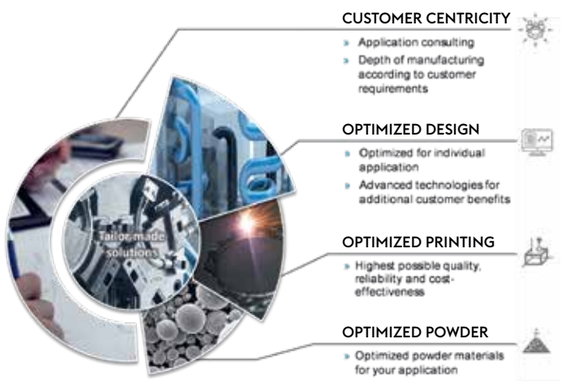
ADDITIVE MANUFACTURING
CORROSION RESISTANT TOOL STEELS

Additive manufacturing offers increased freedom in the design of plastic injection mould inserts. The interaction of powder material, process parameters and heat treatment significantly determines the resulting component properties and the performance of the insert in the injection moulding process.

For decades, we have been recognized as a global leader for high-performance tool steels for the plastic injection moulding (PIM) industry. As a result, we understand the unique production challenges our customers face. Shorter cooling times compared to conventional methods are not our only design priority. We optimize our inserts across multiple factors, including uniform wall cavity temperatures, which significantly reduces component distortion in critical areas, and further enhances the service life of the tool insert.

Customer intimacy and technical understanding are essential factors when developing successful additive manufacturing solutions, as a result, our attention to detail goes far beyond 3D printing.

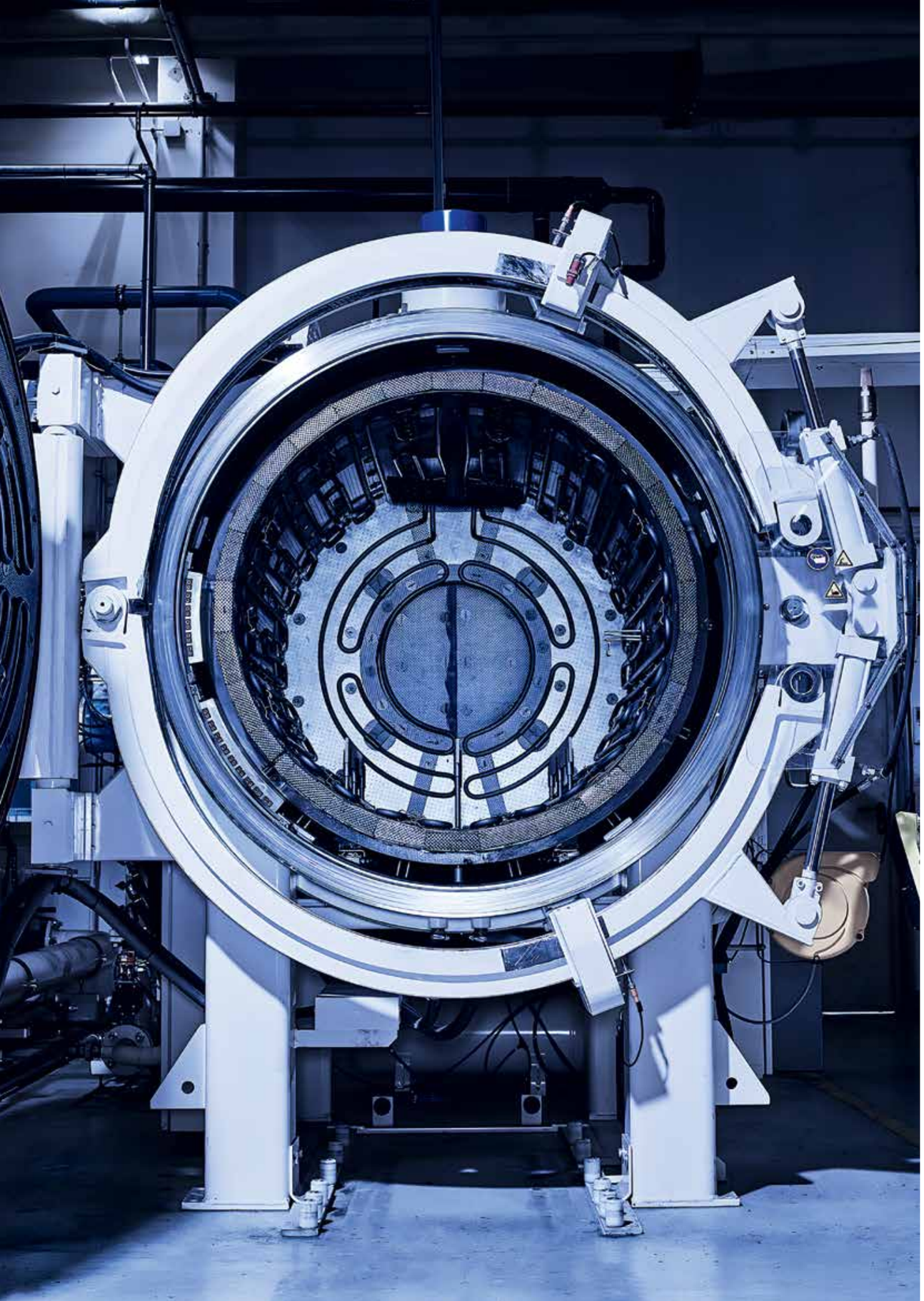
Working together with our customers, using our state-of-the-art additive manufacturing and materials know how, we develop tailor-made solutions optimized specifically for the plastic injection moulding industry.



