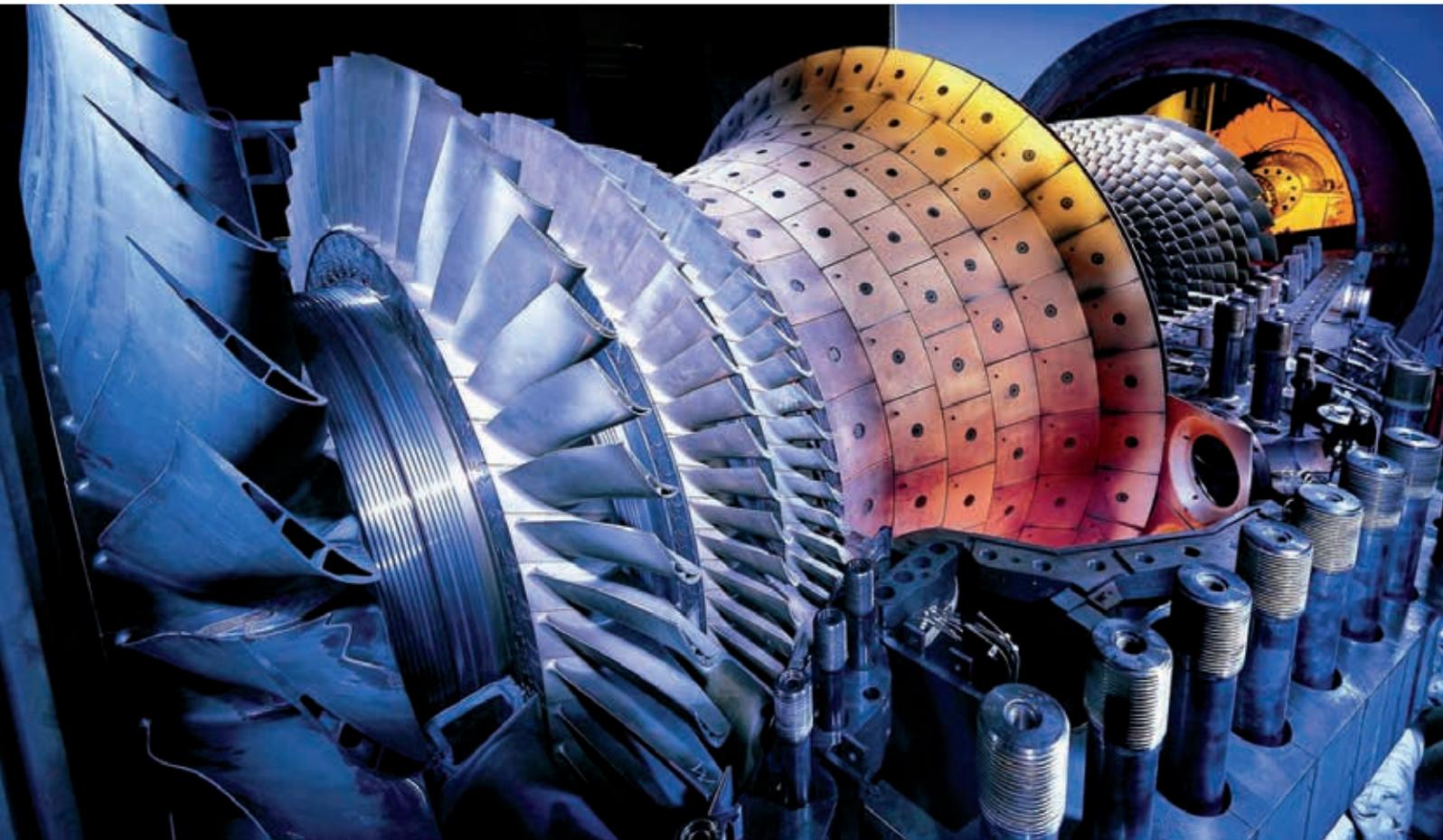


**WTE**  
**POWER STEEL**



# **SPECIAL ALLOYS**

**INCONEL - MONEL - DUPLEX - SUPERDUPLEX**

[www.powersteel.eu](http://www.powersteel.eu)

# QUALITY



WTE PowerSteel supply first quality special steel and alloys. We stock and supply only high quality grades from Europe mills.



Quality is guaranteed by full traceability process system covered by ISO 9001:2008



100% of stock and supplied materials come with original mill atest of EN 10204-3.1 or of EN 10204-3.2 issued by independent third party usually by TÜV Germany or LRQA Lloyd's Register or TÜV Austria.



