Shanghai HY Industry Co.,Ltd

上海贺沅实业有限公司

特种合金专家

Special Alloy Expert

高温合金、耐蚀合金

Heat Resisting Alloy, Corrosion Resisting Alloy

精密合金、钛合金

Precision Alloy, Titanium Alloy

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公司简介
COMPANY PROFILE

贺沅（上海&香港）实业有限公司是一家专业从事特种合金的研究、开发、生产、销售及代理的中外合资高新技术企业。公司先后在上海、香港设立办事机构以方便负责该地区的报价、销售等一切售后服务。贺沅在合理的价格定位方针下为全球客户提供优质产品和服务。经过多年的努力，凭借优良的质量和一流的服务，已经在行业内赢得了良好的口碑。

公司主要生产及销售高温合金、耐蚀合金、精密合金和特钢材料（产品规格有棒材、板材、管材、丝材、法兰及各种形状的锻件及铸造件等。产品广泛应用于石油化工、航空航天、舰船、能源、军工、电子、环保、机械、仪器仪表等领域，为应用领域的高温、高压、腐蚀、磨损、疲劳、蠕变等使用环境，从材料角度提供科学的解决方案和优良的产品服务。

精选的原料，先进的生产技术和设备是优秀产品的保证，公司严格执行ISO9001、2000质量体系，建立了整套生产工艺操作流程和半成品的质量控制规程，确保产品达到标准要求。

公司坚持“质量为生命，诚信为根本”的经营宗旨，秉承“客户的满意度为第一要务”的销售理念，追求“以品质为保障，以服务谋发展”的发展目标，为全球用户提供优质的产品、优良的服务、优惠的价格。真诚期待与志同道合的商业伙伴合作，共同进步！

Shanghai HY Industry Co., Ltd is professional manufacturer for special alloy, that was started since year of 1998 , The factory covers an area of 220 thousand square meters with strong production capacity and advanced test equipments; annual production capacity of 700 thousand tons for high-quality special alloy forgings in forms of bar, pipe, strip, sheet, disks, ring, flange and diferent shape of forgings and castings. that widely used for power plants, chemical machinery, automobiles, shipbuilding , metallurgy mining, petrochemical, aerospace, marine equipment and other industries.

HY Industry not only has Certificate of ISO9001:2000 , But also have ASME, ISO14000, OHSA18000, AS9100, AD2000, PED, EN1090, CCS, ABS, BV, DNV, and GL Certificate.

Customer satisfaction is our first and foremost priority which we should achieve through Transparency in pricing with High Quality product, and Excellent service. We will continuously strive to achieve higher and higher levels of Customer Satisfaction.

Q证书 Qualfication

服务承诺

多年以来，公司始终坚持“忠诚、创新、诚信、勤勉”的企业精神和“科技创新、质量可靠、持续改进、顾客满意”的经营理念，在广大客户中和社会上有较高的知名度和美誉度。

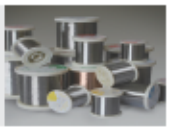
Commitment of services

Over the years, HY Industry has always adhered to the "loyalty, innovation, integrity and diligence" as the enterprise spirit.
Because of company concept "scientific and technological innovation, reliable quality, continuous improvement, and customer satisfaction".
HY Industry has high reputation with customers and majority of society.

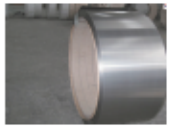
产品形状/Product Shape

- Bar & Rod
  棒，圆棒

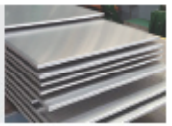
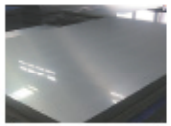
- Wire
  丝材



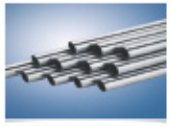
- Strip & foil & coil
  带材



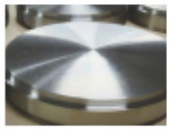
- Plate,Sheet
  板材

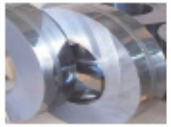
- Pipe & Tube
  管材



- Disc & Disk
  饼件 & 圆盘

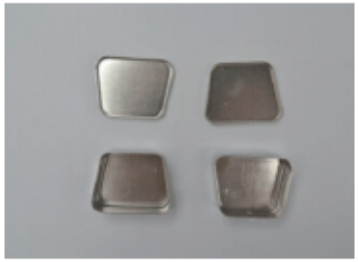


- Ring
  环件



- Flange & Other as drawing
  法兰

精密合金零件/NiFe Precision Alloy Part



屏蔽罩 1J79
Shield 1J79

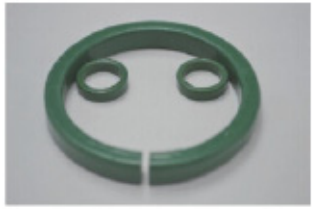
验钞机磁头 1J79 1J85
Head of Currency Detector

软磁零件
Soft Magnetic Part

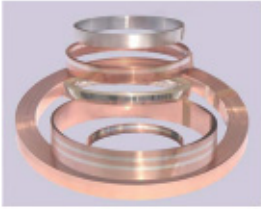
软磁零件
Soft Magnetic Part

铁芯 1J85
Iron Core 1J85

线架
Wire Shelf



铁蕊 1J85
Iron Stamen



银–铜复合带
Silver–Copper Composite Tape

生产设备 Production Facility

真空感应炉/Vacuum Induction Furnace

丝材生产线/Wire production line

真空熔炼炉/Vacuum Smelting Furnace

生产设备 Production Facility

电渣重熔炉
Electro-Slag Refining Furnace

锻造设备
Forging Euquipment

轧机
Rolling Mill

热处理炉子
Heat Treatment Furnace

检测设备
Test Facility

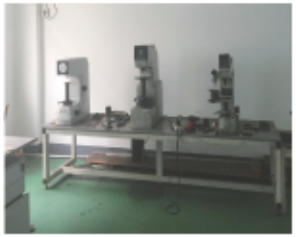
高温持久测试
High temperature stress rupture test

光谱仪
Spectroscope analysis

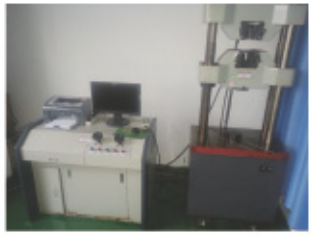
涡流探伤
Eddy current flaw detection

检测设备
Test Facility

金相检测
Metallographic inspection



硬度测试机
Hardness tester



常温拉伸检测
Room temperature tensile tester

超声波探伤仪
Infrared detector for Ultrasonic Test

碳硫分析仪
Carbon and sulfur analyzer

水压测试
Water pressure test

Pure nickel

Material Grade :N4、N5、N6、N7、N8、Nickel 200、Nickel 201、Nickel 205、Nickel 270 etc.

Nickel 200 /UNS N02200/ N6

Material grades and equivalents Trademark N6 UNS N02200/ W.Nr 2.4060 /N6

Short Introduction:

Nickel 200 /UNS N02200/ W.Nr 2.4060 /N6 has highly resistant to various reducing chemicals, excellent resistance to caustic alkalies, high electrical conductivity, excellent corrosion resistance to distilled and natural waters, resistance to neutral and alkaline salt solutions, excellent resistance to dry fluorine, widely used to handle caustic soda, good thermal, electrical and magnetostrictive properties, offers some resistance to hydrochloric and sulfuric acids at modest temperatures and concentrations

Nickel 200 Chemical composition

Alloy	%	Ni	Fe	C	Mn	Si	Cu	S
Nickel 200	Min.	Rest						
	Max.		0.4	0.15	0.35	0.35	0.25	0.01

Nickel 200 Pysical properties

Density	8.89 g/cm³
Melting point	1440℃

Nickel 200 Alloy minimum mechanical properties in the room temperature

Product Form	Condition	Tensile strength Rm N/mm²	Yield strength RP0.2 N/mm²	Elongation A5 %	Brinell hardness HB
Rod & Bar	Hot Finished	60–85	15–45	35–55	45–80
Rod & Bar	Cold Drawn/Annealed or Hot-Finished/Annealed	55–75	15–30	40–55	45–70
Plate	Hot-Rolled/Annealed	55–80	15–40	40–60	45–75
Sheet	Annealed	55–75	15–30	40–55	70 max
Tube & Pipe	Seamless Annealed	55–75	12–30	40–60	70 max

Nickel 200 Characteristic as below:

Highly resistant to various reducing chemicals
Excellent resistance to caustic alkalies
High electrical conductivity
Excellent corrosion resistance to distilled and natural waters

Resistance to neutral and alkaline salt solutions
Excellent resistance to dry fluorine
Widely used to handle caustic soda
Good thermal, electrical and magnetostrictive properties
Offers some resistance to hydrochloric and sulfuric acids at modest temperatures and concentrations

Nickel 200 Application field：

Food processing equipment
Marine and offshore engineering
Salt production
Caustic handling equipment
Manufacture and handling of sodium hydroxide, particularly at temperatures above 300° F
Reactors and vessels in which fluorine is generated and reacted with hydrocarbons

Specification:

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Fitting
B161	B622	B161	B622	B162	B160	B163

纯镍产品：

Material Grade :N4、N5、N6、N7、N8、Nickel 200、Nickel 201、Nickel 205、Nickel 270 等。

N6/ Nickel 200 /UNS N02200

N6 相似牌号：Trademark Nickel 200 /UNS N02200/ W.Nr 2.4060

N6 /UNS N02200/ W.Nr 2.4060，具有优良的力学性能和耐腐蚀性，较高的热导率和电导率，低气体含量和低蒸汽压力。

N6 的化学成分:

合金	%	镍	铁	碳	锰	硅	铜	硫
N6	最小	余						
	最大	量	0.4	0.15	0.35	0.35	0.25	0.01

N6 的物理性能:

密度	8.89 g/cm³
熔点	1440 ℃

N6 在常温下合金的机械性能的最小值:					
产品形态	条件	抗拉强度 Rm N/mm²	屈服强度 RP 0.2 N/mm²	延伸率 A5 %	布氏硬度 HB
棒	热轧	60–85	15–45	35–55	45–80
棒	冷拉或退火	55–75	15–30	40–55	45–70
板	退火	55–80	15–40	40–60	45–75
薄板	退火	55–75	15–30	40–55	70 max
钢管	无缝退火	55–75	12 月 30 日	40–60	70 max

纯镍应用

制碱行业;氯碱化工及有机氯化物的生产;高温卤素及盐腐蚀环境;电子仪表零件;各种耐强碱的设备;聚乙烯单体生产设备,合成纤维生产,淡水及其他水处理设备;微弧氧化及电泳涂装用电极;锂离子电池极片;特殊灯具;电真空器件或无线电、机械制造、仪表、化工领域结构零件及焊接用焊丝等。

技术规范:

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Fitting
B161	B622	B161	B622	B162	B160	B163

Nickel 201/ UNS N02201/N4

Material grades and equivalents N02201/ W.Nr 2.4061/N4

Short Introduction:

N4/Nickel 201/N02201/W.Nr 2.4061 has highly resistant to various reducing chemicals,excellent resistance to caustic alkalies,high electrical conductivity

Nickel201 Chemical composition

Alloy	%	Ni	Fe	C	Mn	Si	Cu	S
Nickel 201	Min.	Balance						
	Max.		0.4	0.02	0.35	0.35	0.25	0.01

Nickel 201 Pysical properties

Density	8.89 g/cm³
Melting point	1440℃

Nickel 201 Alloy minimum mechanical properties in the room temperature

Product Form	Condition	Tensile strength Rm N/mm²	Yield strength RP0.2 N/mm²	Elongation A5 %	Brinell hardness HB
Rod & Bar	Hot Finished	60–85	15–45	35–55	45–80
Rod & Bar	Cold Drawn/Annealed or Hot–Finished/Annealed	55–75	15–30	40–55	45–70
Plate	Hot–Rolled/Annealed	55–80	15–40	40–60	45–75
Sheet	Annealed	55–75	15–30	40–55	70 max
Tube & Pipe	Seamless Annealed	55–75	12–30	40–60	70 max

Nickel 201Characteristic as below:

Highly resistant to various reducing chemicals
Excellent resistance to caustic alkalies
High electrical conductivity
Excellent corrosion resistance to distilled and natural waters
Resistance to neutral and alkaline salt solutions
Excellent resistance to dry fluorine
Widely used to handle caustic soda
Good thermal, electrical and magnetostrictive properties
Offers some resistance to hydrochloric and sulfuric acids at modest temperatures and concentrations

Nickel 201 Application field :

Food processing equipment
Marine and offshore engineering
Salt production
Caustic handling equipment
Manufacture and handling of sodium hydroxide, particularly at temperatures above 300° F
Reactors and vessels in which fluorine is generated and reacted with hydrocarbons

Specification:

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Fitting
B161	B622	B161	B622	B162	B160	B163

N4 / Nickel 201/ UNS N02201

N4 相似牌号:Nickel 201 / N02201/ W.Nr 2.4061

N4 /Nickel 201/N02201/W.Nr 2.4061 是含碳量极低，已被批准用于服务高达 1230℃的高温环境中。

N4 的物理性能:					
密度		8.89 g/cm³			
熔点		1440 ℃			
N4 在常温下合金的机械性能的最小值:					
产品形态	条件	抗拉强度 Rm N/mm²	屈服强度 RP 0.2 N/mm²	延伸率A5 %	布氏硬度 HB
棒	热轧	60–85	15–45	35–55	45–80
棒	冷拉或退火	55–75	15–30	40–55	45–70
板	退火	55–80	15–40	40–60	45–75
薄板	退火	55–75	15–30	40–55	70 max
钢管	无缝退火	55–75	12–30	40–60	70 max

合金具有以下特性：是含碳量极低，已被批准用于服务高达 1230℃的高温环境中。

应用领域：

1. 食物加工处理设备，食盐提炼设备。
2. 采矿和海洋开采。
3. 在 300℃以上的高温条件下制造工业氢氧化钠所需的设备。
4. 有机或无机氯化物和氟化物的生产：抗氯气和氟气腐蚀
5. 核反应堆
6. 热处理炉中鼓颈瓶及部件，尤其是在碳化和氮化气氛中
7. 石油化工生产中的催化再生器在 700℃以上的应用中推荐使用合金 600 以获得较长的使用寿命。

技术规范：

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Fitting
B161	B622	B161	B622	B162	B160	B163

Inconel 600 / UNS N06600

Inconel 600 Material grades and equivalents

Inconel 600/ GB NS312 / UNS N06600 / SEW VDIUV W.Nr.2.4816 NiCrl 5Fe/ BS NA14 / AFNOR NC15FE

Short Introduction:

Inconel 600 /GB NS312 / UNS N06600 / SEW VDIUV W.Nr.2.4816 NiCrl 5Fe/ BS NA14 / AFNOR NC15FE have corrosion resistance to many kinds of corrosive media. Chromium content made it with better corrosion resistance than Nickel 99.2 (alloy200) and Nickel 99.2 (alloy201,low carbon) in the oxidize environment.

Inconel 600 Chemical composition:

Allloy	%	Ni	Cr	Fe	C	Mn	Si	Cu	P	S
Inconel 600	Min.	72	14	6						
	Max.		17	10	0.15	1	0.5	0.5	0.015	0.015

Inconel 600 Physical properties:

Density	8.4 g/cm³
Melting Point	1370–1425 ℃

Inconel 600 Alloy m inimum Mechanical properties in the room temperature:

Aolly status	Tensile strength	Yield strength	Elongation	Brinell hardness
	Rm N/mm²	R P 0. 2N/mm²	A 5 %	HB
Annealing treatment	550	240	30	≤195
Solution treatment	500	180	35	≤185

Inconel 600 Characteristic as below:

1.Good corrosion resistance property for the reduction, oxidation, Nitric and other media.
2.Good stress corrosion cracking resistance property in both room temperature and high temperature.
3.Good corrosion resistance of the dry chlorine and chlorine hydride.

4.Good mechanical property when below zero, room temperature and high temperature.
5.Good anti–creep rupture strength, with the recommendation of 700℃ or above working environment.

Inconel 600 Metallurgical structure

Inconel 600 is face–centered cubic lattice structure.

Inconel 600 Corrosion resistance

Inconel 600 have corrosion resistance to many kinds of corrosive media. Chromium content made it with better corrosion resistance than Nickel 99.2 (alloy200) and Nickel 99.2 (alloy201,low carbon) in the oxidize environment. Meantime, high Nickel content make this alloy with good corrosion resistance in the reduction condition and alkaline solution, and also effective avoid chlorine–iron stress corrosion cracking. Inconel600 have good corrosion resistance in the acid, acetic acid, formic acid, stearic acid and other organic acid, with medium corrosion resistance in the inorganic acid. The alloy with excellent corrosion resistance in the first and the second recycling use of the high purity water in the nuclear reactor.Especially excellent corrosion resistance to dry chlorine and chlorine hydride applied up to 650 ℃. When nder the high temperature, annealing and state solution alloy have good antioxidant off and high–intensity in the air, Inconel600 can resist the ammonia, nitriding and carburizing atmosphere, but at the turn of the changes in redox conditions, it will be corrosion by parts of oxidation media.(such as green death liquid)

Inconel 600 Application field:

1. Erosion thermocouple sheath of the atmosphere
2.Vinyl chloride monomer production: corrosion resistance to chlorine, hydrogen chloride, oxidation and carbonation.
3. Oxide shaft chloride converted to six fluoride: hydrogen fluoride anti–corrosion.
4. Corrosive alkali metal produce and usage filed, especially the sulfide use environment.
5. Use Chlorine produce titanium dioxide
6.Organic or inorganic chlorine produce: corrosion resistance to chlorine and fluoride.
7. Nuclear reactor
8.Heat treatment furnace flask and components, especially in the carbonization and nitride atmosphere.
9. Petrochemical works production of catalytic regeneration in the application of more than 700℃ recommended the use of 600, in order to obtain a longer service life.

Specifications

pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting
B167	B517	B163	B516	B168	B166	B564	B366

GB NS312/ Inconel 600 / UNS N06600

GB NS312 相似牌号：

Inconel 600 / UNS N06600 / SEW VDIUV W.Nr.2.4816 NiCrl 5Fe/ BS NA14 / AFNOR NC15FE

GB NS312 / Inconel 600 / UNS N06600 / SEW VDIUV W.Nr.2.4816 NiCrl 5Fe/ BS NA14 / AFNOR NC15FE 具有很好的耐还原、氧化、氮化介质腐蚀的性能，在室温及高温时都具有很好的耐应力腐蚀开裂性能，具有很好的耐干燥氯气和氯化氢气体腐蚀的性能，在零下、室温及高温时都具有很好的机械性能。

GB NS312 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	铜	磷	硫
GB NS312	最小	72	14	6						
	最大		17	10	0.15	1	0.5	0.5	0.015	0.015

GB NS312 的物理性能:

密度	8.4 g/cm3
熔点	1370–1425 ℃

GB NS312 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %	布氏硬度 HB
退火处理	550	240	30	≤195
固溶处理	500	180	35	≤185

GB NS312 合金具有以下特性：

1. 具有很好的耐还原、氧化、氮化介质腐蚀的性能
2. 在室温及高温时都具有很好的耐应力腐蚀开裂性能
3. 具有很好的耐干燥氯气和氯化氢气体腐蚀的性能
4. 在零下、室温及高温时都具有很好的机械性能
5. 具有很好的抗蠕变断裂强度，推荐用在 700℃以上的工作环境。

GB NS312 的金相结构:

GB NS312 为面心立方晶格结构。

GB NS312 的耐腐蚀性:

GB NS312 合金对于各种腐蚀介质都具有耐腐蚀性。铬的成分使该合金在氧化条件下比镍 99.2（合金 200）和镍 99.2（合金 201,低碳）具有更好的耐腐蚀性。同时，较高的镍含量使合金在还原条件和碱性溶液中具有很好的耐腐蚀性，并且能有效地防止氯-铁应力腐蚀开裂。Inconel600 合金在乙酸、醋酸、蚁酸、硬脂酸等有机酸中具有很好的耐蚀性，在无机酸中具有中等的耐蚀性。在核反应堆中一次和二次循环使用的高　纯度水中具有很优秀的耐蚀性。Inconel600 尤其突出的性能是能够抵抗干氯气和氯化氢的腐蚀，应用温度达650℃。在高温下，退火态和固溶处理态的合金在空气中具有很好的抗氧化剥落性能和高强度。该合金也　能抵抗氯气和渗氮、渗碳气氛，但是在氧化还原条件交替变化时，合金会受到部分氧化介质的腐蚀（如绿色死亡液）。

GB NS312 应用范围应用领域有：

1. 侵蚀气氛中的热电偶套管
2. 氯乙烯单体生产：抗氯气、氯化氢、氧化和碳化腐蚀
3. 铀氧化转换为六氟化物：抗氟化氢腐蚀
4. 腐蚀性碱金属的生产和使用领域，特别是使用硫化物的环境
5. 用氯气法制二氧化钛
6. 有机或无机氯化物和氟化物的生产：抗氯气和氟气腐蚀
7. 核反应堆
8. 热处理炉中曲颈瓶及部件，尤其是在碳化和氮化气氛中
9. 石油化工生产中的催化再生器在 700℃以上的应用中推荐使用合金Inconel 600 以获得较长的使用寿命。

生产标准：

pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting
B167	B517	B163	B516	B168	B166	B564	B366

Inconel 601 /UNS N06601

Inconel 601 Material grades and equivalents

Inconel 601 / GB NS313 / UNS N06601/W.Nr.2.4851 NiCr23Fe / AFNOR NC23FeA

Short Introduction:

One of the mainly performance of **Inconel 601 / GB NS313 / UNS N06601/W.Nr.2.4851 NiCr23Fe / AFNOR NC23FeA** in high temperature, even in very inclement conditions. If in the process of heating and cooling cycle, Inconel 601 can generate the dense layer of oxide film to get high spalling resistance. Inconel 601 have good carbonation resistance. With excellent inoxidability in the high temperature of sulfur atmosphere since it has high chromium and aluminum content.

