
sij

Wear-resistant and high-strength steels

**SIDUR | SIMAXX**

sij | group

SIJ is a vertically integrated holding company, the leading steel manufacturer in Slovenia, and one of the largest stainless and special steel manufacturers in Europe. SIJ Group consists of the two largest steel companies in Slovenia (SIJ Acroni and SIJ Metal Ravne), other manufacturing and processing companies (SIJ Ravne Systems, SIJ SUZ), specialized service and sales centers across Europe and the USA, and companies for scrap steel collection and sales.

**www.sij.si**

**INCREASE YOUR PRODUCT'S LIFESPAN.**

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

**DECREASE MACHINING COSTS.**

Narrow dimensional tolerances, exceeding international standards.

**OPTIMIZE YOUR MANUFACTURING PROCESSES.**

Extensive range of mechanical treatment possibilities to find the best fit for your production process.

**EXCEED YOUR CUSTOMERS' EXPECTATIONS.**

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

SIDUR

SIDUR

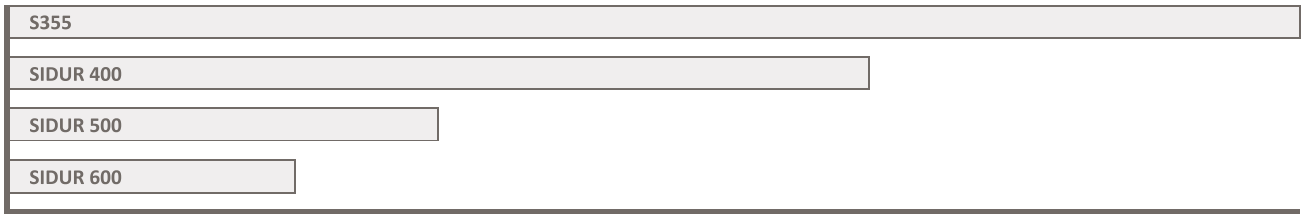
**SIDUR** represents a family of wear-resistant steels with optimized hardness, strength, and toughness. This makes it durable and suitable for use in the most difficult environments where there is a risk of abrasion caused by contact with hard minerals and other abrasive materials.

## SIDUR – EXTREME RESISTANCE TO ABRASIVE WEAR

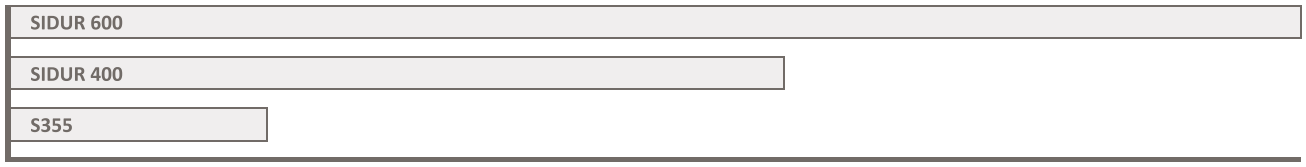
SIDUR steels are produced within a hardness range from 250 to 600 HBW. Compared to non-alloyed structural steels, SIDUR plates have higher durability which extends the lifespan of your products up to three times.

The unique combination of mechanical properties improves bending, welding, and machining properties and deformation levels. SIDUR is a material well suited to a wide variety of applications, where resistance to heavy wear by hard minerals and other abrasive materials is required.

## BETTER PERFORMANCE AT LOWER THICKNESS




## UP TO THREE TIMES LONGER LIFESPAN OF PRODUCTS




For the best performance with proper material selection, wear factors, such as type of counter-body, humidity etc., should be considered. All these factors significantly increase the lifespan of a finished product.

## SPECIAL SIDUR GRADES

### SIDUR 350 HI TEMP

– resistance against softening

SIDUR fine-grained steel combines sufficient resistance to mechanical wear and heat resistance up to 450°C with good weldability and machining, mainly due to the uniform cross-section microstructure. The material responses in temperatures up to 500 °C are provided in the table bellow for SIDUR 350 HI TEMP. The typical limitations of water-quenched steels in temperatures up to 220 °C are not observed in this case.

### SIDUR 3401

– increasing hardness with exposure to wear

The virtue of high manganese steel SIDUR 3401 (Hadfield steel, X120Mn12) is high wear resistance and a work-hardening effect on the steel structure. With exposure to dynamic loads, hardness can be increased by three times compared to its delivered condition.

## SIDUR APPLICATIONS

Bulldozers, earth-moving crusher jaws, shredder plates, shovel buckets, dump trucks, industrial trucks, lorries, **containers for iron ore,** machine parts and tools for mineral extraction (mining), metal working tools – cutting edges, knives, gears, bearings, loaders, buckets, slurry pipe systems, **guiding and shifting plates,** liners for shot blasting units, shot blasting equipment.