## To guarantee top quality we provide wide range of testing including the following:

- Ultrasonic (UT)
- Microstructure
- Micropurity
- PMI
- Tension
- Charpy
- Penetrant Testing (PT)
- Acid and salt test
- Eddy Current Testing (ET)
- Radiographic Testing (RT)
- X-Ray
- Magnetic Particle Testing (MT)

## Industrial sectors:

- Powergen / Turbine
- OIL&GAS
- Motorsport
- Offshore
- Chemical / Petrochemical
- Medical
- Cryogenic
- Thermal
- Aerospace

## SHAPES



Round Bar



Pipe



Hex Bar



Sheet



Hollow Bar



Plate

## SERVICES



Sawing



Machining



Plasma cutting



Waterjet cutting



Laser cutting

# NICKEL ALLOYS

## Inconel 625 UNS N0625

2.4668 - NiCr22Mo9Nb - 625 N06625, Alloy 625, AMS 5666

Alloy 625 is a low-carbon Ni-Cr-Mo alloy with Nb addition. This alloy is characterized by good mechanical properties (due to effect of Mo and Nb in the matrix structure), excellent resistance to pitting and crevice corrosion, high resistance to stress-corrosion. Also it resists in a wide range of organic and mineral acids and at high temperature as well to oxidation and to carburization. In accordance to heat treat, temperatures it is classified as grade 1 (annealed) or grade 2 (solution ann.). Grade 2 is recommended for applications where good resistance to creep or rupture up to 1000°C is requested. Grade 1 is recommended for applications up to 840°C when finer grain size and high mechanical properties are requested.

## Inconel 718 UNS N0718

2.4856 - NiCr19MoNb - 718 N07718, Alloy 718, AMS 5662, AMS 5663, API 6A, NACE MR0175

Alloy 718 is a precipitation-hardening austenitic Ni-base superalloy. High strength and corrosion resistance (at high and low temperature) are its stand out features. It is also characterized by good oxidation resistance up to 1000° C, good mechanical properties at temperature below 0° C and good resistance to stress-corrosion cracking and pitting.

## Inconel 825 UNS N0825

2.4858 - NiCr21Mo - UNS N08825, Alloy 825

Alloy 825 is a Ti-stabilized fully austenitic Ni-Fe-Cr alloy with Mo and Cu additions. It is characterized by excellent resistance to stress-corrosion cracking, good resistance to pitting, crevice corrosion and to oxidizing and reducing acids. Its mechanical properties are good from cryogenic to moderately high temperature, but at temperature above 540° C this alloy shows a lower ductility and impact strength. It is not recommended for high-temp. services where creep-rupture resistance is requested.

## Inconel 925 UNS N0925

UNS N09925, Alloy 925

Inconel 925 This is an alloy of high resistance to corrosion and high mechanical strength. The resistance is developed by the precipitation of the  $\gamma'$  phase through solubilization and aging heat treatment, so as to maintain ductility and toughness at high levels. It is mainly used in components and parts for the production of natural gas and oil.

## Monel 400

2.4360 - NiCu30Fe - UNS N04400, Alloy 400

Alloy 400 is a Ni-Cu alloy characterized by corrosion resistance in marine and chemical applications (hydrofluoric acid, non-oxidizing dilute acids, alkalis and salt solutions, organic acids, dry gases such as chlorine and to hydrogen chloride), high strength and toughness from temperatures below 0° up to 550° C. The mechanical properties can be improved only by cold working.

## Monel K500

2.4375 - NiCu30Al - UNS N05500, Alloy K500, AMS 4676

Alloy K-500 is a precipitation hardening alloy with Al and Ti additions. This alloy is characterised by the same excellent corrosion resistance as alloy 400 but with higher mechanical properties that are maintained for a wide range of temperature (from -200° C up to 650° G). It has a greater tendency toward stress-corrosion cracking in some environments than alloy 400 and in the aged condition it has low magnetic permeability to temperature below to -120° C.

## Alloy B41

UNS N09925, Rene 41, AMS 5712, AMS 5713

Alloy R41 is a Nickel based, precipitation hardening alloy with exceptionally high strength at room temperature and in the temperature range of 649 - 982 °C (1200 - 1800 °F). Mechanical properties can be tailored to specific applications by using various combinations of solution treating and aging treatments. It is produced by double vacuum melting (vacuum induction melting plus vacuum arc remelting).

