Born from fire,
made to endure

CARBON STEEL

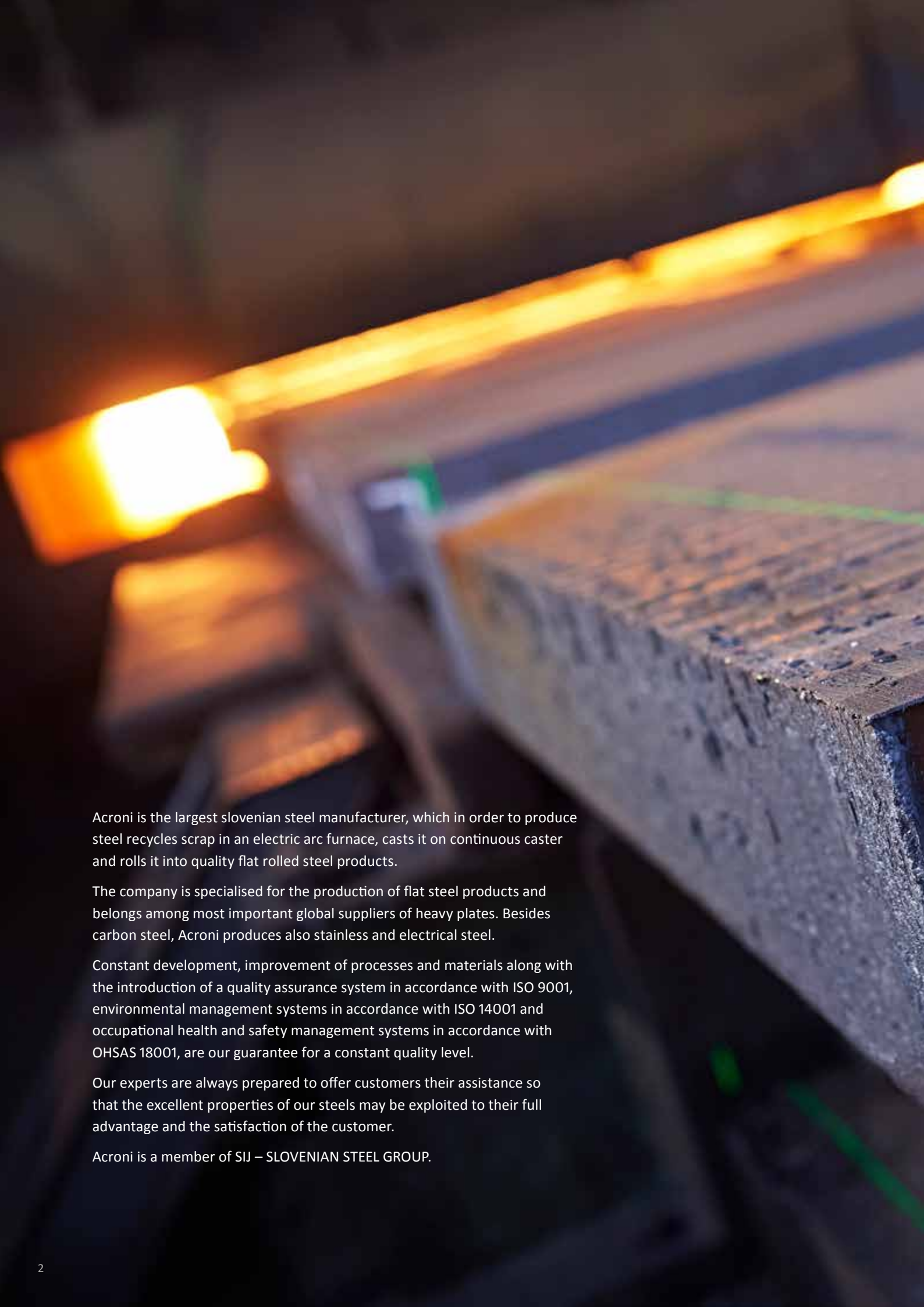
QUENCHED & TEMPERED
HEAVY PLATES

NON-ALLOYED STRUCTURAL STEEL

STRUCTURAL STEELS WITH
IMPROVED ATMOSPHERIC
CORROSION

STEELS FOR PRESSURE PURPOSES

sij | acroni



Acroni is the largest slovenian steel manufacturer, which in order to produce steel recycles scrap in an electric arc furnace, casts it on continuous caster and rolls it into quality flat rolled steel products.

