



**STEELS FOR PRESSURE VESSELS**

**sij** | acroni



In pressure vessel applications, choosing the right steel is crucial for ensuring safety and performance. SIJ Acroni offers a wide range of high-quality low-alloy pressure vessel steels, boiler steel plates and stainless steels for pressure vessels, which can be used at elevated, moderate, or cryogenic temperatures for applications in pressure vessels, LNG, and the oil & gas industry.

## 01 PRESSURE VESSEL STEELS FOR CRYOGENIC AND LNG APPLICATIONS

Transporting and storing liquefied gases demand steels capable of withstanding extremely low temperatures. A special-purpose steel grade SIQUAL 5663 (X7Ni9) and a selection of SINOXX stainless steel grades are specifically designed for cryogenic applications. The addition of nickel to these alloys ensures their ductility and resistance to cracking, enabling secure and efficient handling of materials at extremely low temperatures. These steels are extensively used in LNG applications, ensuring the integrity and reliability of cryogenic systems.

SINOXX austenitic stainless steel grades, suitable for LNG applications and liquid helium storage, have a low carbon content. This reduces cracking and increases impact toughness at operating temperatures as low as  $-269\text{ }^{\circ}\text{C}$  (4 K). Some also contain nitrogen, which increases mechanical properties.

Nickel steel alloy SIQUAL 5663 (X7Ni9) performs best at temperatures between  $-50$  and  $-196\text{ }^{\circ}\text{C}$ . Thanks to its excellent mechanical properties, wall thickness can be reduced, creating cost-efficient solutions for constructing LNG storage and transportation tanks.



### ADVANTAGES

#### SINOXX<sup>\*\*\*</sup>

- Excellent ductility
- Superior weldability
- Extreme temperature resistance ( $-269\text{ }^{\circ}\text{C}$  without loss of toughness)
- Exceptional crack resistance at low temp.
- High mechanical properties at low temp.
- Excellent corrosion resistance

#### SIQUAL<sup>\*\*\*</sup> 5663 (X7Ni9)

- Excellent ductility
- Excellent weldability
- Extreme temperature resistance ( $-196\text{ }^{\circ}\text{C}$  without loss of toughness)
- Exceptional crack resistance at low temp.
- High mechanical properties at low temp.
- Cost-effective low-alloyed alternative for non-corrosion-resistant applications

SIJ Acroni	DESIGNATION			FORM		Corrosion resistance
	WNR.	EN	AISI/ASTM	Quarto plate	Delivery conditions	
<b>SINOXX 4307</b>	1.4307	X2CrNi18-9	304L	•	1D/no. 1	●
<b>SINOXX 4311</b>	1.4311	X2CrNi18-10	304LN	•	1D/no. 1	●
<b>SINOXX 4315</b>	1.4315	X5CrNi19-9	304N	•	1D/no. 1	●
<b>SINOXX 4404</b>	1.4404	X2CrNiMo17-12-2	316L	•	1D/no. 1	●●
<b>SINOXX 4435</b>	1.4435	X2CrNiMo18-14-3	316L	•	1D/no. 1	●●
<b>SINOXX 4406</b>	1.4406	X2CrNiMoN17-12-2	316LN	•	1D/no. 1	●●
<b>SIQUAL 5663</b>	1.5663	X7Ni9	(S)A553 Type I	•	QT	

#### DELIVERY CONDITION:

1D/no. 1 = hot rolled, heat treated, pickled  
QT = quenched & tempered

#### CORROSION RESISTANCE:

○ = low    ● = moderate    ●● = high    ●●● = extreme





Although all stainless-steel grades in this catalogue can be used for pressure vessels that operate within the temperature range of 0 to 280 °C, we recommend SINOXX duplex and superduplex stainless steel grades. Their excellent corrosion resistance and superior mechanical properties at moderate temperatures make them ideal for applications in the oil and gas industry.

If you are looking for a cost-effective solution for applications within the temperature range of 0 to 400 °C, where corrosion resistance is not essential, we recommend our range of low-alloyed steel grades. Thanks to good weldability and toughness, these steels are especially suitable for tanks in the oil and gas industry.

## ■ ADVANTAGES



### SINOXX<sup>\*\*\*</sup>

- Excellent corrosion resistance
- High mechanical properties at moderate temp.