## CHEMICAL COMPOSITION IN %

| Ladle analysis | C max | Si max | Mn max | S max | P max | Cr max | Ni max | Mo max | B max |
|---|---|---|---|---|---|---|---|---|---|
| SIDUR 250 | 0.18 | 0.6 | 1.6 | 0.001 | 0.012 | 1.2 | 0.5 | | |
| SIDUR 300 | 0.22 | 0.6 | 1.6 | 0.003 | 0.012 | 1.3 | 0.5 | | |
| SIDUR 400 | 0.26 | 1.0 | 1.5 | 0.002 | 0.012 | 1.0 | 1.0 | 0.5 | 0.004 |
| SIDUR 450 | 0.27 | 1.0 | 1.5 | 0.002 | 0.012 | 1.0 | 1.0 | 0.5 | 0.004 |
| SIDUR 500 | 0.29 | 1.0 | 1.5 | 0.002 | 0.012 | 1.0 | 1.0 | 0.5 | 0.004 |
| SIDUR 550 | 0.38 | 1.0 | 1.5 | 0.005 | 0.02 | 1.1 | 1.3 | 0.5 | 0.005 |
| SIDUR 600 | 0.44 | 1.0 | 0.8 | 0.005 | 0.02 | 1.3 | 2.0 | 0.5 | 0.005 |
| SIDUR 350 HI TEMP | 0.12 | 0.5 | 1.8 | 0.001 | 0.015 | 2.1 | 1.3 | 0.25 | |
| SIDUR 3401 | 1.3 | 0.4 | 13 | 0.001 | 0.02 | 0.55 | | | |

## MAXIMUM CARBON EQUIVALENT CEV = C+Mn/6+(Ni+Cu)/15+(Cr+Mo+V)/5

| Grade \| Thickness range | 6–25mm | 25–40mm | Above 40 mm |
|---|---|---|---|
| SIDUR 400 | 0.46 | 0.59 | 0.67 |
| SIDUR 450 | 0.49 | 0.59 | 0.74 |
| SIDUR 500 | 0.59 | 0.66 | 0.75 |
| SIDUR 550 | 0.78 | | |
| SIDUR 600 | 0.93 | | |

## HARDNESS HBW AND DELIVERY CONDITION

| SIDUR 250 | SIDUR 300 | SIDUR 400 | SIDUR 450 | SIDUR 500 | SIDUR 550 | SIDUR 600 | SIDUR 350 HI TEMP | SIDUR 3401 |
|---|---|---|---|---|---|---|---|---|
| 220–280 | 260–340 | 360–440 | 420–470 | 460–540 | 510–580 | 560–640 | Min. 300 HB | Max. 240 HB |
| Rolled | Rolled | Q+T | Q+T | Q+T | Q+T | Q+T | Normalized | Solution annealed |

According to EN ISO 6506-1. Measured 0.5–2 mm below the surface.

## TYPICAL MECHANICAL CHARACTERISTICS AT ELEVATED TEMPERATURES FOR SIDUR 350 HI TEMP

| Temperature [°C] | $R_{p0.2}$ [MPa] | $R_m$ [MPa] | $A_5$ [%] |
|---|---|---|---|
| 500 | 750 | 880 | 13 |
| 400 | 900 | 1080 | 17 |
| 300 | 930 | 1140 | 17 |
| 200 | 910 | 1060 | 11 |
| 100 | 900 | 1050 | 11 |
| Room | 900 | 1120 | 14 |

## MECHANICAL PROPERTIES*

| | Yield strength (min.) $R_e$ or $R_{p0.2}$ [MPa] | Tensile strength $R_m$ [MPa] | Elongation (min.) $A_5$ [%] | Charpy V-notch, transverse at –20 °C |
|---|---|---|---|---|
| SIDUR 250 | 470 | 900 | 7 | 10 J |
| SIDUR 300 | 500 | 950 | 5 | 10 J |
| SIDUR 400 | 870 | 1250 | 10 | 27 J |
| SIDUR 450 | 970 | 1350 | 10 | 27 J |
| SIDUR 500 | 1100 | 1550 | 8 | 27 J |
| SIDUR 550 | 1350 | 1700 | 7 | 20 J |
| SIDUR 600 | 1500 | 1700 | 8 | 20 J |
| SIDUR 350 HI TEMP | 660 | 1000 | 8 | 20 J |
| SIDUR 3401 | 350 | 800 | 30 | >100 J |