The company is specialised for the production of flat steel products and belongs among most important global suppliers of heavy plates. Besides carbon steel, Acroni produces also stainless and electrical steel.

Constant development, improvement of processes and materials along with the introduction of a quality assurance system in accordance with ISO 9001, environmental management systems in accordance with ISO 14001 and occupational health and safety management systems in accordance with OHSAS 18001, are our guarantee for a constant quality level.

Our experts are always prepared to offer customers their assistance so that the excellent properties of our steels may be exploited to their full advantage and the satisfaction of the customer.

Acroni is a member of SIJ – SLOVENIAN STEEL GROUP.

CARBON STEEL

Carbon steel grades are suitable for various applications in construction of buildings and bridges, machine parts and components, springs and spring parts. The most important properties of these steels are strength, abrasion resistance, formability and weldability. Production forms are hot rolled heavy plates, hot rolled coils and plates from coils and cold rolled coils and sheets.

WE PRODUCE THE FOLLOWING TYPES OF CARBON STEEL

- **QUENCHED & TEMPERED HEAVY PLATES**
  - **High strength steel**
  - **Wear resistant steel**
- **NON-ALLOY STRUCTURAL STEEL**
- **CARBON STEEL MATERIAL SELECTION**
  - **Steel for quenching and tempering**
  - **Spring steel**
  - **Case hardening steel**
- **STRUCTURAL STEELS WITH IMPROVED ATMOSPHERIC CORROSION**
- **STEELS FOR PRESSURE PURPOSES**

QUENCHED & TEMPERED HIGH STRENGTH STEELS

High-strength, quenched and tempered fine-grained heavy plates in the MICRAL group are used where a slim line construction combines with the demands of high mechanical loads, therefore it is used in various application fields specially in constructional and hydraulic steelwork. Their chemical analysis and mechanical properties meet the requirements prescribed by EN 10025-6.

ACRONI BRAND NAME	W.Nr.	GRADE (EN 10025-6)	THICKNESS (mm)
MICRAL 690	1.8931 1.8928 1.8988	S690Q S690QL S690QL1	8 — 100
MICRAL 890	1.8940 1.8983	S890Q S890QL	8 — 80
MICRAL 960	1.8941 1.8933	S960Q S960QL	8 — 80

WEAR RESISTANT STEELS

Wear resistant heavy plates with Acroni's brand name NICRODUR are used where unique combination of appropriate high hardness, high strength and good toughness make the material well suited for a wide variety of applications in which it is exposed to heavy wear by hard minerals and other abrasive materials, like bulldozers, dump trucks, industrial trucks, lorries, machine parts and tools for mineral extraction (mining), buckets, slurry pipe systems, etc.

ACRONI BRAND NAME	DELIVERY CONDITION	THICKNESS (mm)
NICRODUR 250	As rolled	8 — 100
NICRODUR 300	As rolled	
NICRODUR 400	Quenched	
NICRODUR 500	Quenched	
NICROTER 600	Normalized	
X120Mn12	Solution annealed	

DIMENSIONS AND TOLERANCES

Width (mm) 1000-2000/2500

Length (mm) 2000-12000

* max. plate weight 9,60 t

DELIVERY CONDITIONS

- As rolled
- Quenched
- Solution annealed

SURFACE CONDITION

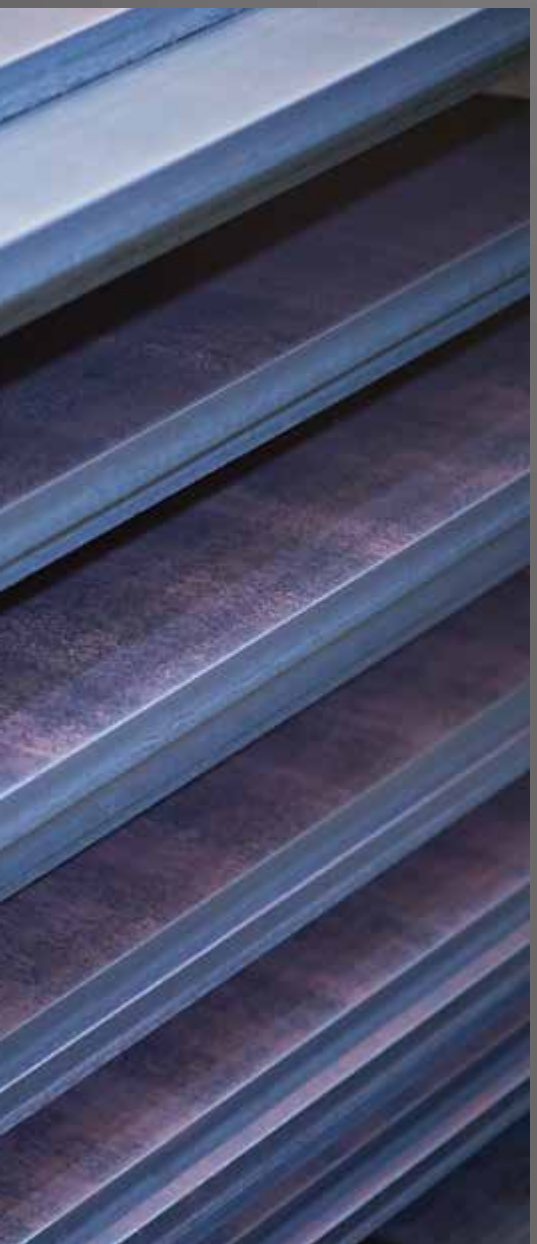
- Black - unscaled
- Shot blasted
- Shot blasted + primed

