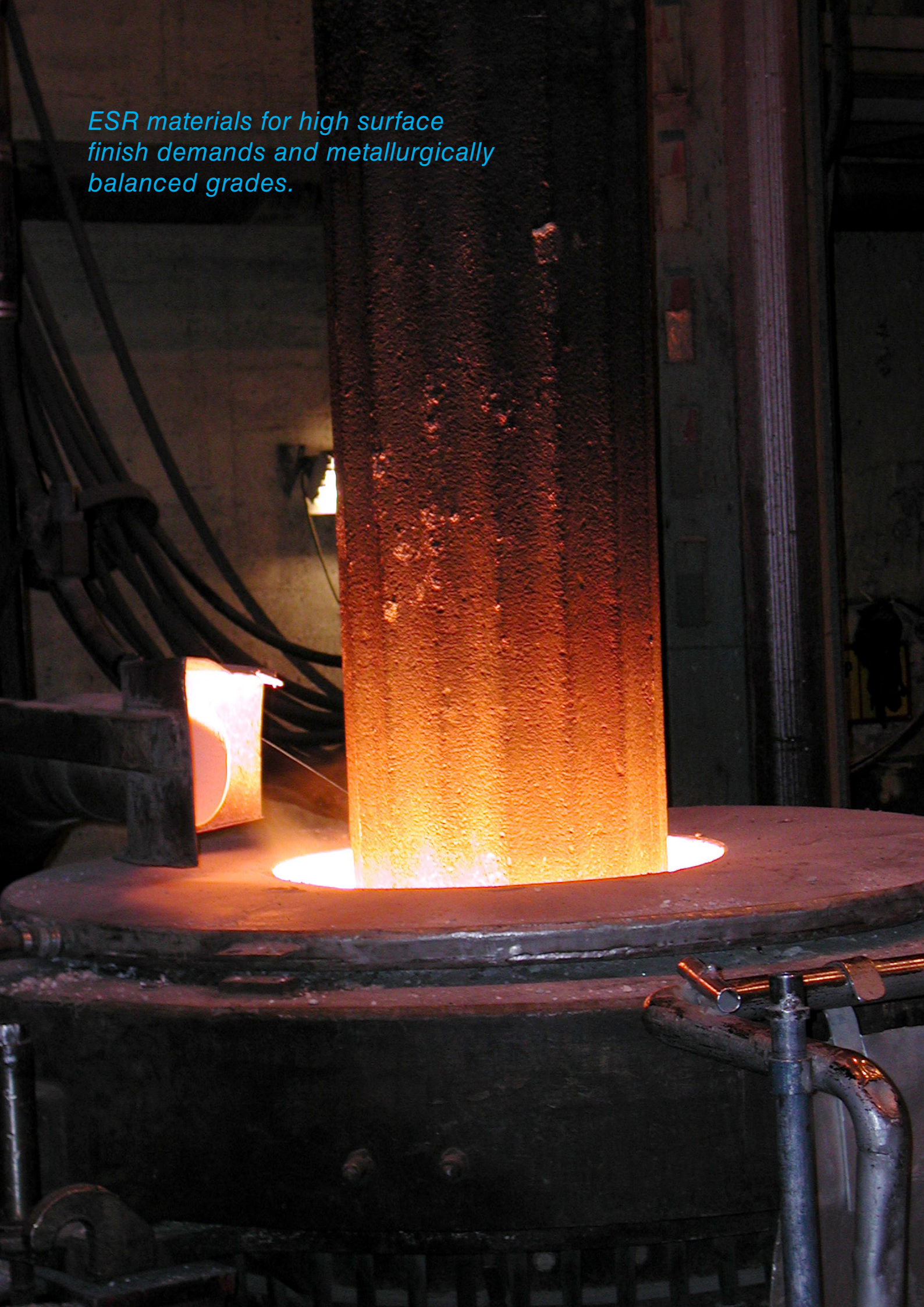


PIONEERS BREAK BARRIERS

**LEAD THE WAY
WITH UDDEHOLM
AUTOMOTIVE
LIGHTING**

ESR materials for high surface finish demands and metallurgically balanced grades.



OUTSTANDING LIGHTING SOLUTIONS

TOOL RELIABILITY AND PRODUCTION ECONOMY

A change from metal to plastic parts makes an important difference for your business. Lower fuel consumption and reduced CO₂-emissions place demands on vehicle weight reduction. This coupled with severe pressure on prices and short lead time means that choosing the right tool steel for your moulds is a crucial first step to better total tooling economy.