Inconel 601 Chemaical composition:

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Cu	Al	P	S
Inconel 601	Min.	58	21						1.0		
	Max.	63	25	balance	0.1	1.5	0.5	1	1.7	0.02	0.015

Inconel 601 Physical properties:

Density	8.1g/cm³
Melting point	1320–1370℃

Inconel 601 Alloy m inimum mechanical properties in the room temperature

Alloy state	Tensile strength Rm N/mm²	Yield strength R P0. 2N/mm²	Elongation A 5 %	Brinell hardness HB
Annealing treatment	650	300	30	–
Solution treatment	600	240	30	≤220

Characteristic as below:

1. Excellent inoxidability in the high temperature.
2. Good resistance to carbonizing.
3. Good inoxidabilitiy in sulfur atmosphere
4. Good mechanical property in both room temperature and high temperature.
5. Good resistance to stress corrosion cracking, 601 have high creep rupture strength since it limits the carbon content and grain size, so recommend to use for above 500℃ environment.

Inconel 601 Metallurgical structure:
Inconel 601 is face–centered cubic lattice structure .

Inconel 601 Corrosion resistance
One of the mainly performance of Inconel 601 is inexorability in high temperature, even in very inclement conditions. If in the process of heating and cooling cycle, Inconel 601 can generate the dense layer of oxide film to get high spalling resistance. 601 have good carbonation resistance. With excellent inoxidability in the high temperature of sulfur atmosphere since it has high chromium and aluminum content.

Inconel 601 Application field:
1. The tray basket and tool clamp in the heat treatment factory.
2. Steel shares at annealing and radiation control, high–speed gas burners, Industrial furnace silk screen.
3. Separate tank of ammonia reforming and catalytic support grid of nitric acid producing.
4. Exhaust system parts
5. Solid waste incinerator' s combustion chamber
6. Channel support and soot dealing parts.
7. Detoxification exhaust system components
8. Oxygen re–heater

Specifications

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting	Wire
B167	B517	B167	–	B168	B166	B564	B366	B166

GB NS313 / Inconel 601/ UNS N06601

相似牌号:
Inconel 601 / UNS N06601/W.Nr.2.4851 NiCr23Fe / AFNOR NC23FeA

Inconel 601 / GB NS313 / UNS N06601/W.Nr.2.4851 NiCr23Fe / AFNOR NC23FeA 在高温时具有出色的抗氧化性，具有很好的抗碳化性能，很好的抗氧化性含硫气氛，在室温和高温时都具有很好的机械性能。

GB NS313 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	铜	铝	磷	硫
GB NS313	最小	58	21						1.0		
	最大	63	25	余量	0.1	1.5	0.5	1	1.7	0.02	0.015

GB NS313 的物理性能:

密度	8.1 g/cm3
熔点	1320–1370℃

GB NS313 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %	布氏硬度 HB
退火处理	650	300	30	–
固溶处理	600	240	30	≤220

GB NS313 此合金具有以下特性:
1. 高温时具有出色的抗氧化性
2. 很好的抗碳化性
3. 能很好的抗氧化性含硫气氛
4. 在室温和高温时都具有很好的机械性能
5. 很好的耐应力腐蚀开裂性能由于控制了碳含量和晶粒尺寸，601 具有较高的蠕变断裂强度，因此在500℃以上的领域推荐使用 601。

GB NS313 的金相结构:
GB NS313 为面心立方晶格结构。

GB NS313 的耐腐蚀性:
GB NS313 合金一个重要性能是能在温度高达 1180℃具有抗氧化性。甚至在很严酷的条件下，如加热和冷却循环过程中，601 能生成一层致密的氧化膜而得到很高的抗剥落性。601 具有很好的抗碳化性。由于有较高的铬、铝含量，601 在高温含硫气氛中具有很好的抗氧化性。

GB NS313 应用范围应用领域有:
1. 热处理工厂用的托盘、筐及工夹具。
2. 钢丝分股退火和辐射管，高速气体燃烧器，工业炉中的丝网带。
3. 氨重整中的隔离罐和硝酸制造中的催化支撑栅格。
4. 排气系统部件
5. 固体垃圾焚烧炉的燃烧室
6. 管道支撑和烟灰处理部件
7. 废气解毒系统部件
8. 氧气再加热器

技术规范:

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting	Wire
B167	B517	B167	–	B168	B166	B564	B366	B166

Inconel 617/ UNS N06617

Material grades and equivalents

Inconel 617/ UNS N07617 / SEW VDIUV W.Nr.2.4663 NiCr23Co12Mo / AFNOR NC22KDA

Short Introduction:

Inconel 617/ UNS N07617 / SEW VDIUV W.Nr.2.4663 NiCr23Co12Mo / AFNOR NC22KDA **is a solid–solution, strengthened, nickel–chromium–cobalt– molybdenum alloy with a n exceptional combination of high–temperature strength and oxidation resistance. The alloy also has excellent resistance to a wide range of corrosive environments.**

Inconel 617 is a solid–solution, strengthened, nickel–chromium–cobalt– molybdenum alloy with an exceptional co mbination of high–temperature strength and oxidation resistance. The alloy also has excellent resistance to a wide range of corrosive environments, and it is readily formed and welded by conventional techniques

The combination of high strength and oxidation resistance at temperatures over 1800° F (980° C) makes Inconel 617 an attractive material for such components as ducting, combustion cans, and transiti on liners in both aircraft and land–based gas turbines.

Inconel 617 Chemical composition:

%	Ni	Cr	Fe	C	Mn	Si	Mo	Co	Al	Ti	P	S
Min		20		0.05			8	10.0	0.6	0.2		
Max	Rest	23	2.0	0.1	0.7	0.7	10.0	13.0	1.5	0.6	0.012	0.008

Inconel 617 Physical properties:

Density	8.4 g/cm³
Melting Point	1330–1380℃

Corrosion Resistance

elevated temperatures, those elements cause the formation of a thin, subsurface zone of oxide particles. The zone forms rapidly upon exposure to high temperatures until it reaches a thickness of 0.001 to 0.002 in. (0.025 to 0.05 mm). The oxide zone provides the proper diffusion conditions for the formation of a

protective chromium oxide layer on the surface of the metal. It also helps to prevent spalling of the protective layer.

Inconel 617 has excellent resistance to carburization. Table 9 compares alloy 617 and some other carburization–resistant alloys in a gaseous carburizing environment at 2000° F (1095° C). The weight–gain measurements indicate the amount of carbon absorbed during the test period. The composition of INCONEL alloy 617 includes ubstantial amounts of nickel, chromium, and aluminum for a high degree of resistance to oxidation and carburization at high temperatures. Those elements, along with the molybdenum content, also enable the alloy to withstand many wet corrosive environments.

Heat Treatment

Inconel 617 is normally used in the solutionannealed condition. That condition provides a coarse grain structure for the best creep–rupture strength. It also provides the best bend ductility at room temperature. Solution annealing is performed at a temperature of 2150° F (1175° C)for a time commensurate with section size.

Cooling should be by water quenching or rapid air cooling.

Specifications

Rod, Bar, Wire, and Forging Stock	ASTM B 166/ASME SB 166/ASTM B 564/ASME SB 564/SAE AMS 5887/VdTÜV 485/ISO 9724/DIN 17752/DIN 17753/DIN 17754
Plate, Sheet, and Strip	ASTM B 168/ASME SB 168/SAE AMS 5888/SAE AMS 5889/VdTÜV 485/ISO 6208/DIN 17750
Pipe & Tubing	VdTÜV 485/ISO 6207/ASTM B 546/ASME SB 546/DIN 17751

Inconel 617/ UNS N06617

Inconel 617　相似牌号：

UNS N07617 / SEW VDIUV W.Nr.2.4663 NiCr23Co12Mo / AFNOR NC22KDA

Inconel 617/ UNS N07617 / SEW VDIUV W.Nr.2.4663 NiCr23Co12Mo / AFNOR NC22KDA 在热腐蚀领域中如硫化环境，尤其是高达 1100℃循环的氧化和碳化环境中具有极好的耐腐蚀能力。这些耐腐蚀性加上出色的机械性能，使这种合金特别适用于高温领域。

Inconel 617 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	钼	钴	铝	钛	磷	硫
Inconel 617	最小		20		0.05			8	10.0	0.6	0.2		
	最大	余量	23	2.0	0.1	0.7	0.7	10.0	13.0	1.5	0.6	0.012	0.008

Inconel 617 的物理性能:

密度	8.4 g/cm3
熔点	1330–1380℃

Inconel 617 的特点:

- 在高达 1100℃高温下具有很好的瞬时和长期机械性能
- 在 1100℃时具有高抗氧化性
- 在 1100℃时具有高抗碳化性
- 良好的焊接性能

Inconel 617 的金相结构:

Inconel 617 合金为为面心立方晶格结构，具有良好的晶相稳定性。通过固液硬化具有了优秀的高温强度，合金没有时效硬化。

Inconel 617 的耐腐蚀和耐热性能:

Inconel 617 合金在热腐蚀领域中如硫化环境，尤其是高达 1100℃循环的氧化和碳化环境中具有极好的耐腐蚀能力。这些耐腐蚀性加上出色的机械性能，使这种合金特别适用于高温领域。另外，较高的铬、铝、钼含量使合金在大多数侵蚀介质中具有号的抗腐蚀性。

Inconel 617 适用于高温和极高机械应力的场合。推荐使用温度不超过 1000℃。同时 Inconel 617 适用于薄壁结构部件加工等需要减轻重量的场合。

1. 工业和航空汽轮机部件
2. 空气加热器
3. 马弗罐和辐射馆
4. 高温热交换器、阀和弹簧
5. 高温气体冷却核反应堆，如核反应堆高温部件–氦/氦介质热交换器
6. 化工设备
7. 石化工业中的螺旋管和管道

技术规范:

Rod, Bar, Wire, and Forging Stock	ASTM B 166/ASME SB 166/ASTM B 564/ASME SB 564/SAE AMS 5887/VdTÜV 485/ISO 9724/DIN 17752/DIN 17753/DIN 17754
Plate, Sheet, and Strip	ASTM B 168/ASME SB 168/SAE AMS 5888/SAE AMS 5889/VdTÜV 485/ISO 6208/DIN 17750
Pipe & Tubing	VdTÜV 485/ISO 6207/ASTM B 546/ASME SB 546/DIN 17751

Inconel 625 / UNS N06625

Material grades and equivalents

Inconel 625/ GB NS336 / UNS N06625/ SEW VDIUV W.Nr.2.4856/ NiCr22Mo9Nb / BS NA 12 / AFNOR NC22DNB

Short Introduction:

Incoenl 625/ GB NS336 / UNS N06625/ SEW VDIUV W.Nr.2.4856 NiCr22Mo9Nb / BS NA 12 / AFNOR NC22DNB own a very good corrosion resistance in many media, especially with excellent resistance to pitting, crevice corrosion, intercrystalline corrosion, and erode in oxide, also good resistance to inorganic acid corrosion, such as nitric acid, phosphoric acid, sulfuric acid and hydrochloric acid. 625 can resist the alkali and organic acid corrosion in the oxidation and reduction environment.

Inconel 625 Chemical composition

%	Ni	Cr	Mo	Nb+N	Fe	Al	Ti	C	Mn	Si	Cu	P	S
Min	58	20	8	3.15									
Max		23	10	4.15	5	0.4	0.4	0.1	0.5	0.5	0.5	0.015	0.015

Inconel 625 Pysical properties

Density	8.4 g/cm³
Melting point	1290–1350° C

Inconel 625 Alloy m inimum mechanical properties in the room temperature

Alloy state	Tensile strength Rm N/mm²	Yield strength R P0. 2N/mm²	Elongation A 5 %	Brinell hardness HB
Inconel 625	760	345	30	≤220

Characteristic as below

1. Excellent corrosion resistance of different kinds of media in both oxidation and reduction environments.
2. Excellent resistance of pitting and crevice corrosion, and won' t happen stress corrosion cracking because of chloride.
3. Excellent resistance of the inorganic acid corrosion performance, such as nitric acid, phosphoric acid, sulfuric acid, hydrochloric acid and the mixture of sulfuric acid and hydrochloric acid.
4. Excellent corrosion resistance of different kinds of inorganic acid mixture performance.

5. Good corrosion resistance of a variety of concentrations of hydrochloric acid when the temperature up to 40° C .
6. Good machining and welding, no weld cracking sensitivity.
7. Have pressure vessel authentication for the wall temperature between –196 ~ 450° C .
8. Apply for the highest standard lever VII of acidic environment by the NACE (MR–01–75) authorized.

Inconel 625 Corrosion resistance

Inconel 625 own a very good corrosion resistance in many media, especially with excellent resistance to pitting, crevice corrosion, intercrystalline corrosion, and erode in oxide, also good resistance to inorganic acid corrosion, such as nitric acid, phosphoric acid, sulfuric acid and hydrochloric acid.Inconel 625 can resist the alkali and organic acid corrosion in the oxidation and reduction environment. Effect resists the chloride reduction stress corrosion cracking. Normally no corrosion in the sea–water and industry environments since high corrosion resistance to the sea–water and salting liquid,as well as in high temperature, without sensitivity during welding. Inconel625 have the resistance to oxidation and carbonizing in the static and cycle environments, also hacve the resistance the chlorine corrosion.

Inconel 625 Application field

Soften annealing low carbon alloy 625 widely used in the chemical process industry, good corrosion resistance and high strength made it an good choice for structural parts. 625 have application in sea–water for local mechanical stress attach.

Inconel 625 Typical application field as below

1 .The Organic chemical process parts contains chloride, especially in the use of acid chloride catalyst.
2. The digester and bleacherin the use of paper pulp and paper making industry.
3.Absorption tower, re–heater,gas import board, fan, blender, fair water fin, flue and so on for using in flue gas desulfurization system.
4. The equipment and parts in the use of acidic gas environments.
5. Acetic acid and anhydride reaction generator
6. Sulfur acid cooling

Specifications:

Sheet	AMS 5599/AMS 5879/ASME SB–443 Gr. 1/ASTM B–443 Gr. 1
Plate	AMS 5599/ASME SB–443 Gr. 1/ASTM B–443 Gr. 1
Bar	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1
Forging	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1

GH 3625/GH 625/GB NS336/Inconel 625 / UNS N06625

GH 3625 相似牌号:

Inconel 625 / GB NS336 / GH625/UNS N06625/ SEW VDIUV/ W.Nr.2.4856 /NiCr22Mo9Nb / BS NA 12 / AFNOR NC22DNB

GH 3625/ Incoenl 625/ GB NS336 / UNS N06625/ SEW VDIUV W.Nr.2.4856 NiCr22Mo9Nb / BS NA 12 / AFNOR NC22DNB 在很多介质中都表现出极好的耐腐蚀性。在氧化物介质中具有出色的抗点蚀、缝隙腐蚀、晶间腐蚀和侵蚀的性能。具有很好的耐无机酸腐蚀性，如硝酸、磷酸、硫酸、盐酸等，同时在氧化和还原环境中也具有耐碱和有机酸腐蚀的性能。有效的抗氯离子还原性应力腐蚀开裂。

GH 3625 的化学成分:

合金	%	镍	铬	钼	铌钽	铁	铝	钛	碳	锰	硅	铜	磷	硫
GH 3625	最小	58	20	8	3.15									
	最大		23	10	4.15	5	0.4	0.4	0.1	0.5	0.5	0.5	0.015	0.015

GH 3625 的物理性能:

密度	8.4 g/cm3
熔点	1290–1350℃

GH 3625 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %	布氏硬度 HB
GH 625	760	345	30	≤220

此合金具有以下特性:

1.对氧化和还原环境的各种腐蚀介质都具有非常出色的抗腐蚀能力
2.非常好的抗点腐蚀和缝隙腐蚀的能力，并且不会产生由于氧化物引起的应力腐蚀开裂
3.非常好的耐无机酸腐蚀能力，如硝酸、磷酸、硫酸、盐酸以及硫酸和盐酸的混合酸等
4.非常好的耐各种无机酸混合溶液腐蚀的能力
5.温度达 40℃时，在各种浓度的盐酸溶液中均能表现出很好的耐蚀性能
6.良好的加工性和焊接性，无焊后开裂敏感性
7.具有壁温在–196 ~ 450℃的压力容器的制造认证
8.经美国腐蚀工程师协会 NACE 标准认证（MR–01–75）符合酸性气体环境使用的最高标准等级 VII

GH 625的金相结构:

GH 625 为面心立方晶格结构。当在约 650℃保温足够长时间后，将析出碳颗粒和不稳定的四元相并将转化为稳定的 Ni3(Nb,Ti)斜方晶格相。固溶强化后镍铬矩阵中的钼、铌成分将提高材料的机械性能，但塑性会有所降低。

GH 3625 的耐腐蚀性:

GH 625 合金在很多介质中都表现出极好的耐腐蚀性。在氯化物介质中具有出色的抗点蚀、缝隙腐蚀、晶间腐蚀和侵蚀的性能。具有很好的耐无机酸腐蚀性，如硝酸、磷酸、硫酸、盐酸等，同时在氧化和还原环境中也具有耐碱和有机酸腐蚀的性能。有效的抗氯离子还原性应力腐蚀开裂。在海水和工业气体环境中几乎不产生腐蚀，对海水和盐溶液具有很高的耐腐蚀性，在高温时也一样。焊接过程中无敏感性。在静态或循环环境中都具有抗碳化和氧化性，并且耐含氯的气体腐蚀。

GH 3625 应用范围应用领域有：

软化退火后的低碳GH 625 广泛的应用于化工流程工业，较好的耐腐蚀性和高强度使之能作为较薄的结构部件。此合金可以应用于接触海水并承受高机械应力的场合。典型应用领域：

1. 含氯化物的有机化学流程工艺的部件，尤其是在使用酸性氯化物催化剂的场合
2. 用于制造纸浆和造纸工业的蒸煮器和漂白池
3. 烟气脱硫系统中的吸收塔、再加热器、烟气进口挡板、风扇（潮湿）、搅拌器、导流板以及烟道等
4. 用于制造应用于酸性气体环境的设备和部件
5. 乙酸和乙酐反应发生器
6. 硫酸冷凝器

技术规范：

Sheet	AMS 5599/AMS 5879/ASME SB–443 Gr. 1/ASTM B–443 Gr. 1
Plate	AMS 5599/ASME SB–443 Gr. 1/ASTM B–443 Gr. 1
Bar	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1
Forging	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1

Inconel 686 /UNS N06686

Inconel 686 Material grades and equivalents Inconel 686 / UNS N06686 / Werkstoff Nr.2.4606

Short Introduction:

Inconel 686 / UNS N06686 / Werkstoff Nr.2.4606 is solid solution strengthening and corrosion resistance nickel based alloy of NI–Cr–Mo, which has good corrosion resistance in severe corrosive environment. They mainly apply to heat exchanger, reaction container and delivery pipe in the area of chemical processing, processing, pollution control, papermaking, industry and garbage treatment etc.

Inconel 686 Chemical composition:

% Main Chemical Composition %										
Mo	Cr	Fe	W	C	Si	Mn	P	S	Ti	Ni
15.0 ~ 17.0	19.0 ~ 23.0	≤ 5.0	3.0 ~ 4.4	≤ 0.01	≤ 0.08	≤ 0.75	≤ 0.04	≤ 0.02	0.02~ 0.25	Rest

Inconel 686 Physical properties：

Density	Melting range	Hardness
8.73	1338 ~ 1380	HRC36

Inconel 686 Alloy minimum mechanical properties in the room temperature

Condition	Tensile Strength	Yield strength	Elongation
	Rm N/mm²	R P 0. 2N/mm²	A 5 %
Solution	690	380	45
Cold Drawing/Hot Rolled	1115	1020	23.1

Inconel 686 Characteristic as below

Inconel 686 is solid solution strengthening and corrosion resistance nickel based alloy of NI–Cr–Mo, which has good corrosion resistance in severe corrosive environment. They mainly apply to heat exchanger, reaction container and delivery pipe in the area of chemical processing, processing, pollution control, papermaking, industry and garbage treatment etc.