STANDARDS

EN 10025-1	Hot rolled products of structural steels. General technical delivery conditions
EN 10025-6	Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition
EN 10163-1	Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections. General requirements
EN 10163-2	Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections. Plate and wide flats
EN 10164	Steel products with improved deformation properties perpendicular to the surface of the product. Technical delivery conditions
EN 10160	Ultrasonic Testing of Steel Flat Product of Thickness Equal or GreaterThan 6 mm (Reflection Method)

TOLERANCES ON DIMENSIONS AND SHAPE

EN 10029	Hot rolled steel plates 3mm thick or above - Tolerances on dimensions, shape and mass
FLATNESS	5mm/1m



HOT ROLLED STRIPS AND PLATES AND HEAVY PLATES MADE OF NON-ALLOY STRUCTURAL STEELS

Non-alloy structural steels are steels intended for manufacturing welded constructions, this means bridges, factory halls, parts of agricultural mechanization, pipes and sections.

For these steel grades the garantueed yield and tensile strength have to be combined with good weldability. The welding technique used must be suitable for intended application.
Good toughness and formability are also very important.

Carbon steel material selection

GRADE (EN 10025-2)	W.Nr.
S 235 J0	1.0114
S 235 JR	1.0038
S 235 J2	1.0117
S 275 J0	1.0143
S 275 JR	1.0044
S 275 J2	1.0145
S 355 J0	1.0553
S 355 JR	1.0045
S 355 J2	1.0577
S 355 K2	1.0596

Non-alloy structural steels for cold forming

GRADE (EN 10025-2)	W.Nr.
S 235 J0C	1.0115
S 235 JRC	1.0122
S 235 J2C	1.0119
S 275 J0C	1.0140
S 275 JRC	1.0128
S 275 J2C	1.0142
S 355 J0C	1.0554
S 355 JRC	1.0551
S 355 J2C	1.0569
S 355 K2C	1.0593

S . . . . . structural steel
235, 355 . . . . minimum yield strength
JR. . . . . notch toughness at +20 °C min 27 J
J0. . . . . notch toughness at +0 °C min 27 J
J2. . . . . notch toughness at -20 °C min 27 J
K2 . . . . . notch toughness at -20 °C min 40 J
C . . . . . intended for cold forming

STRUCTURAL STEELS WITH IMPROVED ATMOSPHERIC CORROSION RESISTANCE

GRADE (EN 10025-5)	W.Nr.
S235J0W	1.8958
S355J0WP	1.8945
S355J2WP	1.8946
S355J2W	1.8965

Steels alloyed with P can be delivered in thicknesses up to 20 mm

NON-ALLOY AND ALLOY STEELS FOR PRESSURE VESSELS

Steels for pressure vessels are intended for manufacturing of containers for storage or transportation of liquids or gases (ammonia, chlorine, propane, butane) which operates above or below atmospheric pressure.

Steels for pressure vessels are used in oil refineries, petrochemical plants, submarines, space vehicles, in general, in all hydraulic and pneumatic systems. They are also used as diving cylinders, steam boilers, boilers or pipes operating at high or low temperatures, turbine housings, for the use of fossil fuels.

Typically, pressure vessels are in the form of a cylinders or spheres.

Steels for pressure vessels may be unalloyed or alloyed.

