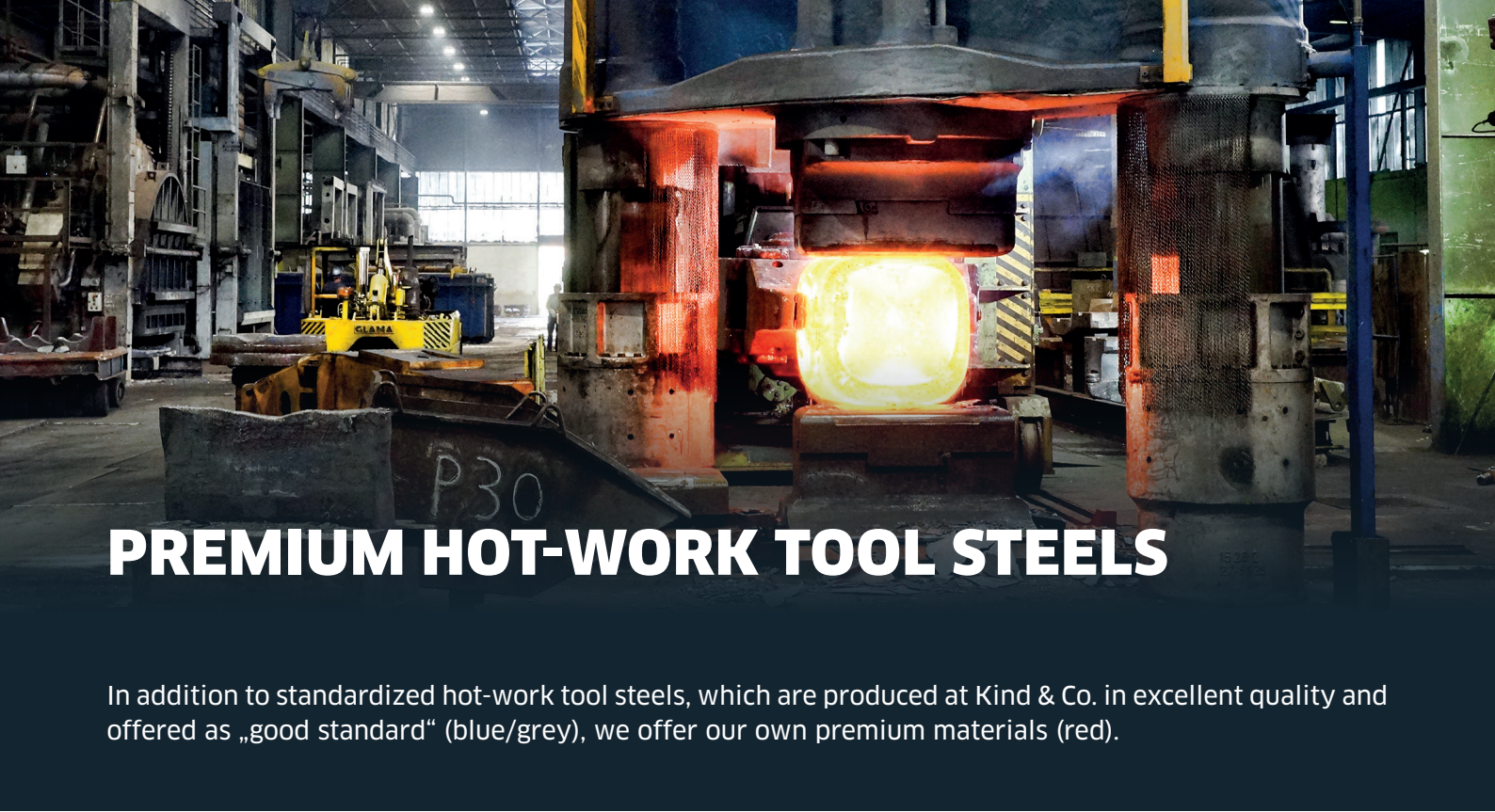




PREMIUM HOT-WORK TOOL STEELS

High-quality material solutions tailored to the application



PREMIUM HOT-WORK TOOL STEELS

In addition to standardized hot-work tool steels, which are produced at Kind & Co. in excellent quality and offered as „good standard“ (blue/grey), we offer our own premium materials (red).