Specifications：

Rod and Bar	ASTM B–574;ASME SB–574;VdTÜV 515,12.98;DIN 17752
Wire	ASTM B–574;ASME SB–574; DIN 17753
Plate, Sheet & Strip	ASTM B–575;ASME SB–575;VdTÜV 515,12.98;DIN 17750
Forging	ASTM B–564;ASME SB–564;DIN 17754
Seamless Tube & Pipe	ASTM B–622/B 829*;ASME SB–622/SB–829*;VdTÜV 515,1298;DIN 17751
Welded Tube	ASTM B–626/B–751*; ASME SB–626/ SB–751*
Welded Pipe:	ASTM B–619/B–775*; ASME SB–619/SB–775*

Inconel 686 /UNS N06686

Inconel 686 相似牌号：UNS N06686 / Werkstoff Nr.2.4606
Inconel 686 / UNS N06686 / Werkstoff Nr.2.4606 是一种 Ni–Cr–Mo 固溶强化耐腐蚀合金，在恶劣的腐蚀环境中具有杰出的耐蚀性，主要应用于化学处理，污染控制，造纸，工业及城市垃圾处理等的热交换器，反应容器，输送管等。

Inconel 686 的化学成分

牌号	%主要成分%										
	Mo	Cr	Fe	W	C	Si	Mn	P	S	Ti	Ni
Inconel 686	15.0 ~ 17.0	19.0 ~ 23.0	≤ 5.0	3.0 ~ 4.4	≤ 0.01	≤ 0.08	≤ 0.75	≤ 0.04	≤ 0.02	0.02~ 0.25	Rest

Inconel 686 的物理性能

密度	熔点范围	硬度
8.73	1338 ~ 1380	HRC36

Inconel 686 在常温下的机械性能

Condition 状态	Tensile Strength 抗拉强度	Yield strength 屈服强度	Elongation 延伸率
	Rm N/mm²	R P 0. 2N/mm²	A 5 %
Solution 固溶	690	380	45
Cold Drawing 冷拉/ Hot Rolled 热轧	1115	1020	23.1

Inconel 686 的特点及应用
Inconel 686 是一种 Ni–Cr–Mo 固溶强化耐腐蚀合金，在恶劣的腐蚀环境中具有杰出的耐蚀性，主要应用于化学处理，污染控制，造纸，工业及城市垃圾处理等的热交换器，反应容器，输送管等。

技术规范：

Rod and Bar	ASTM B–574;ASME SB–574;VdTÜV 515,12.98;DIN 17752
Wire	ASTM B–574;ASME SB–574; DIN 17753
Plate, Sheet & Strip	ASTM B–575;ASME SB–575;VdTÜV 515,12.98;DIN 17750
Forging	ASTM B–564;ASME SB–564;DIN 17754
Seamless Tube & Pipe	ASTM B–622/B 829*;ASME SB–622/SB–829*;VdTÜV 515,1298;DIN 17751
Welded Tube	ASTM B–626/B–751*; ASME SB–626/ SB–751*
Welded Pipe:	ASTM B–619/B–775*; ASME SB–619/SB–775*

Inconel 690/ UNS N06690

Material grades and equivalents Inconel 690 / UNS N06690 / W. Nr. 2.4642
Short Introduction:

Inconel 690 / UNS N06690 / W. Nr. 2.4642 is a kind of nickel based wrought super alloy which has excellent resistance to many aqueous medium and ability of high temperature atmosphere erosion. It also has high strength , good stability and excellent characteristics for metallurgical processing.

Inconel 690 Chemical composition:

% Main Chemical Composition %							
Ni	Cr	Fe	Cu	C	Si	Mn	S
Rest	27.0 ~ 31.0	7.0 ~ 11.0	≤0.05	≤0.05	≤0.5	≤0.5	≤0.015

Inconel 690 Physical properties：

Density	Melting range	Hardness
8.73	1338 ~ 1380	HRC36

Inconel 690 Alloy minimum mechanical properties in the room temperature

Condition	Tensile Strength Rm N/mm²	Yield strength R P 0. 2N/mm²	Elongation A 5 %
Solution	690 ~ 738	334 ~ 372	44 ~ 50

Inconel 690 Characteristic as below
Inconel 690 alloy is a kind of nickel based wrought super alloy which has excellent resistance to many aqueous medium and ability of high temperature atmosphere erosion. It also has high strength , good stability and excellent characteristics for metallurgical processing.

Specifications：

Rod, Bar, Wire and Forging Stock	ASTM B166; ASME SB 166, ASTM B 564; ASME SB 564, ASME Code Case N–525, ISO 9723, MIL–DTL–24801
Seamless Pipe and Tube	ASTM B 163; ASME SB 163, ASTM B 167; ASME SB 167, ASTM B 829; ASME SB 829, ASME Code Cases 2083, N– 20, N–525, ISO 6207, MIL– DTL–24803
Plate, Sheet, and Strip	ASTM B168; ASME SB 168; ASME N–525, ISO 6208, MIL–DTL–24802
Welding Products	INCONEL Filler Metal 52 – AWS A5.14 / ERNiCrFe–7; INCONEL Welding Electrode 152 – AWS A5.11 / ENiCrFe–7

Inconel 690/ UNS N06690

INCONEL 690 相似牌号： UNS N06690 / W. Nr. 2.4642

Inconel 690 / UNS N06690 / W. Nr. 2.4642 是具有优异抗多种水性介质和高温气氛侵蚀能力的镍基变形合金。它还具有高的强度，良好的稳定性和优良的加工特性。

Inconel 690 的化学成分

牌号	主要成分 % Main Chemical Composition %							
	Ni	Cr	Fe	Cu	C	Si	Mn	S
Inconel 690	余量 Rest	27.0 ~ 31.0	7.0 ~ 11.0	≤0.05	≤0.05	≤0.5	≤0.5	≤0.015

Inconel 690 的物理性能

密度 Density	熔点 Melting range	硬度 Hardness
8.2	1340 ~ 1377	HB240

Inconel 690 在常温下的机械性能

Condition	Tensile Strength Rm N/mm²	Yield strength R P 0. 2N/mm²	Elongation A 5 %
Solution	690 ~ 738	334 ~ 372	44 ~ 50

Inconel 690 的特点

Inconel 690 合金是具有优异抗多种水性介质和高温气氛侵蚀能力的镍基变形合金。它还具有高的强度，良好的稳定性和优良的加工特性。

规格：

Rod, Bar, Wire and Forging Stock	ASTM B166; ASME SB 166, ASTM B 564; ASME SB 564, ASME Code Case N–525, ISO 9723, MIL–DTL–24801
Seamless Pipe and Tube	ASTM B 163; ASME SB 163, ASTM B 167; ASME SB 167, ASTM B 829; ASME SB 829, ASME Code Cases 2083, N– 20, N–525, ISO 6207, MIL– DTL–24803
Plate, Sheet, and Strip	ASTM B168; ASME SB 168; ASME N–525, ISO 6208, MIL–DTL–24802
Welding Products	INCONEL Filler Metal 52 – AWS A5.14 / ERNiCrFe–7; INCONEL Welding Electrode 152 – AWS A5.11 / ENiCrFe–7

Inconel 718 /UNS N07718

Inconel 718 Material grades and equivalents

Inconel 718 / GB GH4169 / UNS N07718 / SEW VDIUV W.Nr.2.4668 NiCr19Fe19Nb5Mo3 / BS NA 51 / AFNOR NC19FeNb

Short Introduction:

Inconel 718 / Inconel 718 / GB GH4169 / UNS N07718 / SEW VDIUV W.Nr.2.4668 NiCr19Fe19Nb5Mo3 / BS NA 51 / AFNOR NC19FeNb with extremely resistance to stress corrosion cracking and pitting ability in high temperature or low temperature environments, especially the inoxidability in the high temperature.

Inconel 718 Chemical composition

%	Ni	Cr	Fe	Mo	Nb	Co	C	Mn	Si	S	Cu	Al	Ti
Min.	50	17	balance	2.8	4.75							0.2	0.7
Max.	55	21		3.3	5.5	1	0.08	0.35	0.35	0.01	0.3	0.8	1.15

Inconel 718 Physical properties

Density	8.2 g/cm³
Melting point	1260–1340 ℃

Inconel 718 Alloy minimum mechanical properties in the roomtemperature

Alloy	Tensile strength Rm N/mm²	Yield strength R P0. 2N/mm²	Elongation A 5 %	Brinell hardness HB
Solution treatment	965	550	30	≤363

Inconel 718 Characteristic as below:

1.workability

2.High tensile strength,endurance strength,creep strength and rupture strength at 700℃.

3.High inoxidability at1000℃.

4.Steady mechanical performance in the low temperature.

5.Good welding performance.

Inconel 718 Metallurgical structure

Inconel 718 is Austenitic structure, precipitation hardening generate "γ" made it excellent mechanical performance. G rain boundary generate "δ" made it the best plasticity in the heat treatment.

Inconel 718 Corrosion resistance

Inconel 718 with extremely resistance to stress corrosion cracking and pitting ability in high temperature or low temperature environments, especially the inoxidability in the high temperature.

Inconel 718 Application field:

The elevated temperature strength, excellent corrosion resistance and workability at 700℃ properties made it use in a wide range of high requirement environments.

1.Steam turbine
2.Liquid–fuel rocket
3.Cryogenic engineering
4.Acid environment
5.Nuclear engineering

Specifications

Sheet/Plate	AMS 5599/AMS 5879/ASME SB–443 Gr. 1/ASTM B670
Wire	ASTM B670
Bar/Forging	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1

GH4169/ GH169/ Inconel 718 /UNS N07718

GH 4169/GH 169 / Inconel 718 / UNS N07718 / SEW VDIUV W.Nr.2.4668 NiCr19Fe19Nb5Mo3 / BS NA 51 / AFNOR NC19FeNb 为奥氏体结构，沉淀硬化后生成的γ" 相使之具有了优秀的机械性能。在热处理过程中于晶界处生成的δ相使之具有了最佳的塑性。

GH 4169 的化学成分:

合金	%	镍	铬	铁	钼	铌	钴	碳	锰	硅	硫	铜	铝	钛
GH4169	最小	50	17	余量	2.8	4.75							0.2	0.7
	最大	55	21		3.3	5.5	1	0.08	0.35	0.35	0.01	0.3	0.8	1.15

GH 4169 的物理性能:

密度	8.2 g/cm3
熔点	1260–1340 ℃

GH 4169 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %	布氏硬度 HB
固溶处理	965	550	30	≤363

GH 4169 合金具有以下特性:

1.易加工性
2.在 700℃时具有高的抗拉强度、疲劳强度、抗蠕变强度和断裂强度
3.在 1000℃时具有高抗氧化性
4.在低温下具有稳定的化学性能
5.良好的焊接性能

GH 4169 的金相结构:

718 合金为奥氏体结构，沉淀硬化后生成的γ" 相使之具有了优秀的机械性能。在热处理过程中于晶界处生成的δ相使之具有了最佳的塑性。

GH 4169 的耐腐蚀性:

不管在高温还是低温环境，Inconel 718合金都具有极好的耐应力腐蚀开裂和点蚀的能力。Inconel 718 合金在高温下的抗氧化性尤其出色。

GH 4169 应用范围应用领域有:

由于在 700℃时具有高温强度和优秀的耐腐蚀性能、易加工性，Inconel 718 可广泛应用于各种高要求的场合。

1.汽轮机
2.液体燃料火箭
3.低温工程
4.酸性环境
5.核工程

技术规范:

Sheet/Plate	AMS 5599/AMS 5879/ASME SB–443 Gr. 1/ASTM B670
Wire	ASTM B670
Bar/Forging	AMS 5666/ASME SB–446 Gr. 1/ASTM B–446 Gr. 1

Inconel 725 /UNS N07725

Inconel 725 Material grades and equivalents Trademark Inconel 725 /UNS N07725
Short Introduction:

Inconel 725 / Inconel 725 / UNS N07725 is highly resistant to corrosion and is age hardenable for extremely high strength. The strength of this alloy is developed by heat treatment to achieve high ductility and toughness. The alloy is resistant to hydrogen embrittlement and stress–corrosion cracking.

Inconel 725 Chemical composition

Alloy	%	Ni	Cr	Mo	Al	Ti	Fe	Nb
Inconel 725	Min.	55	19	7		1	balance	2.75
	Max.	59	22.5	9.5	0.35	1.7		4

Inconel 725 Characteristic as below:
A nickel–chromium–molybdenum–niobium alloy that is highly resistant to corrosion and is age hardenable for extremely high strength. The strength of this alloy is developed by heat treatment to achieve high ductility and toughness. The alloy is resistant to hydrogen embrittlement and stress–corrosion cracking.

Inconel 725 Application field：
Used for hangers, landing nipples, side pocket mandrels and polished bore receptacles in sour gas service. Also used for high–strength fasteners in marine applications.

Specifications:

Bar and wire:	ASTM B 805 /ASME Code Case 2217

Inconel 725 /UNS N07725

Inconel 725 / UNS N07725 该合金为镍铬钼铌合金，具有优良的耐腐蚀性能，经时效热处理后可以极大的增加合金强度，能极大地提高合金的延展性和抗拉性。该合金还具有较强的抗应力腐蚀性能。

Inconel 725 相似牌号Trademark Inconel 725 / UNS N07725 Inconel 725 的化学成分:

合金	%	镍	铬	钼	铝	钛	铁	铌
Inconel 725	最小	55	19	7		1	余量	2.75
	最大	59	22.5	9.5	0.35	1.7		4

Inconel 725 合金具有以下特性：
该合金为镍铬钼铌合金，具有优良的耐腐蚀性能，经时效热处理后可以极大的增加合金强度，能极大地提高合金的延展性和抗拉性。该合金还具有较强的抗应力腐蚀性能。

Inconel 725 的应用领域：
用于耐酸设备中的管件、接头、轴承。在海洋船舶设备上也有广泛应用。

技术规范：

Bar and wire:	ASTM B 805 /ASME Code Case 2217

Alloy 783/ Inconel 783/ UNS R30783/GH 783

Material grades and equivalents Inconel 783 / Alloy 783 / UNS R30783 /GH 783

Short Introduction:

Alloy 783 /Inconel 783 / GH 783 / UNS R30783 is an oxidation resistant low coefficient of thermal expansion (low CTE) superalloy developed for gas turbine applications.The alloy is strengthened by a precipitation–hardening heat treatment made possible by additions of niobium and aluminum. In addition, the aluminum content provides excellent resistance to oxidation at high temperature.

An oxidation resistant low coefficient of thermal expansion (low CTE) superalloy developed for gas turbine applications.
The alloy is strengthened by a precipitation–hardening heat treatment made possible by additions of niobium and aluminum. In addition, the aluminum content provides excellent resistance to oxidation at high temperature.
The alloy' s density is 5% less than those of super alloys such as INCONEL alloy 718. The combination of low expansion, high strength and excellent resistance to oxidation makes the alloy especially useful for gas turbine and steam turbine components.
The low expansion enables closer control of clearances and tolerances for greater power output and fuel efficiency.

Alloy 783 Chemical composition:

Alloy	%	Ni	Cr	Co	Cu	Fe	Al	Si	Mn	S	P
Alloy 783	Min.	26	2.5	Rest		24	5.00				
	Max	30	3.5		0.05	27	6.00	0.5	0.5	0.005	0.015

Alloy 783 Physical properties:

Density	7.7–8.03 g/cm3
Melting point	1338–1380 ℃
Hardess	HB335

Alloy 783 minimum Mechanical properties in the room temperature:

Alloy	Tensile Strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
Solution	1158	1034	15

Alloy 783 Characteristic as below:

It is a new "W" nickel–cobalt superalloy that keeps the alloy high strength and excellent corrosion resistance while having a low thermal expansion coefficient.

Alloy 783 Application field:

Widely used in aviation, aerospace, petroleum, chemical, shipbuilding industry. Nickel–base superalloy occupies a particularly important position in the entire superalloy field, and it is widely used to manufacture the hottest end parts of aviation jet engines and various industrial gas turbines.

GH783/GH6783/ Inconel 783/ UNS R30783

GH783/GH6783 相似牌号：Inconel 783 / UNS R30783 / Alloy 783

GH783/GH6783 /Inconel 783 / Alloy 783 / UNS R30783 是一种新的“W”镍钴高温合金，使合金保持高强度和优良耐腐蚀强度的同时具有低热膨胀系数。

GH783/GH6783 的化学成分:

合金	%	镍	铬	钴	铜	铁	铝	硅	锰	硫	磷
GH783/ GH6783	最小	26	2.5	余量		24	5.00				
	最大	30	3.5		0.05	27	6.00	0.5	0.5	0.005	0.015

GH783/GH6783 的物理性能:

密度	7.7–8.03 g/cm3
熔点	1338–1380 ℃
硬度	HB335

GH783/GH6783 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
固溶处理	1158	1034	15

GH783/GH6783 合金的特性：

是一种新的“W”镍钴高温合金，使合金保持高强度和优良耐腐蚀强度的同时具有低热膨胀系数。

GH783/GH6783 应用范围应用领域有：

广泛应用于航空、航天、石油、化工、舰船行业。镍基高温合金在整个高温合金领域占有特殊重要的地位，它广泛地用来制造航空喷气发动机、各种工业燃气轮机最热端部件.

UNS N07750/GH4145/ Inconel X–750

Material grades and equivalents

GH4145 / GB GH4145 / UNS N07750/W.Nr.2.4669 NiCr15Fe7TiAl / AFNOR NC15FeT

Short Introduction:

Inconel X–750 / GB GH4145 / UNS N07750/W.Nr.2.4669 NiCr15Fe7TiAl / AFNOR NC15FeT is a precipitation–hard enable alloy which has been used in applications such as high temperature structural members for gas turbines, jet engine parts, nuclear power plant applications, heat–treating fixtures, forming tools, and extrusion dies. The alloy is highly resistant to chemical corrosion and oxidation and has high stress–rupture strength and low creep rates under high stresses at temperatures up to 1500° F (816° C) after suitable heat treatment.

Inconel X750 Chemical composition:

Alloy	%	Ni	Cr	Fe	Nb	Co	C	Mn	Si	S	Cu	Al	Ti
Inconel X750	Min.		14	5	0.7							0.4	2.25
	Max.	70	17	9	1.2	1	0.08	1	0.5	0.01	0.5	1	2.75

Inconel X750 Physical properties:

Density	8.28 g/cm3
Melting range	1393–1427℃

Inconel X750 Alloy minimum Mechanical properties in the room temperature:

Alloy	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	ElongationA5 %	Brinell hardness HB
Solution treatment	1267	868	25	≤400

Inconel X750 Characteristic as below:

Inconel X750 is a precipitation–hard–enable alloy which has been used in applications such as high temperature structural members for gas turbines, jet engine parts, nuclear power plant applications, heat–treating fixtures, forming tools, and extrusion dies. The alloy is highly resistant to chemical corrosion and oxidation and has high stress–rupture strength and low creep rates under high stresses at temperatures up to 1500° F (816° C) after suitable heat treatment.

Inconel X750 Machinability:

Conventional machining techniques used for iron based alloys may be used. This alloy does work–harden during machining and has higher strength and "gumminess" not typical of steels. Heavy duty machining equipment and tooling should be used to minimize chatter or work–hardening of the

alloy ahead of the cutting.

Inconel X750 Corrosion resistance:

Inconel X750 has excellent resistance to chloride ion stress–corrosion cracking. It exhibits satisfactory resistance to numerous oxidizing environments. The alloy has similar corrosion resistance to alloy 600 in many media.

Inconel X750 Application range and field:

Nuclear reactors
Gas turbines
Rocket engines
Pressure vessels
Aircraft structures

Specifications:

Plate	AMS 5542/ASM 5598/Mil–N–7786
Forgings	AMS 5667/AMS 5668/AMS 5669/AMS 5670/AMS 5747/AMS B–637

GH4145/ Inconel X–750/ UNS N07750

GH4145/Inconel X–750 / GB GH4145 / UNS N07750/W.Nr.2.4669 NiCr15Fe7TiAl / AFNOR NC15FeT 在 980℃以下具有良好的耐腐蚀和抗氧化性能，800℃以下具有较高的强度，540℃以下具有较好的耐松弛性能，同时还具有良好的成形性能和焊接性能，在低温环境中有优异的机械性能。

GH4145 相似牌号：

Inconel X–750 / GB GH4145 / UNS N07750/W.Nr.2.4669 NiCr15Fe7TiAl / AFNOR NC15FeT

GH4145 的化学成分:

合金	%	镍	铬	铁	铌	钴	碳	锰	硅	硫	铜	铝	钛
GH4145	最小		14	5.0	0.7							0.4	2.25
	最大	70	17	9.0	1.2	1.00	0.08	1.00	0.5	0.01	0.5	1.0	2.75

GH4145 的物理性能:

密度	8.28 g/cm3
熔点	1393–1427℃

GH4145 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %	布氏硬度 HB
固溶处理	1267	868	25	≤400

GH4145 合金具有以下特性:
GH4145 在 980℃以下具有良好的耐腐蚀和抗氧化性能，800℃以下具有较高的强度，540℃以下具有较好的耐松弛性能，同时还具有良好的成形性能和焊接性能，在低温环境中有优异的机械性能。

GH4145 应用范围应用领域有:
该合金在高温环境下具有良好的耐蚀性和蠕变断裂强度,力学性能好,应用十分广泛, 980℃以下有足够的强度及抗腐蚀抗氧化性 .

1. 制造高温下工作的弹簧,螺栓; 燃气涡轮机上的转子叶片 ,叶轮和其它结构件 ;
2. 火箭发动机上的推力室;
3. 飞机上的反推力装置;
4. 大型的高压容器;
5. 弹性气封片,弹性密封模片 ,橡胶机械电热刀片。

技术规范:

Plate	AMS 5542/ASM 5598/Mil–N–7786
Forgings	AMS 5667/AMS 5668/AMS 5669/AMS 5670/AMS 5747/AMS B–637

Inconel 602CA/ UNSN06025

Material grades and equivalents Inconel 602CA UNSN06025 /W. Nr./EN 2.4633/ERNiCrFe–12

Short Introduction:

Inconel 602CA is the most oxidation resistant/high strength nickel alloy available. It is capable of extreme temperature use up to and beyond 2200° F (1200° C). For thermal processing applications where minimal product contamination is necessary, the oxidation/scaling resistance of RA 602 CA is extremely desirable. A high chromium content, along with aluminum and yttrium additions, allows the alloy to develop a tightly adhering oxide scale.
A relatively high carbon content combined with the alloying additions of titanium and zirconium results in high creep rupture strength. RA 602 CA provides 150% of the strength of other commonly used nickel alloys such as alloy 600.

