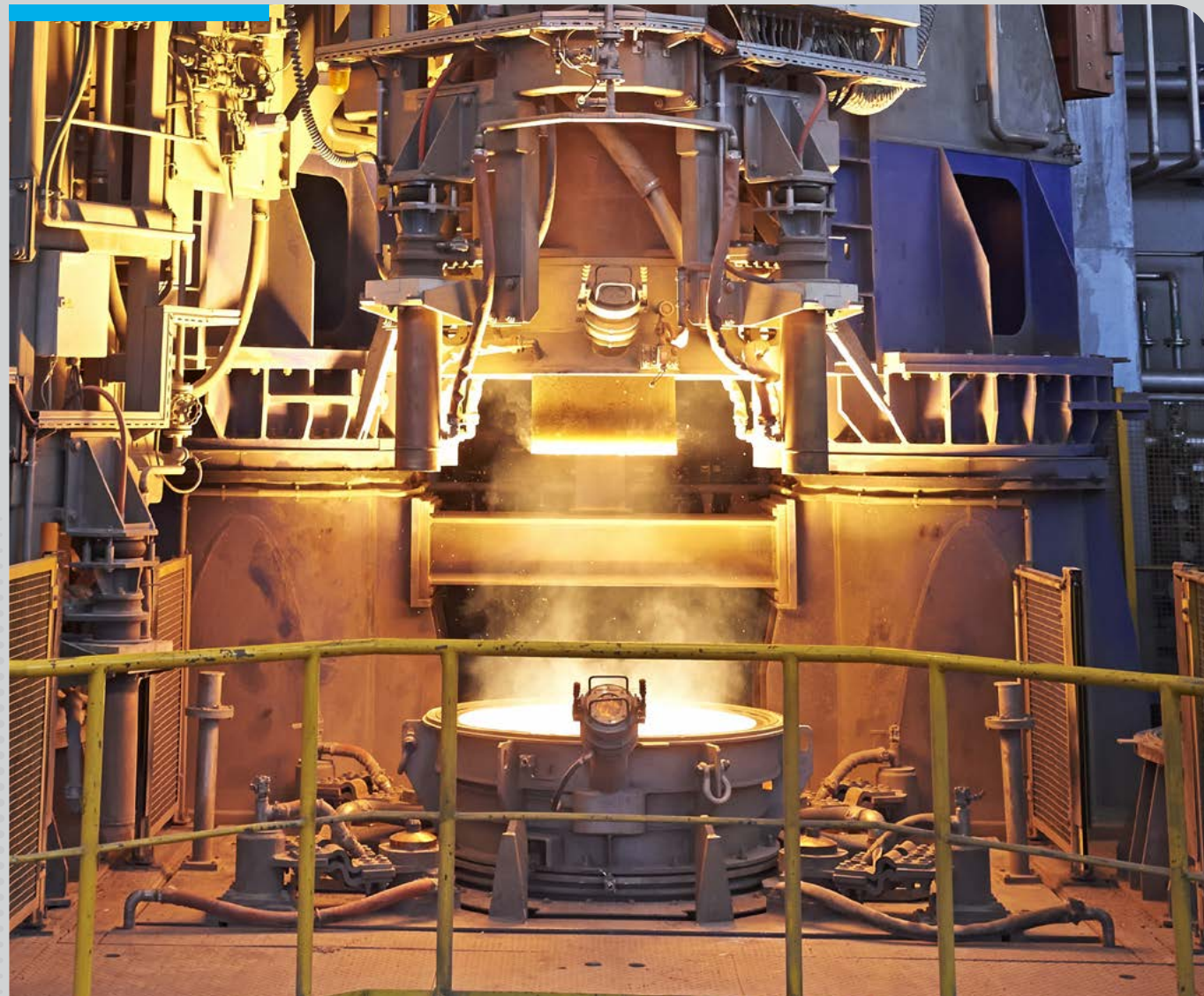




TOOL STEEL CUTTING AND DISTRIBUTION

About the steel mill



HTS is the official distributor of SIJ Metal Ravne (part of Slovenian Steel Group)
one of the largest steel producers in Europe.

sij | metal ravne

200+

Steel grades manufactured in compliance with international standards ISO 9001, ISO 14000



The highest steel quality, based on world class production equipment and more than 400 years of experience in steel making



Strong in-house R&D department and broad applied knowledge helps you get the best solutions for your customers' needs



Narrow dimensional tolerances, exceeding international standards



European
Green Transition

About the steel service centers



HTS Group with its daughter companies Ravne Steel Center (Slovenia) and Sidertoce (Italy) is one of the largest service centers for tool steel in Europe.