## Waspaloy

2.4654 - UNS N07001, AMS 5544, AMS 5708, AMS 5828

Waspaloy is an age hardening nickel base superalloy with useful strength at temperatures up to 1400-1600°F, and good oxidation resistance in gas turbine engine atmospheres up to 1600°F. The creep-rupture strength of Waspaloy is superior to that of alloy 718 at temperatures above 1150-1200°F. Short time hot tensile strength is inferior to alloy 718 at temperatures up to 1350°F. A typical heat treatment is a solution heat treat at 1825°F for 2 hours, air cool. Stabilize heat treat at 1550°F for 4 hours, air cool. Precipitation heat treat at 1400°F for 16 hours, air cool.

## **Nimonic 80 UNS N080**

2.4952 - NiCr20TiAl - N07080, Alloy 80A

Alloy 80A is a Ni-Cr precipitation hardenable alloy. It is characterized by good mechanical properties and resistance to creep at high temperature. Alloy 80A exhibits also good corrosion and oxidation resistance and high fatigue resistance in several conditions. This alloy is used for services up to 815° C.

## **Incoloy 800 UNS N0800**

1.4876 - N08800, Alloy 800

Alloy 800 is an austenitic Fe-Ni-Cr alloy with controlled Al, Ti, Si and Mn additions. It is characterized by high strength for service temperatures up to 540° C, very good resistance to oxidation and to carburization up to 1093° C and corrosion resistance in many corrosive and aqueous media.

## **Incoloy 800 H UNS N0800H**

1.4876 - N08810, Alloy 800H

Alloy 800 is an austenitic Fe-Ni-Cr alloy with controlled Al, Ti, Si and Mn additions. It is characterized by high strength for service temperatures up to 540° C, very good resistance to oxidation and to carburization up to 1093° C and corrosion resistance in many corrosive and aqueous media.

## **Incoloy 800HT UNS N0800HT**

1.4876 - N08811, Alloy 800HT

Alloy 800HT is a modified chemistry of alloy 800H which guarantees a higher creep and stress rupture for service temperatures above 700° C because of controlled C, Al and Ti additions (C=0,06-0,10%, Al+Ti=0,85-1,20%) and a higher solution annealing temperature grain size 5 or coarser is requested. 800HT is used specially at temperature above 800° C.

## **Alloy 660/A286 UNS N0286**

1.4980 - ASME 660 A/B/C/D, Alloy 660, Alloy A286

Alloy 660/A286 is a precipitation hardenable superalloy. It is a Fe-Ni-Cr alloy with additions of Mo and Ti. In aged condition this alloy shows high mechanical properties and good creep-rupture, corrosion resistance to oxidation at temperatures up to 700° C. In accordance to different solution treat, temperatures and the quenching. Alloy 660/A286 could be classified in different types or classes provided by the specifications; for instance: solution treatment at 980° C gives the highest creep-rupture strength in precipitation-hardened material, solution treatment at 900° C instead results in improvement ductility and room-temperature tensile strength.

## **HASTELLOY C-276**

1.4819 - UNS N10276, Alloy C-276

INCONEL alloy C-276 (UNS N10276/W.Nr. 2.4819) is known for its corrosion resistance in a wide range of aggressive media. The high molybdenum content imparts resistance to localized corrosion such as pitting. The low carbon minimizes carbide precipitation during welding to maintain resistance to intergranular attack in heat-affected zones of welded joints. It is used in chemical processing, pollution control, pulp and paper production, industrial and municipal waste treatment and the recovery of "sour" natural gas.

Applicable standards: EN 10269, PED 97/23 EC, API, NORSOK, ASTM, ASME, AMS, NACE, NACE MR0175, ASTM B637, ASTM B564, ASTM B865, ASTM A164

# **STAINLESS - DUPLEX - SUPER DUPLEX**

## **DUPLEX - F51 - F60**

1.4462 - UNS S32205 - X2CrNiMoN22-5-3-, NORSOK, API

Duplex Alloy UNS S 32205 F51/1.4462) austenitic-ferritic duplex stainless steel. Stainless ferritic-austenitic Cr-Ni-Mo steel with nitrogen addition. High corrosion resistance, especially against stress corrosion cracking in solutions containing chloride. Good strength properties. Resistant to intergranular corrosion in the temperature range up to 300°C. Heat treatment subsequent to welding not necessary. Surface condition for optimum corrosion resistance: pickled, heat treated free from scale or machined.