Inconel 602CA Chemical composition:

	Cr	Ni	C	Al	Ti	Y	Zr	Mn	Si	Cu	Fe
MIN	24.00		0.15	1.80	0.10	0.05	0.01	-	-	-	8.00
MAX	26.00	Balance	0.25	2.40	0.20	0.12	0.10	0.15	0.50	0.10	11.00

Specifications:

Rod, Bar, Wire and Forging Stock	ASTM B166; ASME SB166
Plate, Sheet and Strip	ASTM B168; ASME SB168

Inconel 602CA/ UNSN06025

Inconel 602CA 相似牌号 UNSN06025 /W. Nr./EN 2.4633/ERNiCrFe-12

Inconel 602CA 合金是最耐氧化/高强度的镍合金。它可以在超过 2200° F（1200° C）的温度下使用。在热加工应用中，有必要尽可能少的剥落氧化物对产品产生的污染，而 RA 602 CA 的抗氧化/抗结垢性是非常理想的。高铬含量以及铝和钇的添加使合金生成致密的氧化皮层。高浓度的碳含量与钛和锆的合金的结合，增强了蠕变断裂强度。 RA 602 CA 提供了比其他常用镍合金多 150%的强度，例如合金 600。

Inconel 602CA 的化学成分:

	铬	镍	碳	铝	钛	钇	锆	锰	硅	铜	铁
最小	24.00		0.15	1.80	0.10	0.05	0.01	-	-	-	8.00
最大	26.00	余量	0.25	2.40	0.20	0.12	0.10	0.15	0.50	0.10	11.00

技术规范：

Rod, Bar, Wire and Forging Stock	ASTM B166; ASME SB166
Plate, Sheet and Strip	ASTM B168; ASME SB168

Inconel 738LC

Material grades and equivalents Inconel 738LC

Short Introduction:

Inconel 783LC is a precipitation hardenable nickel–base alloy with superior corrosion resistance and high temperature creep–rupture strength. Inconel 738 LC is used in gas turbine blades and other high–temperature industrial applications. HY Industry Co. manufactures Inconel 783 LC in varying compositions and forms such as powder, plate, rod, wire, and sputtering target.

Inconel 738LC Chemical composition:

Element	C	Mn	Si	W	S	P	Cr	Mo	Al+Ti
Min	0.09	–	–	2.4	–	–	15.7	1.5	6.5
Max	0.13	0.2	0.3	2.8	0.015	0.015	16.3	2.0	7.2
Element	Cb	Ti	Al	B	Zr	Co	Ta	Fe	Ni
Min	0.6	3.2	3.2	0.007	0.03	8.0	1.4	–	Balance
Max	1.1	3.7	3.7	0.012	0.08	9.0	2.0	0.35	

Heat Treatment Procedure

Physical properties:

Precipitation Hardening			
Solution Annealing	Temperature	Holding time	Remarks
	1120 ℃	2 hours	25–40 ℃/min to below 800 ℃
Aging	Temperature	Holding time	Remarks
	845 ℃	24 hours	Air cool

Tensile Property:

Temperature (℃)	Yield, N/mm² min	UTS, N/mm² min	Elongation, min A5 (%)	Reduction of Area, min (%)
25	792	895	4	5
650	690	895	4	5

Creep Rupture Properties:

Temperature (℃)	Stress (N/mm²)	Life (Hours)	Elongation (A4) (%)	Reduction of Area (Z) (%)
982	152	≥ 30	≥ 5	≥ 10

Inconel 738LC

Inconel 738LC 是一种具有优异耐腐蚀性和高温蠕变－断裂强度的可沉淀硬化的镍基合金。
Inconel 738LC 用于燃气轮机叶片和其他高温工业应用。上海贺沅生产 Inconel 783LC，其成分和形式各不相同，如粉末，板材，棒材，线材和溅射靶材。

Inconel 738LC 化学成分:

元素	C	Mn	Si	W	S	P	Cr	Mo	Al+Ti
最小值	0.09	–	–	2.4	–	–	15.7	1.5	6.5
最大值	0.13	0.2	0.3	2.8	0.015	0.015	16.3	2.0	7.2
元素	Cb	Ti	Al	B	Zr	Co	Ta	Fe	Ni
最小值	0.6	3.2	3.2	0.007	0.03	8.0	1.4	–	余量
最大值	1.1	3.7	3.7	0.012	0.08	9.0	2.0	0.35	

热处理程序：

沉淀硬化			
固溶退火	温度	保持时间	备注
	1120 °C	2 hours	25–40 °C/分 钟 降 到 800 °C 以 下
时效态	温度	保持时间	备注
	845 °C	24 小时	空气冷却

机械性能:

拉伸性能:

Temperature (℃)	Yield, N/mm² min	UTS, N/mm² min	Elongation, min A_5 (%)	Reduction of Area, min (%)
25	792	895	4	5
650	690	895	4	5

蠕变破裂特性：

Temperature (℃)	Stress (N/mm²)	Life (Hours)	Elongation (A_5) (%)	Reduction of Area (Z) (%)
982	152	≥ 30	≥ 5	≥ 10

Inconel 751 / UNS N07751

Material grades and equivalents UNS N07751

Short Introduction:

Uniform corrosion of the product can occur in acidic or hot alkaline solutions. Losses can be expected through this mechanism and are allowed in the design. When the corrosion rate of the Inconel 751 product is very slow, the metal is in a passive state, and generally the corrosion resistance is better with a larger chromium content, but other solutes can be harmful.

Chemical compositions near the grain boundaries of Inconel 751 products can be modified by precipitation of chromium–rich particles. The resulting chromium–depleted zone at the grain boundary makes the 4Cr13 stainless steel tube product susceptible to intergranular anode attack, even in stress–free conditions.

The designation of inconel 751 steel products means that 12% of the Cr content exceeds a bit. Most of the Fe–Cr–C Fe–Cr–Ni–C system based on stainless steel is based on, but is also important for other alloying elements.

Inconel 751 steel products can be in several crystal forms, the most common of which are the presence of body–centered cubic (bcc) and face–centered cubic (fcc). In pure iron, the fcc structure is still present at temperatures between 910 and 1400 ° C, this time interval below and above the body–centered cubic structure (up to 1539 ° C melting temperature).

Inconel7 51 The importance of metallurgical transformation of steel products at this stage cannot be overestimated. This conversion allows a wide range of microstructures to be achieved by controlling the heat treatment. Essentially related to microstructure, mechanical properties, therefore, inconel751 products can get a very large range of strength, toughness, etc.

Chemical composition：

	Cr	Ni	C	Al	Ti	Y	Zr	Mn	Si	Cu	Fe
MIN	24.00			1.80	0.10	0.05	0.01	-	-	-	8.00
MAX	26.00	Balance	0.1	2.40	0.20	0.12	0.10	0.9	0.01	0.10	11.00

Inconel 751 / UNS N07751

Inconel 751 **相似的牌号**
UNS N07751

Inconel 751 产品的均匀腐蚀可以发生在酸性或热的碱性溶液。通过这种机制可以预计的亏损，并在设计允许的。Inconel 751 产品的腐蚀速率非常慢时，该金属是在被动状态，一般的是耐腐蚀性更好地较大的铬含量，但其他的溶质可以是有害的。

Inconel 751 产品的晶界附近的化学组合物中，可以改变由硬化中含铬的颗粒。所得的在晶界处的贫铬区，使得 4cr13 不锈钢管产品容易受到晶间阳极攻击，即使在无应力-条件。

inconel 751 钢材产品意味着 12%的 Cr 的含量超过一点。大部分的不锈钢的 Fe-Cr-C 的Fe-Cr-Ni-C 是基于不锈钢，但这些元素对其它合金也很重要。

Inconel 751 钢材产品可以在几个晶体形式，其中最常见的是体心立方（bcc）和面心立方（fcc）的存在。在纯铁，fcc 结构仍然存在之间的 910 和 1400℃下，这个时间间隔的下面和上面的体心立方结构（高达 1539℃下的熔融温度。

inconel7 51 钢材产品的冶金在这个阶段转型的重要性不能被估计过高。此转换允许宽范围的微观结构，以实现通过控制热处理。本质上是与微观结构，机械性能，因此，inconel751 产品可以得到的一个非常大的范围内的强度，韧性等。

化学成分：

	Cr	Ni	C	Al	Ti	Y	Zr	Mn	Si	Cu	Fe
最小值	24.00			1.80	0.10	0.05	0.01	-	-	-	8.00
最大值	26.00	Balance	0.1	2.40	0.20	0.12	0.10	0.9	0.01	0.10	11.00

Incoloy Alloys

Incoloy 800/ UNS N08800

Material grades and equivalents
Incoloy 800/GB NS111/UNS N08800/SEW VDIUV W.Nr.1.4876 X10NiCrAlTi3220/BS NA15/AFNOR Z8NC32.21

Short Introduction:

GB NS111//Incoloy 800/GB NS111/ UNS N08800 /SEW VDIUV W.Nr.1.4876 X10NiCrAlTi3220/BS NA15 /AFNOR Z8NC32.21 has good corrosion resistance, creep corrosion and high temperature oxidation resistance.

Chemical composition:

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Cu	S	Al	Ti
Incoloy 800	Min.	30	19							0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
Incoloy 800H	Min.	30	19		0.05					0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
Incoloy 800HT	Min.	30	19		0.06					0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
	Al+Ti: 0.85-1.20										

Incoloy 800 Physical properties

Density	8.0 g/cm³
Melting point	1350-1400 ° C

Incoloy 800 Alloy minimum mechanical properties in the room temperature

Alloy	Tensile strength	Yield strength	Elongation
	Rm N/mm²	R P 0. 2N/mm²	A 5 %
Incoloy 800	500	210	35
Incoloy 800H	450	180	35

Specifications：

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408, ASME SB 408 (Rod & Bar), ASTM B 564, ASME SB 564 (Forgings), ASME Code Case 1325 (All Product Forms), ASME Code Case 1949 (Forgings), AMS 5766 (Rod & Bar), ISO 9723 (Rod & Bar), ISO 9724 (Wire), ISO 9725 (Forgings), BS 3076NA15 (Rod & Bar), BS 3075NA15 (Wire), VdTÜV 412 (All Products).
Plate, Sheet, and Strip	ASTM A 240, ASTM A 480, ASME SA 240, ASME SA 480 (Plate, Sheet, and Strip), ASTM B 409, ASTM B 906, ASME SB 409, ASME SB 906 (Plate, Sheet, and Strip), ASME Code Case 1325 (All Product Forms), ASME Code Case 2339 (Plate), AMS 5871 (Plate, Sheet, and Strip), BS 3072NA15 (Plate & Sheet), BS 3073NA15 (Strip), VdTÜV 412 (All Products), ISO 6208 (plate, sheet and strip).
Pipe and Tube	ASTM B 163 & ASME SB 163 (Seamless Condenser & Heat Exchanger Tubes), ASTM B 407, ASTM B 829, ASME SB 407, ASME SB 829 (Seamless Pipe & Tubes), ASTM B 514, ASTM B 775, ASME SB 514, ASME SB 775 (Welded Pipe), ASTM B 515, ASTM B 751, ASME SB 515, ASME SB 751(Welded Tubes), ASME Code Case 1325 (All Product Forms), ASME N-20 (Cold Worked Seamless Condenser and Heat Exchanger Tubes for Nuclear Service), BS 3074NA15 (Seamless Pipe & Tubes), VdTÜV 412 (All Products), ISO 6207 (Seamless Tubing).

GB NS111/Incoloy 800/ UNS N08800

GB NS111 相似牌号：
Incoloy 800/ / UNS N08800 /SEW VDIUV W.Nr.1.4876 X10NiCrAlTi3220 / BS NA15 / AFNOR Z8NC32.21

GB NS111/Incoloy 800/GB NS111/ UNS N08800 /SEW VDIUV W.Nr.1.4876 X10NiCrAlTi3220/BS NA15 /AFNOR Z8NC32.21 为高强度镍铁铬合金，在高温条件下具有很强的抗氧化性和抗碳化作用，同时在许多有水的环境下具有抗腐蚀能力。

GB NS111 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	铜	硫	铝	钛
GB NS111	最小	30	19							0.15	0.15
	最大	35	23	余量	0.10	1.5	1	0.75	0.015	0.60	0.60

GB NS111 的物理性能:

密度	8.0 g/cm3
熔点	1350-1400 ℃

GB NS111 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
GB NS111	500	210	35

GB NS111 合金具有以下特性：为高强度镍铁铬合金，在高温条件下具有很强的抗氧化性和抗碳化作用，同时在许多有水的环境下具有抗腐蚀能力。
GB NS111 的金相结构: GBNS111为面心立方晶格结构。极低的碳含量和提高了的Ti:C 比率增加了结构的稳定性和最大的抗敏化性以及抗晶间腐蚀性。950℃左右的低温退火保证了细晶结构。
GB NS111 的耐腐蚀性: GBNS111能耐很多腐蚀介质腐蚀。其较高的镍含量使其在水性腐蚀条件具有很好的抗应力腐蚀开裂性能。高铬含量使之具有更好的耐点腐蚀和缝隙腐蚀开裂性能。该合金具有很好的耐硝酸、有机酸腐蚀性，但是在硫酸和盐酸中的耐腐蚀性有限。除了在卤化物有可能发生点腐蚀外，在氧化性和非氧化性盐中有很好的耐腐蚀性。在水、蒸气以及蒸汽、空气、二氧化碳的混合物中也具有很好的耐腐蚀性。
GB NS111 应用范围应用领域有：热交换器和管道系统、汽化的装置和反应釜、熔炉零配件、电动射程加热元件护套、挤压油管乙烯和水蒸汽甲烷重整炉、氨氮废水冷却器。

技术规范：

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408, ASME SB 408 (Rod & Bar), ASTM B 564, ASME SB 564 (Forgings), ASME Code Case 1325 (All Product Forms), ASME Code Case 1949 (Forgings), AMS 5766 (Rod & Bar), ISO 9723 (Rod & Bar), ISO 9724 (Wire), ISO 9725 (Forgings), BS 3076NA15 (Rod & Bar), BS 3075NA15 (Wire), VdTÜV 412 (All Products).
Plate, Sheet, and Strip	ASTM A 240, ASTM A 480, ASME SA 240, ASME SA 480 (Plate, Sheet, and Strip), ASTM B 409, ASTM B 906, ASME SB 409, ASME SB 906 (Plate, Sheet, and Strip), ASME Code Case 1325 (All Product Forms), ASME Code Case 2339 (Plate), AMS 5871 (Plate, Sheet, and Strip), BS 3072NA15 (Plate & Sheet), BS 3073NA15 (Strip), VdTÜV 412 (All Products), ISO 6208 (plate, sheet and strip).
Pipe and Tube	ASTM B 163 & ASME SB 163 (Seamless Condenser & Heat Exchanger Tubes), ASTM B 407, ASTM B 829, ASME SB 407, ASME SB 829 (Seamless Pipe & Tubes), ASTM B 514, ASTM B 775, ASME SB 514, ASME SB 775 (Welded Pipe), ASTM B 515, ASTM B 751, ASME SB 515, ASME SB 751(Welded Tubes), ASME Code Case 1325 (All Product Forms), ASME N-20 (Cold Worked Seamless Condenser and Heat Exchanger Tubes for Nuclear Service), BS 3074NA15 (Seamless Pipe & Tubes), VdTÜV 412 (All Products), ISO 6207 (Seamless Tubing).

GB NS112/ Incoloy 800H/ UNS NO8810

GB NS112 Material grades and equivalents
Incoloy 800H/GB NS112/UNS N08810/SEW VDIUV W.Nr.1.4958 X5 NiCrAlTi 31–20 /BS NA 15 (H)/AFNOR Z8NC33.21

Short Introduction:

GB NS11/Incoloy 800H/GB NS112/UNS N08810/SEW VDIUV W.Nr.1.4958 X5 NiCrAlTi 31–20 /BS NA 15 (H)/AFNOR Z8NC33.21 is the face–centered cubic lattice structure, very low carbon content and increased Ti:C rate improve the stability of the structure, anti–allergy, and anti–intergranular corrosion. Low temperature annealing around 950℃ ensure the fine grain structure.

Incoloy 800H Chemical composition:

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Cu	S	Al	Ti
Incoloy 800	Min.	30	19							0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
Incoloy 800H	Min.	30	19		0.05					0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
Incoloy 800HT	Min.	30	19		0.06					0.15	0.15
	Max.	35	23	balance	0.1	1.5	1	0.75	0.015	0.6	0.6
	Al+Ti: 0.85–1.20										

Incoloy 800H Physical properties

Density	8.0 g/cm³
Melting point	1350–1400 ℃

Incoloy 800H Alloy minimum mechanical properties in the room temperature

Alloy	Tensile strength	Yield strength	Elongation
	Rm N/mm²	R P 0. 2N/mm²	A 5 %
Incoloy 800	500	210	35
Incoloy 800H	450	180	35

Incoloy 800H Characteristic as below:

1. Excellent corrosion resistance in the water media of the extremely high temperature of 500℃.

2. Good stress corrosion resistance
3. Good machining

Incoloy 800H Metallurgical structure:

Incoloy 800H is the face–centered cubic lattice structure, very low carbon content and increased Ti:C rate improve the stability of the structure, anti–allergy, and anti–intergranular corrosion. Low temperature annealing around 950℃ ensure the fine grain structure.

Incoloy 800H Corrosion resistance:

Incoloy 800H can not be corroded in many kinds of media. Its higher nickel content made it have good stress corrosion resistance cracking properties in the water corrosion condition. High chromium content made it better resistance to pitting and crevice corrosion cracking. This alloy can resist nitric acid and organic acid, but it is not so fine in the sulfuric acid and hydrochloric acid.
800H have good corrosion resistance to both oxidation and non–oxidizing salt, but maybe a little pitting in halide, and also excellent properties in the mixture of water, smoke, steam, air and carbon dioxide.

Incoloy 800H Application range and field:

1. Nitrate condenser—Corrosion resistance of Nitric acid
2. Steam heating pipes - Very good mechanical properties
3. Heat up element tube - Very good mechanical properties

For the application of up to 500℃ environment, alloy state supplies change to annealing.

Specifications:

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408 & ASME SB 408;ASTM B 564 & ASME SB 564;ASME Code Case 1325;ASME Code Case 1949;ISO 9723;ISO 9724;ISO 9725;BS 3076NA15;BS 3075NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10095
Plate, Sheet, and Strip	ASTM A 240/A 480;ASME SA 240/SA 480;ASTM B 409/B 906;ASME SB 409/SB 906;ASME Code Case 1325;ASME Code Case 2339;BS 3072NA15;BS 3073NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10028–7 & EN 10095
Pipe & Tube	ASTM B 163;ASME SB 163;ASTM B 407/B 829;ASME SB 407/SB 829;ASTM B 514/B 775;ASME SB 514/SB 775;ASTM B 515/B 751;ASME SB 515/SB 751;ASME Code Case 1325 and 1983;BS 3074NA15;SEW 470;VdTÜV 412 & 434;ISO 6207;DIN 17459
Fittings	ASTM B 366/ASME SB 366

GB NS112/ Incoloy 800H/ UNS NO8810

GB NS112 相似牌号：
Incoloy 800H/GB NS112/UNS N08810/ SEW VDIUV W.Nr.1.4958 X5 NiCrAlTi 31–20 /BS NA 15 (H)/ AFNOR Z8NC33.21

Incoloy 800H/GB NS112/UNS N08810/SEW VDIUV W.Nr.1.4958 X5 NiCrAlTi 31–20 /BS NA 15 (H)/AFNOR Z8NC33.21 在高达 500℃的极高温的水性介质中具有出色的抗腐蚀性，具有很好的抗应力腐蚀的性能和很好的加工性。

GB NS112 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	铜	硫	铝	钛
GB NS112	最小	30	19		0.05					0.15	0.15
	最大	35	23	余量	0.10	1.5	1	0.75	0.015	0.60	0.60

GB NS112 的物理性能:

密度	8.0 g/cm3
熔点	1350–1400 ℃

GB NS112 在常温下合金的机械性能的最小值:

合金	抗拉强度Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率A5 %
GB NS112	450	180	35

GB NS112 合金具有以下特性：
1. 在高达 500℃的极高温的水性介质中具有出色的抗腐蚀性
2. 很好的抗应力腐蚀的性能
3. 很好的加工性

GB NS112 的金相结构:
GB NS112 为面心立方晶格结构。极低的碳含量和提高了的Ti:C 比率增加了结构的稳定性和最大的抗敏化性以及抗晶间腐蚀性。950℃左右的低温退火保证了细晶结构。

GB NS112 的耐腐蚀性:
GB NS112 能耐很多腐蚀介质腐蚀。其较高的镍含量使其在水性腐蚀条件具有很好的抗应力腐蚀开裂性能。高铬含量使之具有更好的耐点腐蚀和缝隙腐蚀开裂性能。该合金具有很好的耐硝酸、有机酸腐蚀性，但是

在硫酸和盐酸中的耐腐蚀性有限。除了在卤化物有可能发生点腐蚀外，在氧化性和非氧化性盐中有很好 的耐腐蚀性。在水、蒸气以及蒸汽、空气、二氧化碳的混合物中也具有很好的耐腐蚀性。

GB NS112 应用范围应用领域有：
1. 硝酸冷凝器——耐硝酸腐蚀
2. 蒸汽加热管——很好的机械性能
3. 加热元件管——很好的机械性能
对于应用于高达 500℃的环境，合金供货态为退火态。

规格：

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408 & ASME SB 408;ASTM B 564 & ASME SB 564;ASME Code Case 1325;ASME Code Case 1949;ISO 9723;ISO 9724;ISO 9725;BS 3076NA15;BS 3075NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10095
Plate, Sheet, and Strip	ASTM A 240/A 480;ASME SA 240/SA 480;ASTM B 409/B 906;ASME SB 409/SB 906;ASME Code Case 1325;ASME Code Case 2339;BS 3072NA15;BS 3073NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10028–7 & EN 10095
Pipe & Tube	ASTM B 163;ASME SB 163;ASTM B 407/B 829;ASME SB 407/SB 829;ASTM B 514/B 775;ASME SB 514/SB 775;ASTM B 515/B 751;ASME SB 515/SB 751;ASME Code Case 1325 and 1983;BS 3074NA15;SEW 470;VdTÜV 412 & 434;ISO 6207;DIN 17459
Fittings	ASTM B 366/ASME SB 366

Incoloy 800HT UNS N08811

Material grades and equivalents:Incoloy 800HT/Z8NC32.21/W Nr.1.4876/X10NiCrAlTi322/NA15 /UNS NO8811/FeNi32Cr21AlTi

Short Introduction:

Incoloy 800HT/Z8NC32.21/W Nr.1.4876/X10NiCrAlTi322/NA15 /UNS NO8811/FeNi32Cr21AlTi is resistant to many corrosive media. Its high nickel content makes it have good resistance to stress corrosion cracking in aqueous corrosion conditions. High chromium content makes it more resistant to pitting and crevice corrosion cracking. The alloy has good resistance to nitric acid, organic acid corrosion, but in sulfuric acid and hydrochloric acid corrosion resistance is limited. Except for the possibility of pitting corrosion in halides, there is good corrosion resistance in oxidizing and non–oxidizing salts. In water, steam and steam, air, carbon dioxide mixture also has good corrosion resistance.

