Uddeholm sets a new standard
for high-gloss polishing

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Modern technologies are continuously creating new demands on the surface finish of moulded plastic parts. Even the smallest defects on a part will be rejected, something both end-customers and toolmakers want to avoid. For high-gloss surface demands, one should aim for a steel grade with good polishability. Uddeholm Tyrax® ESR is a new high hardness corrosion resistant tool steel from Uddeholm, developed for applications with extreme demands on surface finish.

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Uddeholm Tyrax® ESR, developed for high gloss polishing

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Applications for light transmission such as automotive lighting and optical lenses are continuously increasing. Multifunctional displays are in everything from white goods to car interiors. Autonomous cars require integration of cameras and lidars for safe transportation. These applications all have one thing in common, extreme demands on surface finishes. Because the moulded part is an exact replica of the mould itself, a high gloss surface finish is necessary for optimal results.

Poor surface finishes lead to devastating and financially costly results. Rejected moulded parts is unacceptable for all parties involved. End-customers will not get their parts in time and the tool users suffers from expensive down time. Mould makers know that repolishing is a time consuming and expensive process. They know that they cannot afford to do things twice if they are to stay competitive.

The surface finish of a mould is dependent on the polisher's technique in combination with the microstructure and cleanliness of the tool steel. Uneven hardness across the surface means an uneven removal of material during the polishing process, where harder areas will resist abrasion better than softer areas. Uneven hardness may be the result of impurities in the steel and segregations.

Two of the most common polishing defects are pitting and orange peel:

- Pitting looks like scattered pinholes dispersed over the surface. Pitting is usually due to pull-outs of hard particles, such as carbides or oxides. The best way to avoid such problems is to choose a very clean steel, such as an ESR grade, with fine and evenly distributed carbides. Pitting can also arise if the mould is stored in a humid environment, where localized corrosion attacks may cause pits at the mould surface. In such cases, one needs a corrosion resistant tool steel.
- Orange peel means that the surface morphology looks similar to an orange peel. Plastic deformation at the mould surface causes this phenomenon. The best way to reduce the risk of orange peel is to choose a tool steel with a homogeneous microstructure, such as an ESR grade, in combination with high hardness.

We are experts in polishing. We know the problems that the polisher suffers from when polishing standard steel grades. We have gained this expertise and insights from more than 350 years of experience. That is why we are #1 in high performance tool steel.

Uddeholm Tyrax® ESR is a premium corrosion resistant steel grade designed for polishing. Our Electro Slag Re-melting (ESR) process enables superior cleanliness by removing almost all impurities while keeping segregations to a minimum. The high hardness of up to 58 HRC minimizes the risk of orange peel.

The chemical analysis of Uddeholm Tyrax® ESR enables the polisher to reach a high gloss surface finish in three polishing steps compared to five steps for AISI 420 ESR, reducing the polishing time by 40-50%.

Uddeholm Tyrax® ESR offers excellent polishability in combination with high hardness and corrosion resistance, making it the obvious choice for applications where surface finish is of uttermost importance.
Main advantages of Uddeholm Tyrax® ESR for high-gloss surface finishes:

- Superior cleanliness
- Reduced polishing time
- Corrosion resistance

Manufacturing solutions for generations to come

SHAPING THE WORLD®

We are shaping the world together with the global manufacturing industry. Uddeholm manufactures steel that shapes products used in our every day life. We do it sustainably, fair to people and the environment. Enabling us to continue shaping the world – today and for generations to come.

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