30+

Steel grades available from stock in compliance with international standards ISO 9001, ISO 14000



More than 8.000 tons of steel available from stock



Advance service center with > 50 sawing machines

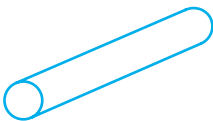


Narrow dimensional tolerances, exceeding international standards

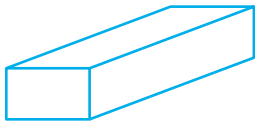


Extensive range of machining and heat treatment possibilities to find the best fit for your production process

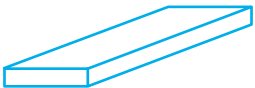
Dimensional range



Bars up to
Φ 700 mm



Blocks up to
600 × 1.600 mm



Plates up to
300 × 2.000 mm

Stock range



Stock range



SIJ grade	W. NR.	C	Si	Mn	Cr	Mo	Ni	V	W	Other	Supply Condition	Achievable hardness	Stock program	
SIMOLD 2083	1.2083	0,46	max. 1,00	max. 1,00	13,50	/	/	/	/	/	HB max. 230	55-57 HRC	Φ > 21 mm < Φ 132 mm	□ < 1000×300
SIMOLD 2083R	1.2083	0,46	max. 1,00	max. 1,00	13,50	/	/	/	/	/	HB max. 230	55-57 HRC	/	□ < 805×405
SIMOLD 2085	1.2085	0,35	0,40	0,45	16,00	/	/	/	/	S 0,07	Q+T HB 280-325	45-51 HRC	/	□ < 1210×405
SIMOLD 2099	1.2099	0,05	/	1,10	12,10	/	/	/	/	S 0,10 Cu 0,70	Q+T HB 280-330	36-38 HRC	/	□ < 810×180
SIMOLD 2311	1.2311	0,40	0,30	1,45	1,95	0,20	/	/	/	/	Q+T HB 280-325	52 HRC	/	□ < 1510×405
SIMOLD 2312	1.2312	0,40	0,40	1,50	1,90	0,20	/	/	/	S 0,07	Q+T HB 290-325	51 HRC	Φ > 21 mm < Φ 703 mm	□ < 1510×605
SIMOLD 2316	1.2316	0,38	1,00	1,00	16,50	1,00	1,00	/	/	/	Q+T HB 285-320	49 HRC	Φ > 21 mm < Φ 141 mm	□ < 1010×410
SIMOLD 2738	1.2738	0,40	0,30	1,40	1,90	0,20	1,00	/	/	/	Q+T HB 290-325	52 HRC	/	□ < 1510×610
SIMOLD S131	1.2738HH	0,28	0,40	1,50	1,30	0,50	1,00	0,15	/	/	Q+T HB 310-360	52 HRC	/	□ < 1510×610

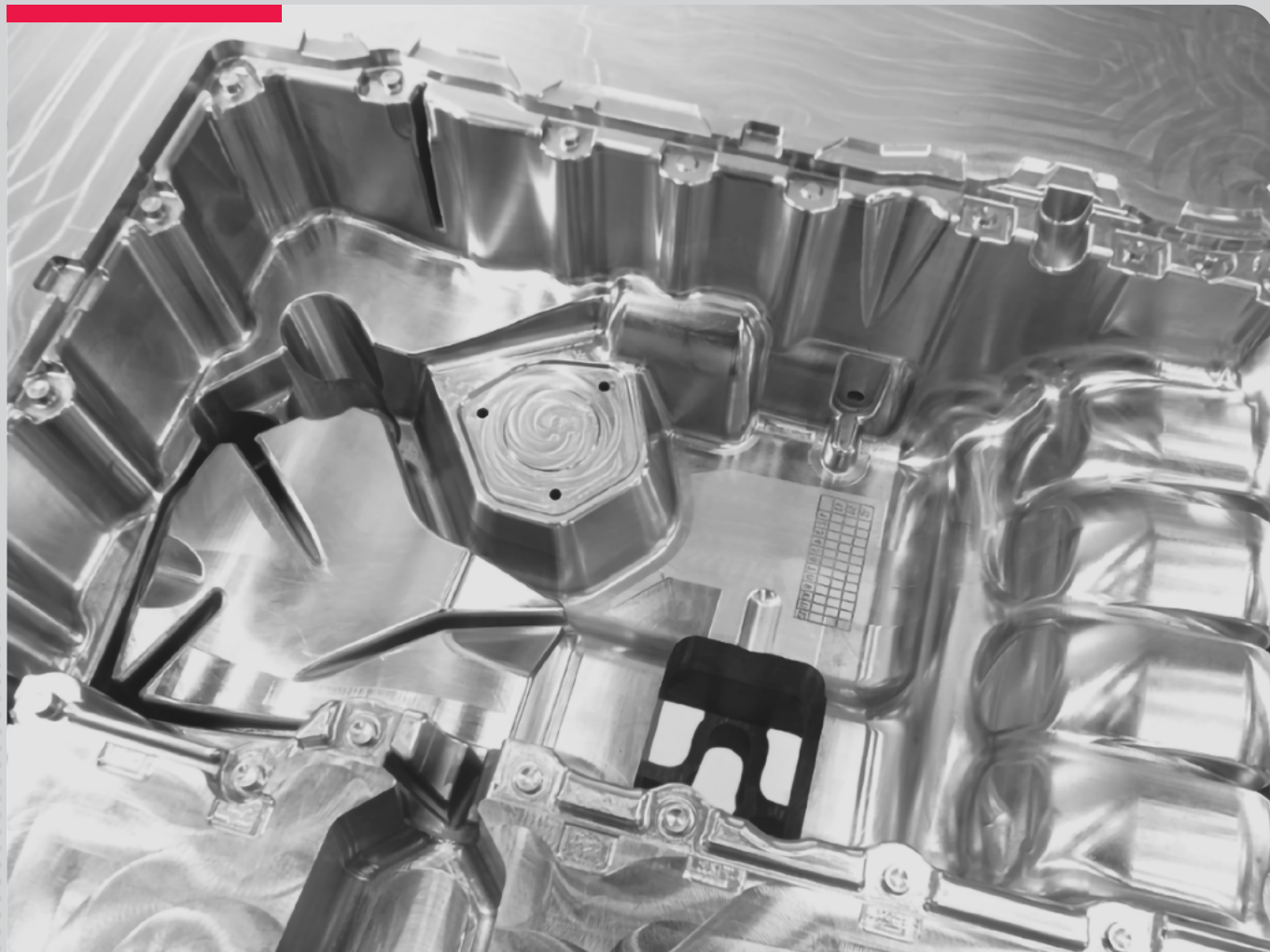
SIJ grade	W. NR.	C	Si	Mn	Cr	Mo	Ni	V	W	Other	Achievable Hardness	Stock program	
SITHERM 2343	1.2343	0,38	1,00	0,40	5,10	1,25	/	0,40	/	/	50-56 HRC	Φ > 12 mm < Φ 642 mm	□ < 1010×455
SITHERM 2343R	1.2343	0,38	1,00	0,40	5,10	1,25	/	0,40	/	/	50-56 HRC	/	□ < 1010×455
SITHERM 2344	1.2344	0,40	1,05	0,40	5,15	1,35	/	1,00	/	/	52-56 HRC	/	□ < 1010×355
SITHERM 2344R	1.2344	0,40	1,05	0,40	5,15	1,35	/	1,00	/	/	52-56 HRC	/	□ < 1010×305
SITHERM 2367	1.2367	0,38	0,40	0,40	5,00	3,00	/	0,55	/	/	53-57 HRC	/	□ < 705×355
SITHERM 2714	1.2714	0,55	0,25	0,75	1,10	0,45	/	0,10	/	/	56-58 HRC	/	□ < 1010×410
SITHERM S353R	/	0,36	0,30	0,30	5,00	2,30	/	0,60	/	/	54-56 HRC	Φ > 202 mm < Φ 282 mm	□ < 760×455
SITHERM S360R	/	0,52	0,25	0,30	4,80	3,00	0,60	0,60	/	/	62-64 HRC	Φ > 123 mm < Φ 263 mm	□ < 610×310
SITHERM S361R	/	0,37	0,25	0,43	4,90	1,60	1,60	0,59	/	/	56-58 HRC	/	□ < 810×410
SITHERM S140R	/	0,36	max. 0,10	/	/	3,20	2,10	/	1,20	/	50-52 HRC	/	□ < 705×300