These materials are specially developed materials which are offered exclusively by Kind & Co. and which essentially extend the delivery spectrum. In many areas of industry today, standard steels cannot fully meet the demands placed on them. In order to continue to produce efficiently and successfully, Kind & Co. premium steels are used in many different applications and convince with their various property concepts. With Kind & Co. premium steels, the service life and performance of tools can be efficiently increased.

Steel, mechanical processing and heat treatment from a single source

Our services range from melting, forging, and mechanical processing to hardening in our modern vacuum hardening shop.

In our own mechanical workshops at the Wiehl site, we can offer a wide range of high-quality machining options.

For more than 40 years, Kind&Co has been known as a specialist supplier of heat treatment processes. With five vacuum furnaces and up to 6.5 tons charging weight we are able to meet even the highest customer requirements. Even with large cross-sections and unit weights, we can ensure excellent material properties. We are internationally known as one of the leading service providers in heat treatment.

Kind & Co.

Since 1888 we have been producing high-quality tool steel exclusively at our site in Bielstein. We stand for sophisticated material solutions, highest quality, reliable service and competent advice - tailored to the respective application. We have particularly strong application expertise in the areas of die casting, extrusion and die forging.

Premium material solutions

This brochure presents various material solutions from Kind & Co., arranged according to the following fields of application:

- Die casting
- Extrusion
- Die forging
- Hot-stamping
- Plastic moulds
- Glass moulds



DIE CASTING

Globally-recognized quality for every die casting application

The die casting process is used for the mass production of industrial components. The molten material is forced into a prefabricated die at high pressure and speed.

| Brand name | Mat.-Nr. | AISI | Application | Toughness | Thermal shock resistance | Comments |
|------------|----------|------|---|-----------|--------------------------|--|
| CS1* | Premium | - | Applications with highest surface requirements and narrow shape tolerances | | | Combination of high hardness (up to max. 58 HRC) and good toughness at the same time |
| HP1* | Premium | - | Die casting inserts with highest mechanical and thermal loads | | | |
| TQ1* | Premium | - | High-performance die casting inserts, especially for large-format moulds and structural components | | | |
| HTR* | Premium | - | Local areas and small-format die casting die inserts that are exposed to high thermal loads, max. hardness 42 HRC | | | Premium steel with excellent thermal conductivity |
| HMoD* | 1.2889 | H19A | Dies for heavy metal casting, highly stressed cores and inserts in the sprue area | | | Excellent hot strength and high hot wear resistance |
| RM10Co* | 1.2888 | - | Shot sleeves, brass die casting | | | Extremely high tempering resistance |
| RPU** | 1.2367 | - | Small and medium-sized die casting die inserts | | | |
| USD** | 1.2344 | H13 | Widely applicable hot-work tool steel for thermally highly stressed dies | | | |
| USN** | 1.2343 | H11 | Universally applicable hot-work tool steel with balanced properties | | | |

*only available in ESR-quality **also available in ESR-quality

EXTRUSION

Always the optimum solution for our customers

Extrusion is a hot metal forming process used to produce solid or hollow profiles, wires or tubes. The most commonly processed materials are aluminum, copper, brass, and steel or stainless steel. However, special materials such as titanium, zirconium or silver brazing alloys are also used.

Hot-work tool steels

| Brand name | Mat.-Nr. | AISI | Application | Toughness | High-temperature strength | Hot wear resistance | Comments |
|------------|----------|------|---|-----------|---------------------------|---------------------|--|
| CS1* | Premium | - | Extrusion dies with specific compressive stress > 1000 MPa, very highly stressed stems, dummy blocks and inner liners | | | | Combination of high hardness (up to max. 58 HRC) and good toughness at the same time |
| HP1* | Premium | - | Highly stressed extrusion stems and dies with high toughness requirements | | | | |
| TQ1* | Premium | - | Highly stressed intermediate and inner liners and stems, mandrels and extrusion dies | | | | |
| Q10 | Premium | - | Tools for extrusion with very long tool life for highly stressed inner liners and smaller stems | | | | |
| HTR* | Premium | - | Air-cooled intermediate liners in copper/brass alloys extrusion, extrusion dies and mandrels | | | | |
| GSF | Premium | - | Tie rods, press columns, mandrel holders and piston rods | | | | |