### SIQUAL<sup>\*\*\*</sup>

- Good toughness
- Good weldability

Sij Acroni	DESIGNATION			FORM			Corrosion resistance
	WNR.	EN	AISI/ASTM	Quarto plate	Hot-rolled coils	Delivery conditions	
<b>SINOXX 4362</b>	1.4362	X2CrNiN23-4	S32304	•		1D/no. 1	•
<b>SINOXX 4462</b>	1.4462	X2CrNiMoN22-5-3	S32205	•		1D/no. 1	••
<b>SINOXX 4410</b>	1.4410	X2CrNiMoN25-7-4	S32750	•		1D/no. 1	•••
<b>SINOXX 4501</b>	1.4501	X2CrNiMoCuWN2 5-7-4	S32760	•		1D/no. 1	•••
<b>SINOXX 4301</b>	1.4301	X5CrNi18-10	304	•		1D/no. 1	•
<b>SINOXX 4541</b>	1.4541	X6CrNiTi18-10	321	•		1D/no. 1	•
<b>SINOXX 4401</b>	1.4401	X5CrNiMo17-12-2	316	•		1D/no. 1	••
<b>SIQUAL 0425</b>	1.0425	P265GH	(S)A414 GR E (S)A516 GR 60	•	•	N, NR, HRC also AR	
<b>SIQUAL 0473</b>	1.0473	P355GH	(S)A516 GR 70	•		N, NR	
<b>SIQUAL 5415</b>	1.5415	16Mo3	(S)A204 GR A	•	•	N, NR	

#### • DELIVERY CONDITION:

1D/no. 1 = hot rolled, heat treated, pickled

N = normalized

NR = normalized-rolled

AR = as-rolled

#### • CORROSION RESISTANCE:

• = low      •• = moderate

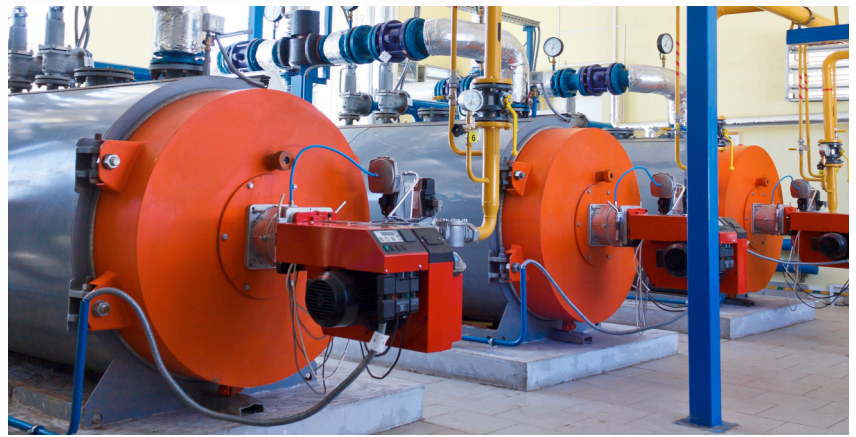
••• = high      •••• = extreme



Whether you need reliable and creep-resistant materials for demanding environments or high-temperature operations, SIJ Acroni's selection of steels for pressure vessel and boiler applications provides the performance you can depend on.

**SINOXX** austenitic stainless steel grades with a higher carbon content are especially suitable for pressure vessel applications requiring corrosion resistance as well as creep resistance at high temperatures up to 600 °C, such as petrochemical and oil and gas industries.

**SIQUAL** pressure vessel and boiler steel plates are designed to maintain high strength even at elevated pressure and temperatures. Thanks to their composition, they can be used at temperatures up to 600 °C. Some grades are also corrosion-resistant. With excellent creep resistance, these steels find applications in industrial flanges, heat exchangers, pipes, boilers, and furnace parts.



**SIPREME 800H** is a nickel-iron-chromium alloy that provides high strength and excellent resistance to oxidation and carburization at high temperatures up to 700 °C. It has good corrosion resistance in oxidizing corrosive environments. SIPREME 800H is the perfect solution for industrial heating, hydrocarbon processing, power generation and petrochemical industries.

## ■ ADVANTAGES

### SINOXX<sup>\*\*\*</sup>

- Excellent creep resistance
- High corrosion resistance
- Superior weldability

### SIQUAL<sup>\*\*\*</sup>

- Excellent creep resistance

### SIPREME<sup>\*\*\*</sup>

- Excellent resistance to oxidation and carburization at high temperatures
- Excellent creep resistance