* orientational value

## DIMENSIONAL RANGE*

| | Thickness [mm]* | Width [mm]* | Length [mm] |
|---|---|---|---|
| **SIDUR 250** | 6–40 | 1000–2500 | 2000–12000 |
| **SIDUR 300** | 6–40 | 1000–2500 | 2000–12000 |
| **SIDUR 400** | 6–70 | 1000–2500 | 2000–12000 |
| **SIDUR 450** | 6–70 | 1000–2500 | 2000–12000 |
| **SIDUR 500** | 6–50 | 1000–2500 | 2000–12000 |
| **SIDUR 550** | 6–25 | 1000–2000** | 2000–12000 |
| **SIDUR 600** | 6–25 | 1000–2000** | 2000–12000 |
| **SIDUR 350 HI TEMP** | 6–50 | 1000–2500 | 2000–12000 |
| **SIDUR 3401** | 3–80 | 1000–2500 | 2000–12000 |

*Must be agreed before ordering
**Available only with trimmed edges. Other grades available with untrimmed edges.

## TOLERANCES

Upon request, narrower tolerances for thickness, shape, length, width and flatness are available than those required by EN 10029.

## SURFACE PROPERTIES

According to EN 10163-2.

Anticorrosive primer red oxide colour available upon request.

## SIDUR IN A WORKSHOP

### BENDING RECOMMENDATIONS

| | | R/t | | W/t | | |
|---|---|---|---|---|---|---|
| | Thickness | Transverse | Longitudinal | Transverse | Longitudinal | Springback |
| **SIDUR 400** | 6 ≤ t < 20 | 3.0 | 4.0 | 10.0 | 10.0 | 9–13 |
| | t ≥ 20 | 4.5 | 5.0 | 12.0 | 12.0 | |
| **SIDUR 450** | 6 ≤ t < 20 | 4.0 | 5.0 | 10.0 | 12.0 | 11–18 |
| | t ≥ 20 | 5.0 | 6.0 | 12.0 | 14.0 | |
| **SIDUR 500** | 6 ≤ t < 20 | 5.0 | 6.0 | 12.0 | 14.0 | 12–20 |
| | t ≥ 20 | 7.0 | 8.0 | 16.0 | 18.0 | |
| **SIDUR 550** | 6 ≤ t 25* | 6.0 | 7.0 | 16.0 | 18.0 | 15–22 |
| **SIDUR 600** | 6 ≤ t ≤ 10* | 6.0 | 7.0 | 16.0 | 18.0 | 15–22 |
| | t > 10 | Bending is not recommended, contact SIJ Acroni. | | | | |

*Max. bending angle 45° TRANSVERSE and 20° LONGITUDINAL

Minimum recommended punch radius (R) and die opening width (W) for plate thickness (t) when the plate is being bent to 90° along the direction of rolling and at right angles to the direction of rolling – and also the corresponding springback.

**Note:** Thermal cut and sheared edges must be properly prepared before bending.

### CUTTING RECOMMENDATIONS

SIDUR can be cut by using regular thermal cutting processes or by using cold methods of shearing for thin plates. Waterjet is also possible. There is no risk of softening and distortion. When cutting thicker SIDUR plates, especially when using oxy-fuel, special care must be taken before and after the cutting process to prevent (delayed) cut edge cracking. Plate preheating is one of the most important solutions before cutting. Additional controlled cooling or post–heating of the cut edge is also carried out where necessary to reduce residual stresses. Preheating is more reliable for reduction or redistribution of buildup stresses than postheating due to the hardening effect in the HAZ. Nevertheless, it is useful for hydrogen removal in the case of oxy-fuel. Cooling, where possible, is done by pilling even if the steel was not preheated.

| **Method of cutting:** | **submerged plasma** | **dry-plasma / oxy-fuel** | **laser** | **waterjet** |
|---|---|---|---|---|
| **Method of preheating:** | - | blow-pipe system / furnace / torch / warm pilling / electric heating mats | - | - |
| **Heating temperature:** | See the table of recommended min. preheating temperatures and max. allowed temperatures. | | - | - |
| **Soaking time in minutes per mm:** | - | Min. 3 min/mm at min. temperature | - | - |
| **Cooling method:** | insulating blanket / warm pilling / furnace | | - | - |
| **If the blow-pipe system is used, temperature measurement should be done on the opposite side of the plate.** | | | | |

