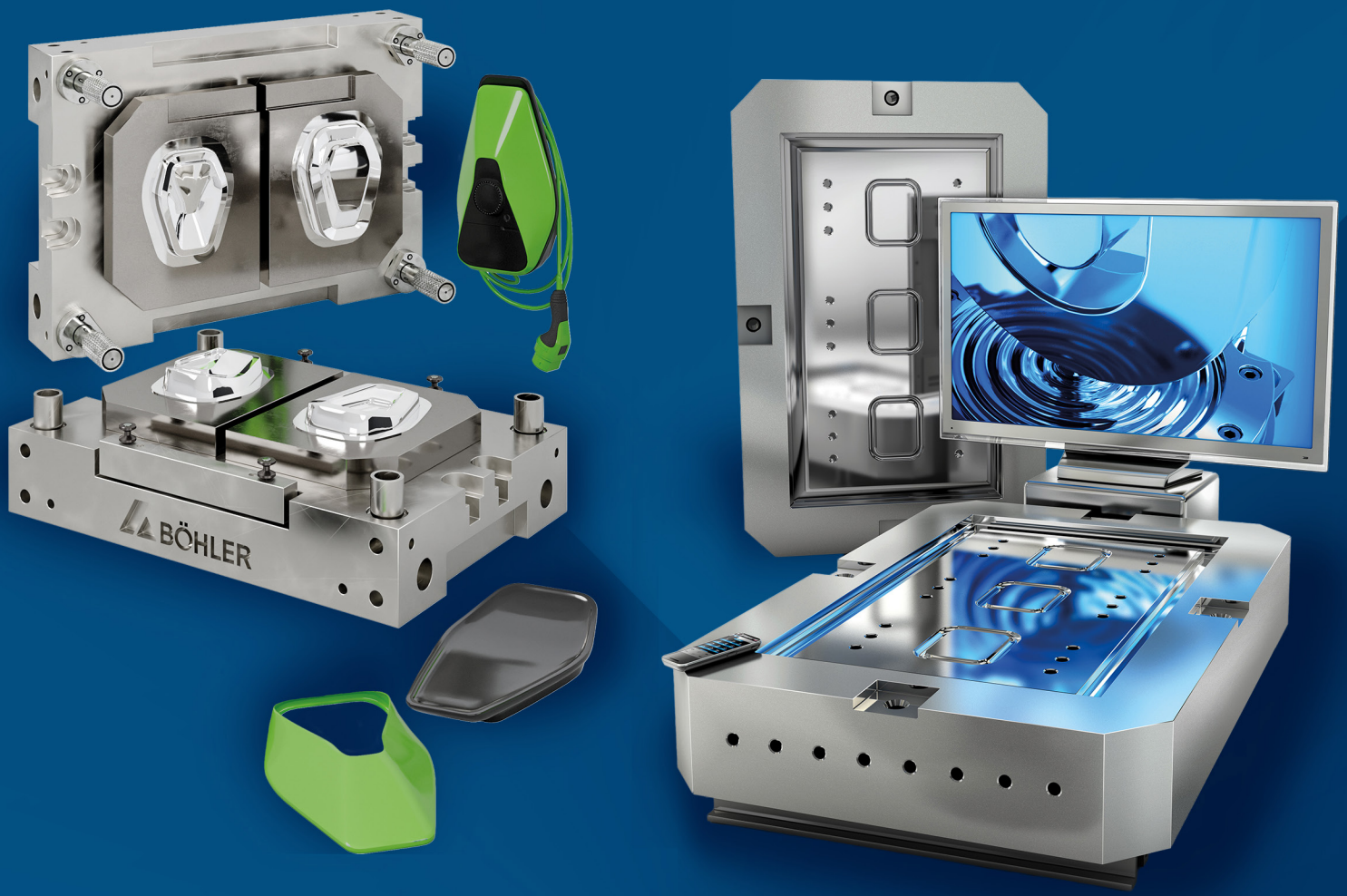


PLASTIC INJECTION MOLDING

Products and Services for Plastic Tooling

voestalpine High Performance Metals North America

voestalpine
ONE STEP AHEAD.