SIJ grade	W. NR.	C	Si	Mn	Cr	Mo	Ni	V	W	Other	Achievable hardness	Stock program	
SIHARD 2080	1.2080	2,05	0,25	0,30	11,50	/	/	/	/	/	63-66 HRC	Φ > 25 mm < Φ 202 mm	□ < 500×200
SIHARD 2358	1.2358	0,60	0,35	0,80	4,50	0,50	/	0,25	/	/	Q+T 280-325 HB	/	□ < 710×350
SIHARD 2363	1.2363	1,00	0,30	0,55	5,20	1,05	/	0,20	/	/	63 HRC	/	□ < 605×355
SIHARD 2379	1.2379	1,55	0,25	0,30	11,50	0,70	/	1,00	/	/	62-64 HRC	Φ > 10 mm < Φ 603 mm	□ < 1000×300
SIHARD 2550	1.2550	0,60	0,85	0,30	1,05	/	/	0,15	2,00	/	60 HRC	Φ > 31 mm < Φ 81 mm	□ < 510×150
SIHARD 2767	1.2767	0,45	0,25	0,30	1,35	0,25	4,00	/	/	/	56 RC	/	□ < 805×405
SIHARD 2842	1.2842	0,90	0,25	2,00	0,35	/	/	0,10	/	/	63-65 HRC	Φ > 16 mm < Φ 302 mm	□ < 805×305
SIHARD S460R	/	1,00	1,10	0,30	8,00	2,70	/	0,30	/	/	60-62 HRC	/	□ < 705×255

SIJ grade	W. NR.	C	Si	Mn	Cr	Mo	Ni	V	W	Other	Supply Condition	Achievable hardness	Stock program	
SINOXX 4112	1.4112	0,90	max. 1,0	max. 1,0	18,00	1,10	/	0,10	/	/	HB max. 265	56 HRC	Φ > 16 mm < Φ 375 mm	□ < 605×305
SINOXX 4125	1.4125	1,08	max. 1,0	max. 1,0	17,00	0,60	/	/	/	/	HB max. 269	min. 58 HRC	Φ > 17 mm < Φ 352 mm	□ < 605×305

SIJ grade	W. NR.	C	Si	Mn	Cr	Mo	Ni	V	W	Other	Supply Condition	Achievable hardness	Stock program	
SIQUAL 1730	1.1730	0,45	0,30	0,70	/	/	/	/	/	/	HB max. 210	/	Φ > 20 mm < Φ 300 mm	□ < 2000×200
SIQUAL 7225	1.7225	0,41	0,20	0,75	1,05	0,23	/	/	/	/	Q+T 900-1100 N/mm²	/	/	/
SIQUAL 8159	1.8159	0,51	max. 0,40	0,90	1,05	/	/	0,18	/	/	HB max. 248	/	Φ > 20 mm < Φ 100 mm	/
SIQUAL 2162	1.2162	0,21	/	1,30	1,20	/	/	/	/	/	HB max. 210	/	/	□ < 1000×300