Incoloy 800HT Chemical Composition

Ni	Cr	Fe	C	Al	Ti	Al+Ti
30.0–35.0	19.0–23.0	39.5 min	.06–.10	.25–.60	.25–.60	0.85–1.2

Incoloy 800HT Physical properties

Density	8.0 g/cm³
Melting point	1350–1400 ℃

Incoloy 800HT Characteristic as below:

1.Incoloy 800H Characteristic as below:
2.Excellent corrosion resistance in very hot aqueous media up to 500 ° C
3.Good resistance to stress corrosion
3.Very good workability

Incoloy 800H Application range and field:

1Nitric acid condenser – resistant to nitric acid corrosion
2.Steam heating tube – very good mechanical properties
3.Heating element tubes – very good mechanical properties
4.For applications up to 500 ° C, the alloy is annealed.

Specifications:

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408 & ASME SB 408;ASTM B 564 & ASME SB 564;ASME Code Case 1325;ASME Code Case 1949;ISO 9723;ISO 9724;ISO 9725;BS 3076NA15;BS 3075NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10095
Plate, Sheet, and Strip	ASTM A 240/A 480;ASME SA 240/SA 480;ASTM B 409/B 906;ASME SB 409/SB 906;ASME Code Case 1325;ASME Code Case 2339;BS 3072NA15;BS 3073NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10028–7 & EN 10095
Pipe & Tube	ASTM B 163;ASME SB 163;ASTM B 407/B 829;ASME SB 407/SB 829;ASTM B 514/B 775;ASME SB 514/SB 775;ASTM B 515/B 751;ASME SB 515/SB 751;ASME Code Case 1325 and 1983;BS 3074NA15;SEW 470;VdTÜV 412 & 434;ISO 6207;DIN 17459
Fittings	ASTM B 366/ASME SB 366

NS113/Incoloy 800HT /UNS N08811

NS 113 相似牌号:
Incoloy 800HT/Z8NC32.21/W Nr.1.4876/X10NiCrAlTi322/NA15 /UNS NO8811/FeNi32Cr21AlTi

NS 113 /Incoloy 800HT/Z8NC32.21/W Nr.1.4876/X10NiCrAlTi322/NA15 /UNS NO8811/FeNi32Cr21AlTi 能耐很多腐蚀介质腐蚀。其较高的镍含量使其在水性腐蚀条件具有很好的抗应力腐蚀开裂性能。高铬含量使之具有更好的耐点腐蚀和缝隙腐蚀开裂性能。该合金具有很好的耐硝酸、有机酸腐蚀性，但是在硫酸和盐酸中的耐腐蚀性有限。除了在卤化物有可能发生点腐蚀外，在氧化性和非氧化性盐中有很好的耐腐蚀性。在水、蒸气以及蒸汽、空气、二氧化碳的混合物中也具有很好的耐腐蚀性。

NS 113 化学成分:

Ni	Cr	Fe	C	Al	Ti	Al+Ti
30.0–35.0	19.0–23.0	39.5 min	.06–.10	.25–.60	.25–.60	0.85–1.2

NS 113 物理性能：

Density	8.0 g/cm³
Melting point	1350–1400 ℃

NS 113 合金具有以下特性：

1. 在高达 500℃的极高温的水性介质中具有出色的抗腐蚀性
2. 很好的抗应力腐蚀的性能
3. 很好的加工性

NS 113 应用范围应用领域有：

1. 硝酸冷凝器—耐硝酸腐蚀
2. 蒸汽加热管—很好的机械性能
3. 加热元件管—很好的机械性能
4. 对于应用于高达 500℃的环境，合金供货态为退火态。

技术规范：

Rod, Bar, Wire, Forgings, and Forging Stock	ASTM B 408 & ASME SB 408;ASTM B 564 & ASME SB 564;ASME Code Case 1325;ASME Code Case 1949;ISO 9723;ISO 9724;ISO 9725;BS 3076NA15;BS 3075NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10095
Plate, Sheet, and Strip	ASTM A 240/A 480;ASME SA 240/SA 480;ASTM B 409/B 906;ASME SB 409/SB 906;ASME Code Case 1325;ASME Code Case 2339;BS 3072NA15;BS 3073NA15;SEW 470;VdTÜV 412 & 434;DIN 17460;EN 10028–7 & EN 10095
Pipe & Tube	ASTM B 163;ASME SB 163;ASTM B 407/B 829;ASME SB 407/SB 829;ASTM B 514/B 775;ASME SB 514/SB 775;ASTM B 515/B 751;ASME SB 515/SB 751;ASME Code Case 1325 and 1983;BS 3074NA15;SEW 470;VdTÜV 412 & 434;ISO 6207;DIN 17459
Fittings	ASTM B 366/ASME SB 366

Incoloy 825 /UNS N08825

Material grades and equivalents

Incoloy 825/GB NS1402/UNS N08825/SEW VDIUV W.Nr.2.4858 NiCr21Mo/BS NA16/AFNOR NC21FeDU

Short Introduction:

Incoloy 825/GB NS1402/UNS N08825/SEW VDIUV W.Nr.2.4858 NiCr21Mo/BS NA16/AFNOR NC21FeDU is an all–purpose project alloy, have good corrosion resistance of the acid and alkali metal property in both oxidation and reduction environments. High nickel content made it with effective stress corrosion cracking resistance performance. Incoloy 825 have excellent corrosion resistance in different kinds of media, such as sulfuric acid, phosphoric acid, nitric acid and organic acid, alkali metal such as sodium hydroxide, potassium hydroxide, and hydrochloric acid. A variety of media corrosion of nuclear–burning dissolver show 825 high integrated prpperty, like sulfuric acid, nitric acid and potassium hydroxide are all dealing in a same device.

Incoloy 825 Chemical composition

%	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	Al	Ti	P	S
Min.	38	19.5	rest				1.5	2.5		0.6		
Max.	46	23.5	rest	0.05	1	0.5	3	3.5	0.2	1.2	0.02	0.03

Incoloy 825 Physical properties

Density	8.1 g/cm³
Melting point	1370–1400° C

Incoloy 825 Alloy mi nimum mechanical properties in the room temperature

Alloy state	Tensile strength Rm N/mm²	Yield strength R P0. 2N/mm²	Elongation A 5 %	Brinell hardness HB
Incoloy 825	550	220	30	≤200

Characteristic as below

1. Good stress corrosion cracking resistance performance
2. Good resistance for pitting and crevice corrosion performance
3. Good anti–oxidation and non–oxidzing heat acid performance
4. Good mechanical performance in both room temperature and up to 550° C
5. Have the pressure vessel authenticate when manufacture temperature up to 450° C

Incoloy 825 Metallurgical structure

Inoloy 825 is the face–centered cubic lattice structure.

Incoloy 825 Corrosion resistance

Incoloy 825 is an all–purpose project alloy, have good corrosion resistance of the acid and alkali metal property in both oxidation and reduction environments. High nickel content made it with effective stress corrosion cracking resistance performance. Incoloy 825 have excellent corrosion resistance in different kinds of media, such as sulfuric acid, phosphoric acid, nitric acid and organic acid, alkali metal such as sodium hydroxide, potassium hydroxide, and hydrochloric acid. A variety of media corrosion of nuclear–burning dissolver show Inoloy 825 high integrated prpperty, like sulfuric acid, nitric acid and potassium hydroxide are all dealing in a same device.

Incoloy 825 Application field

Incoloy 825 widely use in many kinds of industry field that the working temperature no more than 550° C.

Incoloy 825 Typical application field

1. Sulfuric acid factory usage for heating pipe, container, basket, chain and so on.
2. Cooling heat exchanger, marine product pipeline system and gas pipeline of acidic environment.
3. Heat exchanger, steam machine, washing, impregnation pipe, etc. for phosphoric acid produce
4. Oil refining in the air heat exchanger
5. Food project
6. Chemical process
7. Application of high pressure oxygen flam–retardant alloy

Specifications:

Rod, Bar, Wire and Forging Stock	BS 3076NA16;ASTM B 425;ASTM B 564;ASME SB 425;ASME SB 564;ASME Code Case N–572;DIN 17752;DIN 17753;DIN 17754;VdTÜV 432;ISO 9723;ISO 9724;ISO 9725
Plate, Sheet and Strip	BS 3072NA16;BS 3073NA16;ASTM B 424;ASTM B 906;ASME SB 424;ASME SB 906;DIN 17750;VdTÜV 432;ISO 6208
Pipe & Tube	BS 3074NA16;ASTM B 163;ASTM B 423;ASTM B 704;ASTM B 705;ASTM B 751;ASTM B 775;ASTM B 829;ASME SB 163;ASME SB 423;ASME SB 704;ASME SB 705;ASME SB 751;ASME SB 775;ASME SB 829;ASME Code Case 1936;DIN 17751;VdTÜV 432 ISO 6207

NS 142/ Incoloy 825 /UNS N08825

NS 142 相似牌号:

Incoloy 825/ GB NS1402 / UNS N08825 / SEW VDIUV W.Nr.2.4858 NiCr21Mo / BS NA16 / AFNOR NC21FeDU

NS 142/Incoloy 825/GB NS1402/UNS N08825/SEW VDIUV W.Nr.2.4858 NiCr21Mo/BS NA16/AFNOR NC21FeDU 具有良好的耐应力腐蚀开裂性能 、良好的耐点腐蚀和缝隙腐蚀性能 和很好的抗氧化性和非氧化性热酸性能 ，在室温和高达 550℃的高温时都具有很好的机械性能 ，并具有制造温度达 450℃的压力容器的认证。

NS 142 的化学成分:

合金	%	镍	铬	铁	碳	锰	硅	铜	钼	铝	钛	磷	硫
NS 142	最小	38	19.5	余量				1.5	2.5		0.6		
	最大	46	23.5		0.05	1	0.5	3	3.5	0.2	1.2	0.02	0.03

NS 142 的物理性能:

密度	8.1 g/cm3
熔点	1370–1400 ℃

NS 142 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率A5 %	布氏硬度 HB
NS 142	550	220	30	≤200

此合金具有以下特性:

1. 良好的耐应力腐蚀开裂性能
2. 良好的耐点腐蚀和缝隙腐蚀性能
3. 很好的抗氧化性和非氧化性热酸性能
4. 在室温和高达 550℃的高温时都具有很好的机械性能
5. 具有制造温度达 450℃的压力容器的认证

NS 142 的金相结构:

NS 142 为面心立方晶格结构。

NS 142 的耐腐蚀性:

NS 142 合金是一种通用的工程合金，在氧化和还原环境下都具有抗酸和碱金属腐蚀性能高镍成份使合金具

有有效的抗应力腐蚀开裂性。在各种介质中的耐腐蚀性都很好，如硫酸、磷酸、硝酸和有机酸，碱金属 如氢氧化钠、氢氧化钾和盐酸溶液。Inoloy825 合金较高的综合性能表现在腐蚀介质多样的核燃烧溶解器中， 如硫酸、硝酸和氢氧化钠都在同一个设备中处理。

NS 142 应用范围应用领域有：

此合金广泛应用于各种使用温度不超过 550℃的工业领域。

NS 142 典型应用为：

1. 硫酸酸洗工厂用的加热管、容器、筐及链等。
2. 海水冷却热交换器、海洋产品管道系统、酸性气体环境管道。
3. 磷酸生产中的热交换器、蒸发器、洗涤、浸渍管等。
4. 石油精炼中的空气热交换器
5. 食品工程
6. 化工流程
7. 高压氧气应用的阻燃合金

技术规范：

Rod, Bar, Wire and Forging Stock	BS 3076NA16;ASTM B 425;ASTM B 564;ASME SB 425;ASME SB 564;ASME Code Case N-572;DIN 17752;DIN 17753;DIN 17754;VdTÜV 432;ISO 9723;ISO 9724;ISO 9725
Plate, Sheet and Strip	BS 3072NA16;BS 3073NA16;ASTM B 424;ASTM B 906;ASME SB 424;ASME SB 906;DIN 17750;VdTÜV 432;ISO 6208
Pipe & Tube	BS 3074NA16;ASTM B 163;ASTM B 423;ASTM B 704;ASTM B 705;ASTM B 751;ASTM B 775;ASTM B 829;ASME SB 163;ASME SB 423;ASME SB 704;ASME SB 705;ASME SB 751;ASME SB 775;ASME SB 829;ASME Code Case 1936;DIN 17751;VdTÜV 432 ISO 6207

Alloy 901/Incoloy 901 /UNS N09901

Material grades and equivalents Incoloy 901/ GH901/ Alloy 901/USN N09901/W.Nr.2.466 NS/BS Nimonic901 (UNS N09901/Din 1.4898)

Short Introduction:

Incoloy 901/Alloy 901/USN N09901/W.Nr.2.466 NS/BS Nimonic901 is A nickel–iron–chromium alloy containing titanium and aluminum for precipitation hardening and molybdenum for solid–solution strengthening. The alloy has high yield strength and creep resistance at temperatures to about 1110° F (600° C). A subtantial iron content enables the alloy to combine high strength with good forging characteristics. Used in gas turbines for discs and shafts. Standard products form is round.

Alloy 901 Chemical composition:

%	Ni	Cu	Al	Fe	Ti	Co	Mn	S	C	Si	P	Cr	Mo	B
Min.	40.0				2.35							11.0	5.0	0.01
Max.	45.0	0.50	0.35	Rest	3.10	1.0	1.0	0.03	0.10	0.60	0.03	14.0	7.0	0.02

Alloy 901 Physical properties:

Density	8.14 g/cm3
Melting point	1280–1345℃

Alloy 901 minimum mechanical properties in the room temperature:

Status	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
Alloy 901	1034	689	12

Description

A nickel–iron–chromium alloy containing titanium and aluminum for precipitation hardening and molybdenum for solid–solution strengthening. The alloy has high yield strength and creep resistance at temperatures to about 1110° F (600° C). A subtantial iron content enables the alloy to combine high strength with good forging characteristics. Used in gas turbines for discs and shafts. Standard products form is round.

Corrosion Resistance

Alloy 901 has good corrosion resistance to the atmospheres normally found in jet engine operations. It has slightly lower scaling resistance than such alloy as Types 309 and 310 stainless steel.

Workability

Hot Working

Alloy 901 is forged between 2050° F (1121° C) and 1850° F (1010° C), metal temperature. Light hot work may be continued down to 1600° F (871° C) but not below. Metal temperature should not exceed

2050° F (1121° C) during rapid working. Billets should be charged into a hot furnace and heated rapidly through the precipitation hardening range.

Weldability

Alloy 901 can be welded by the inert–gas–arc method. It is difficult to weld. All welding should be done in the solution treated condition. Cold worked parts should be re–solution treated before welding. A re–solution treatment is recommended after welding before stabilizing and aging.

Specifications:

bar	AMS 5661/AMS 5660
forging/ring	AMS 5661
wire	AMS 5830

GH 2901/GH901/ Incoloy 901 /UNS N09901/Alloy 901

GH2901/GH901 相近牌号 Incoloy 901/ Alloy 901/USN N09901/W.Nr.2.466

Incoloy 901/Alloy 901/USN N09901/W.Nr.2.466 NS 是以 Fe–Ni–Cr 为基础的合金，加入钛、铝及相等强化元素的奥氏体型时效硬化合金，并含有微量的硼和较低的碳，经亚稳的γ"相弥散强化，微量的铝可抑制γ"向η–Ni3Ti 相的转化。合金在 650℃以下具有较高的屈服强度和持久强度，760℃以下抗氧化性良好，长期使用组织稳定。该合金是早期发展的较成熟的合金，广泛用于制造在 650℃以下工作的航空及地面燃气涡轮发动机的转动盘形件（涡轮盘、压气机盘、轴颈等）、静结构件、涡轮外环及紧固件等零部件。

GH2901/GH901 化学成分

合金牌号	成分含量	Ni	Cr	Mo	Al	Ti	Fe	Cu	Mn	C	Si	P	S	Co
GH 2901	最小	40	11	5		2.35	余量							
	最大	45	14	7	0.35	3.1		0.5	1	0.1	0.6	0.03	0.01	1

GH2901/GH901 概述

GH2901/GH901 是以 Fe–Ni–Cr 为基础的合金，加入钛、铝及相等强化元素的奥氏体型时效硬化合金，并含有微量的硼和较低的碳，经亚稳的γ"[Ni3(Ti、Al)]相弥散强化，微量的铝可抑制γ"向η–Ni3Ti 相的转化。合金在 650℃以下具有较高的屈服强度和持久强度，760℃以下抗氧化性良好，长期使用组织稳定。

该合金是早期发展的较成熟的合金，广泛用于制造在 650℃以下工作的航空及地面燃气涡轮发动机的转动盘形件（涡轮盘、压气机盘、轴颈等）、静结构件、涡轮外环及紧固件等零部件。

GH2901/GH901 热处理制度

1090℃±10℃，2～3h，水冷或油冷+775℃±5℃，4h，空冷+700～720℃，24h，空冷。

GH2901/GH901 品种规格与状态

可以供应各种盘形锻件、轧环件、棒材及其他锻件。供应状态可经热处理交货或不经热处理交货。

GH2901/GH901 熔炼与铸造工艺

合金采用真空感应加真空电弧重熔的双联工艺生产，也可采用真空感应加电渣重熔工艺。

GH2901/GH901 应用概况与特殊要求

该合金在国外广泛用于航空发动机及地面燃气涡轮上在 650℃以下工作的转动件和紧固件，使用寿命较长。国内也已在航空发动机上使用，是经过使用考验的成熟合金。

合金锻造性，若工艺参数选择或操作不当时，其性能会显示明显的方向性，并可能引起缺口敏感，但只要严格工艺，就不会出现此现象。该合金膨胀系数接近铁素体型热强合金钢，使得两种材料能够连接面 对热涨没有特殊规定。

Specifications:

bar	AMS 5661/AMS 5660
forging/ring	AMS 5661
wire	AMS 5830

Incoloy 925/ UNS N09925

Material grades and equivalents /UNSN09925

Short Introduction:

Incoloy 925/UNSN09925 is an age–hardenable alloy of nickel–chromium–iron. The additions of titanium and aluminum enable it to be age–hardened while molybdenum and copper contents enhance resistance to corrosive media. Designed primarily for applications in the production of gas.

Incoloy 925 Chemical compostion:

%	Ni	Cr	Fe	C	Mn	Si	Cu	S	Al	Ti	P	Mo
Min.	42	19.5	bal				1.5		0.15	1.9		2.5
Max.	46	23.5		0.03	1	0.5	3	0.03	0.50	2.4	0.03	3.5

Incoloy 925 Physical properties:

Density	8.14 g/cm3
Melting point	1343 ℃

Incoloy 925 minimum mechanical properties in the roomtemperature

Alloy state	Tensile strength Rm N/mm²	Yield strength RP0.2 N/mm²	Elongation A 5 %
Solution treatment	650	300	30

Incoloy 925 Characteristic as below：

This is an age–hardenable alloy of nickel–chromium–iron. The additions of titanium and aluminum enable it to be age–hardened while molybdenum and copper contents enhance resistance to corrosive media. Designed primarily for applications in the production of gas.

Incoloy 925 Application field:

It is used in the petroleum industry for applications such as gas well components, valves and tubing, as well as finding use in high–strength piping systems.

Incoloy 925/ UNS N09925

Incoloy 925 相似牌号：UNSN09925

Incoloy 925 具有良好的机械强度和广泛的抗腐蚀性能，常用于油气钻井设备上的零部件制造。

Incoloy 925 的化学成分:										
合金	%	镍	铬	铁	碳	锰	硅	铜	硫	铝
Incoloy 925	最小	42	19.5	余				1.5		0.15
	最大	46	23.5	量	0.03	1	0.5	3	0.03	0.5

Incoloy 925 的物理性能:

密度：8.14 g/cm3

熔点：1343 ℃

Incoloy 925 在常温下合金的机械性能的最小值:

合金状态	抗拉强度 Rm N/mm²	屈服强度 RP0.2 N/mm²	延伸率 A 5 %
固熔态	650	300	30

Incoloy 925 合金具有以下特性：

具有良好的机械强度和广泛的抗腐蚀性能。

Incoloy 925 应用范围应用领域：

常用于油气钻井设备上的零部件制造。

Incoloy 926/ UNS N08926

HY 926 Material grades and equivalents Incoloy 926/ Alloy926/UNS N08926/W.Nr.1.4529 Short Introduction:

Incoloy 926/Incoloy 926/Alloy926/UNS N08926/W.Nr.1.4529 t has high resistance to pitting and crevice corrosion when in Halide and H2S contained acid media.In practice, effective in resistance of chloride stress corrosion cracking.