| Brand name | Mat.-Nr. | AISI | Application | Toughness | High-temperature strength | Hot wear resistance | Comments |
|------------|----------|------|---|-----------|---------------------------|---------------------|----------|
| HMoD** | 1.2889 | H19A | Extrusion dies and die holders for the processing of copper/brass alloys | | | | |
| HWD | 1.2678 | H19 | Extrusion dies and die holders for the processing of copper/brass alloys | | | | |
| RM10Co** | 1.2888 | - | Extrusion dies, die holders and inner liners for processing copper/brass alloys | | | | |
| RPCo | 1.2885 | H10A | Tool head for indirect stems for copper/brass alloys | | | | |
| RPU** | 1.2367 | - | Intermediate and inner liners for high loads, extrusion stems, mandrels, dies, dummy blocks and die holders | | | | |
| USD** | 1.2344 | H13 | Containers, intermediate and inner liners, press stems, mandrels and dies | | | | |
| USN** | 1.2343 | H11 | Highly stressed container mantles, intermediate and inner liners, mandrels and dies | | | | |

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High temperature austenitic steels

| Brand name | Mat.-Nr. | AISI | Characteristics | Application |
|------------|----------|------|---|--|
| AWS | 1.2731 | - | Austenitic hot-work tool steel | Extrusion dies for processing copper alloys |
| HWF | 1.2779 | A286 | Austenitic precipitation hardenable steel | Thermally highly stressed inner liners for the processing of copper/brass alloys |
| MA-Rekord | 1.2758 | - | Austenitic hot-work tool steel | Extrusion dies for processing of copper/brass alloys |

Nickel-base alloys

| Brand name | Mat.-Nr. | AISI | Characteristics | Application |
|------------|----------|----------|---|--|
| SA50Ni | 2.4973 | R41 | Precipitation-hardenable nickel-base alloy with very high high-temperature strength | Dies, die holders and mandrel tips for processing of copper/brass alloys |
| SA718 | 2.4668 | UNS 7718 | Precipitation-hardenable nickel-base alloy with high high-temperature strength | Inner liners, dies, die holders and mandrel tips for processing of copper/brass alloys |

DIE FORGING

High demands - convincing performance - lower unit costs

Die forging is a manufacturing process in which the material to be processed is formed between two tool halves, or dies. At least one side of the die contains the negative of the shape of the later component.

| Brand name | Mat.-Nr. | AISI | Application | Toughness | High-temperature strength | Hot wear resistance | Comments |
|------------|----------|------|---|-----------|---------------------------|---------------------|--|
| Cr7V-L | Premium | - | High performance forging dies with high wear requirements | | | | Ideal for large series |
| CS1* | Premium | - | Dies subjected to a combination of intensive wear with simultaneous risk of cracking - as in semi-hot forging and other demanding applications | | | | Combination of high hardness (up to max. 58 HRC) and good toughness at the same time |
| DFA | Premium | - | Dies and inserts with simple engravings and high wear requirements | | | | |
| FTCo* | Premium | - | Dies and mandrels for high-speed forging machines, ejectors and semi-hot forging tools and near net shape forging tools | | | | |
| GSF | Premium | - | Highly stressed hammer dies, build-up welded press dies, large hammer dies and finishing dies for hydraulic presses, rams and tool holders | | | | Significant increase in performance compared to 1.2714 in case of cracking |
| HP1* | Premium | - | Forging of light metals, especially for deep cavities, e.g. chassis parts | | | | Particularly suitable for forging aluminium |
| HSF | Premium | - | Tools for mandrels, liners and medium-sized or larger stems in high-speed forging machines, round dies with high requirements for hot wear resistance combined with very good toughness, large product series and high tolerance requirements | | | | |
| HTR* | Premium | - | Dies requiring very high tempering resistance, forging of brass | | | | |

DIE FORGING

High demands - convincing performance - lower unit costs

Die forging is a manufacturing process in which the material to be processed is formed between two tool halves, or dies. At least one side of the die contains the negative of the shape of the later component.