SITHERM^{...} 2343R



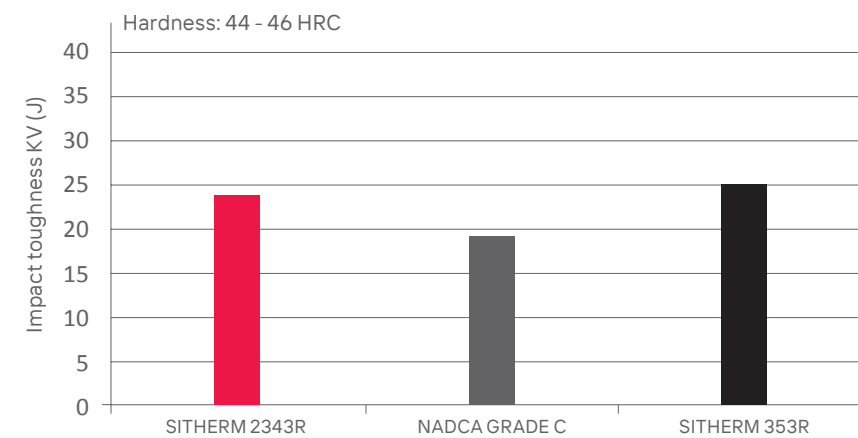
SITHERM 2343R is a general-purpose hot work tool steel, providing a favorable combination of toughness, wear resistance and ease of machining operation. It is produced using ESR remelting procedure which ensures highest purity for demanding applications such as high runner high pressure die casting tools and molding of transparent optical plastics such as car lights.

Tools made from this steel can be water cooled and subject to nitriding treatment without appreciable loss of hardness.

Impact toughness of this steel is considerably higher compared to SITHERM 2344R at the expense of lower hardness and wear resistance.

SITHERM 2343R is certified according to NADCA#229, however HTS is able to guaranty significantly higher mechanical properties and stricter control of microstructure.

Toughness



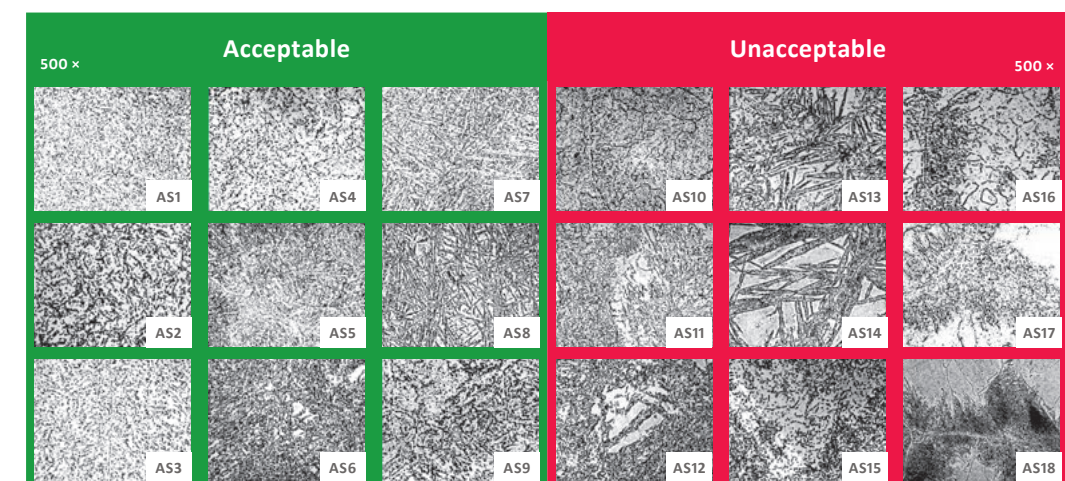
Guarantied impact toughness SITHERM 2343R by HTS

- Standard EN ISO 148-2018
- Hardness: 44-46 HRC

Block size (mm) / NADCA#207-2016: KV ₂ (J)							
<810 × 365		< 1010 × 450		> 1010 × 460		NADCA#229	
Avg.	Min.	Avg.	Min.	Avg.	Min.	Avg.	Min.
23	18	23	17	23	16	19	15

Microstructure

Acceptable microstructure for block size (mm) ≤ 810 x 365 is AS1-AS6 and for block size (mm) > 810 x 365 AS1-AS9.



(All microstructures etched with 5% Nital)
„AS“ – Rating acceptability criteria of annealed microstructure according to NADCA#229-2016, 500 × magnification

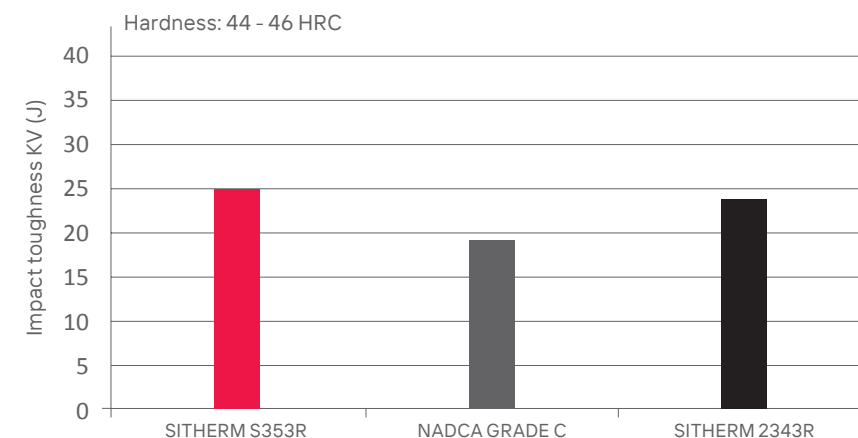


SITHERM S353R is a modified steel grade able to achieve high impact and fracture toughness, along with excellent resistance to thermal fatigue at typical application hardness levels for die casting, die forging, and extrusion. It is designated as grade C acc. to NADCA#229 and also certified, however this steel grade routinely exceeds the standards requirements.