Designed for tooling applications where corrosion resistance is essential.

Grade	Achievable hardness	Corrosion resistance	Wear resistance	Polishability	Impact toughness
1.2083 ESR *	52 HRC	★★★☆☆	★★★☆☆	★★★☆☆	–
Uddeholm Corrax for AM	50 HRC	★★★★★	★★★☆☆	★★★★☆	★★★★☆
Uddeholm Tyrax for AM	55** (58) HRC	★★★★☆	★★★★★	★★★★★	★★★★★
BÖHLER M789 AMPO	52 HRC	★★★★★	★★★☆☆	★★★★☆	★★★★☆

* bar material, for comparison purposes only ** tempered



Learn more about
heat treatment

HEAT TREATMENT

HEAT TREATMENT IS A CRITICAL PROCESS IN THE MANUFACTURING OF PLASTIC INJECTION MOULDS.

WHY HEAT TREATMENT?

In mould making, the primary objectives of heat treatment are

- Increasing surface hardness for wear resistance and longer mould life
- Relieving internal stresses introduced during machining
- Improving toughness to prevent cracking or chipping under load
- Stabilizing dimensions before final finishing and assembly
- Enhancing corrosion resistance when used with stainless tool steels

PROPERLY HEAT-TREATED MOULDS SHOW ...

- Reduced wear and maintenance requirements
- Better part quality and surface finish
- Longer tool life cycles
- Improved consistency during high-volume production
- Enhanced resistance to stress cracking and deformation

ADVANCED HEAT TREATMENT METHODS:

Vacuum Heat Treatment

Plasma / Gas Nitriding

Cryogenic Treatment

Induction Hardening



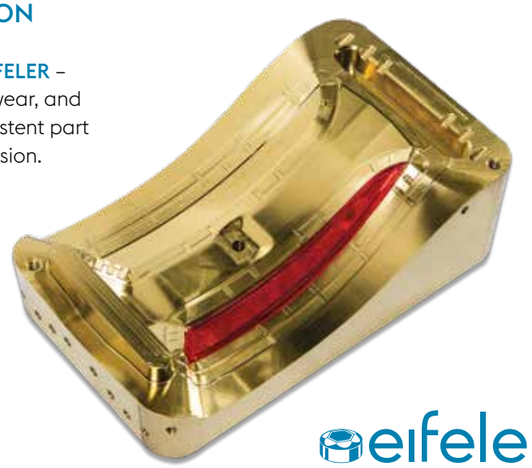
PVD COATING

SMOOTH DEMOULDING, SUPERIOR PROTECTION

HIGH-PERFORMANCE PVD COATING SOLUTIONS FROM EIFELER – the voestalpine coating brand – reduce polymer adhesion, wear, and corrosion, delivering superior demolding performance, consistent part quality, and extended tool life for injection moulds and extrusion.