INDUSTRY LEADERSHIP

Delivering Premium Tooling Solutions Across North America

At voestalpine High Performance Metals, we are a trusted global leader in premium tooling solutions, delivering unmatched expertise and innovation to the North American market. As part of the voestalpine Group, we proudly represent the legacy of BÖHLER and Uddeholm—two metallurgical pioneers with centuries of history supporting toolmakers around the world. Our offering spans the full spectrum of tooling applications, including plastics processing, hot work, and cold work. We supply the industries finest tool steels, advanced eifeler PVD coatings, precision machining and value-added services, and expert heat treatment support through our Heat Treatment Alliance. Whether it's injection molding, die casting, forging, stamping, or extrusion, our solutions are engineered to meet the toughest demands of modern manufacturing.

TECHNICAL SUPPORT FOR PLASTIC INJECTION MOLD TOOLING

TECHNICAL SUPPORT

As a leader in specialty steels for demanding applications, voestalpine provides the technical expertise required to meet your performance expectations. Our experts in heat treatment, machining, polishing, and surface treatment are always available to assist with application issues or questions. In addition to this support, we can call on our world-wide resources to be there when and where we are needed.

WHAT MAKES AN EXCELLENT MOLD STEEL?

- Wear resistance under abrasive or fiber-filled plastics
- Corrosion resistance when processing aggressive plastic like PVC
- High toughness and fracture resistance for reliable performance
- Hardness at elevated temperatures (up to ~400°C)
- Excellent polishability for optical and high-gloss parts
- Thermal conductivity to optimize cooling time

MATERIAL PROPERTIES

Injection molds are complex and expensive tools. Choosing the right tool steel effects:

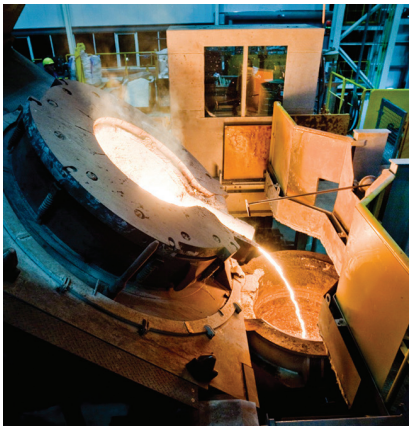
- Tool life and reliability
- Cycle time and part quality
- Surface finish and corrosion resistance
- Maintenance frequency and total cost of ownership

CONTACT US TO DISCUSS YOUR APPLICATION

PREMIUM TOOL STEEL PRODUCTION

BÖHLER and Uddeholm, are globally recognized for their cutting-edge steel mills that blend tradition with innovation. What sets them apart is their pioneering use of advanced metallurgical technologies like Electro-Slag Remelting (ESR), which ensures ultra-clean, high-performance steels essential for industries such as aerospace, automotive, and medical tools. BÖHLER's state-of-the-art facility in Kapfenberg, Austria, hailed as the most modern special steel plant in the world exemplifies their commitment to digitalization, energy efficiency, and sustainability.

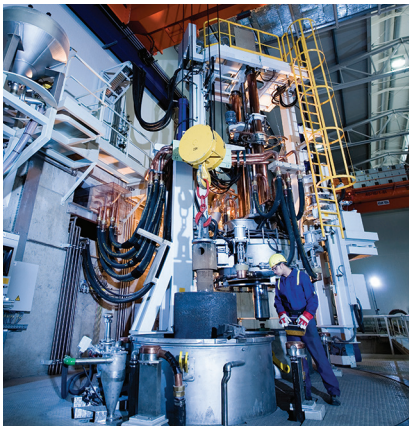
Together, these companies lead the global market in tool and high-speed steels, offering unmatched quality, precision, and environmental responsibility.



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.

P.M. (POWDER METALLURGICAL) STEELS

Powder Metallurgical Production

Produced using Powder Metallurgy Manufacturing Techniques for high alloyed steels requiring optimum homogeneity, hardness, micro-structure, and toughness.