SITHERM S353R is primarily designed for die casting of light metals and alloys. It is recommended for the production of highly stressed structural parts exposed to high temperatures, where a superior level of resilience and thermal fatigue resistance is required. It is also suitable for tools used for die forging, extrusion of aluminum and hot stamping.

SITHERM S353R is supplied in an annealed condition, with a maximum hardness of 229 HBW (735 N/mm²).

Toughness



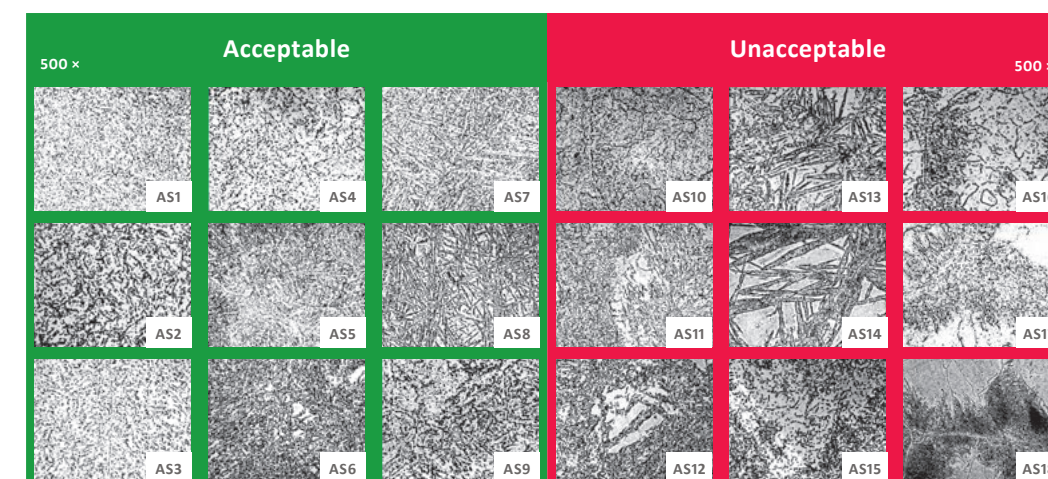
Guaranteed impact toughness SITHERM S353R by HTS

- Standard EN ISO 148-2018
- Hardness: 44-46 HRC

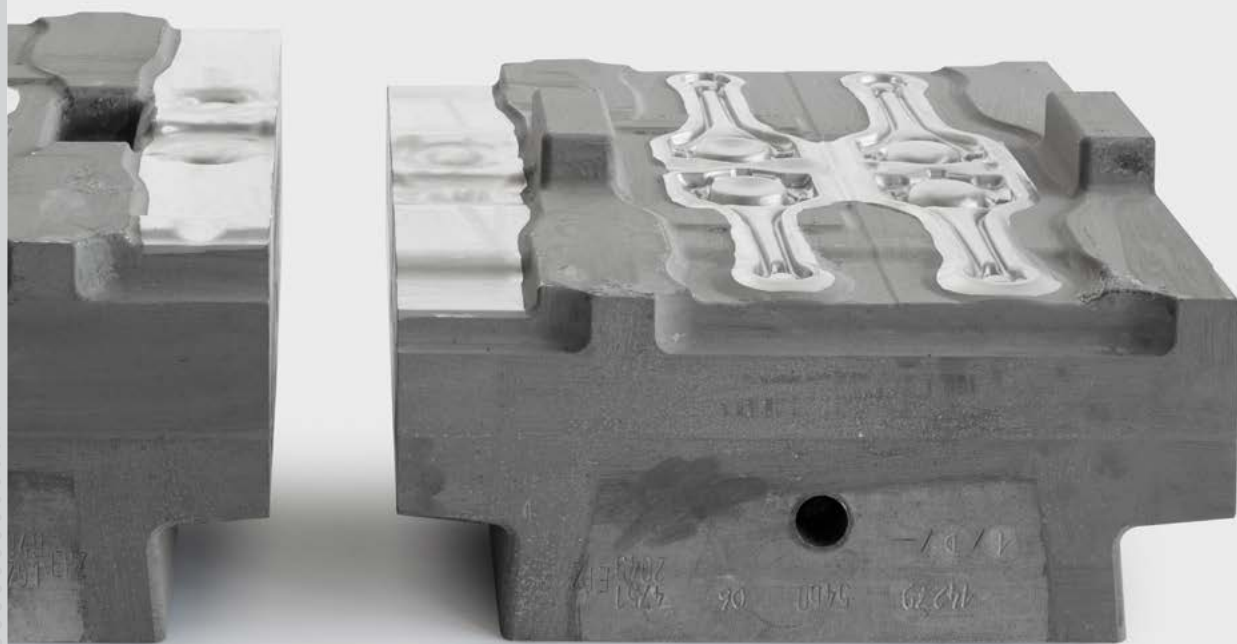
Block size (mm) / NADCA#207-2016: KV ₂ (J)					
≤712 x 304		<762 x 457		NADCA#229	
Avg.	Min.	Avg.	Min.	Avg.	Min.
25	20	23	18	19	15

Microstructure

Acceptable microstructure is AS1-AS6.