| Brand name | Mat.-Nr. | AISI | Application | Toughness | High-temperature strength | Hot wear resistance | Comments |
|------------|----------|------|---|-----------|---------------------------|---------------------|-----------------------------------|
| LMF | Premium | - | Aluminium forging, forging dies subjected to cracking, finishing dies | | | | Alternative to 1.2343, 1.2343 ESR |
| Q10 | Premium | - | Dies subjected to high impact stress, dies with complex geometry, exposed to high thermal stress with high hot wear | | | | |
| TQ1* | Premium | - | Medium and large press dies with deep cavity and intensively cooled multi-stage dies | | | | |
| PWM | 1.2714 | ~L6 | Hammer dies and press saddles | | | | |
| PWU | 1.2744 | - | Hammer dies, jaws on forging machines, moulding press dies | | | | More efficient alternative to PWM |
| RP | 1.2365 | H10 | Small press dies, mandrels and dies for high-speed forging machines | | | | |
| RPCo | 1.2885 | H10A | Moulding press dies, especially mandrel inserts for copper and copper alloys | | | | |
| RPU | 1.2367 | - | Dies or die inserts under forging presses for steel forming | | | | |
| USD | 1.2344 | H13 | Widely applicable hot-work tool steel for press dies and inserts for steel and light metals | | | | |
| USN | 1.2343 | H11 | Universal hot-work tool steel for press dies and inserts for steel and light metals | | | | |

HOT-STAMPING

Long life due to high wear resistance

Hot stamping is the process of plastically deforming metals at high temperatures and quenching them in the die. This process enables the production of high-strength components.

| Brand name | Mat.-Nr. | AISI | Application | Toughness | High-temperature strength | Hot wear resistance | Comments |
|------------|----------|------|---|-----------|---------------------------|---------------------|--|
| Cr7V-L | Premium | - | Well-established steel for high tool performance with low tool care requirements | | | | |
| UH1* | Premium | - | High-performance steel for hot-stamping tools with particularly high wear resistance, large product series | | | | High working hardness up to max. 58 HRC with good toughness at the same time |
| HMoD* | 1.2889 | - | Hot-work tool steel for inserts subjected to particularly high temperature with simultaneous high wear - Tailored Tempering | | | | |
| RM10Co* | 1.2888 | - | Local inserts with highest temperature requirements in the Tailored Tempering process | | | | |
| RPU | 1.2367 | - | | | | | |
| USD | 1.2344 | H13 | | | | | |

*only available in ESR-quality







PLASTIC MOULDS

Optimum steel quality with high polishability requirements



















In order to ensure the most economical plastics production possible, the steel used for molds has to meet particularly high requirements, such as polishability, grainability and and, above all, the longest possible mold service life.

Excellent tool steel cleanliness is a key factor.