OUR PLASTIC INJECTION MOLDING MATERIALS

STAINLESS STEELS

	Standard Reference	Melt Process	Description
Uddeholm Tyrax® ESR	Proprietary Grade	PESR	Improved stainless steel for plastic materials; combines best in class corrosion, toughness, polishability and wear resistance. Matching processing TIG and MIG weld rod available.
Uddeholm Stavax® ESR	420 Modified SS	PESR	Improved stainless steel with very good corrosion resistance and high polishability. Matching TIG and Laser weld rod available.
BÖHLER M310 ISOPLAST	Improved 420 ESR	ESR	Advanced martensitic stainless Cr steel with improved wear resistance and homogeneity.
BÖHLER M333 ISOPLAST	Modified 420 PESR	PESR	Corrosion- resistant, martensitic plastic mold steel with excellent polishability, approved for food and beverage contact.
Uddeholm MIRRAX® 40	400 Series SS, PESR	ESR	Prehardened stainless insert steel with good machinability and resistance to deformation, ~40 HRC. Matching TIG, MIG and Laser weld rod available.
BÖHLER M390 MICROCLEAN	Proprietary Grade	Powder Metallurgical	Martensitic Cr steel with good corrosion resistance and very high wear resistance, approved for food and beverage contact.
RoyAlloy®	Modified 400 Series DIN 1.2095	Conventional	Prehardened ~400SS series with excellent machinability and stability, 30-34 HRC.
Uddeholm CORRAX®	Precipitation Hardening Stainless Steel	Conventional	Precipitation hardening mold steel with excellent corrosion resistance, hardens to 50 HRC. Matching TIG weld rod available.

NON STAINLESS STEELS

	Standard Reference	Melt Process	Description
BÖHLER W360 ISOBLOC	Proprietary Grade	ESR	Versatile high-hardness tool steel for glass fiber reinforced plastics.
Uddeholm Caldie®	Proprietary Grade	PESR	Enhanced quality for short and medium run tooling in applications where high chipping resistance and compressive strength is required. Matching TIG weld rod available.
BÖHLER W400 VMR	AISI H11	VAR	Vacuum remelted 5% Cr steel capable of reaching extremely high toughness values and exhibiting outstanding polishability.
P1FM Holder	Modified 4130	Conventional	Low alloy holder steel with exceptional machinability and good toughness.
AISI S7 MQ	AISI S7 MQ	Conventional	Mold Quality S7 alloy tool steel with combination of machinability, toughness, easy heat treatment and minimal distortion.
Superior H13	Superior H13 ESR	ESR	Very good gross cracking and heat checking resistance, Charpy V-notch toughness 10 ft-lb min, 44-46 HRC.