(All microstructures etched with 5% Nital)
„AS“ – Rating acceptability criteria of annealed microstructure according to NADCA#229-2016, 500 × magnification



SITHERM S360R is a modified steel grade able to achieve high work hardness in excess of 55HRC, while still retaining considerable impact and fracture toughness. This grade is not subject to NADCA#229, but is tested according to the same level of mechanical properties as grade B.

Compared to other conventional steels in this group, SITHERM S360R contains a higher carbon content and is modified with the addition of nickel. Higher carbon improves the achievable working hardness, which increases the wear resistance of die forging dies, hot stamping tools, hot cutting knives as well as tools for molding of abrasive plastics. It also improves the washout resistance of inserts used in high pressure die casting tools.

Nickel is added in order to improve the toughness, hardenability, and thermal conductivity of the steel. As a result, it helps to achieve more uniform properties across all sections of the tool.

Applications

Typical fields of application for SITHERM S360R tool steel in hot working:

Forging

Production of molds, inserts, and punches for hot metal stamping.

Die casting

Molds and inserts for die casting of light metals.

Injection molding

For long run production molds, molds for reinforced plastics and compression molding

Hot Stamping

Production of tools for hot stamping of sheets.

Other Sectors

For example, industrial knives for hot cutting.

Quality comparison

Compared to other conventional steels in this group, SITHERM S360R contains a higher carbon content and is modified with the addition of nickel. This enhances the toughness, hardenability, and thermal conductivity of the steel (or the tools). As a result, it helps achieve more uniform properties across all sections of the tool.

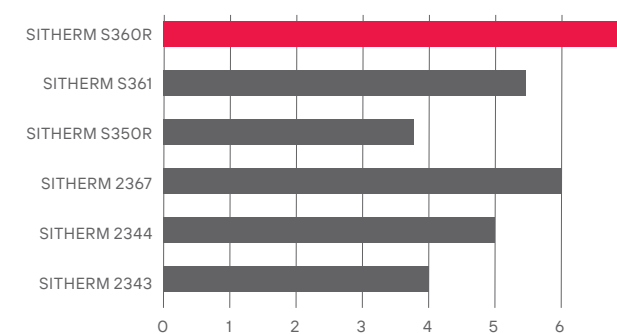


Fig 1: Comparison of hot strength between different tool steels for hot working.

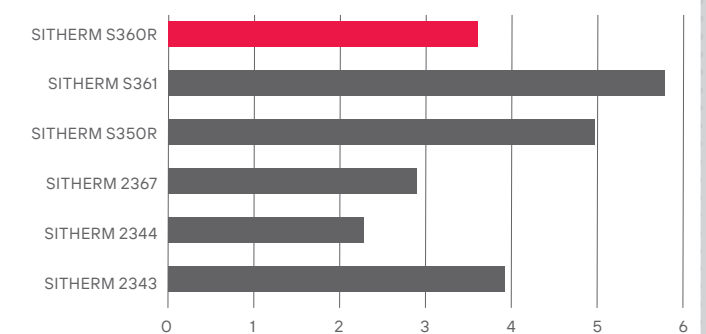
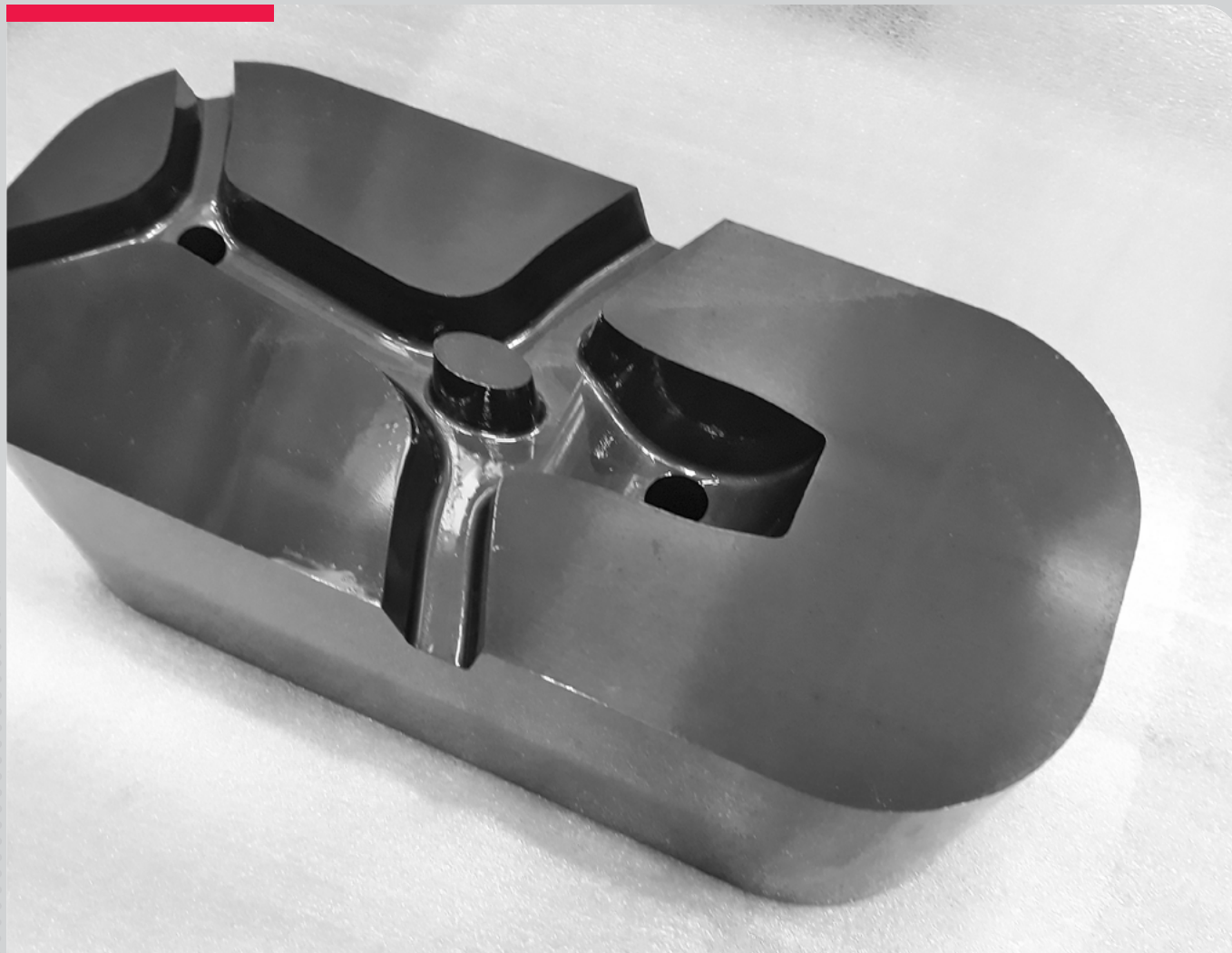