WITH EIFELER PVD COATING YOU CAN PROTECT YOUR:

- Mould cavities and cores
- Slides, lifters, core pulls, rotating cores
- Core pins
- Ejector pins, sleeves and blades
- Hot-runner valve gate pins
- Sprue and gates inserts



SOLVING YOUR CHALLENGES

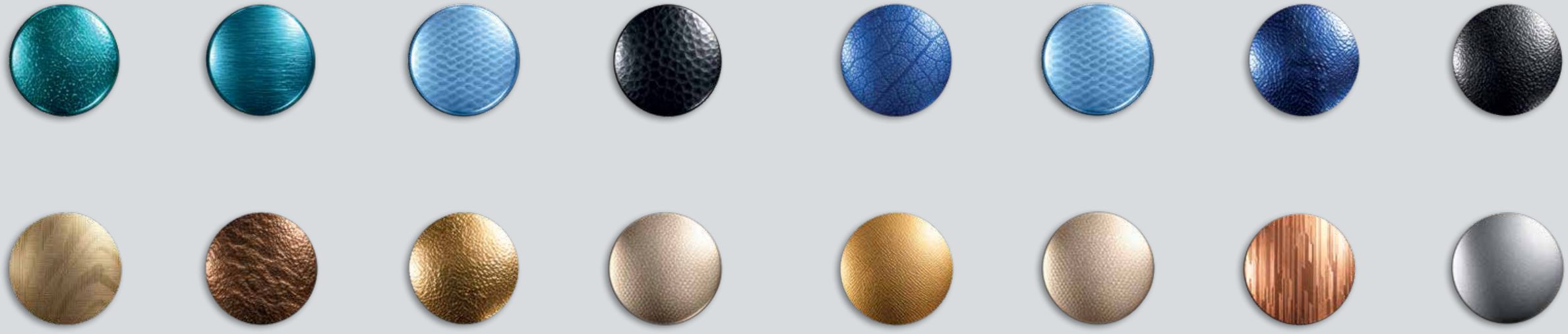
Sticking
Solution: Low-coefficient of friction and surface energy of the thin films, combined with tailored surface finishes, enhance demoulding, reduce ejection forces, minimize scrap rates.

Tool Wear
Solution: Hard, dense coatings on cavities and cores resist abrasive and adhesive wear from polymers, fillers, and additives, extending tool life, reducing maintenance and scrap.

Corrosion
Solution: Multilayer PVD coatings enhance mold surface protection against corrosion, reducing the impact of aggressive polymers, additives, and processing by-products while extending tool life.

OUR PVD COATINGS FOR PLASTICS

CARBON-X®	Extremely low coefficient of friction for superior release and reduced wear in demanding moulding applications.
CHROME-X®	Preserves mirror polish and fine textures to deliver consistent first-shot gloss and minimal adhesion on decorative parts.
SUCASLIDE-T	Low friction, reduced adhesive wear, excellent sliding properties, protecting both mating surface.
CrN/CrCN	Corrosion-resistant, layers that protect against chemical attack.
TIGRAL	Exceptional hardness and wear resistance protect critical mold surfaces from abrasive polymer formulations, improving durability and reducing repair frequency.
ZrN/ZrCN	High hardness, superior tribological behavior, and outstanding resistance to corrosion and abrasive wear,ensuring extended tool life.
TiN-Ultrafine	Smooth & dense coating, excellent scratch protection across a wide range of resins, while preserving mirror-finish and textured mould surfaces.



SURFACE TEXTURING

THE PERFECT TEXTURE FOR EVERY SURFACE

Part of the voestalpine High Performance Metals Division, Eschmann Textures' core competence is in developing and manufacturing innovative solutions for customers in decorative plastic surfaces – from the initial idea to production realization – across the globe.