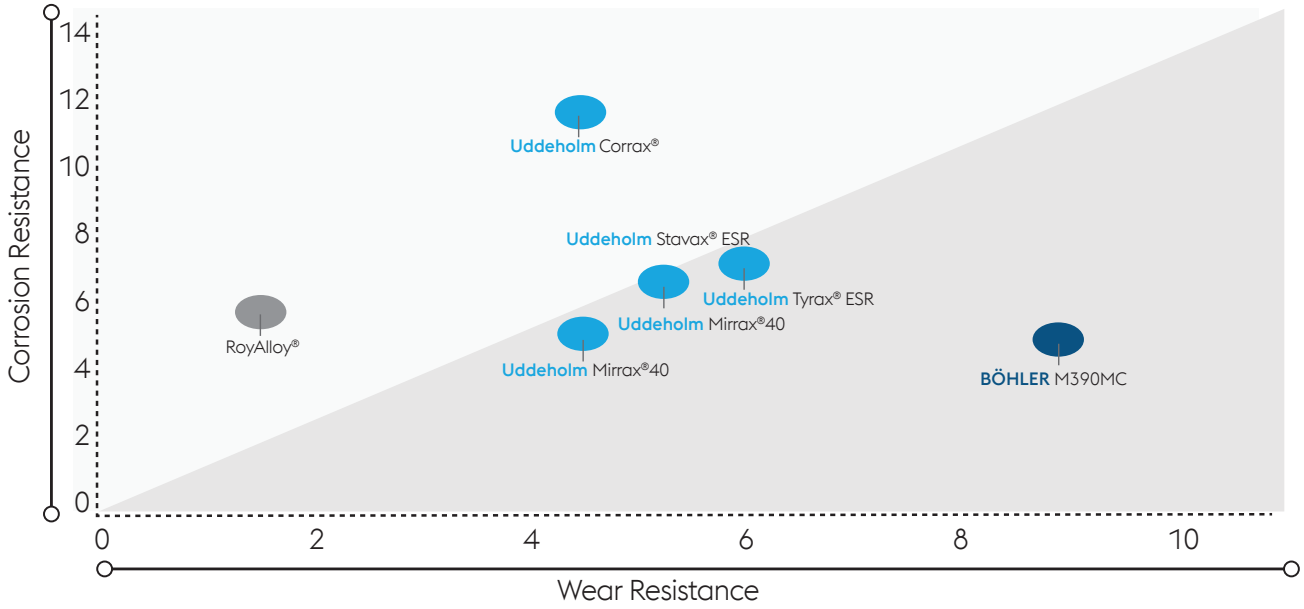
COPPER ALLOYS

	Standard Reference	Melt Process	Description
MOLDMAX HH®	-	Conventional	This copper alloy has a hardness and strength comparable with standard tool steels but its thermal conductivity is four to six times higher.
MOLDMAX LH®	-	Conventional	Copper mold alloy with hardness and strength comparable to AISI P20 tool steel and a thermal conductivity 5 times higher.
MOLDMAX XL®	-	Conventional	High strength copper mold alloy available in sections as large as 12" thick.
MOLDMAX V®	-	Conventional	High conductivity, moderately high strength copper nickel silicon chromium alloy.

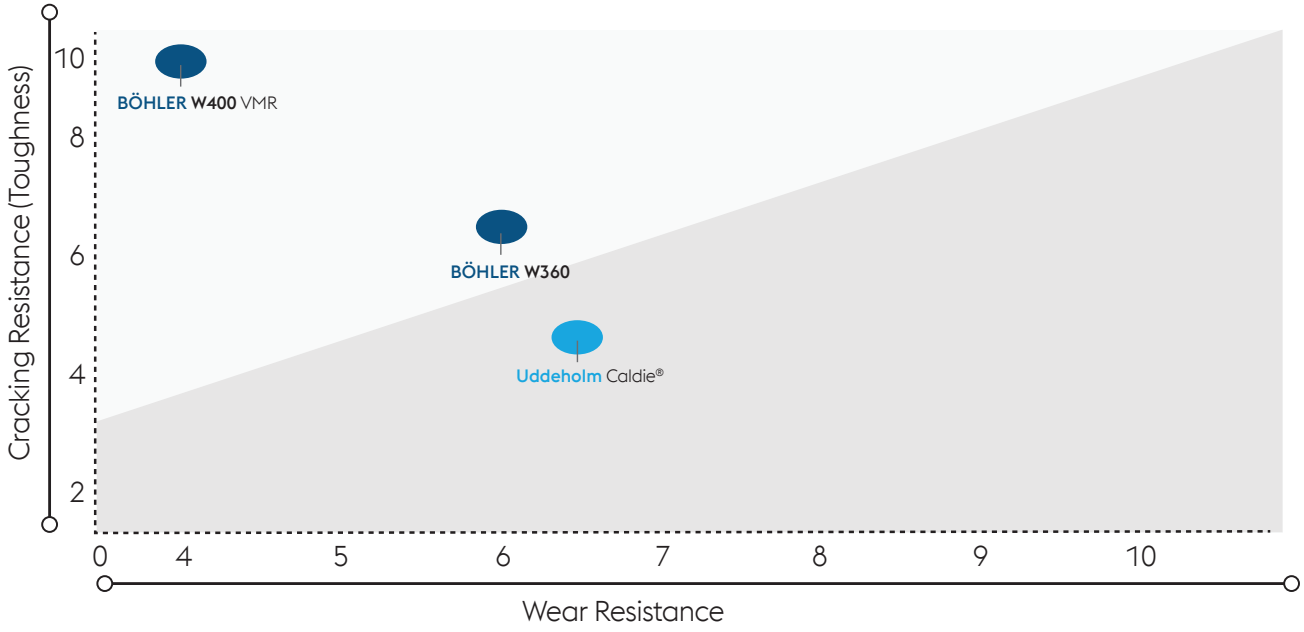
ALUMINUM

	Standard Reference	Melt Process	Description
ACP 5080P	-	Conventional	Excellent wear resistance, high toughness
ACP5080R	-	Conventional	Excellent wear resistance, high toughness
6061-T651	-	Conventional	High machinability, high corrosion resistance
7075-T651	-	Conventional	Excellent corrosion resistance, high toughness
QC-10	-	Conventional	High corrosion resistance, high toughness
Duramold- 2	-	Conventional	Good wear resistance