Fig 2: Comparison of toughness between different tool steels for hot working relative to a hardness of 44-46 HRC (NADCA#229-16).



SITHERM S140R is a modified steel grade with the aim of obtaining the highest possible thermal conductivity, while maintaining a sufficient level of toughness and hardenability. This grade is not subject to NADCA#229, but is tested according to the same level of mechanical properties as grade B.

SITHERM S140R main characteristic is its **high thermal conductivity**, which is maintained even at elevated temperatures. This results in greater resistance to the formation of intergranular cracks, known as “pyrocracks,” caused by thermal fatigue, a particularly important feature in the die-casting industry.

The increase in thermal conductivity has been achieved without compromising other fundamental properties of the material, such as hardness, hot wear resistance, toughness, hardenability, and oxidation resistance. This steel offers high resistance to tempering and softening due to prolonged exposure to high temperatures, making it highly suitable for manufacturing tools for die-casting, extrusion dies, and tools and molds for hot stamping.

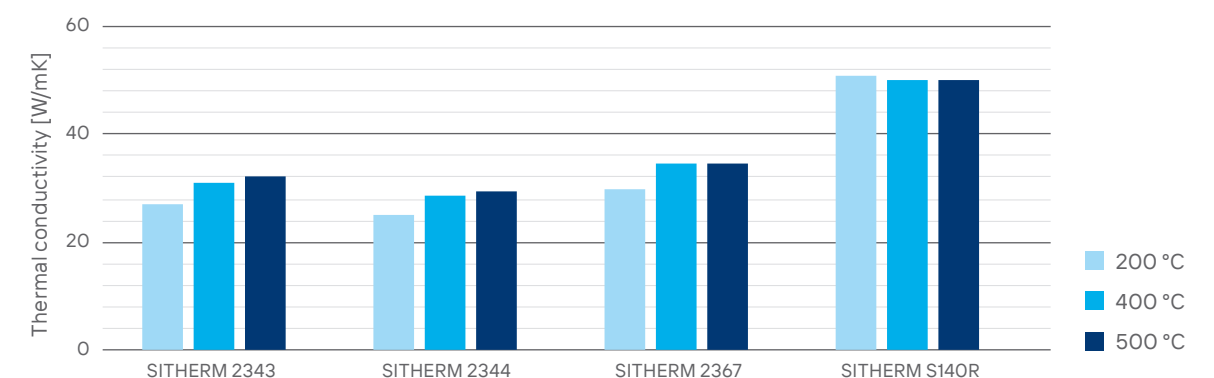
Applications

SITHERM S140R is intended for:

- injection molding molds requiring rapid and/or uniform cooling,
- hot runner systems for plastic molding,
- inserts used in die casting which are prone to overheating,
- small die casting tools with large surfaces exposed to high thermal loads
- hot shearing blades subject to high thermal loads, where Cr-Mo-V steel blades would overheat and soften,
- other applications requiring high thermal conductivity.

Working hardness from 44 up to 50 HRC.