Incoloy 926 Chemical composition:

%	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	N	Ti	P	S
Min.	24	19	Balance				0.5	6.0	0.15	0.6		
Max.	26	21		0.02	2	0.5	1.5	7.0	0.25	1.2	0.03	0.01

Incoloy 926 Physical properties:

Density	8.1 g/cm3
Melting point	1320~1390 ℃

Incoloy 926 Alloy Minimum Mechanical properties in the room temperature:

Alloy state	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
Incoloy 926	650	295	35

Incoloy 926 Characteristic:

1.It has high resistance to pitting and crevice corrosion when in Halide and H2S contained acid media.
2.In practice, effective in resistance of chloride stress corrosion cracking.
3.A variety of corrosion have good corrosion resistance capability in the normal oxidation and restore environment.
4.Upgrade mechanical properties than Cronifer 1925 LC–Alloy 904 L.
5. Alloys has Improved the stability of metallurgical compared to a range of 18% of the nickel content alloys.
6.With a certification of applied in manufacturing–related pressure vessel（VdTUV–196 ~ 400℃ and ASME ）

Metallurgical structure

Incoloy 926 is face–centered cubic lattice structure. **Corrosion resistance**

Incoloy 926 is an austenitic stainless steel alloy has a similar chemical composition with 904L alloy, its nitrogen content is 0.2%, molybdenum content is 6.5%. Molybdenum and nitrogen content significantly

increased the resistance of pitting and crevice corrosion in the halide media.Meantime, nickel and nitrogen not only ensures the stability of metallographical, but also reduce separating intergranular trend in the thermal process or welding process better than the nitrogen content of nickel alloy. 926 has particular corrosion resistance in the chloride ions medium due to the excellent local corrosion resistance and 25% nickel alloy content.A variety of experiments in the 10000–70000ppm of Chloride concentration, PH 5–6, 50–68℃ operating temperature of the slurry of limestone FGD system show that, after a 1–2 year trial period, 926 alloy without pitting and crevice corrosion.926 in other chemical media also has good corrosion resistance in the high temperature and high concentration of media, including sulfuric acid, phosphoric acid, acid gas, sea water, salt and organic acids.926 is the material that choosed for BAM directory Chapter 6 of "dangerous goods storage and transportation containers norms" by Berlin, Germany's national Institute for Materials Research and Testing (BAM) . In addition, in order to have the best corrosion resistance only when the material is in the right state of metallurgy and guarantee clean conditions.

Application field:

Alloy 926 is a multipurpose material can be applied in many industrial:

1. Fire system, water purification system, marine engineering and hydraulic piping perfusion system
2. The pipeline, joint, air systems in the acidic gas production
3. Evaporator, the heat exchanger, filter, mixer, etc. in the phosphate production
4.Power plants condensation and pipe system in the use of sewage water to cool water
5. The use of acidic organic catalyst chlorinated derivatives production
6. The production of cellulose pulp bleacher
7. Polished bar in the orrosive oil wells
8. Hose system in the ocean engineering
9. Flue gas desulphurization system components
10. Sulfuric acid condensation and separation system
11. Crystalline salt concentration and the evaporator
12. Transport of corrosive chemicals containers
13. Reverse osmosis desalination plant

Incoloy 926/ UNS N08926

Incoloy 926 相似牌号：Alloy926/UNS N08926/W.Nr.1.4529

Incoloy 926/Incoloy 926/Alloy926/UNS N08926/W.Nr.1.4529 在卤化物和含H 2S酸性介质中具有较高的耐蚀性和折痕性。在实际应用中，对抗氯离子应力腐蚀开裂有较好的效果。

Incoloy 926 化学成分:

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	N	P	S
Incoloy 926	Min.	24	19	Balance				0.5	6.0	0.15		
	Max.	26	21		0.02	2	0.5	1.5	7.0	0.25	0.03	0.01

Incoloy 926 物理性能:

Density	8.1 g/cm3
Melting point	1320–1390 ℃

Incoloy 926 合金在常温下的最小机械性能

牌号	抗张强度 Rm N/mm2	屈服强度 RP0.2N/mm2	伸长率 A5 %
Incoloy 926	650	295	35

Incoloy 926 特点:

1.在卤化物和含H 2S的酸性介质中具有较高的耐蚀性和折裂性。
2.在实际应用中，对抗氯离子应力腐蚀开裂有较好的效果。
3.各种腐蚀在正常的氧化和还原环境中具有良好的耐腐蚀能力。
4.提升机械性能比 Cronifer 1925 LC–Alloy 904 L 更好
5.与18%的镍含量合金相比，Incoloy 926提高了冶金的稳定性。
6.具有制造相关压力容器(vdtuv–196 ~ 400℃和ASME)的使用功能

冶金结构
Incoloy 926是面心立方晶格结构。
Incoloy 926是一种奥氏体不锈钢合金，化学成分与904l合金相似，其氮含量为0.2%，钼含量为6.5%。钼和氮含量显著增加同时，镍和氮不仅保证了金属形貌的稳定性，而且在热处理或焊接过程中也比镍合金的氮含量更好地减少了晶间的分离趋势。提高了卤化物介质中点蚀和缝隙腐蚀的抵抗力，同时镍和氮不仅保证了金相的稳定性，而且还降低了热处理或焊接过程中的分离晶间倾向比镍合金的氮含量好。Incoloy 926由于氯离子介质具有优良的局部耐蚀性和25%的镍合金含量，在氯离子介质中具有特殊的耐蚀性。在石灰石烟气脱硫系统的泥浆中，在100–7000 ppm的氯浓度、PH 5–6、50–68℃的操作温度下进行了各种实验。在1–2年的试验期内，Incoloy 926种无点蚀和缝隙腐蚀的合金在其它高温介质中也具有良好的耐腐蚀性，其中包括硫酸、磷酸、酸性气体、海水、盐和有机酸。德国柏林国家材料研究所（BAM）选择BAM目录第6章“危险货物储运集装箱规范”的材料。此外，只有在材料处于正确的冶金状态并保证干净的条件下才能获得最佳的耐腐蚀性。
应用领域:
Incoloy 926是一种多用途材料，可应用于许多工业:
1、消防系统、净水系统、轮机工程和液压管路灌注系统
2、酸性气体生产中的管道、接头、空气系统
3、蒸发器、换热器、过滤器、混合器等在磷酸盐生产中的应用4、电厂冷凝水和管道系统在污水中的应用
4、酸性有机催化剂氯化衍生物的生产
5、纤维素纸浆漂白机的生产
6、磨光油威尔斯抛光棒
7、海洋工程中的软管系统
8、烟气脱硫系统部件
9、硫酸综合分离系统
10、结晶盐浓度和蒸发器
11、腐蚀性化学品容器的运输
12、反渗透海水淡化装置

GB GH2132 / Incoloy A–286 /UNS S66286

GB GH2132 Material grades and equivalents
GB GH2132 / IncoloyA–286 / GB GH2132 / UNS S66286 / SEW VDIUVW. Nr.1.4980 / AFNOR ZbNCT25
Short Introduction:

GB GH2132 / IncoloyA–286 / GB GH2132 / UNS S66286 / SEW VDIUVW. Nr.1.4980 / AFNOR ZbNCT25 is an alloy that is precipitation hardenable for high mechanical properties. The alloy maintains good strength and oxidation resistance at temperatures up to about 1300° F (700° C). The alloy' s high strength and excellent fabrication characteristics make it useful for various components of aircraft and industrial gas turbines. Applications include blades, vanes, shafts, tail cones, afterburners, springs, and fasteners. This alloy is also used for automotive applications.

GB GH2132 Chemical composition:

Alloy	%	Ni	Cr	Mo	B	Fe	Al	Ti	C	Mn	Si	V	S
GH2132	Min.	24	13.5	1.0	0.001			1.9				0.1	
	Max.	27	16	1.5	0.01	Rest	0.35	2.35	0.08	2.0	1.0	0.5	0.03

GB GH2132 Physical properties:

Density	7.93 g/cm3
Melting point	1364–1424℃

GH2132 minimum mechanical properties in the room temperature:

Status	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
GH2132	950	680	28

An alloy that is precipitation hardenable for high mechanical properties. The alloy maintains good strength and oxidation resistance at temperatures up to about 1300° F (700° C). The alloy' s high strength and excellent fabrication characteristics make it useful for various components of aircraft and industrial gas turbines. Applications include blades, vanes, shafts, tail cones, afterburners, springs, and fasteners. This alloy is also used for automotive applications.

Specifications:

Rod, Bar, Wire and Forging Stock	ASTM A 638;ASME SA 638;SAE AMS 5726;SAE AMS 5731;SAE AMS 5732;SAE AMS 5734;SAE AMS 5737;SAE AMS 5895;BS HR 51;BS HR 52;AECMA PrEn2171;AECMA PrEN2119;AECMA PrEN2172;AECMA PrEN2173;AECMA PrEN2174;AECMA PrEN2303;AECMA PrEN2304;AECMA PrEN2398;AECMA PrEN2399;AECMA PrEN3510
Plate, Sheet and Strip	SAE AMS 5525;SAE AMS 5858;AECMA PrEN2175;AECMA PrEN241
Pipe & Tube	SAE AMS 5731;SAE AMS 5732;SAE AMS 5734;SAE AMS 5737;SAE AMS 5895

GB GH 2132/Incoloy A-286 /UNS S66286

GB GH2132 相似牌号：
IncoloyA-286 / GB GH2132 / UNS S66286 / SEW VDIUVW. Nr.1.4980 / AFNOR ZbNCT25

IncoloyA-286 / UNS S66286 / SEW VDIUVW. Nr.1.4980 / AFNOR ZbNCT25 是一种高温强度高、耐高温氧化的合金材料。在 650° C 以下具有高的屈服强度和持久、蠕变强度并且具有较好的加工塑性和满意的焊接性能。

GB GH2132 的化学成分:

合金	%	镍	铬	钼	硼	铁	铝	钛	碳	锰	硅	钒	硫
GH2132	最小	24	13.5	1.0	0.001	余		1.9				0.1	
	最大	27	16	1.5	0.01	量	0.35	2.35	0.08	2.0	1.0	0.5	0.03

GB GH2132 的物理性能:

密度	7.93 g/cm3
熔点	1364-1424℃

GB GH2132 在常温下合金的机械性能的最小值:

合金状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
A-286	950	680	28

GB GH2132 主要特征：
GB GH2132（Ni-Cr-Fe）是一种高温强度高、耐高温氧化的合金材料。在 650° C 以下具有高的屈服强度和持久、蠕变强度并且具有较好的加工塑性和满意的焊接性能。
广泛用于制造航空发动机和工业燃气涡轮机上的零部件，比如涡轮叶片、加力燃烧室、紧固件等，在汽车发动机上也有广泛应用。在 650° C 以下长期工作的航空发动机高温承力部件，如涡轮盘等。

技术规范：

Rod, Bar, Wire and Forging Stock	ASTM A 638;ASME SA 638;SAE AMS 5726;SAE AMS 5731;SAE AMS 5732;SAE AMS 5734;SAE AMS 5737;SAE AMS 5895;BS HR 51;BS HR 52;AECMA PrEn2171;AECMA PrEN2119;AECMA PrEN2172;AECMA PrEN2173;AECMA PrEN2174;AECMA PrEN2303;AECMA PrEN2304;AECMA PrEN2398;AECMA PrEN2399;AECMA PrEN3510
Plate, Sheet and Strip	SAE AMS 5525;SAE AMS 5858;AECMA PrEN2175;AECMA PrEN241
Pipe & Tube	SAE AMS 5731;SAE AMS 5732;SAE AMS 5734;SAE AMS 5737;SAE AMS 5895

Alloy 28 /UNS N08028

Material grades and equivalents Alloy 28/UNS N08028/W. Nr. 1.4563

Short Introduction:
Alloy 28/UNS N08028/W. Nr. 1.4563 is a nickel-iron-chromium alloy with additions of molybdenum and copper. It has excellent resistance to both reducing and oxidizing acids, to stress-corrosion cracking, and to localise attack such as pitting and crevice corrosion. The alloy are especially resistant to sulphuric and phosphoric acid. Used for chemical processing, pollution control equipment, oil and gas well piping, nuclear fuel reprocessing, acid production and pickling equipment.

Alloy 28 Chemical composition:

	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Fe
Min	-	-	-	-	-	26.00	30.00	3.00	0.06	0.00
Max	0.03	1.00	2.50	0.030	0.030	28.00	34.00	4.00	1.40	0.00

Alloy 28 Physical properties:

Material	Tensile Strength MPa	Yield Strength (0.2% Offset) MPa	Elongation (%)
Alloy 28	650	250	40

Specifications：

Seamless tube and pipe	ASTM B 668, EN 10216-5, SEW 400 (Feb 1991), SS 14 25 84,NFA 49-217
Plate, sheet and strip	ASTM B 709, EN 10088-2, SS 14 25 84
Bar steel	EN 10088-3, EN 10272, SS 14 25 84
Fittings	ASTM A 403 (chemical composition and mechanical properties according to ASTM B668)

合金 28 /UNS N08028

合金 28 相似牌号：

合金 28/UNS N08028/W. Nr. 1.4563

合金28/UNS N08028/W. Nr. 1.4563 是添加了钼和铜的镍铁铬合金。对还原酸，氧化酸，耐应力腐蚀开裂，耐点腐蚀，缝隙腐蚀等的侵蚀具有优异的耐腐蚀性。该合金特别耐硫酸和磷酸。用于化学加工，污染控制设备，油气井管道，核燃料后处理，酸生产和酸洗设备。

合金 28 化学成分:

	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Fe
Min	-	-	-	-	-	26.00	30.00	3.00	0.06	0.00
Max	0.03	1.00	2.50	0.030	0.030	28.00	34.00	4.00	1.40	0.00

合金 28 物理性能:

Material	Tensile Strength MPa	Yield Strength (0.2% Offset) MPa	Elongation (%)
合金 28	650	250	40

技术规范：

Seamless tube and pipe	ASTM B 668, EN 10216-5, SEW 400 (Feb 1991), SS 14 25 84,NFA 49-217
Plate, sheet and strip	ASTM B 709, EN 10088-2, SS 14 25 84
Bar steel	EN 10088-3, EN 10272, SS 14 25 84
Fittings	ASTM A 403 (chemical composition and mechanical properties according to ASTM B668)

Alloy 31

Alloy 31 Material grades and equivalents: 1.4562/N08031

Chemical composition:

%	Ni	Cr	Fe	Mo	N	C	Mn	Si	S	Cu	P
Min	30	26	Rest	6.0	0.15					1.00	
Max	32	28		7.0	0.25	0.015	2.00	0.30	0.010	1.40	0.020

Density: 8.1g/cm3, melting point: 1350–1370 C

Alloy 31 (1.4562/N08031) is characterized by:

- outstanding corrosion resistance in alkaline and acidic halide–containing media
- excellent resistance to sulfuric acid, even in highly concentrated form
- excellent resistance to corrosion and erosion in phosphoric acid media
- outstanding resistance to surface corrosion and local corrosion in chlorine dioxide bleaching plants in paper production
- excellent resistance in reducing and oxidizing media as well as in boiling azeotropic nitric acid

Applications of Alloy 31

Typical fields of application for Alloy 31 are:

- components for flue gas desulfurization (FGD) plants
- plants for the production of phosphoric acid via the wet digestion process
- pipes and heat exchangers for sulfuric acids contaminated with chlorides
- pipes containing ocean water and brackish water, condensers and chillers
- pickling plants for sulfuric acid as well as nitric–hydrofluoric acid
- treatment of sulfuric acids from waste
- evaporation and crystallization of salts
- components for the cellulose and paper industry
- digestion of ores, e.g. in HIPAL (high–pressure acid leach) plants for the digestion of laterite ores
- mineral oil production and refineries
- organic acids and ester synthesis
- fine chemicals
- strain–hardened transport and feed pipes as well as slicklines, wirelines and flowlines in the transport of oil and gas

Specifications

pipe Smls	Pipe Welded	Sheet/Plate	Bar	Forging	Fitting
ASTM B622					

合金 31

合金 31 相似牌号 Alloy 31/1.4562/N08031

化学成分：

%	镍	铬	铁	钼	氮	碳	锰	硅	硫	铜	磷
Min	30	26	余量	6.0	0.15					1.00	
Max	32	28		7.0	0.25	0.015	2.00	0.30	0.010	1.40	0.020

密度：8.1g/cm³，熔点：1350–1370℃

合金 31（1.4562 / N08031）的特征：

- 在碱性和酸性卤化物介质中优异的耐腐蚀性
- 对硫酸有极好的抗性，即使是高度浓缩的形式
- 在磷酸介质中具有优异的耐腐蚀性和抗冲蚀性
- 二氧化氯漂白厂在造纸生产中对表面腐蚀和局部腐蚀的优异抵抗力
- 在还原和氧化介质以及沸点共沸硝酸中具有优异的电阻

合金 31 的典型应用领域

- 烟气脱硫装置组分湿法消解磷酸生产装置
- 氯化物污染硫酸的管道和热交换器
- 含有海水和微咸水、冷凝器和冷水机组的管道
- 硫酸、氢氟酸的酸洗装置
- 从废物中处理硫酸
- 盐的蒸发结晶
- 纤维素和造纸工业用组分
- 矿石的消化，例如在 HIPAL（高压酸浸）植物中用于红土矿的溶出
- 矿物油生产和炼油厂
- 有机酸与酯合成
- 精细化学品
- 应变硬化的输送和进料管道以及在管道中的滑行线、电缆和流线。

技术规范：

pipe Smls	Pipe Welded	Sheet/Plate	Bar	Forging	Fitting
ASTM B622					

Hastelloy Alloys

Hastelloy B /UNS N10001

Material grades and equivalents Hastelloy B/GB NS321/UNS N10001

Short Introduction:

Hastelloy B/GB NS321/UNS N10001 is the face–centered cubic lattice structure. By controlling the content of iron and chromium at the minimum to reduce the processing brittle, prevent Ni4Mo precipitation during 700–870 ℃.

Chemical compostion:

Alloy	%	Ni	Mo	Fe	Cr	Co	C	Mn	V	Si	P	S
GB NS321	Min.	Rest	26	4					0.2			
	Max.		30	6	1	2.5	0.05	1	0.4	1	0.04	0.03

GB NS321 Physical properties:

Density	9.24g/cm3
Melting point	1330–1380℃

GB NS321Alloy minimum mechanical properties in the room temperature:

Alloy state	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
GB NS321	690	310	40

Characteristic：

1. Control of iron and chromium content to a minimum to prevent the generation of β –phase Ni4Mo.
2. Excellent corrosion resistance of restore environment.
3. An excellent resist to concentration sulfuric acid medium and large number of non–oxidizing acid corrosion.
4. A very good resistance of chloride reduction of stress corrosion cracking (SCC).
5. Good corrosion resistance of various organic acids.

Metallurgical structure

GB NS321 is the face–centered cubic lattice structure. By controlling the content of iron and chromium at the minimum to reduce the processing brittle, prevent Ni4Mo precipitation during 700–870 ℃.

Corrosion resistance

Ni–Mo alloy HY HB, the carbon and silicon content is extremely low, reducing the HAZ carbon and other impurities precipitation, so the weld has sufficient corrosion resistance. Alloy HY HBin the reduction of medium with very good corrosion resistance, such as a various temperature and concentration of hydrochloric acid. In the middle of the concentration of sulfuric acid solution (or contain a certain amount of chloride ions) also has very good corrosion resistance. At the same time can be used to acetic acid and phosphoric acid environment. Alloy material suitable only in the metallurgical structure and pure crystal structure in order to have the best corrosion resistance.

Applied field:

GB NS321 Alloy with a wide range of applications in the field of chemical, petrochemical, energy manufacturing and pollution control , particularly in the sulfuric acid, hydrochloric acid, phosphoric acid, acetic acid, and other industries.

