PROCESS BENEFITS

Faster Solidification
High thermal conductivity accelerates heat extraction from processing during every production cycle, enabling faster solidification and improved productivity.

Reduced Cycle Times
Efficient heat transfer shortens cooling and dwell times, supporting higher output and improved overall equipment effectiveness.

Reduced Cooling Requirements
Improved thermal conductivity reduces cooling intensity during casting process while supporting stable die temperatures throughout production.

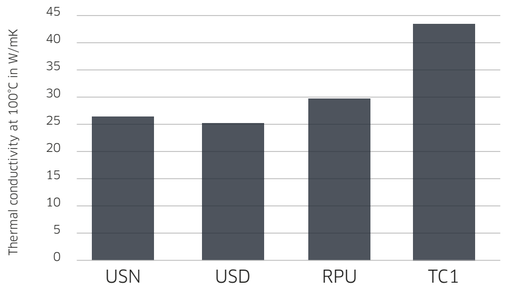
Higher Thermal Conductivity Than Conventional Hot-Work Steels
TC1 provides a higher thermal conductivity profile than the compared hot-work steels USN ESR (1.2343), USD ESR (1.2344) and RPU ESR (1.2367). This supports efficient heat extraction from the die surface into the cooling system.

Longer Tool Life
Excellent tempering resistance and hot wear resistance help maintain tool performance under demanding operating conditions.

Balanced Property Profile
TC1 combines:
- Outstanding thermal conductivity
- Excellent tempering resistance
- Excellent hot wear resistance
- Advanced high temperature resistance for long use
- Good weldability
- Good machinability

Produced by ESR remelting, TC1 offers:
- High purity
- Excellent homogeneity
- Homogeneous material properties
- Reliable performance in demanding tooling applications

Thermal conductivity of TC1 in comparison to USN, USD and RPU



Condition:
hardened and tempered to 45 HRC

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51674 Wiehl - Bielstein | Germany
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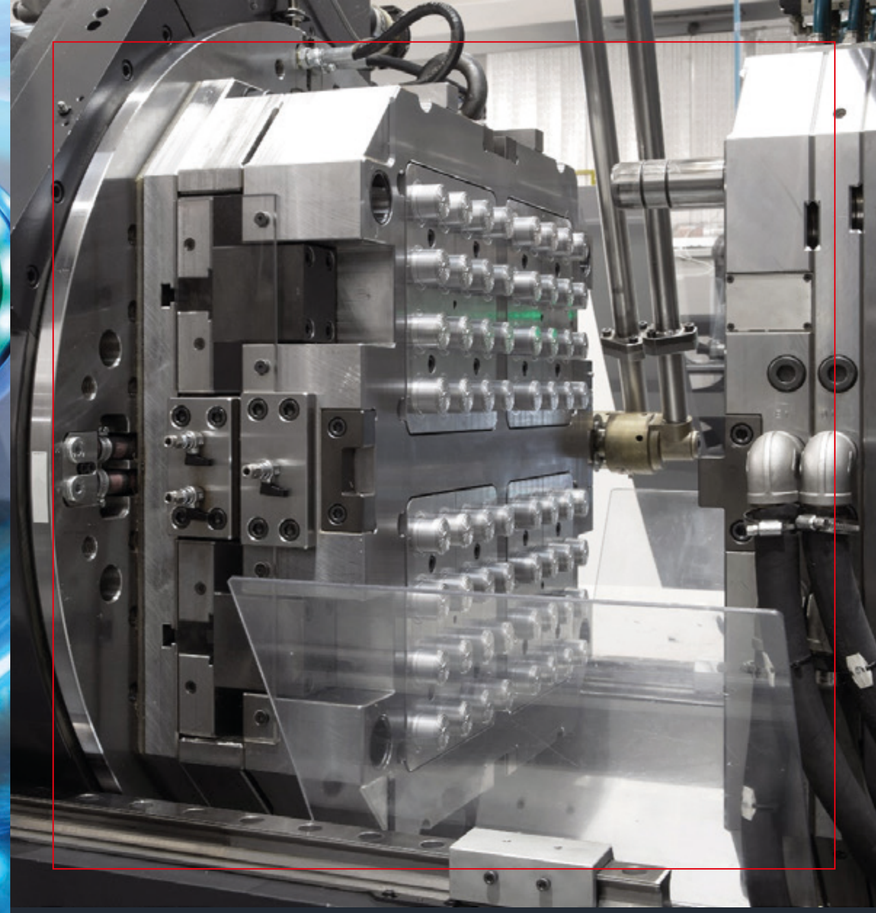

TC1

Advanced productivity by excellerating moulding processes

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TC1

Premium ESR-Remelted Hot-Work Steel for Faster Production Cycles and Reliable Tool Life.

Edelstahlwerk Kind & Co.
GMH GRUPPE
Pure Performance

In high-volume moulding operations, productivity is determined by one critical factor: how efficiently heat can be removed from the process.

TC1 is a premium ESR-remelted hot-work steel developed for applications requiring exceptional heat transfer, reliable hot-work performance, and maximum process stability. Its outstanding thermal conductivity enables faster heat dissipation, helping manufacturers reduce cycle times, improve processing quality, and extend tool life.

WHY TC1?

Faster Heat Dissipation. Higher Productivity.