## WELDING SIDUR

| Welding process or procedure | Welding materials/ Welding process | EN Designation (EN ISO 2650, EN ISO 3581, EN ISO 3580, EN ISO 636, EN ISO 14171, EN ISO 16834, EN ISO 21952, EN ISO 17632, EN ISO 14343, EN ISO 14341) | SIJ Acroni Wear Resistant Plate Grade | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SIDUR 250 | SIDUR 300 | SIDUR 400 | SIDUR 450 | SIDUR 500 | SIDUR 550 | SIDUR 600 | SIDUR Hi-Temp | SIDUR 3401 |
| **Welding *** | Electrodes for MMAW | E 42 4 B 32 H5 | • | • | • | • | • | | | • | |
| | | E 42 6 B 42 H5 | | | • | • | • | • | • | • | |
| | Flux cored wires for FCAW | T 46 4 MM1 H5 | • | • | • | • | • | • | • | | |
| | | T 42 4 BM/C3 H5 | • | • | • | • | • | • | • | | |
| | Massive wires for GMAW / GTAW | G 42 5M/C G3Si1 | • | • | • | • | • | • | • | | |
| | | G 46 4M/C G4Si1 | | | • | • | • | • | • | • | |
| **Welding **** | Electrodes for MMAW | E 42 6 B 42 H5 | • | • | • | • | • | | | | |
| | | E 69 6 Mn2NiCrMo B 42 H5 | | | • | • | • | • | | • | |
| | | E 79 4 Mn2Ni1CrMo B 42 H5 | | | | • | • | • | • | • | |
| | | E 18 8 Mn B 22 | | | | | | | | | • |
| | | E 20 10 3 R12 | | | | | | | | | • |
| | Flux cored wires for FCAW | T 69 4 Mn2NiCrMoMM1 H5 | | | • | • | • | • | | | |
| | | T 69 6 Mn2NiCrMoBM/ C 3H5 | | | • | • | • | • | | | |
| | Massive wires for GMAW / GTAW | G 69 4M Mn3Ni1CrMo | • | • | • | • | • | • | • | • | |
| | | G 89 6 M Mn4Ni2CrMo | | | • | • | • | • | • | • | |
| | | G 18 8 Mn / W 18 8 Mn | | | | | | | | | • |
| **Hardfacing** | Electrodes for MMAW | E Fe 1 | • | • | | | | | | | |
| | | E Fe 3 | | • | • | • | • | | | | |
| | | E Fe 8 | | | | | • | • | • | | |
| | | E Fe 9 | | | | | | | | | • |
| **Interlayer for hard-facing** | Electrodes for MMAW | E 18 8 Mn B 22 | | | • | • | • | • | • | | |
| | Massive wires for GMAW / GTAW | G 18 8 Mn / W 18 8 Mn | | | • | • | • | • | • | | |

* Those filler materials are suitable for welding of SIDUR steels with unalloyed construction steels like S235JR or S355J2. They are also suitable for root passes or welding of the joints where strength of the joint is not critical parameter.

** Those filler materials are suitable to weld SIDUR steels with each other and for welding of the joints where high strength of the joint shall be achieved.

## RECOMMENDED WELDING PROCEDURES

1. For SIDUR steels in combination with unalloyed material types S355, we recommend welding materials marked with *.

2. For welding SIDUR steels with each other, for root and filling passes, we recommend under matching welding materials marked with * or fine-grained welding materials marked with **. To achieve higher hardness on the surface, cover layers should be welded with suitable hardfacing welding materials.

3. For cladding on SIDUR steels, we recommend buffer layer with austenitic 307 (18/8/6) welding materials without preheating and cover layers with suitable welding materials.

## MINIMUM RECOMMENDED PREHEAT TEMPERATURE

| Minimum recommended preheat temperature [°C] | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| **SIDUR 400** | Room temp. | | | | 75 | | | | 175 | | | | | | | |
| **SIDUR 450** | Room temp. | | | | 125 | | | | 175 | | | | | | | |
| **SIDUR 500** | Room temp. | | | 125 | | | 175 | | | | | | | | | |
| **SIDUR 550** | 150 | | | | | | | | | | | | | | | |
| **SIDUR 600** | 150 | | | | | | | | | | | | | | | |

For thicknesses up to 13 mm | Data from the table is applicable to single plate thickness when welding with a heat input of 1.7 kJ/mm. | The consumables determine the preheating temperature if its carbon equivalent is higher than that of the plate | Room temperature is approx. 20 °C.

## MAXIMUM RECOMMENDED INTERPASS TEMPERATURE

| Maximum recommended interpass temperature [°C] | |
|---|---|
| **SIDUR 400** | 200 |
| **SIDUR 450** | 180 |
| **SIDUR 500** | 180 |
| **SIDUR 550** | 180 |
| **SIDUR 600** | 180 |

SIJ Acroni SIDUR steels have good weldability. When welding thin plates, preheating is normally not necessary (if the ambient temperature is > 5 °C).

## PREHEATING IS RECOMMENDED:

- if the material is stored outside at temperatures below 5 °C;
- at thicknesses above 20 mm;
- at risk of moisture and condensation.