Thermal conductivity



Quality comparison

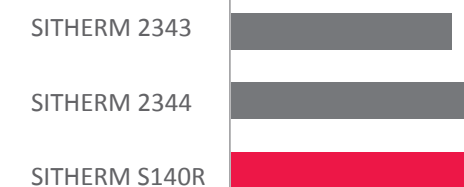


Fig 2: Heat resistance comparison



Fig 3: Toughness comparison

SIHARD^{...} S460R



SIHARD S460 cold working tool steel, produced by SIJ Metal Ravne, is a self-hardening CrMoV tool steel that offers an excellent combination of high hardness and toughness. It is primarily available in round bars for the construction of tools for cold working.

Applications

Typical applications for SIHARD S460 cold working tool steel include:

- Shearing dies for medium to thick sheet metal
- Knives and blades for shears
- Thread rolling dies
- Punches for drilling
- Work and intermediate rolling cylinders
- Coining dies
- Dies and punches for stamping
- Cold heading tools

Quality comparison

SIHARD S460 steel is a high-quality tool steel with high hardness and toughness. Compared to conventional SIHARD 2379 (AISI D2) steel, SIHARD S460 has greater wear resistance, better hardenability, and is capable of achieving higher hardness and toughness. Toughness is important to prevent cracks and chipping, which can lead to structural failure of the steel. The toughness is superior to the traditional SIHARD 2379 (AISI D2) for cold working.

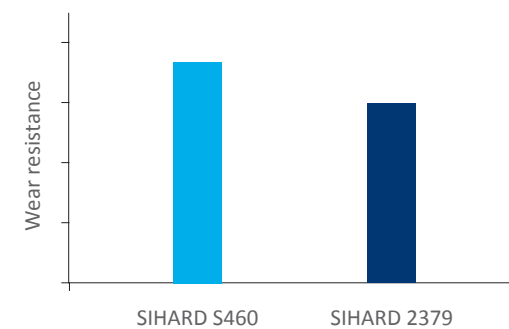


Fig. 1: Comparison of wear resistance

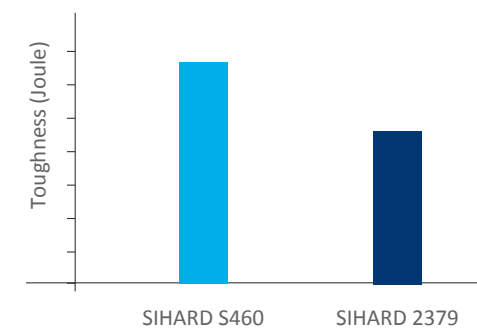


Fig. 2: Comparison of hardness and toughness

Temperature

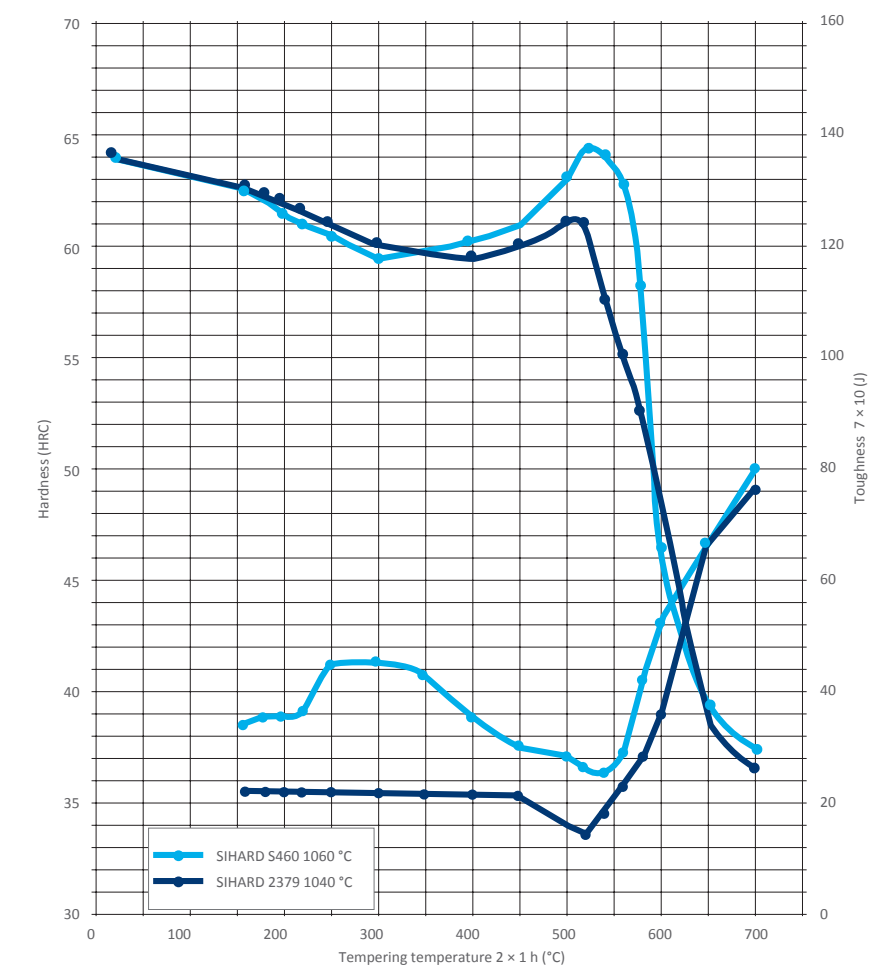


Fig. 3: Tempering diagrams

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