OPTIMAL TOOL STEEL LOWERS COSTS

The development in the automotive industry points to increasing demands for higher strength plastic vehicle parts. The parts are also becoming larger and the surface requirements more challenging.

Uddeholm's product program for large plastic moulds includes several steel grades perfectly suited for the tough demands of the automotive industry. By selecting the optimal tool steel for the respective application, you get the possibility to maximize tool life and performance, giving the lowest possible total tooling cost per part produced.

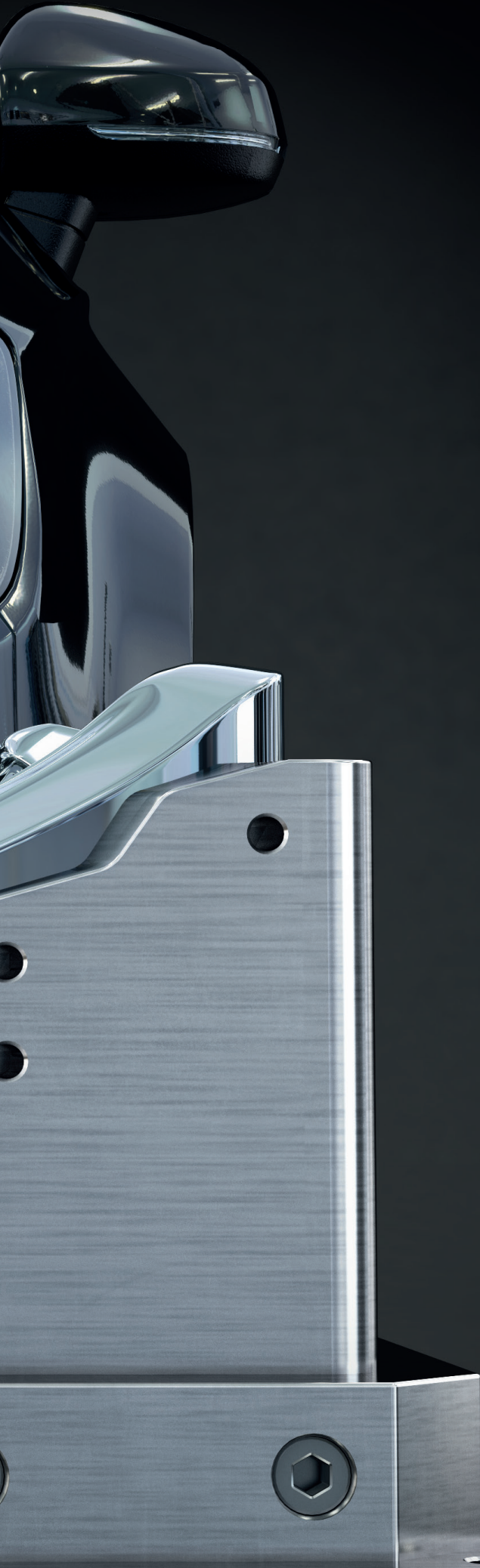
FOR YOUR BENEFIT

Uddeholm's committed partnership stretches all the way from R&D to distribution service. Offering a worldwide marketing organization and strategically located warehouses, we place great emphasis on matching our stock size program and stock levels with the needs of individual markets. Each of our stock locations has a well established distribution system to assure ready availability wherever and whenever you need it.





UDDEHOLM



COMPLEX DESIGN REQUIRES INTELLIGENT TOOL STEEL

FROM LENS TO HOUSING

Uddeholm's solutions for the automotive industry are the result of dedicated research and innovative product development from the best metallurgists and field specialists in the world. Tool steel from Uddeholm not only meets the toughest demands on production, it delivers the added value that enhances competitiveness for you.

HIGH QUALITY FOR BETTER BUSINESS

Uddeholm's range of steel grades is developed and refined to meet the needs of the plastic moulding industry. With market leading metallurgy and production technology we secure the mechanical properties and provide the unique material characteristics that are required for demanding applications.

Our business-enhancing solutions multiply the life and performance of the mould, reduce maintenance and increase production rates. It's your fastest way to lower costs and better total tooling economy.

PROFESSIONAL PROBLEM SOLVERS

Technology and design trends both affect the world of lighting. But regardless how development changes the industry, we know that high standards for tool steel will always be present and play an important role on the market.

With Uddeholm as a partner, you get access to the best metallurgists and field specialists in the world. In close collaboration with our customers we research, develop and test materials, tools and production so that you always can be one step ahead of your competitors.