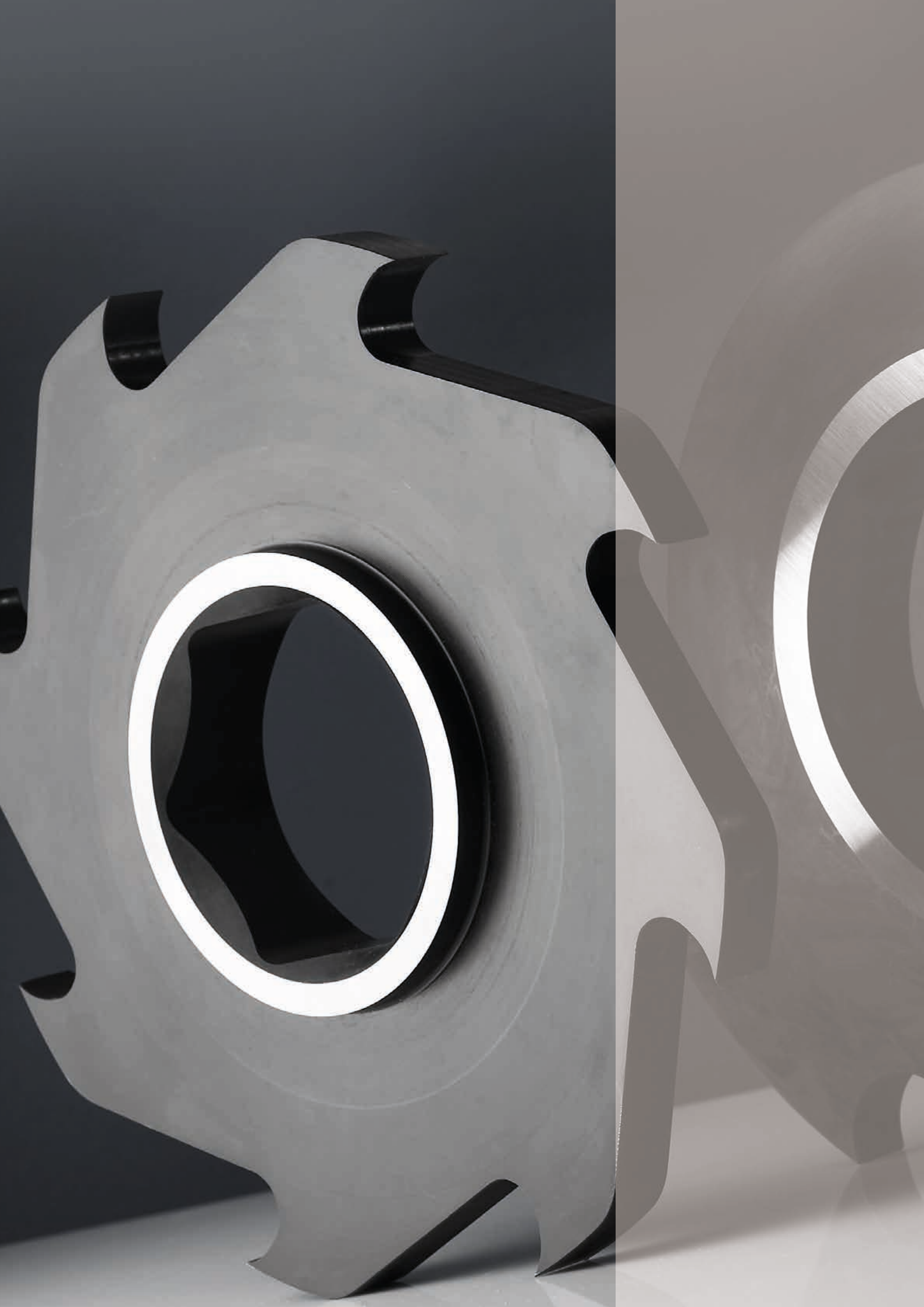
In these cases, the recommended preheat temperature during fusion welding processes should not exceed 200 °C as this can cause reduction in hardness.

Welding should be carried out immediately after the weld edges are finished to avoid surface contamination. All potential contact surfaces with welding metal should always be ground to base layer. Consumables must be properly stored, always according to the manufacturer`s recommendations. Basic coated electrodes should be dried before welding.

In repair welding and joint welding, sharp edges should be avoided and the first layer of weld material should be of thinner dimensions to make sure the energy input is as low as possible.

All welding instructions are recommendations only.

Welding recommendations are also available in EN 1011-1 and EN 1011-2.