## **SUPER DUPLEX - F55**

1.4501 - UNS S32760 - X2CrNiMoN22-5-3-, NORSOK

Super Duplex Alloy UNS S32760 (F55 / 1.4501) has excellent corrosion resistance to a wide variety of media, with outstanding resistance to pitting and crevice corrosion in seawater and other chloride containing environments, with Critical Pitting Temperature exceeding 50°C. Providing higher strength than both austenitic and 22% Cr Duplex Stainless Steels UNS S32760 (F55) is suited to a variety of applications in industries such as Chemical Processing, Oil & Gas, and Marine environments. UNS S32760 (F55 / 1.4501) is listed in NACE MR 01 75 for sour service and having gained ASME Approval for Pressure Vessel applications.

## **SUPER DUPLEX - F53**

1.4410 - UNS S32750 - X2CrNiMoN25-7-4-, NORSOK

Super Duplex alloy UNS S32750 (F53 / 1.4410 / 32750 / Alloy 2507) has excellent corrosion resistance to a wide variety of media, with outstanding resistance to pitting and crevice corrosion in seawater and other chloride containing environments, with Critical Pitting Temperature exceeding 50°C. UNS S32750 (F53 / 1.4410 / Alloy 32750) exhibits a low coefficient of thermal expansion and higher heat conductivity than austenitic steels and is suitable for working temperatures up to 300°C. Listed in NACE MR 01 75 for sour service UNS S32750 (F53 / 1.4401) and having gained ASME Approval for Pressure Vessel applications Alloy 32750 can be used in a wide variety of applications.

## **17-4PH**

1.4542 - UNS S17400 - A564 Gr.630 - X5CrNiCuNb16.4, Precipitation Hardening

17-4 PH® is a martensitic precipitation-hardening stainless steel that provides an outstanding combination of high strength, good corrosion resistance, good mechanical properties at temperatures up to 600°F (316°C), good toughness in both base metal and welds, and shorttime, low-temperature heat treatments that minimize warpage and scaling. This versatile material is widely used in the aerospace, chemical, petrochemical, food processing, paper and general metalworking industries. 17-4 PH Stainless Steel can be heat treated at a variety of temperatures to develop a wide range of properties. Eight standard heat treatments have been developed.

## **F904L**

1.4539 - UNS N08904 - UNS N08904 - URANUS B6

Austenitic chromium-nickel-molybdenum-copper with low carbon content which resists intergranular corrosion in the temperature range up to 400° C. Possesses a very good resistance to sulphuric acid of any concentration up to about 60° C, as well as to phosphoric acid and organic acids. Excellent resistance to stress corrosion cracking, and pitting and crevice corrosion in the media containing chloride ions. Applications in highly corrosive fields where aggressive chemicals are used, e.g. machines and plants cooled by seawater and offshore components. In the chemical industry where resistance to the attack of pure acids as well as acids containing chloride ions (sulphuric acid in particular), of organic acids and mixed acids is required in the higher pressure and temperature ranges. The enhanced resistance to crevice corrosion permits use also for applications where incrustation must be expected, and / or where the formation of gaps cannot be avoided by design precautions.

## **NITRONIC 50XM-19**

1.3964 - UNS S20910 - NITRONIC 50, FERMONIC 50

It's a very good corrosion resistant austenitic steel and strength properties, even in the most aggressive situations. Excellent resistance both to high and minus zero temperatures. Very low magnetic permeability. Amagnetic even after cold hardening. Ideal in high corrosion fields and/or requiring excellent mechanical properties. For petrochemical, oil&gas, pulp&paper, ship building.

## **AISI 410S**

1.4000 - UNS S41008

AISI Type 410S is a non-hardenable, low carbon modification of Type 410, providing moderate strength with moderate corrosion resistance. The low carbon content and a small titanium addition minimizes austenite formation at high temperatures, thereby restricting the alloy's ability to harden. The result is a soft, ductile condition when the material is rapidly cooled from above the critical temperature. The alloy is completely ferritic. Thermal conductivity is improved and thermal expansion reduced relative to austenitic stainless grades.

## **AISI 309**

1.4828 - UNS S30900

1.4828 is a heat resistant austenitic stainless steel. It has improved oxidation resistance, carburisation resistance and high temperature strength compared to standard grades like 304. This grade can be regarded as a development of standard grade 304. Its increased chromium and nickel give it better oxidation resistance whilst silicon gives improved carburisation resistance. It is sometimes said to be equivalent to grade 309 but in fact, 309 has a higher Cr content and no Si. The relatively high carbon content gives strength at high temperatures.

## **AISI 310S**

1.4845

1.4845 is an Heat resistant austenitic steel able to support relatively high loads. It features good resistance to corrosion in sulfurous environments even at temperatures above 600 °C. Embrittlement, caused by soaking for long periods at 500-900 °C, can be eliminated with solution annealing at approx. 1100 °C. May be used in an oxidizing environment up to 1050 °C. It is easy to weld with all types of processes. It is used for parts of furnaces, heat exchangers, burners, in the chemical and oil industries.