SIJ Acroni	DESIGNATION			FORM		Corrosion resistance
	WNR.	EN	AISI/ASTM	Quarto plate	Delivery conditions	
<b>SINOXX 4948</b>	1.4948	X6CrNi18-10	304H	•	1D/no. 1	●
<b>SINOXX 4878</b>	1.4878	X8CrNiTi18-10	321H	•	1D/no. 1	●
<b>SINOXX 4919</b>	1.4919	X6CrNiMoB17-12-2	316H	•	1D/no. 1	●●
<b>SINOXX 4571</b>	1.4571	X6CrNiMoTi 17-12-2	316Ti	•	1D/no. 1	●●
<b>SINOXX 4835</b>	1.4835	X9CrNiSiNce21-11-2	S30815	•	1D/no. 1	●●●
<b>SINOXX 4845</b>	1.4845	X8CrNi25-21	310/310S/310H	•	1D/no. 1	●●●
<b>SINOXX 4841</b>	1.4841	X15CrNiSi25-21	314	•	1D/no. 1	●●●
<b>SIPREME 800H</b>	1.4876		<b>800H</b>	•	1D/no. 1	●
<b>SIQUAL 7335</b>	1.7335	13CrMo4-5	(S)A387 GR 12	•	N+T+SB, N+T+SB+P	
<b>SIQUAL 7336</b>	1.7336	13CrMoSi5-5	(S)A387 GR 11	•	N+T+SB, N+T+SB+P	
<b>SIQUAL 7380</b>	1.7380	10CrMo9-10	(S)A387 GR 22	•	N+T+SB, N+T+SB+P	
<b>SIQUAL 7362</b>	1.7362	X12CrMo5	(S)A387 GR 5	•	N+T+SB, N+T+SB+P	○
<b>SIQUAL 7386</b>	1.7386	X11CrMo9-1	(S)A387 GR 9	•	N+T+SB, N+T+SB+P	○
<b>SIQUAL 4903</b>	1.4903	X10CrMoVNb9-1	(S)A387 GR 91	•	N+T+SB, N+T+SB+P	○

#### • DELIVERY CONDITION:

1D/no. 1 = hot rolled, heat treated, pickled  
N = normalized      T = tempered

#### • SURFACE CONDITION:

SB = shot-blasted  
P = primed

#### • CORROSION RESISTANCE:

○ = low      ● = moderate  
●● = high      ●●● = extreme



## ■ DIMENSIONS



Our steel manufacturing process is designed to accommodate your individual needs, with a comprehensive range of widths and lengths available, allowing for a customized solution.

	STAINLESS STEEL QUARTO PLATES	LOW-ALLOY STEEL & BOILER QUARTO PLATES	HOT-ROLLED COILS	HOT-ROLLED SHEETS
Thickness [mm]	8–130	6–110	3–6	3–6
Width [mm]	1000–2500		100–1000	800–1000
Length [mm]	2000–12,000		-	2000–6000
Weight: plates [kg] or coils [kg/mm width]	max. 9600		7–9	-
Thickness [mm]			610	-

## ■ STANDARDS, CERTIFICATIONS AND PRODUCT APPROVALS



SIJ Acroni's steel grades for pressure vessels are manufactured to higher standards, ensuring exceptional chemical composition and material properties to withstand the demanding conditions of pressure vessels. The unique end-use of pressure vessels necessitates the use of pressure vessel quality steel plates that can provide reliability, strength, and durability in extreme environments. Meeting the minimum standard requirements is crucial to guarantee the safety of these vessels and prevent dangerous accidents.

To ensure the best material for your requirements, SIJ Acroni produces steel plates for pressure vessel applications according to the following standards:

- EN 10028-2, 3, 4, 7 – PED
- ASME Boiler and Pressure Vessel Code (BPVC) SA-240/SA-240M

CERTIFIER	APPROVAL	FOR
TÜV SÜD INDUSTRIE SERVICE	AD 2000-Merkblatt W0/TRD 100	Plates, coils, sheets cut from coils and slabs of ferritic, austenitic and ferritic-austenitic steels
TÜV SÜD INDUSTRIE SERVICE	Pressure Equipment Directive 97/23/EC	Plates, coils, sheets cut from coils and slabs of ferritic, austenitic and ferritic-austenitic steels
TÜV SÜD INDUSTRIE SERVICE	Construction Products Directive (CPD) 89/106/EEC	Hot-rolled products of structural steels; Sheet/plate and strip of corrosion resisting steels acc. To EN 10025-1, 2, 6/EN 10088-4
TÜV SÜD INDUSTRIE SERVICE	NORSOK M-650 requirements	Plates of duplex and superduplex steels acc. to ASTM A240/A240M MDS D45 REV. 5 and D55 REV. 5
DNV	Manufacturer certificate in acc. with DNV rules for classification – Ships	Steelmaking and rolled steel products made of normal and high strength steels, steels for boiler and pressure vessels and stainless steel
LLOYD'S REGISTER	LR requirements	Steelmaking and plates of ferritic and austenitic steels

## ■ SUSTAINABILITY



We value flexibility and sustainability, which is why we make small batches of high-quality steel products with high added value and low CO<sub>2</sub> footprint for niche markets. SIJ Acroni is proud to have one of the lowest carbon footprints in the industry.

- **100%** of our steel is made **from recycled steel scrap** in an electric arc furnace. We use magnetic separation to purify and increase the quality of scrap. This helps us reduce our environmental impact and increase the quality of the final product.
- **98%** of waste generated during our production process, such as steel scrap and slag, is **recycled or otherwise reused**.
- 100% of our steel can be endlessly recycled.