GB NS321/ Hastelloy B /UNS N10001

GB NS321 相 似 牌 号：
Hastelloy B / UNS N10001

Hastelloy B/GB NS321/UNS N10001 可控制铁元素和铬元素在最低含量，阻止β 相 Ni4Mo 的生成，对还原环境的优异的耐腐蚀性，具有极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性、很好的抗氯离子还原应力腐蚀开裂性（SCC）和优秀的耐各种有机酸腐蚀的能力。

GB NS321 的化学成分:

合金	%	镍	钼	铁	铬	钴	碳	锰	钒	硅	磷	硫
NS321	最小	余量	26	4.0					0.2			
	最大		30	6.0	1.0	2.5	0.05	1.0	0.4	1.0	0.04	0.03

GB NS321 的物理性能:

密度	9.24g/cm3
熔点	1330~1380℃

GB NS321 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
GB NS321	690	310	40

GB NS321 合金具有以下特性：

1. 控制铁元素和铬元素在最低含量，阻止β 相 Ni4Mo 的生成。
2. 对还原环境的优异的耐腐蚀性。
3. 极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性。
4. 很好的抗氯离子还原应力腐蚀开裂性（SCC）。
5. 优秀的耐各种有机酸腐蚀的能力。

GB NS321 的金相结构:

NS321 为面心立方晶格结构。通过控制铁和铬含量在最小值，降低了加工脆性，阻止了在 700–870℃间 Ni4Mo 相的析出。

GB NS321 的耐腐蚀性:

此镍钼合金的碳、硅含量极低，降低了焊接热影响区碳和其它杂质相的析出，因此其焊缝也具有足够的抗腐蚀性。此合金在还原性介质中具有很好的抗腐蚀性，如各种温度和浓度的盐酸溶液。在中等浓度的硫酸溶液（或者含有一定量的氯离子）中也具有很好的抗腐蚀性。同时也能用于醋酸和磷酸环境。合金材料只有在适宜的金相状态和纯净的晶体结构时才能具有最好的耐腐蚀性。

GB NS321 应用范围应用领域有：

此合金在化学、石化、能源制造和污染控制领域中有着广泛的应用，尤其是在硫酸、盐酸、磷酸、醋酸等工业中。

GB NS32 / Hastelloy B–2 /UNS N10665

GB NS322 Material grades and equivalents Hastelloy B–2/GB NS322/UNS N10665/SEW VDIUV W.Nr.2.4617

Short Introduction:

GB NS322/Hastelloy B–2/GB NS322/UNS N10665/SEW VDIUV W.Nr.2.4617 NiMo28/AFNOR NiMo28 is the face–centered cubic lattice structure. By controlling the content of iron and chromium at the minimum to reduce the processing brittle, prevent Ni4Mo precipitation during 700–870 ℃

GB NS322 Chemical compostion:

Alloy	%	Ni	Mo	Fe	Cr	Co	C	Mn	V	Si	P	S
GB NS322	Min.	Balance	26	4					0.2			
	Max.		30	6	1	2.5	0.05	1	0.4	1	0.04	0.03

GB NS322 Physical properties:

Density	9.24g/cm3
Melting point	1330–1380℃

GB NS322 Alloy minimum mechanical properties in the room temperature:

Alloy state	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
GB NS322	690	310	40

Characteristic:

1. Control of iron and chromium content to a minimum to prevent the generation of β –phase Ni4Mo.
2. Excellent corrosion resistance of restore environment.
3. An excellent resist to concentration sulfuric acid medium and large number of non–oxidizing acid corrosion.
4. A very good resistance of chloride reduction of stress corrosion cracking (SCC).
5. Good corrosion resistance of various organic acids.

Metallurgical structure

GB NS322 is the face–centered cubic lattice structure. By controlling the content of iron and chromium

at the minimum to reduce the processing brittle, prevent Ni4Mo precipitation during 700–870 ℃.

Corrosion resistance

Ni–Mo alloy Hastelloy B–2, the carbon and silicon content is extremely low, reducing the HAZ carbon and other impurities precipitation, so the weld has sufficient corrosion resistance. Alloy Hastelloy B– 2 in the reduction of medium with very good corrosion resistance, such as a various temperature and concentration of hydrochloric acid. In the middle of the concentration of sulfuric acid solution (or contain a certain amount of chloride ions) also has very good corrosion resistance. At the same time can be used to acetic acid and phosphoric acid environment. Alloy material suitable only in the metallurgical structure and pure crystal structure in order to have the best corrosion resistance.

Applied field:

Alloy Hastelloy B–2 with a wide range of applications in the field of chemical, petrochemical, energy manufacturing and pollution control , particularly in the sulfuric acid, hydrochloric acid, phosphoric acid, acetic acid, and other industries.

Specifications:

Plate, Sheet, Strip	ASTM B333, ASME SB333
Bar	ASTM B 335, ASME SB335, (DUAL CERTIFIED TO ASTM B564, ASME SB564 ON 3–1/2 DIA. AND UP)
Welded Pipe	ASTM B619, ASME SB619, CLASS I or II, (ABOVE 8 SCH 40) ASTM B775, ASME SB775
Seamless Pipe	ASTM B622, ASME SB622

GB NS322/ Hastelloy B–2 /UNS N10665

GB NS322 相似牌号：Hastelloy B–2 / UNS N10665 / SEW VDIUV W.Nr.2.4617 NiMo28 / AFNOR NiMo28

Hastelloy B–2/GB NS322/UNS N10665/SEW VDIUV W.Nr.2.4617 NiMo28/AFNOR NiMo28 可控制铁元素和铬元素在最低含量，阻止β 相 Ni4Mo 的生成，对还原环境的优异的耐腐蚀性，具有极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性、很好的抗氯离子还原应力腐蚀开裂性（SCC）和优 秀的耐各种有机酸腐蚀的能力。

GB NS322 的化学成分:

%	镍	钼	铁	铬	钴	碳	锰	钒	硅	磷	硫
最小	余量	26	2.0								
最大		30	7.0	1.0	1.0	0.02	1.0		0.1	0.04	0.03

GB NS322 的物理性能:

密度	9.24g/cm3
熔点	1330–1380℃

GB NS322 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
GB NS322	690	310	40

GB NS322 合金具有以下特性:

1. 控制铁元素和铬元素在最低含量，阻止 β 相 Ni4Mo 的生成。
2. 对还原环境的优异的耐腐蚀性。
3. 极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性。
4. 很好的抗氯离子还原应力腐蚀开裂性（SCC）。
5. 优秀的耐各种有机酸腐蚀的能力。

GB NS322 的金相结构:

GB NS322为面心立方晶格结构。通过控制铁和铬含量在最小值，降低了加工脆性，阻止了在 700–870℃ 间 Ni4Mo 相的析出。

GB NS322 的耐腐蚀性:

镍钼合金GB NS322 的碳、硅含量极低，降低了焊接热影响区碳和其它杂质相的析出，因此其焊缝也具有足够的抗腐蚀性。此合金在还原性介质中具有很好的抗腐蚀性，如各种温度和浓度的盐酸溶液。在中等浓度的硫酸溶液（或者含有一定量的氯离子）中也具有很好的抗腐蚀性。同时也能用于醋酸和磷酸环境。合金材料只有在适宜的金相状态和纯净的晶体结构时才能具有最好的耐腐蚀性。

GB NS322 应用领域有:

合金 GB NS322 在化学、石化、能源制造和污染控制领域中有着广泛的应用，尤其是在硫酸、盐酸、磷酸、醋酸等工业中。

技术规范:

Plate, Sheet, Strip	ASTM B333, ASME SB333
Bar	ASTM B 335, ASME SB335, (DUAL CERTIFIED TO ASTM B564, ASME SB564 ON 3–1/2 DIA. AND UP)
Welded Pipe	ASTM B619, ASME SB619, CLASS I or II, (ABOVE 8 SCH 40) ASTM B775, ASME SB775
Seamless Pipe	ASTM B622, ASME SB622

GB NS333/ Hastelloy C /UNS N06003

GB NS333 Material grades and equivalents

HastelloyC/GB NS333&NS3303/SEW VDIUV W.Nr.2.4819/BS NA45

Short Introduction:

GB NS333/HastelloyC/GB NS333&NS3303/SEW VDIUV W.Nr.2.4819/BS NA45 is a omnipotent of nickel, chromium and molybdenum mixed alloy, with better corrosion resistance performance than other alloys, for example, Hastelloy C276 alloy, C4 alloy and 625 alloy.

GB NS333 Chemical composition

Alloy	%	Ni	Cr	Mo	Fe	W	Co	C	Mn	Si	V	P	S
C	Min.	balance	14.5	15	4	3							
	Max.		16.5	17	7	4.5	2.5	0.08	1	1	0.35	0.04	0.03
C22	Min.	balance	20	12.5	2	2.5							
	Max.		22.5	14.5	6	3.5	2.5	0.02	0.5	0.08	0.35	0.02	0.02

GB NS333 Physical properties

Density	8.9 g/cm³
Melting point	1325–1370 ° C

GB NS333 Alloy minimum mechanical properties in the room temperature

Alloy	Tensile Strength Rm N/mm²	Yield strength R P 0. 2N/mm²	Elongation A 5 %
GB NS333	690	283	40

Characteristic as below

GB NS333 is a omnipotent of nickel, chromium and molybdenum mixed alloy, with better corrosion resistance performance than other alloys, for example, Hastelloy C276 alloy, C4 alloy and 625 alloy. HY HC have a good resistance performance to pitting, crevice corrosion and stress corrosion cracking, have excellent inoxidability water medium performance, including the wet–chlorine, nitric acid or oxidizing acid mixed acid with chloride ion. Meantime, HY HC possesses perfect resistance to reduction and oxidation of processing enviroments, then it can be used in some complicated environment or with many different manufacture target factory depend on the omnipotent performance. HY HC possess prominent resistance performance to different chemical environments, including strong oxidizing matter,

such as iron chloride, copper chloride, chlorine, heat pollution liquid(organic and inorganic), formic acid, acetic acid, acetyl oxide, sea water and salting liquid and so on.

GB NS333 Metallurgical structure

GB NS333 is face–centered cubic lattice structure.

GB NS333 Corrosion resistance

GB NS333 alloy suit for many kinds of chemical process industry which contain the oxidizing medium and reductant. High molybdenum and chromium content make it can resist the chloride corrosion, and tungsten make this corrosion resistance better. HY HC is one of a few material that can resist the corrosion of moist chlorine, hypochlorite and chlorine dioxide, this alloyhave prominent corrosion resistanceto high concentration chlorate(iron chloride and copper chloride)

GB NS333 Application field

GB NS333 is widely used in the chemical field and petrifaction field, such as the element of chloride organic and catalyze system. This material especially suit for high temperature environments, impure inorganic acid and organic acid (such as formic acid and acetic acid), sea–water corrosion environments.

GB NS333 Other application field

1. Acetic acid/acetyl oxide
2.Acid dipping
3.Cellophane paper manufactures
4.Chloride system
5. Complicated mixed acid
6. Electrogalvanizing groove roller
7.Expansion bellows
8.Flue gas washer system
9.Geothermal well
10.Fluorine hydride furnace cleaner
11.Incineration cleaner system
12. Nuclear fuel regeneration
13. Pesticide manufacture
14.Phosphoric acid manufacture
15.Acid cleaning system
16.Plate heat exchanger
17. Selectivity filter system

Specifications:

bar/forging/ring	AMS 5750

GB NS333/NS3303/ Hastelloy C /UNS N06003

GB NS333&NS3303 相似牌号：HastelloyC / SEW VDIUV W.Nr.2.4819 / BS NA45

HastelloyC/GB NS333/NS3303/SEW VDIUV W.Nr.2.4819/BS NA45 可控制铁元素和铬元素在最低含量，阻止β相 Ni4Mo 的生成，对还原环境的优异的耐腐蚀性，具有极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性、很好的抗氯离子还原应力腐蚀开裂性（SCC）和优秀的耐各种有机酸腐蚀的能力。

GB NS333/NS3303 的化学成份

合金	%	镍	钼	钨	碳	锰	磷	硫	铁
GB NS333	最小		15	3					4
	最大	余量	17	4.5	0.08	1	0.04	0.03	7

GB NS333/NS3303 物理性能

密度	9.24 g/cm3
熔点	1330–1380 ℃

GB NS333/NS3303 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
GB NS333	690	310	40

GB NS333/NS3303 的特征

1.控制铁元素和铬元素在最低含量，阻止β相 Ni4Mo 的生成。
2.对还原环境的优异的耐腐蚀性。
3.极好的抗中等浓度硫酸和许多非氧化性酸腐蚀性。
4.很好的抗氯离子还原应力腐蚀开裂性（SCC）。
5.优秀的耐各种有机酸腐蚀的能力

GB NS333/NS3303 的金相结构

GB NS333/NS3303 为面心立方晶格结构。通过控制铁和铬含量在最小值，降低了加工脆性，阻止了在700–870℃间 Ni4Mo 相的析出。

GB NS333/NS3303 的耐腐蚀性

镍钼合金 GB NS333/NS3303 的碳、硅含量极低，降低了焊接热影响区碳和其它杂质相的析出，因此其焊缝也具有足够的抗腐蚀性。合金 Hastelloy C–2 在还原性介质中具有很好的抗腐蚀性，如各种温度和浓度的盐酸溶液。在中等浓度的硫酸溶液（或者含有一定量的氯离子）中也具有很好的抗腐蚀性。同时也能用于醋酸和磷酸环境。合金材料只有在适宜的金相状态和纯净的晶体结构时才能具有最好的耐腐蚀性。

GB NS333/NS3303 的应用领域

合金 GB NS333/NS3303 在化学、石化、能源制造和污染控制领域中有着广泛的应用，尤其是在硫酸、盐酸、磷酸、醋酸等工业中。

技术规范：

bar/forging/ring	AMS 5750

Hastelloy C–4 /UNS N06455

Material grades and equivalents Hastelloy C–4/UNS N06455 / AFNOR NC16D16M

Short Introduction:

Hastelloy C–4/ UNS N06455 / AFNOR NC16D16M is a nickel–chromium–molybdenum alloy with outstanding high–temperature stability as evidenced by high ductility and corrosion resistance even after aging in the 1200 to 1900° F (649 to 1038° C) range. This alloy resists the formation of grain–boundary precipitates in the weld heat–affected zone, thus making it suitable for most chemical process applications in the as–welded condition. C–4 alloy also has excellent resistance to stress–corrosion cracking and to oxidizing atmospheres up to 1900° F (1038° C).

Hastelloy C–4 Chemical compostion:

%	Ni	Cr	Mo	Fe	C	Mn	Si	Co	S	P	Ti
Min.	65	14	14								
Max.		18	17	3	0.01	1	0.08	2	0.01	0.025	0.7

Hastelloy C–4 Physical properties:

Density	8.64 g/cm3
Melting point	1350–1400 ℃

Hastelloy C–4 Alloy minimum mechanical properties in the room temperature:

Alloy	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
Hastelloy C–4	783	365	55

Hastelloy C–4 alloy is a nickel–chromium–molybdenum alloy with outstanding high–temperature stability as evidenced by high ductility and corrosion resistance even after aging in the 1200 to 1900° F (649 to 1038° C) range. This alloy resists the formation of grain–boundary precipitates in the weld heat–affected zone, thus making it suitable for most chemical process applications in the as–welded condition. C–4 alloy also has excellent resistance to stress–corrosion cracking and to oxidizing atmospheres up to 1900° F (1038° C).

Hastelloy C–4 alloy has exceptional resistance to wide variety of chemical process environments. These include hot contaminated mineral acids, solvents, chlorine and chlorine contaminated media (organic and inorganic), dry chlorine, formic and acetic acids, acetic anhydride, and seawater and brine solutions.

Hastelloy C–4 alloy can be forged, hot–upset, and impact extruded. Although the alloy tends to work–harden, it can be successfully deep–drawn, spun, press formed or punched. All of

the common methods of welding can be used to weld HASTELLOY C–4 alloy, although the oxy–acetylene and submerged arc processes are not recommended when the fabricated item is intended for use in corrosion service. Special precautions should be taken to avoid excessive heat input.

Specifications:

Sheet, Plate & Strip	SB 575/B 575(P= 43)
Billet, Rod & Bar	SB 574/B 574(P= 43)
Bare Welding Rods & Wire	SFA 5.14/ A 5.14(ERNiCrMo–7)DIN 2.4611(SG–NiMo16Cr16Ti)(F= 43)
Seamless Pipe & Tube	SB 622/B 622(P= 43)
Welded Pipe & Tube	SB 619/B 619;SB 626/B 626(P= 43)
Fittings	SB 366/B 366(P= 43)

NS335/NS3305/ Hastelloy C–4 /UNS N06455

NS335/NS3305 相似牌号：Hastelloy C–4 / UNS N06455 / AFNOR NC16D16M

NS335/NS3305 / Hastelloy C–4/ UNS N06455 / AFNOR NC16D16M 在高温状态下具有优良的热稳定性和韧性，对于高温状态下的应力腐蚀裂纹和氧化性气氛具有良好的抵抗性。适合各类热的矿物酸、含 氯介质、乙酸、乙酸酐、海水和盐水溶液等腐蚀性物质。

NS335/NS3305 的化学成分:

合金	%	镍	铬	钼	铁	碳	锰	硅	钴	硫	磷	钛
NS335	最小	65	14	14								
	最大		18	17	3.0	0.01	1.0	0.08	2.0	0.010	0.025	0.70

NS335/NS3305V 的物理性能

密度	8.64 g/cm3
熔点	1350–1400 ℃

NS335/NS3305 在常温下合金的机械性能的最小值

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
NS335	783	365	55

NS335/NS3305（Ni–Cr– Mo）在高温状态下具有优良的热稳定性和韧性，对于高温状态下的应力腐蚀裂纹和氧化性气氛具有良好的抵抗性。适合各类热的矿物酸、含氯介质、乙酸、乙酸酐、海水和盐水溶液等腐蚀性物质。

NS335/NS3305 工作温度約：–200 至 +400° C

主要特征：组织稳定性好、焊接后可直接使用。

用途举例：湿氯、次氯酸、盐酸、氯化物装置。

技术规范：

Sheet, Plate & Strip	SB 575/B 575(P= 43)
Billet, Rod & Bar	SB 574/B 574(P= 43)
Bare Welding Rods & Wire	SFA 5.14/ A 5.14(ERNiCrMo–7)DIN 2.4611(SG–NiMo16Cr16Ti)(F= 43)
Seamless Pipe & Tube	SB 622/B 622(P= 43)
Welded Pipe & Tube	SB 619/B 619;SB 626/B 626(P= 43)
Fittings	SB 366/B 366(P= 43)

Hastelloy C–22/ UNS N06022

Material grades and equivalents

Hastelloy C–22/UNS N06022/SEW VDIUV W.Nr.2.4602 NiCr21Mo14W/AFNOR NU–30M

Short Introduction:

Hastelloy C–22/UNS N06022/SEW VDIUV W.Nr.2.4602 NiCr21Mo14W/AFNOR NU–30M has a good resistance performance to pitting, crevice corrosion and stress corrosion cracking, have excellent inoxidability water medium performance, including the wet–chlorine, nitric acid or oxidizing acid mixed acid with chloride ion.

Hastelloy C 22 Chemical composition:

Alloy	%	Ni	Cr	Mo	Fe	W	Co	C	Mn	Si	V	P	S
C	Min.	balance	14.5	15	4	3							
	Max.		16.5	17	7	4.5	2.5	0.08	1	1	0.35	0.04	0.03
C22	Min.	balance	20	12.5	2	2.5							
	Max.		22.5	14.5	6	3.5	2.5	0.02	0.5	0.08	0.35	0.02	0.02

Hastelloy C 22 Physical properties

Density	8.9 g/cm³
Melting point	1325–1370 ℃

Hastelloy C 22 Alloy minimum mechanical properties in the room temperature

Alloy	Tensile Strength Rm N/mm²	Yield strength R P 0. 2N/mm²	Elongation A 5 %
Hastelloy C 22	690	283	40

Characteristic as below：

Hastelloy C 22 is a omnipotent of nickel, chromium and molybdenum mixed alloy, with better corrosion resistance performance than other alloys, for example, Hastelloy C276 alloy, C4 alloy and 625 alloy. HY Hastelloy C 22 have a good resistance performance to pitting, crevice corrosion and stress corrosion cracking, have excellent inoxidability water medium performance, including the wet–chlorine, nitric acid or

oxidizing acid mixed acid with chloride ion. Meantime, HY HC22 possesses perfect resistance to reduction and oxidation of processing enviroments, then it can be used in some complicated environment or with many different manufacture target factory depend on the omnipotent performance. HY HC22 possess prominent resistance performance to different chemical environments, including strong oxidizing matter, such as iron chloride, copper chloride, chlorine, heat pollution liquid(organic and inorganic), formic acid, acetic acid, acetyl oxide, sea water and salting liquid and so on.Hastelloy C 22 alloy can resist the grain boundary precipitate form when jointing heat affected zone, this performance made it can applied in many kinds of chemical processing.

Hastelloy C 22 Metallurgical structure

Hastelloy C22 is face–centered cubic lattice structure.

Hastelloy C 22 Corrosion resistance

Hastelloy C 22 alloy suit for many kinds of chemical process industry which contain the oxidizing medium and reductant. High molybdenum and chromium content make it can resist the chloride corrosion, and tungsten make this corrosion resistance better. HY HC22 is one of a few material that can resist the corrosion of moist chlorine, hypochlorite and chlorine dioxide, this alloyhave prominent corrosion resistanceto high concentration chlorate(iron chloride and copper chloride).

Hastelloy C 22 Application field:

Hastelloy C 22 is widely used in the chemical field and petrifaction field, such as the element of chloride organic and catalyze system. This material especially suit for high temperature environments, impure inorganic acid and organic acid (such as formic acid and acetic acid), sea–water corrosion environments.