STAINLESS STEELS



NON STAINLESS STEELS



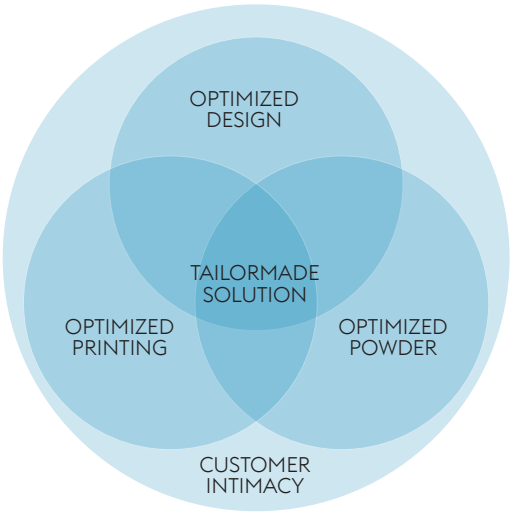
ADDITIVE MANUFACTURING

THE NEXT DIMENSION IN TOOLING

For decades we have worked alongside our customers developing high performance tool steels and solutions for the plastic injection molding industry. As a result, we understand the unique production challenges our customers face.

Working together with our customers, using our state-of the-art additive manufacturing (AM) and materials know how, we develop tailor-made AM solutions optimized specifically for each application.

Your trusted AM partner



Three-Pillar Approach: Optimized Powder, Design and Printing

OPTIMIZED DESIGN

Unique tools require unique solutions. We support our customers through a detailed consultation process to develop the right solution for the right application.

Supporting the manufacturing process from initial concept through to functional parts. Where needed our AM engineers can help our customers re-design tools according to the exact requirements of their application. Our data driven approach to cooling design analyses, processing parameters and mechanical loads allows us to develop detailed computer models of the customer process. This method of optimizing thermal management is essential to ensure the right balance between efficient cooling and the mechanical performance of the tool.

This process goes far beyond regular conformal cooling channel design. We provide you with optimized cooling performance.

SURFACE TREATMENT
PVD COATINGS

eifeler is the voestalpine brand for advanced PVD and DLC coating solutions, trusted by manufacturers and end users across a wide range of industries. In the Plastic Injection Molding industry, eifeler offers premium solutions including CARBON®-X DLC, TiN ultrafine, TiCN ultrafine, and CHROME-X®—to reduce friction, prevent plastic adhesion, and extend mold life, among other benefits

COATING BENEFITS

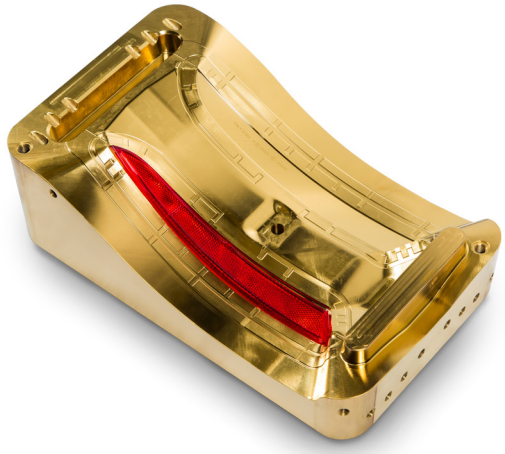
- High lubricity
- High hardness
- Protection against corrosion
- Protection against heat
- Improves plastic flow
- Prevents sticking
- Improve mold release/part ejection
- Protection against gas venting issues
- Preserve surface finish
- Prevents galling and preserves delicate shut-offs
- Increased tool life, reduction in wastage resulting in low cost per components

PVD COATINGS FOR PLASTICS

- **EXXTRAL®-plus:** Abrasion, corrosion resistance and demolding
- **TiN-ultrafine:** For ultra smooth surfaces when clear resins are used
- **CARBON-X®:** Outstanding wear resistance with superb lubricity
- **SUCASLIDE®:** Matchless lubricity when enhanced part release is desired
- **CrN/CrCN:** Corrosion resistance combined with high hardness and adhesive wear resistance
- **MOLDADUR®-P:** Scratch protection for sensitive surfaces

WITH EIFELER PVD AND DLC COATINGS YOU CAN PROTECT YOUR:

- Mold cavities & cores
- Slides, lifters, core pulls, rotating cores
- Core pins
- Ejector pins, sleeves and blades
- Hot runner system valve gate pins
- Spruce bushings and gates inserts



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