TC1 combines exceptionally high thermal conductivity with excellent tempering resistance and heat resistance. This unique property profile supports:

- Improved ability to transfer heat from the mould to the cooling medium
- Significant reduction of casting and process times during moulding
- More stable thermal conditions throughout production
- Increased process reliability and repeatability
- Longer tool life through reduced thermal stress

For thermally demanding applications requiring efficient heat transfer and reliable hot-work performance, TC1 provides a measurable performance advantage.

TYPICAL APPLICATIONS

TC1 is particularly suitable for applications where efficient heat dissipation directly contributes to productivity and component quality.

High Pressure Die Casting (HPDC)

- Die inserts for light metal die-casting applications subject to high thermal loads
- Highly stressed cores located in the casting stream
- Structural casting applications
- Gigacasting applications
- Local inserts requiring enhanced heat dissipation
- Chill blocks requiring rapid solidification of molten metal

Other Casting Applications

- Low-pressure casting dies
- Permanent mould casting dies
- Casting dies for heavy metal alloys
- Inserts for casting chamber

Injection moulding

- For plastics moulding of advanced productivity
- For processing advanced engineering and high performance resins
- Inserts for high class injection moulds
- Moulds and inserts like pinch and neck rings for blow moulds
- Injection nozzels
- Manifolds for hot runner systems

Extended Applications

TC1 is also suitable for:

- Moulding press dies for hot pressing of heavy metals
- Tools for indirect press hardening
- Forging dies for brass and copper alloys
- Other high-temperature tooling applications
- Applications requiring a combination of very high thermal conductivity and wear resistance

ENGINEERED FOR RELIABLE TOOL PERFORMANCE

Steel quality alone does not determine tooling performance.
Long-term operational success depends on the interaction between material selection, heat treatment, tooling design, and process conditions.

Kind & Co. supports customers with:

- Material selection
- Heat-treatment recommendations
- Application-specific engineering support
- Tooling expertise for thermally demanding applications

This integrated approach helps ensure reliable performance from prototype development through serial production.

INTEGRATED MANUFACTURING EXPERTISE

Since 1888, Kind & Co. has produced premium tool steels exclusively at its Bielstein site in Germany.
As part of GMH Gruppe, we combine under one technical responsibility:

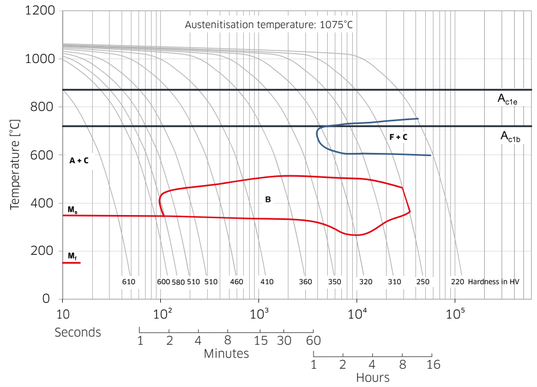
- Metallurgical expertise
- ESR remelting technology
- Heat-treatment capability
- Application engineering
- Manufacturing know-how

This integrated value chain enables consistent quality and dependable performance for demanding industrial applications.

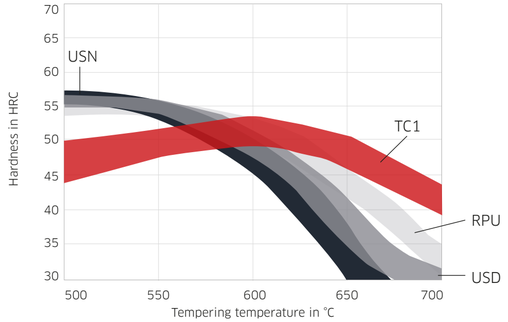
Physical properties in hardened and tempered condition

Temperature (°C)	Heat Capacity Cp (J/gK)	Thermal conductivity (W/mK)	Thermal expansion (10-6 m/mK)
20	0,440	44	Temperaure interval: 20 - T°C
100	0,473	45	11,9
200	0,510	42	12,3
300	0,545	41	12,8
400	0,579	35	13,2
600	0,782	35	13,9
Density 7,8 g/cm³			

Continuous Cooling Transformation Diagramm



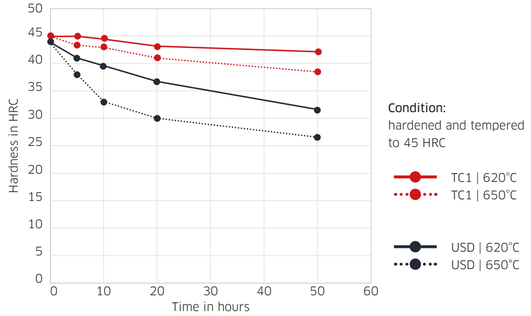
Tempering resistance of TC1 in comparison to USN, USD and RPU



Tempering Resistance for Demanding Hot-Work Conditions

In addition to high thermal conductivity, TC1 offers excellent tempering resistance for demanding hot-work applications. The comparison shows that TC1 develops a higher hardness than USN (1.2343), USD (1.2344) and RPU (1.2367) at elevated temperature, supporting reliable performance under high thermal load.

Long time tempering resistance for mainting hardness



Long time tempering resistance for mainting hardness

The long-time tempering comparison shows how TC1 maintains hardness over extended exposure at 620°C and 650°C compared with USD. This supports the material's suitability for hot-work applications where thermal load is not only high, but sustained over time.