**SIDUR CASE STUDY**

**PERFORMANCE** and **DURABILITY** in **PERFECT BALANCE**

## INDUSTRIAL KNIVES MADE OF SIDUR WEAR-RESISTANT STEEL

*"Where extreme wear on knives and other components is expected, the choice of appropriate material is crucial. From the perspective of mechanical treatment, SIDUR can be easily worked with. SIDUR's excellent plate flatness and narrow toler- ances allow us to omit surface treatment for some types of industrial knives and wear parts, thereby saving time and money.*

*According to our measurements, the lifetime of parts produced using SIDUR and SIDUR HI TEMP is up to three times longer in comparison to other steels. To avoid abrasive wear on industrial knives and wear parts, we recommend welding on parts which are most often exposed. Using SIDUR enables us to boost the performance of our clients."*

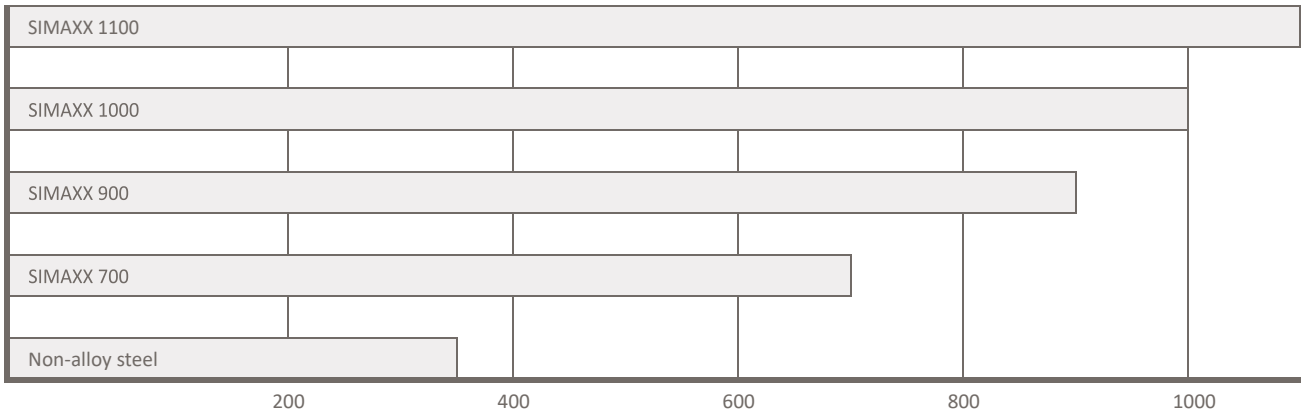
**Stanko Ravlan,** *Production Manager, SIJ Ravne Systems*


SIMAXX

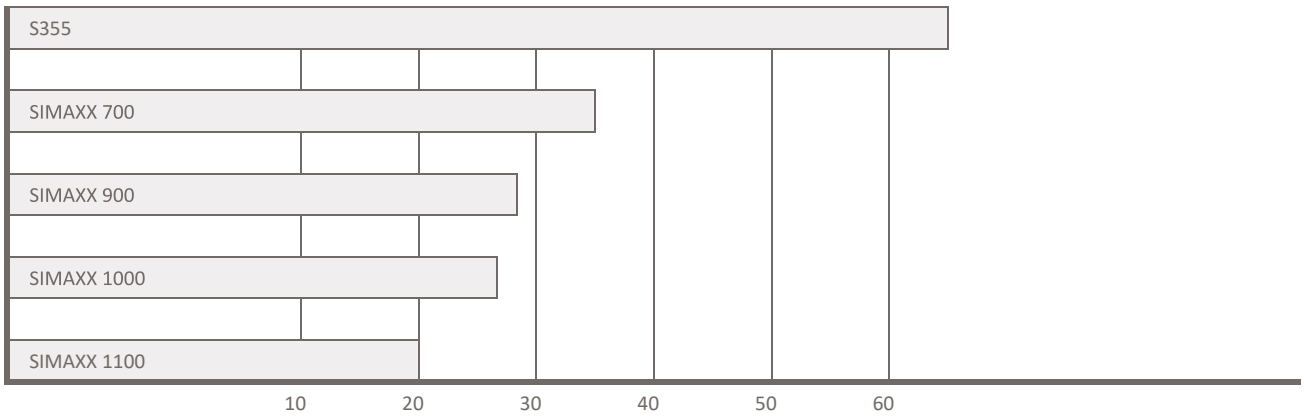
**SIMAXX** is a high-strength steel that makes structures lighter; it is tough and has a homogeneous structure – properties that deliver optimal results. Its extensive shaping possibilities make SIMAXX steel ideal for use in a wide range of industries.

In comparison to non-alloyed structural steel grades, the use of SIMAXX gives better results at lower thickness. Lifting equipment and transport vehicles become lighter and can carry more. The thinner plates require less demanding welding, resulting in lower costs of production.