PIONEERING RESEARCH AND INNOVATIVE PRODUCT DEVELOPMENT

ONE SOURCE FOR ALL YOUR TOOL STEEL NEEDS

Uddeholm provides the world's most advanced tool steel, perfectly suited for moulds with complex shapes and demanding surfaces. Corrosion, high temperatures, temperature changes and wear are just a few of the challenges you face everyday. Choosing the right tool steel is the solution.

The headlights represent an essential part of the car's design and have a great influence on its personality.



SCHEME FRONT LIGHT

1 LENS

PLASTIC MATERIAL: Polycarbonate

FEATURES: Complex shapes, high polished surfaces

- ✓ Mechanical properties
- ✓ Wear and compression resistance
- ✓ Polishability
- ✓ Hardenability

2 EXTENSION

PLASTIC MATERIAL: Polycarbonate or PA66

FEATURES: Complex shapes, high polished surfaces

- ✓ Mechanical properties
- ✓ Wear and compression resistance
- ✓ Polishability
- ✓ Hardenability

3 REFLECTOR

PLASTIC MATERIAL: BMC Thermosetting

FEATURES: Complex shapes, PVD coating or chromium plating is sometimes used

- ✓ Abrasive wear resistance
- ✓ Mechanical properties
- ✓ Corrosion resistance

4 HOUSING

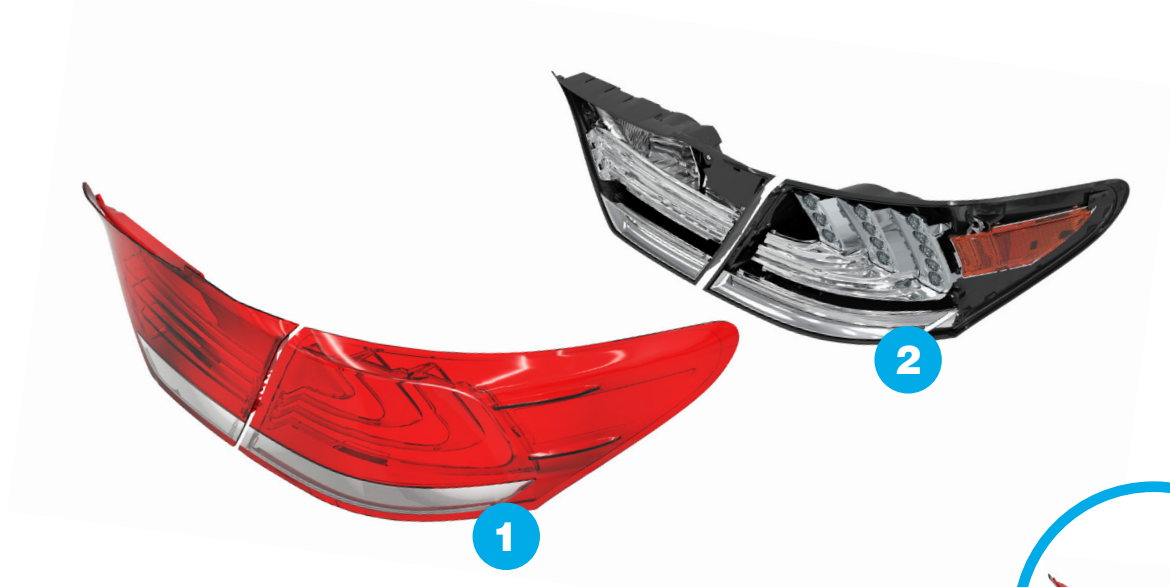
PLASTIC MATERIAL: Polypropylene or PBT with 20-40% Talc or Glass fibre

FEATURES: Complex shapes

- ✓ Mechanical properties
- ✓ Good machinability
- ✓ Pre-hardened tool steel
- ✓ Good heat conductivity

KNOWING WHAT YOU WANT AND MEETING YOUR DEMANDS

Because the reflector and housing are grouped in one piece the production process for backlights is less complex. Nevertheless, the high demands on material properties are consistent. Uddeholm's quality tool steel developed specifically for automotive lighting meets and exceeds your mould requirements.