Depending on the application, namely whether the steel used for the elevated or low temperature, these steels are alloyed with different elements. Thus, for example, addition of molybdenum increases the resistance at elevated temperatures, nickel is added to improve properties at low temperatures, chromium is added for corrosion resistance.

Delivery condition for non-alloyed steel grades is normalized. Normalized and tempered and quenched and tempered delivery condition are used for alloy steel grades.

Steels can be made according to the requirements of European and American standards as well as the specific requirements of our customers.

GRADE (EN 10028-2)	W.Nr.	ASME/ASTM
P235GH	1.0345	
P265GH	1.0425	
P295GH	1.0481	
P355GH	1.0473	
16Mo3	1.5415	A204
13CrMo4-5	1.7335	A387Gr12
13CrMoSi5-5	1.7336	A387Gr11
10CrMo9-10	1.7380	A387Gr22
12CrMo9-10	1.7386	A387Gr9
X12CrMo5	1.7362	A387Gr5
X10CrMoVNb9-1	1.4903	A387Gr91

P . . . . . pressure vessels steel
235, 265, 355 . . . . minimum yield strength

DIMENSIONS OF HOT ROLLED STRIPS, PLATES AND HEAVY PLATES

	HOT ROLLED STRIP	HOT ROLLED PLATES	HEAVY PLATES
Thickness (mm)	3 – 6	3 – 6	8 — 130*
Width (mm)	100-1000	800 — 1000	1000- 2000/2500
Length (mm)		2000 – 6000	2000-12000

- Weight (kg/mm width 7 – 9
- ID (mm) 610
- * for thickness over 130 mm special agreement between customer and producer should be made

DELIVERY CONDITIONS

HOT ROLLED STRIPS AND PLATES

- As rolled (AR),
- normalized rolled (N)

HEAVY PLATES

- As rolled (AR),
- normalized rolled (N),
- normalized (N)
- normalized+tempered (N+T)
- quenched and tempered

Heavy plates can be delivered with trimmed or untrimmed edges.

SURFACE CONDITION

- Unscaled (hot rolled strips or plates, heavy plates)
- Pickled (hot rolled strips and plates)
- Shot blasted (heavy plates)

STANDARDS

EN 10025-1	Hot rolled products of structural steels. General technical delivery conditions
EN 10025-2	Technical delivery conditions for non-alloy structural steels
ASME/ASTM 387	Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum
ASTM/ASME516	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower- Temperature Service
ASTM/ASME 515	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
EN 10163-1	Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections. General requirements
EN 10163-2	Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections. Plate and wide flats
EN 10164 *	Steel products with improved deformation properties perpendicular to the surface of the product. Technical delivery conditions
EN 10160	Ultrasonic Testing of Steel Flat Product of Thickness Equal or Greater Than 6 mm(Reflection Method)
EN 10028-1	Flat Products made of steels for pressure purposes
EN 10028-2	Flat Products made of steels for pressure purposes-non alloy and alloy steels with specified elevated temperature properties

TOLERANCES ON DIMENSIONS AND SHAPE

EN 10029	Hot rolled steel plates 3mm thick or above - Tolerances on dimensions, shape and mass
EN 10051	Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels - Tolerances on dimensions and shape

STEELS FOR QUENCHING AND TEMPERING

Strips, sheets and plates made of steels for quenching and tempering are intended for products with high strength and hardness and good toughness at the same time. The products are formed in annealed condition, the desired mechanical properties are achieved by quenching and tempering made by customer.

SPRING STEELS

Sheets, strips and plates made of spring steels are intended for production of all kinds of springs. The products are formed in spheroidization annealed condition, but the desired properties are obtained by proper heat treatment - quenching and tempering made by customer.

CASE HARDENING STEELS

Strips and sheets made of case hardening steels are used for parts with improved wear and fatigue resistance. Other benefits derived from surface hardening are resistance to plastic deformation of the part surface, good capacity for contact load, free of quench cracking, good dimensional control and greater ease in grinding and polishing to smooth surface.