Yield strength comparison




Same strength at lower thickness



**SIMAXX APPLICATIONS**

Forklifts, excavator buckets, loader buckets, rippers, wind power and offshore cranes, wind power and offshore towers, ship cranes, forestry machines, bridges, light building structures, mining buckets, mining shovels, mining trucks, polygrabs, refuse vehicles, special trailers (heavy loads), mobile cranes, telescopic booms, pipes, mobile bridges.

## CHEMICAL COMPOSITION IN %

| Ladle analysis | C max | Si max | Mn max | S max | P max | Cr max | Ni max | Mo max | B max |
|---|---|---|---|---|---|---|---|---|---|
| **SIMAXX 700** | 0.18 | 0.5 | 1.5 | 0.002 | 0.012 | 1 | 1.20 | 0.5 | 0.005 |
| **SIMAXX 900** | 0.18 | 0.5 | 1.5 | 0.002 | 0.012 | 1 | 1.20 | 0.5 | 0.005 |
| **SIMAXX 1000** | 0.19 | 0.5 | 1.6 | 0.002 | 0.012 | 1.2 | 1.20 | 0.6 | 0.005 |
| **SIMAXX 1100** | 0.19 | 0.5 | 1.5 | 0.005 | 0.0015 | 0.9 | 1.30 | 0.6 | 0.004 |

## MECHANICAL PROPERTIES

| | Yield strength (minimal) Re [MPa] | Tensile strength Rm [MPa] | Elongation (minimal) $A_5$ [%] |
|---|---|---|---|
| **SIMAXX 700** | 690 | 770–940 | 14 |
| **SIMAXX 900** | 890 | 940–1100 | 11 |
| **SIMAXX 1000** | 960 | 980–1150 | 10 |
| **SIMAXX 1100** | 1100 | 1200–1500 | 10 |

Values valid for plates up to 50 mm in thickness. According to EN 10025-6 + A1

## IMPACT PROPERTIES

| | Test temperature [°C] | Impact energy Charpy V-notch, transverse (min.) [J] |
|---|---|---|
| **Q** | –20 | 27 |
| **QL** | –40 | 27 |
| **QL1** | –60* | 27 |

According to EN 10025-6 + A1, except for SIMAXX 1100

* Except for SIMAXX 900, SIMAXX 1000 and SIMAXX 1100

## DELIVERY CONDITIONS

Quenched and tempered (Q + T )

Quenched and tempered + shotblasted + primed

## DIMENSIONAL RANGE*

| | Thickness [mm] | Width [mm] | Length [mm] |
|---|---|---|---|
| **SIMAXX 700** | 6–100** | 1000–2500 | 2000–12000 |
| **SIMAXX 900** | 6–60 | 1000–2500 | 2000–12000 |
| **SIMAXX 1000** | 6–60 | 1000–2500 | 2000–12000 |
| **SIMAXX 1100** | 6–15 | 1000–2500 | 2000–12000 |

*Must be agreed before ordering
** 6–60 mm for SIMAXX 700QL1

## TOLERANCES

Upon request, narrower tolerances for thickness, shape, length, width and flatness are available than those required by EN 10029.

## SURFACE PROPERTIES

According to EN 10163-2.

Anticorrosive primer red oxide color upon request.

## SIMAXX IN A WORKSHOP

## BENDING

| | | R/t | | W/t | | |
|---|---|---|---|---|---|---|
| | Thickness | Transverse | Longitudinal | Transverse | Longitudinal | Springback |
| **SIMAXX 700** | 6–20 | 2.0 | 3.0 | 7.0 | 8.5 | 6–10 |
| **SIMAXX 900/1000** | 6–20 | 3.0 | 4.0 | 8.5 | 10.0 | 8–12 |
| **SIMAXX 1100** | 6–15 | 3.5 | 4.0 | 4.0 | 15.0 | 11–13 |

Minimum recommended punch radius (R) and die opening width (W) for plate thickness (t) when the plate is bent to 90° along the direction of rolling and at right angles to the direction of rolling – and also the corresponding springback.

## WELDING SIMAXX

| Welding materials / Welding process | EN Designation (EN ISO 16834, EN ISO 18276, EN ISO 18275) | SIJ Acroni grade | | | | | |
|---|---|---|---|---|---|---|---|
| | | SIMAXX 550 | SIMAXX 620 | SIMAXX 700 | SIMAXX 900 | SIMAXX 1000 | SIMAXX 1100 |
| Electrodes for MMAW | E 55 6 Mn 1 NiMo B42H5 | • | | | | | |
| | E 69 6 Mn2NiCrMo B 42 H5 | | • | • | | | |
| | E 79 4 Mn2Ni1CrMo B42 H5 | | | | • | • | |
| | E 89 4 ZB62 H5 | | | | | • | • |
| Flux cored wires for FCAW | T 69 4 Mn2NiCrMoMM1 H5 | • | • | • | | | |
| | T 69 6 Mn2NiCrMoBM/C 3H5 | • | • | • | | | |
| | T 89 4 Mn2Ni1CrMoBM3 H5 | | | | • | • | |
| | T 89 4 Mn2NiCrMoMM1H5 | | | | • | • | |
| Massive wires for GMAW / GTAW | G 69 4M Mn3Ni1CrMo | | • | • | | | |
| | G 89 6 M Mn4Ni2CrMo | | | | • | • | • |