SCHEME BACK LIGHT

1 COLOURED LENS

PLASTIC MATERIAL: Polymethyl methacrylate (PMMA)

FEATURES: Complex shapes, high polished surfaces, double moulding,

- ✓ Mechanical properties
- ✓ Wear and compression resistance
- ✓ Polishability
- ✓ Hardenability

2 REFLECTOR AND HOUSING

PLASTIC MATERIAL: ABS/Polycarbonate

FEATURES: Complex shapes

- ✓ Mechanical properties
- ✓ Good machinability
- ✓ Pre-hardened tool steel
- ✓ Good heat conductivity

HIGH END CUSTOMIZATION WITH LASER

New technology such as LED and laser bring the advantages of more design options as well as energy savings.

Another important benefit with the new lighting solutions is that they are more efficient and take up less space in the vehicle. They produce less heat for the same or better light output in comparison to the solutions of earlier generations. However, when the design becomes more intricate, the shapes of

moulds must develop and become more advanced. The system behind laser and LED is characterized by a larger number of smaller and more complex pieces. This means high demands on the tool steel for both manufacturing and moulding.

All lighting techniques demand intelligent, high performance tool steel and the standards of Uddeholm's portfolio are perfectly suited for the production models required for high end headlights.

SOLUTIONS THAT MAKE A DIFFERENCE

TOOL STEEL THAT SAVES TIME AND MONEY

For manufacturers, Uddeholm's automotive tooling has the technological capability to meet the demands for complex moulds and production. For the automotive industry we're answering the need for cost-saving and efficient production of parts that reduce vehicle weight. Uddeholm's ambition is always to find the answer to future challenges before they even arise.



ADDITIONAL SERVICES

We can support you with business-enhancing services and technical advice regarding:

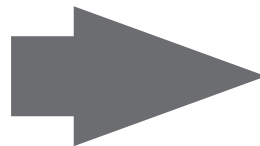
- ✓ Heat treatment
 - ✓ PVD coating
 - ✓ Polishing
 - ✓ Pocketing
 - ✓ Fine machining
 - ✓ Welding and supporting materials
-

Uddeholm's product program for large plastic moulds is developed and customized for the tough demands of the automotive industry.

FIND YOUR MATCH!

THROUGH-HARDENING

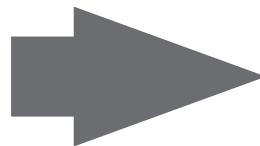
46 - 52 HRC



- Uddeholm **Vidar 1 ESR**
- Uddeholm **Orvar Supreme**
- Uddeholm **Mirrax ESR**

PRE-HARDENED

30 - 40 HRC



- Uddeholm **Mirrax 40**
- Uddeholm **Nimax**
- Uddeholm **Nimax ESR**

	WEAR RESISTANCE	TOUGHNESS	POLISHABILITY	CORROSION RESISTANCE
Uddeholm Vidar 1 ESR	<div style="width: 30%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 10%; background-color: #0070C0;"></div>
Uddeholm Orvar Supreme	<div style="width: 30%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 10%; background-color: #0070C0;"></div>
Uddeholm Mirrax ESR	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 30%; background-color: #0070C0;"></div>	<div style="width: 50%; background-color: #0070C0;"></div>	<div style="width: 90%; background-color: #0070C0;"></div>
Uddeholm Mirrax 40	<div style="width: 20%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 70%; background-color: #0070C0;"></div>
Uddeholm Nimax ESR	<div style="width: 20%; background-color: #0070C0;"></div>	<div style="width: 50%; background-color: #0070C0;"></div>	<div style="width: 40%; background-color: #0070C0;"></div>	<div style="width: 10%; background-color: #0070C0;"></div>
Uddeholm Nimax	<div style="width: 20%; background-color: #0070C0;"></div>	<div style="width: 50%; background-color: #0070C0;"></div>	<div style="width: 30%; background-color: #0070C0;"></div>	<div style="width: 10%; background-color: #0070C0;"></div>



AWARD-WINNING PROBLEM SOLVERS

With pioneering research and development, innovative thinking and deep commitment, Uddeholm offers business-enhancing steel solutions to premium clients all over the world.

What started as a small iron mill in 1668 has now become the world's leading provider of tool steel, with business and operations in 90 countries.

Always with the promise to deliver solutions that enhance competitiveness and create added value for our customers.

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty for fitness for a particular purpose. Classified according to EU Directive 1999/45/EC.



SS-EN ISO 9001
SS-EN ISO 14001

Manufacturing solutions for generations to come

SHAPING THE WORLD

Since 1668 we have been providing a wide range of innovative cutting-edge solutions for our customers in demanding segments. Our dedicated employees work in almost ninety countries and together we deliver improved competitiveness to clients worldwide. Welcome to Uddeholm.