Applicable standards: EN 10269, PED 97/23 EC, API, NORSOK, ASTM, ASME, AMS, NACE, FERRALIUM, ZERON

# FASTENERS - OIL&GAS - OFFSHORE - POWERGEN - TURBINE

## **24CrMO5+QT - 1.7258**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 100, Thread rolling dia.

DIN 17240, EN 10204-3.2 from TUV Germany

## **26CrMo4+QT - 1.7219**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 100, Thread rolling dia.

DIN 17240, EN 10204-3.2 from TUV Germany

## **21CrMoV5-7+QT - 1.7709**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 106, SIEMENS TLV918601 DIN 17 240, Thread rolling dia.

EN 10204-3.2 from TUV Germany

## **DIN X6NiCrTiMoVB25-15-2 - 1.4980**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, Thread rolling dia.

## **X22CrMoV12-1+QT1 - 1.4923**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7, DIN 17 240 , Thread rolling dia.

## **X22CrMoV12-1+QT2 - 1.4923**

EN 10269, NO PED 97/23 EC

## **34CrNiMo6+QT - 1.6582**

EN 10269, PED 97/23 EC, AD 2000 W0

## **SA193-B6**

ASTM A193 B6 is a high-temperature ferritic stainless steel bolting specification for extreme applications in heavy industry. Grade B6 studs are 12-13 % chromium.

## **SA193-B7**

ASTM A193 Grade B7 Chromium Molybdenum steel, heat treated to 28-32 Rockwell Hardness, 125,000 PSI tensile strength, 105,000 PSI yield. It will hold its strength to 1000 degrees F.

## **SA193-B16**

ASTM A193 Grade B16 Chromium, molybdenum, Vanadium steel. It has the same physicals as B7. Added vanadium allows it to hold its strength to 1100 degrees Fahrenheit.

## **SA193-B8M class 2**

ASTM A193 Grade B8M Class II Same as B8M except strain hardened, 90,000-125,000 PSI. Tensile Strength High strength strain hardened SS, in round a hex bar.

## **25CrMo4+QT - 1.7218**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 100, Thread rolling dia.

EN 10204-3.2 from TUV Germany

## **42CrMo4+QT - 1.7225**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 100, Thread rolling dia.

EN 10204-3.2 from TUV Germany

## **40CrMoV4-6+QT - 1.7711**

EN 10269, PED 97/23 EC, AD 2000 W0 / W7 / W10, TRD 100, SIEMENS TLV 9191, DIN 17 240, Thread rolling dia.

## **20CrMoVTiB4-10 - 1.7729 - Alloy T41 - Durehete 1055**

EN 10269, PED 97/23 EC, SIEMENS TLV 9185

## **X19CrMoNbVN11-1 +QT - 1.4913**

EN 10269, PED 97/23 EC

## **30CrNiMo8+QT - 1.6580**

EN 10269, PED 97/23 EC, AD 2000 W0

## **SA193-B5**

ASTM A193 B5 is a high-temperature stainless steel bolting specification for extreme applications in heavy industry. These specs are typically found in flanged piping applications with corrosive elements present under high temperatures.

## **SA320-L7**

ASTM A320 Grade L7 Bolts, studs, and other fasteners under the L7 grade have the same chemical and physical properties as B7. Additional requirement that it meet a Charpy Test at 150 degrees F is needed. Such fasteners are commonly used for low temperature service.

## **SA193-B8 class 2**

ASTM A193 Grade B8 class 2 Bars from this grade are considered the same as B8 except strain hardened. This is a cold working process which increases physical properties. 100,000-125,000 PSI Tensile Strength.

## **A2-70, A3-70, A4-80**

EN 3506-1, EN 3506-2, AD 2000 W0 / W2 / W10

## **Class 5.6 - 8.8 - 10.9 - 12.9**

DIN EN ISO 898-1, AD 2000 W0, PED 97/23 EC

Applicable standards: EN 10269, PED 97/23 EC, DIN 267-13, DIN 17 240, NACE MR 0175, AD 2000 Merkblatt, W0/W2/W7/W10, DIN EN ISO 898-1, DIN EN ISO 898-2, EN 3506-1, EN 3506-2, A193 / SA193, A320/SA320, A194/SA194, API 6A, EN 10060

# WAREHOUSES



 Sheffield, United Kingdom



 Siegen, Germany



 Prague, Czech Republic



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