Unalloyed steels for quenching and tempering

GRADE	W.Nr. + STANDARD
C22E	1.1151 (EN 10083-2, EN 10132-3)
C35E	1.1181 (EN 10083-2, EN 10132-3)
C45E	1.1191 (EN 10083-2, EN 10132-3)
C55E	1.1203 (EN 10083-2, EN 10132-3)
C60E	1.1221 (EN 10083-2, EN 10132-3)
C67S	1.1231 (EN 10132-4)
C75S	1.1248 (EN 10132-4)

Steels for quenching and tempering - with Mn

GRADE	W.Nr. + STANDARD
28Mn6	1.1170 (EN 10083-2)
37Mn6	1.1235
40Mn4	1.1157
80Mn4	1.1259
46Mn6	1.0912
50Mn7	1.0913
42MnV7	1.5223

Steels for quenching and tempering - with Cr

GRADE	W.Nr. + STANDARD
34Cr4	1.7033 (EN10083-3)
41Cr4	1.7035
74NiCr2	1.2703

Steels for quenching and tempering - with Cr and Mo

GRADE	W.Nr. + STANDARD
25CrMo4	1.7218 (EN 10083-3,EN10132-3)
34CrMo4	1.7220
42CrMo4	1.7225
42CrMoS4	1.7227 (EN 10083-3)
50CrMo4	1.7228 (EN 10083-3)
34CrMo44	1.7341

Steels for quenching and tempering - with Cr and V

GRADE	W.Nr. + STANDARD
51CrV4	1.8159 (EN 10132-4 EN 10083-3)
58CrV4	1.8161

Steels for quenching and tempering - with with Si and Cr (spring steels)

GRADE	W.Nr. + STANDARD
38Si6	1.5022
46Si7	1.5024
51Si7	1.5025
55Si7	1.5026
65Si7	1.5028
54SiCr6	1.7102
67SiCr5	1.7103

Steels for quenching and tempering - with B

GRADE	W.Nr. + STANDARD
28MnB5	1.0871
27MnCrB5	1.7182 (EN 10083-3)
30MnB5	1.5531 (EN 10083-3)
40MnB4	1.5527

Case hardening steels

GRADE	W.Nr. + STANDARD
C10E	1.1121 (EN 10084)
C15E	1.1141 (EN 10132-2)
16MnCr5	1.7131
20MnCr5	1.7147
17Cr3	1.7016
15CrNi6	1.5919
18CrNi8	1.5920

DIMENSIONS OF HOT AND COLD ROLLED STRIPS, PLATES AND SHEETS

	HOT ROLLED STRIP	HOT ROLLED SHEET	COLD ROLLED STRIP	COLD ROLLED SHEET	HEAVY PLATES
Thickness (mm)	3 - 6	3 - 6*	0,3 - 3	0,5 - 2,0	8 - 100
Width (mm)	100-1000	800 - 1000	30 - 1000	1000	1000 - 2000/2500
Length (mm)		2000 - 6000		2000 – 6000	2000-6000
Weight (kg/mm width)	7 - 9		6 - 8		9,6

- ID (mm) 610 508 and 610

DELIVERY CONDITION

HOT ROLLED STRIP	COLD ROLLED STRIP	HEAVY PLATE
As rolled - (unscaled) Pickled, annealed*	Annealed, skin passed** Cold rolled - hardened	As rolled - (unscaled) As rolled - shot blasted Annealed - (unscaled) Annealed - shot blasted QT - sand blasted QT - sand blasted + primed

* pickled and annealed condition - max. thickness of hot roled strip/plate is 5mm
** Surface finish of cold rolled strips and sheets: MA RL (Ra . 0,6µm)

CARBON STEEL STANDARDS
Material standards

EN 10132-1	Cold rolled narrow strip for heat treatment - Technical delivery conditions - Part1: General
EN 10132-2	Cold rolled narrow strip for heat treatment - Technical delivery conditions - Part 2: Case hardening steels
EN 10132-3	Cold rolled narrow strip for heat treatment - Technical delivery conditions - Part 3: Steels for quenching and tempering
EN10132-4	Cold rolled narrow strip for heat treatment - Technical delivery conditions - Part 4: Spring steels and other applications
EN 10083-1	Steels for quenching and tempering - Part 1: General technical delivery conditions
EN 10083-2	Steels for quenching and tempering - Part 2: Technical delivery conditions for non alloy steels
EN 10083-3	Steels for quenching and tempering - Part 3: Technical delivery conditions for alloy steels
EN 10084	Case hardening steels - Technical delivery conditions
EN 10089	Hot rolled steels for quenched and tempered springs

TOLERANCES ON DIMENSIONS AND SHAPE

EN 10140	Cold rolled narrow steel strip - Tolerances on dimensions and shape
EN 10131	Cold rolled uncoated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimension and shape
EN 10029	Hot rolled steel plates 3mm thick or above - Tolerances on dimensions, shape and mass
EN 10051	Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels - Tolerances on dimensions and shape

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