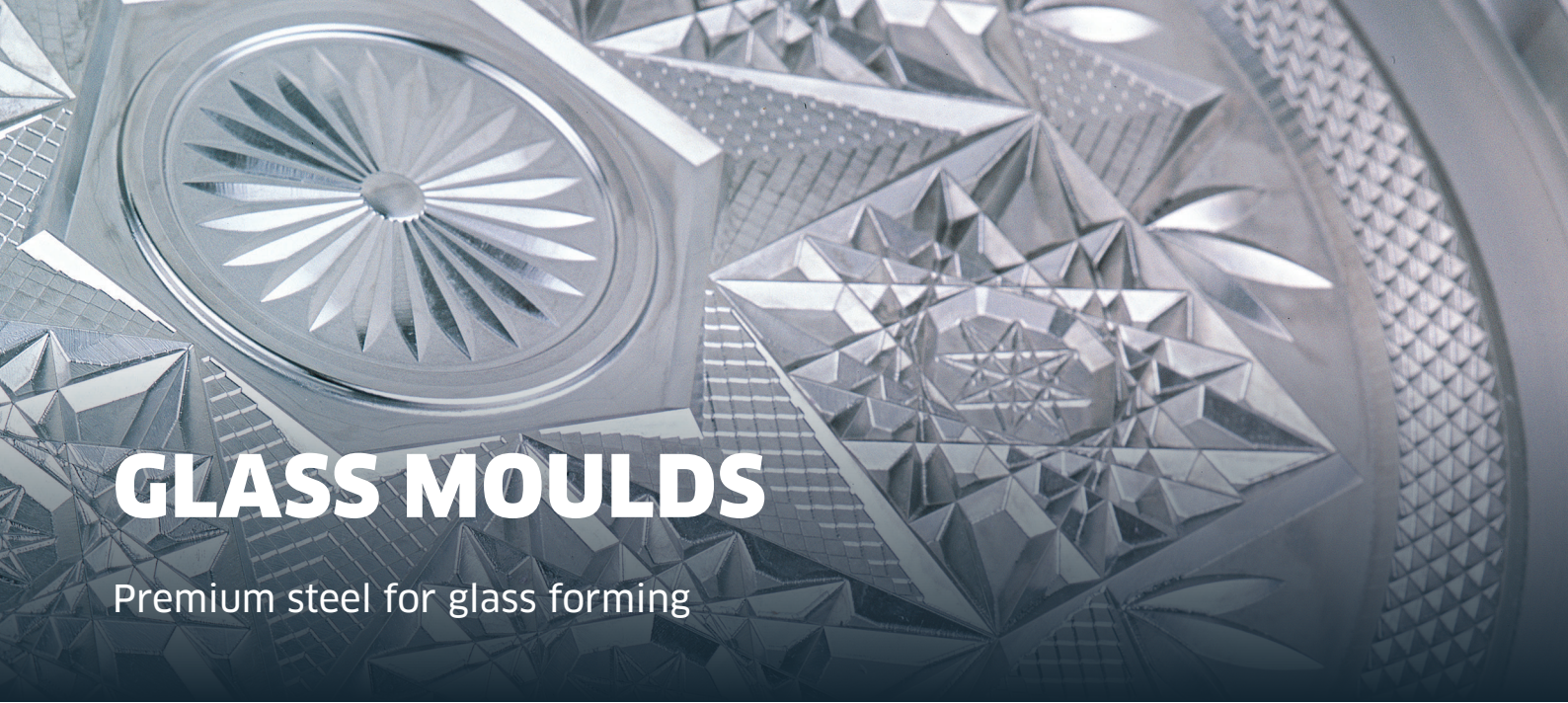
Corrosion-resistant steels

| Brand name | Mat.-Nr. | AISI | Application | Corrosion resistance | Polishability | Thermal conductivity |
|------------|----------|------|---|--|---|---|
| CMR** | 1.2316 | - | Moulds for precision plastic parts for use under corrosive conditions |  |  |  |
| RF* | 1.2083 | 420 | Moulds for precision plastic parts for use under corrosive conditions, with high demands on surface quality |  |  |  |

Through-hardenable steels







| Brand name | Mat.-Nr. | AISI | Application | Wear resistance | Polishability | Thermal conductivity |
|------------|----------|------|--|--|---|---|
| CS1* | Premium | - | Texturized and polished mould inserts and mould plates for processing plastics with a high glass fibre content or moulds with highest surface requirements |  |  |  |
| GSF* | Premium | - | High-quality mould inserts for medium-sized product series |  |  |  |
| TQ1* | Premium | - | Moulds of all sizes for precision plastic parts, suitable for large production series, suitable for mirror polishing |  |  |  |
| N400 | 1.2767 | - | Variety of highly stressed moulds, injection moulds for transparent plastics |  |  |  |
| USD** | 1.2344 | H13 | Moulds of all sizes for precision plastic parts, suitable for large production series - for mirror polishing we recommend the ESR-quality |  |  |  |
| USN** | 1.2343 | H11 | Moulds of all sizes for precision plastic parts, suitable for large production batches - for mirror polishing we recommend the ESR-quality |  |  |  |

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Hollow glassware, such as bottles, jars and drinking glasses, is produced by paste molding, press-blowing, suction-blowing or a combination of these processes. In this process, a liquid glass gob, called a „glass batch,“ is placed in the forming tools and formed. The different manufacturing processes and glass products require the use of different tool steels with different properties.

The highest product demands require the highest quality tool steel.

| Brand name | Mat.-Nr. | AISI | Application | Scale resistance | Polierbarkeit | High-temperature strength |
|------------|----------|------|---|---|---|---|
| FAM* | 1.2787 | 431 | Glasformen für hohe Anforderungen an die Glasqualität, geeignet für Hart- und technisches Glas und große Fertigungslose |  |  |  |
| ZF2* | 1.2782 | 314 | Glasformen für höchste Glasqualität, geeignet für Glas mit Kristallglanz und Hartglas und sehr große Fertigungslose |  |  |  |

*only available in ESR-quality



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