SURFACE SPECIALIST WITHIN A POWERFUL GROUP

» CREATE*x*
» PROTO*tex*
» CLASS*Itex*
» LASER*tex*
» CERA*tex*
» CO*Atex*

ESCHMANN TEXTURES

SOLVING YOUR CHALLENGES

Part Weight & Foam Streaks

Solution: CERAtex – Breakthrough for thermoplastic foam injection moulding, lightweight & unique grain design.

Moulding Quality Issues: Gloss Spots, Micro-Ghosting, Flow-lines

Solution: COAtex – Optimised injection moulding production coatings.

Adhesion Issues

Solution: CLASSItex – technical grain solutions.

... and many more – we are happy to advise you.

OUR TECHNOLOGIES FOR PLASTIC INJECTION MOULDING

CLASSItex	Etching technology is a traditional craftsmanship used to apply textures to metal surfaces by means of chemical reaction.
LASERtex	New horizons for texture applications, where a laser beam removes layer by layer from the tool surface of a plastic injection die. This produces multi-layered surface textures.
CERAtex	Advanced surface engineering solution that significantly expands design possibilities and breaks new ground in processing capability for plastic injection moulding.
COAtex	Innovative coatings for many areas of application, like reducing process-related problems in the production of plastics such as "tiger striping", gloss spots or micro-ghosting, significantly reducing gloss to a nearly lacquer-like finish without changing the surface's basic texture.

Learn more about Eschmann Textures

TOWARDS A MORE SUSTAINABLE FUTURE

SOLUTIONS FOR SUSTAINABLE PERFORMANCE

In today's evolving plastics industry, sustainability isn't just a trend – it's a competitive advantage. That's why our tooling solutions are designed to deliver maximum performance with minimum environmental footprint. Engineered for every injection, our tooling solution delivers stable part quality, less maintenance downtime, and a process designed for long-term environmental responsibility. Every shot becomes a dual win – advancing your output while advancing sustainability.

We deeply understand the unique challenges faced by the plastic moulding industry. Drawing on this insight, we've engineered our tool steel materials to deliver exceptional performance through key features such as:

- **Corrosion resistance**
- **Wear resistance**
- **High polishability**
- **Outstanding toughness**

50%

Reducing **CO_2 emissions by 50 %** in our operations by 2029 (Scope 1 & 2)

90%

Using **over 90% of recycled** scrap and secondary raw materials in our production processes by 2030

25%

Contributing to the voestalpine group target of reducing **CO_2 emissions by 25% in our supply chain** by 2029 (Scope 3)

THE LATEST TECHNOLOGY AND HIGHEST ENVIRONMENTAL STANDARDS

At our production sites – in Hagfors in Sweden, Sumaré in Brasil, and Kapfenberg as well Mürzzuschlag in Austria – we set new standards for production quality, process reproducibility, and environmental impact. In addition to using resources responsibly, we are constantly implementing new measures for environmentally friendly processes and production.

Production processes focusing on improving sustainability and decarbonisation have been an essential part of our environmental philosophy for decades. With our integration of products, services and technical advisory, and sustainable business solutions, we create a profound impact for our customers.

HIGHEST PRODUCTION QUALITY

As the world's leading manufacturer of tool steel, our high-performance materials are specially developed for the tooling industry. Safe, efficient production lines with minimum downtime are of great importance in the injection moulding industry around the world. Our state-of-the-art production processes such as protective gas electroslag remelting or powder metallurgy enable us to fulfil the highest quality standards.

Through our unique service network, we create long-lasting performance that meets the needs of our planet and future generations. We work closely with our customers on these demanding applications. Leading by example, we enable our customers to engage in sustainable initiatives while also driving our suppliers and partners to be at the cutting edge of essential transformation processes for tomorrow.

Together, we inSPire the change in our industries by always thinking and walking one step ahead.

Learn more about inSPire

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. Measurement data are laboratory values and can deviate from practical analyses.

voestalpine High Performance Metals International GmbH
DC Tower, Donau-City-Straße 7
1220 Vienna, Austria
T. +43/50304/30-23100
E. office.hpm_international@voestalpine.com
www.voestalpine.com/hpm

voestalpine
ONE STEP AHEAD.

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