Despite the improved weldability of high-strength SIMAXX steels, correct welding procedures should always be followed.

Root-welding passes should be welded with softer filler materials (undermatching), while similar fine-grained welding materials are recommended for filling and cover passes – see the table above.

Welding SIMMAX steels with non-alloy materials can be done using materials intended for non-alloy steels.

For welding SIJ Acroni SIMAXX steels, welding with low energy input is recommended, which involves an optimum welding current and welding with more passes. Welding with an exceedingly high energy input can result in excessive grain growth in the HAZ (heat-affected zone), which greatly deteriorates mechanical properties.

Our experts recommend welding immediately after the joint faces are finished, to avoid contamination. Coated electrodes must be dried before welding.

## MINIMUM RECOMMENDED PREHEAT TEMPERATURE

| Minimum recommended preheat temperature [°C] | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 |
| SIMAXX 700 | Room temperature | | | | | 75 | | | | 100 | | | | | | | | |
| SIMAXX 900 | 75 | | | | | 100 | | | | | | Not available in this thickness range | | | | | | |
| SIMAXX 1000 | 75* | 100 | | | | | | | | | | | | | | | | |
| SIMAXX 1100 | 150 | | | | | | | | | | | | | | | | | |

For thicknesses up to 13 mm | Data from the table is applicable to single plate thickness when welding with a heat input of 1.7 kJ/mm | The consumables determine the preheat temperature if its carbon equivalent is higher than that of the plate | Room temperature is approx. 20 °C

## MAXIMUM RECOMMENDED INTERPASS TEMPERATURE

| Maximum recommended interpass temperature [°C] | |
|---|---|
| SIMAXX 700 | 225 |
| SIMAXX 900 | 200 |
| SIMAXX 1000 | 200 |
| SIMAXX 1100 | 180 |

Welding recommendations are also available in EN 1011-1 and EN 1011-2.


**QUALITY DRIVEN**

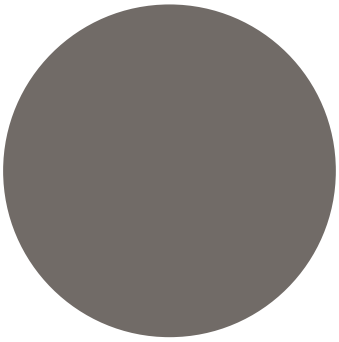
We test each plate to ensure consistent quality you can rely on.

**TESTING AND CERTIFICATION**

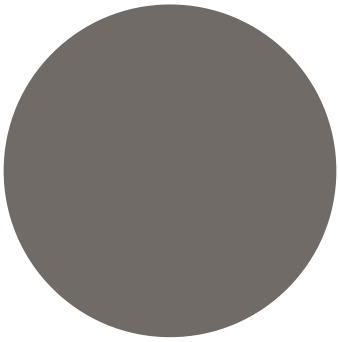
Mechanical properties are measured on each plate according to EN ISO 6506-1 or EN 10003-1. Tests are performed in an accredited in-house testing laboratory. Inspection certificate EN 10204/3.1 is issued for each delivery. By agreement, an inspection certificate EN 10204/3.2. by an independent inspection agency can be provided.

Additional ultrasonic testing according to EN 10160, A/SA435 or A/SA578 can be performed.

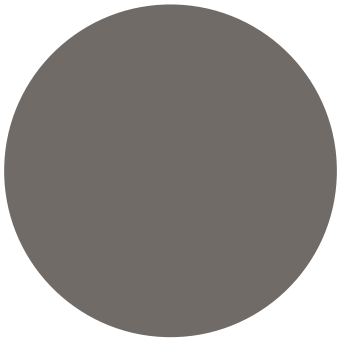
**Our work is never truly done; we are a part of an endless process.** This is symbolised by the **three dots** in our corporate logo and the logos of each SIJ Group product and service brand. **Three dots represent three values.** Each one stands firmly on its own, and they all stand together, forever. As a sign of trust and quality, they symbolise our three main values, which define who and what we are.



**CUSTOMISATION.**



**DILIGENCE.**



**RELIABILITY.**

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