Other application field:

1. Acetic acid/acetyl oxide
2. Acid dipping
3. Cellophane paper manufactures
4. Chloride system
5. Complicated mixed acid
6. Electrogalvanizing groove roller
7. Expansion bellows
8. Flue gas washer system
9. Geothermal well
10. Fluorine hydride furnace cleaner
11. Incineration cleaner system
12. Nuclear fuel regeneration
13. Pesticide manufacture
14. Phosphoric acid manufacture
15. Acid cleaning system
16. Plate heat exchanger
17. Selectivity filter system
18. Sulfur dioxide cooling tower
19. Sulfonating system

20. Tubing heat exchanger
21. Resurfacing welding valve

Specifications:

Rod, Bar, Wire and Forging Stock	ASTM B 462 (Rod, Bar and Forging Stock), ASTM B 564 & ASME SB 564 (Forgings), ASTM B 574 & ASME SB 574 (Rod, Bar and Wire), ASME Code Case 2226, ASME Code Case N–621, ISO 9723, ISO 9724, DIN 17752 (Rod & Bar), DIN 17753 (Wire), DIN 17754 (Forgings)
Plate, Sheet and Strip	ASTM B 575; ASTM B 906 & ASME SB 575; ASME SB 906, ASME Code Case 2226, ASME Code Case N–621, ISO 6208, DIN 17750
Pipe and Tube	ASTM B 619; ASTM B 775 & ASME SB 619; ASME SB 775 (Welded Pipe), ASTM B 622; ASTM B 829 & ASME SB 622; ASME SB 829 (Seamless Tube), ASTM B 626; ASTM B 751 & ASME SB 626; ASME SB 751 (Welded Tube), ASME Code Case 2226, ASME Code Case N–621, ISO 6207, DIN 17751.
Welding Products	Filler Metal 622 – AWS A5.14 / ERNiCrMo–10, Welding Electrode 622 – AWS A5.11 / ENiCrMo–10

NS338/NS3308/Hastelloy C–22/ UNS N06022

NS338/ NS3308 相似牌号：

Hastelloy C–22/ UNS N06022/ SEW VDIUV W.Nr.2.4602 NiCr21Mo14W / AFNOR NU–30M

NS338/ NS3308/Hastelloy C–22/UNS N06022/SEW VDIUV W.Nr.2.4602 NiCr21Mo14W/AFNOR NU–30M 是全能的镍铬钼钨合金，比其他的现有的镍铬钼合金拥有更好的总体抗腐蚀性能。此合金有很好的抗点蚀，缝隙腐蚀和应力腐蚀开裂能力。它具有优异的抗氧化水介质能力，包括湿氯，硝酸或者含有氯化物离子的氧化性酸的混合酸。

NS338/ NS3308 的化学成分:

合金	%	镍	铬	钼	铁	钨	钴	碳	锰	硅	钒	磷	硫
NS338	最小	余量	14.5	15	4	3							
	最大		16.5	17	7	4.5	2.5	0.08	1	1	0.35	0.04	0.03
C22	最小	余量	20.0	12.5	2	2.5							
	最大		22.5	14.5	6	3.5	2.5	0.015	0.5	0.08	0.35	0.02	0.02

NS338/ NS3308 的物理性能:

密度	8.9 g/cm3
熔点	1325–1370 ℃

NS338/ NS3308 在常温下合金的机械性能的最小值:

合金	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
NS338	690	283	40

此合金具有以下特性：是全能的镍铬钼钨合金，比其他的现有的镍铬钼合金拥有更好的总体抗腐蚀性能， 包括 Hastelloy C276、C4 合金以及 625 合金。此合金有很好的抗点蚀，缝隙腐蚀和应力腐蚀开裂能力。它具有优异的抗氧化水介质能力，包括湿氯，硝酸或者含有氯化物离子的氧化性酸的混合酸。同时，此合金也有理想的的抵抗过程中遭遇的还原性和氧化性环境的能力。依靠这种万能的性能，它能在一些令人头疼的环境中使用，或者在多种生产目的工厂中应用。此合金对各种化工环境有着异常的抵御能力， 包括强氧化性物质，比如氯化铁、氯化铜、氯、热污染溶液（有机的无机的），甲酸、乙酸、醋酸酐、海水和盐溶液等。此合金在焊接热影响区有抵抗晶界沉淀形成的能力，这样使它在焊接状态下也能适应很多种化工过程的应用。

NS338/ NS3308 的金相结构:为面心立方晶格结构。

NS338/ NS3308 的耐腐蚀性:

此合金适用于各种含有氧化和还原性介质的化学流程工业。较高的钼、铬含量使合金能够耐氯离子的侵蚀，钨元素也进一步提高了其耐腐蚀性。此合金是仅有的几种能够耐潮湿氯气、次氯酸盐以及二氧化氯 溶液腐蚀的材料之一，该合金对高浓度的氯化盐溶液具有显著的耐腐蚀性（如氯化铁和氯化铜）。

NS338/ NS3308 应用范围应用领域有：
此合金在化工和石化领域得到了广泛的应用，如应用在接触含氯化物有机物的元件和催化系统中。这种 材料尤其适合在高温、混有杂质的无机酸和有机酸（如甲酸和乙酸）、海水腐蚀环境中使用。

NS338/ NS3308 其它应用领域：
1. 醋酸/醋酸酐
2. 酸浸
3. 玻璃纸制造
4. 氯化系统
5. 复杂的混合酸
6. 电镀锌槽的镀子
7. 膨胀波纹管
8. 烟气清洗器系统
9. 地热井
10. 氟化氢熔炉清洗器
11. 焚烧清洗器系统
12. 核燃料再生
13. 杀虫剂生产
14. 磷酸生产
15. 酸洗系统
16. 板式热交换器
17. 选择性过滤系统
18. 二氧化硫冷却塔
19. 磺化系统
20. 管式热交换器
21. 堆焊阀门

技术规范：

Rod, Bar, Wire and Forging Stock	ASTM B 462 (Rod, Bar and Forging Stock), ASTM B 564 & ASME SB 564 (Forgings), ASTM B 574 & ASME SB 574 (Rod, Bar and Wire), ASME Code Case 2226, ASME Code Case N–621, ISO 9723, ISO 9724, DIN 17752 (Rod & Bar), DIN 17753 (Wire), DIN 17754 (Forgings)
Plate, Sheet and Strip	ASTM B 575; ASTM B 906 & ASME SB 575; ASME SB 906, ASME Code Case 2226, ASME Code Case N–621, ISO 6208, DIN 17750
Pipe and Tube	ASTM B 619; ASTM B 775 & ASME SB 619; ASME SB 775 (Welded Pipe), ASTM B 622; ASTM B 829 & ASME SB 622; ASME SB 829 (Seamless Tube), ASTM B 626; ASTM B 751 & ASME SB 626; ASME SB 751 (Welded Tube), ASME Code Case 2226, ASME Code Case N–621, ISO 6207, DIN 17751.
Welding Products	Filler Metal 622 – AWS A5.14 / ERNiCrMo–10, Welding Electrode 622 – AWS A5.11 / ENiCrMo–10

Hastelloy C–276/ UNS N10276

Material grades and equivalents

Hastelloy C–276/GB NS334/UNS N10276/SEW VDIUV W.Nr.2.4819 NiMo16Cr15W/BS NC17D/NiMo16Cr15

Short Introduction:

Hastelloy C–276/GB NS334/UNS N10276/SEW VDIUV W.Nr.2.4819 NiMo16Cr15W/BS NC17D/NiMo16Cr15 suit for many kinds of chemical process industry which contain the oxidizing medium and reductant. High molybdenum and chromium content make it can resist the chloride corrosion, and tungsten make it corrosion resistance better.C276 is one of a few material that can resist the corrosion of most chlorine, hypochlorite and chlorine dioxide, this alloy have prominent corrosion resistance to high concentration chlorate(iron chloride and copper chloride).

Hastelloy C276 Chemical composition

%	Ni	Cr	Mo	Fe	W	Co	C	Mn	Si	V	P	S
Min.	balance	14.5	15	4	3							
Max.		16.5	17	7	4.5	2.5	0.01	1	0.08	0.35	0.04	0.03

Hastelloy C276 Physical properties:

Density	8.9 g/cm³
Melting point	1325–1370 ℃

Hastelloy C276 Alloy m inimum mechanical properties in the room temperature

Alloy state	Tensile strength Rm N/mm²	Yield strength R P0. 2N/mm²	Elongation A 5 %
Hastelloy C276	690	283	40

Characteristic as below

1. Excellent corrosion resistance to most of corrosion media in oxidation and reduction environments.
2. Excellent resist pitting, crevice corrosion and stress corrosion cracking performance.

Hastelloy C276 Metallurgical structure

Hastelloy C276 is face–centered cubic lattice structure.

Hastelloy C276 Corrosion resistance

C276 alloy suit for many kinds of chemical process industry which contain the oxidizing medium and reductant. High molybdenum and chromium content make it can resist the chloride corrosion, and tungsten make it corrosion resistance better.C276 is one of a few material that can resist the corrosion of most chlorine, hypochlorite and chlorine dioxide, this alloy have prominent corrosion resistance to high concentration chlorate(iron chloride and copper chloride).

Hastelloy C276 Application field:

C276 is widely used in the chemical field and petrifaction field, such as the element of chloride organic and catalyze system. This material especially suit for high temperature environment, impure inorganic acid and organic acid (such as formic acid and acetic acid), sea–water corrosion environment.

Other application field:

1. The digester and bleacher in the use of paper pulp and paper making industry.
2. Absorption tower, re–heater and fan in the FGD system.
3. The equipment and parts in the use of acidic gas environments.
4. Acetic acid and anhydride reaction generator
5. Sulfur acid cooling
6. MDI
7.Manufacture and processing of impure phosphoric acid.

Specification:

Sheet, Plate & Strip	SB 575/B 575(P= 43)
Rod & Bar	SB 574/B 574;B 472(P= 43)
Bare Welding Rods & Wire	SFA 5.14/ A 5.14 (ERNiCrMo–4);DIN 2.4886;(SG–NiMo16Cr16W)(F= 43)
Seamless Pipe & Tube	SB 622/B 622;B 983(P= 43)
Welded Pipe & Tube	SB 619/B 619;SB 626/B 626(P= 43)
Fittings	SB 366/B 366;SB 462/B 462(P= 43)
Forgings	SB 564/B 564;SB 462/B 462(P= 43)

GB NS334/ Hastelloy C-276/ UNS N10276

GB NS334 相似牌号：
Hastelloy C-276 / GB NS334 / UNS N10276 / SEW VDIUV W.Nr.2.4819 NiMo16Cr15W / BS NC17D / NiMo16Cr15

GB NS334/Hastelloy C-276/GB NS334/UNS N10276/SEW VDIUV W.Nr.2.4819 NiMo16Cr15W/BS NC17D/NiMo16Cr15 在氧化和还原状态下，对大多数腐蚀介质具有优异的耐腐蚀性，具有出色的耐点腐蚀、缝隙腐蚀和应力腐蚀开裂性能。

GB NS334 的化学成分:

合金	%	镍	铬	钼	铁	钨	钴	碳	锰	硅	钒	磷	硫
GB NS 334	最小	余量	14.5	15	4	3							
	最大		16.5	17	7	4.5	2.5	0.01	1	0.08	0.35	0.04	0.03

GB NS334 的物理性能:

密度	8.9 g/cm3
熔点	1325-1370 ℃

GB NS334 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
哈C /C276	690	283	40

此合金具有以下特性：
1. 在氧化和还原状态下，对大多数腐蚀介质具有优异的耐腐蚀性。
2. 出色的耐点腐蚀、缝隙腐蚀和应力腐蚀开裂性能。

GB NS334 的金相结构:
为面心立方晶格结构。

GB NS334 的耐腐蚀性:
此合金适用于各种含有氧化和还原性介质的化学流程工业。较高的钼、铬含量使合金能够耐氯离子的侵蚀，钨元素也进一步提高了其耐腐蚀性。此合金是仅有的几种能够耐潮湿氯气、次氯酸盐以及二氧化氯 溶液腐蚀的材料之一，该合金对高浓度的氯化盐溶液具有显著的耐腐蚀性（如氯化铁和氯化铜）。

GB NS334 应用范围应用领域有：
此合金在化工和石化领域得到了广泛的应用，如应用在接触含氯化物有机物的元件和催化系统中。这种 材料尤其适合在高温、混有杂质的无机酸和有机酸（如甲酸和乙酸）、海水腐蚀环境中使用。

GB NS334 其它应用领域：
1. 纸浆和造纸工业，如蒸解和漂白容器
2. FGD 系统中的洗涤塔、再加热器、湿汽风扇等
3. 在酸性气体环境中作业的设备和元件
4. 乙酸和酸性产品的反应器
5. 硫酸冷凝器
6. 亚甲二苯异氰酸盐（MDI）
7. 不纯磷酸的生产和加工

技术规范：

Sheet, Plate & Strip	SB 575/B 575(P= 43)
Rod & Bar	SB 574/B 574;B 472(P= 43)
Bare Welding Rods & Wire	SFA 5.14/ A 5.14 (ERNiCrMo-4);DIN 2.4886;(SG-NiMo16Cr16W)(F= 43)
Seamless Pipe & Tube	SB 622/B 622;B 983(P= 43)
Welded Pipe & Tube	SB 619/B 619;SB 626/B 626(P= 43)
Fittings	SB 366/B 366;SB 462/B 462(P= 43)
Forgings	SB 564/B 564;SB 462/B 462(P= 43)

Hastelloy X /UNS N06002

Material grades and equivalents

Hastelloy X / GB GH3536&GH536/UNS N06002 / SEW VDIUV W.Nr.2.4613 / AFNOR NC22FeD

Short Introduction:

Hastelloy X / GB GH3536&GH536/UNS N06002 / SEW VDIUV W.Nr.2.4613 / AFNOR NC22FeD has good oxidation and corrosion resistance. Below 900 ° C with middle elevated temperature stress rupture and creep rupture strength; good formability with cold working and hot working and excellent welding fabrication.

Hastelloy X Chemical compostion:

%	Ni	Cr	Fe	C	Mn	Si	Cu	S	B	Ti	P	Co	W	Mo	Al
Min.	Rest	20.5	17	0.05								0.5	0.2	8	
Max.		23	20	0.15	1	1	0.5	0.015	0.01	0.15	0.025	2.5	1	10	0.5

Hastelloy X Physical properties:

Density	8.28 g/cm3
Melting Point	1295–1381℃

Hastelloy X Characteristic:

Good oxidation and corrosion resistance. Below 900 ° C with middle elevated temperature stress rupture and creep rupture strength; good formability with cold working and hot working and excellent welding fabrication.

Hastelloy X Applied field:

Aero–engine combustion chamber and other parts used at elevated temperatures，long term usage below 900° C，short term usage temperature can reach 1080° C.

Specification:

sheet/plate	AMS 5536/GE B50T83/GE B50A436/ASME SB–435/ASTM B–435
bar/Forging	AMS 5754/GE B50A463

GH3536/GH536/ Hastelloy X /UNS N06002

GH3536/GH536 相似牌号：

Hastelloy X / UNS N06002 / SEW VDIUV W.Nr.2.4613 / AFNOR NC22FeD

Hastelloy X / GB GH3536&GH536/UNS N06002 / SEW VDIUV W.Nr.2.4613 / AFNOR NC22FeD 在高达 1200℃时具有优秀的抗氧化性，高温强度好，具有很好的成形性、焊接性很和抗应力腐蚀开裂性。

GB GH3536/GH536 的化学成份

合金	%	镍	铬	铁	碳	锰	硅	钼	钴	钨	铝	硼	磷	硫
GH 3536	最小		20.5	17.0	0.05			8.0	0.5		0.2			
	最大	余量	23.5	20.0	0.15	1.0	1.0	10.0	2.5	0.1	1.0	0.005	0.005	0.01

GH3536/GH536 物理性能

密度	8.3 g/cm3
熔点	1260–1355 ℃

GH3536/GH536 的特征

1. 在高达 1200℃时具有优秀的抗氧化性
2. 高温强度好
3. 很好的成形性和焊接性
4. 很好的抗应力腐蚀开裂性

GH3536/GH536 的应用领域

由于高温时在各种气氛中具有耐腐蚀性，并且具有优秀的高温强度，此合金在各种高温环境中得到了广泛的应用。

1. 工业和航空汽轮机（燃烧室、整流器、结构盖）
2. 工业炉部件、支撑辊、栅板、丝带和辐射管
3. 石油化学炉中的螺旋管
4. 高温气体冷却核反应堆

技术规范：

sheet/plate	AMS 5536/GE B50T83/GE B50A436/ASME SB–435/ASTM B–435
bar/Forging	AMS 5754/GE B50A463

Haynes 214

Haynes 214 Material grades and equivalents: ASTM 061/ UNS/ NO7214/ W.NR 2.4646

Chemical composition:

Ni	Co	Cr	Mo	Zr
75	2	16	0.5	–

Characteristic as below:

Haynes 214 is a Nickel–Chromium–Aluminium–Iron alloy which is principally intended for use at temperatures of 955oC (1750oF) and above.

Processing conditions and application:

Mesh belts.

Trays and fixtures for the firing of pottery and china, and the heat treatment of electronic devices and technical grade ceramics

海恩斯 214

Haynes 214 对应的国际牌号：ASTM 061/ UNS/ NO7214/ W.NR 2.4646

化学成分：

Ni	Co	Cr	Mo	Zr
75	2	16	0.5	–

特点如下：

Haynes 214 是一种镍 – 铬 – 铝 – 铁合金，主要用于 955oC（1750oF）及以上的温度。

加工条件和应用：

网带；陶瓷和瓷器烧制的托盘和夹具，以及电子器件和工业级陶瓷的热处理。

Haynes 230

Haynes 230 Material grades and equivalents

Trademark	IMPHY	ASTM	UNS	W.Nr
Haynes 230	NiCr22W14Mo	AMS 5878 Sheet, Strip and Plate AMS 5891 Bar and Forgings	NO6230	DIN 17744 No 2.4733

Chemical composition:

Ni	Co	Cr	Mo	Zr
53	5	22	2	–

Characteristic as below:

Haynes 230 is a nickel–chromium–tungsten–molybdenum alloy that combines excellent high–temperature strength and oxidation resistance with very good long–term thermal stability and good fabricability.

Processing conditions and application:

The alloy is used in gas–turbine engines, in high–temperature heat–treatment equipment and in severe chemical processing industries.

海恩斯 230

Haynes 230 对应的国际牌号: NiCr22W14Mo / UNS NO6230 / W. Nr. DIN 17744 No 2.4733

化学成分：

Ni	Co	Cr	Mo	Zr
53	5	22	2	–

特点如下：

Haynes 230 是一种镍 – 铬 – 钨 – 钼合金，具有优异的高温强度和抗氧化性，具有非常好的长期热稳定性和良好的可加工性。

加工条件和应用：

该合金用于燃气涡轮发动机，高温热处理设备和重化工行业。

Haynes 242

Material grades and equivalents : Haynes 242/ UNS N10242

Chemical composition:

Ni	Co	Cr	Mo	Zr
60	2.5	8	25	–

Characteristic as below:

Haynes 242 alloy is an age–hardenable nickel–molybdenum chromium alloy which derives its strength from a long–range ordering reaction upon aging. It has tensile and creep strength properties up to 1300° F (705° C) which are as much as double those for solid solution strengthened alloys, but with high ductility in the aged condition. The thermal expansion characteristics of 242 alloy are much lower than those for most other alloys, and it has very good oxidation resistance up to 1500° F (815° C). Other attractive features include excellent low cycle fatigue properties, very good thermal stability, and resistance to high–temperature fluorine and fluoride environments.

Processing conditions and application:

HAYNES 242 alloy has very good forming and welding characteristics in the annealed condition. It may be forged or otherwise hot–worked by conventional techniques, and it is readily cold formable. Welding may be performed in the annealed condition by standard gas tungsten arc (GTAW) or gas metal arc (GMAW) techniques.

海恩斯 242

Haynes 242 对应的国际牌号： UNS N10242

化学成分：

Ni	Co	Cr	Mo	Zr
60	2.5	8	25	–

性能如下：

Haynes 242 是一种可时效硬化的镍 – 钼铬合金，经过老化后可进行长时间的有序反应。它的拉伸和蠕变强度高达 1300° F（705° C），是固溶强化合金的两倍，但在老化条件下具有高延展性。 242 合金的热膨胀特性远低于大多数其他合金的热膨胀特性，在高达 1500° F（815° C）的温度下具有非常好的抗氧化性能。其他有吸引力的特点包括优异的低循环疲劳性能，非常好的热稳定性，以及耐高温氟和氟化物环境。

加工条件及用途：

Haynes 242 在退火状态下具有非常好的成形和焊接特性。它可以通过常规技术锻造或以其他方式进行热加工，并且易于冷成形。通过标准气体钨弧（GTAW）或气体金属弧（GMAW）技术，可以在退火状态下进行焊接。

Haynes 556

Material grades and equivalents: Haynes 556/ UNS R30556

Chemical composition:

%	Fe	Cr	Ni	Co	Mo	W	C	Mn	Si
min	balance	21.0	19.0	16.0	2.5	2.0	0.05	0.50	0.20
max		23.0	22.5	21.0	4.0	3.5	0.15	2.00	0.80
%	P	S	Al	Ta	Nb	La	Zr	N	B
min			0.10	0.30		0.005	0.001	0.10	
max	0.040	0.015	0.50	1.25	0.30	0.10	0.10	0.30	0.020

Mechanical properties:

Density	8.23 g/cm3
Melting range	1330–1415℃

Characteristic as below:

Haynes 556 combines effective resistance to sulfidizing, carburizing and chlorine–bearing environments at high temperatures with good oxidation resistance, fabricability and excellent high temperature strength. It also resists to corrosion by molten zinc, molten chloride salts and other salts.

Processing conditions and application:

Industrial waste incinerators, rotary calciners and kilns, hot–dip galvanizing equipment, aerospace industry high temperature components.

海恩斯 556

Haynes 556 对应的国际牌号：UNS R30556

化学成分：

%	Fe	Cr	Ni	Co	Mo	W	C	Mn	Si
min	余量	21.0	19.0	16.0	2.5	2.0	0.05	0.50	0.20
max		23.0	22.5	21.0	4.0	3.5	0.15	2.00	0.80
%	P	S	Al	Ta	Nb	La	Zr	N	B
min			0.10	0.30		0.005	0.001	0.10	
max	0.040	0.015	0.50	1.25	0.30	0.10	0.10	0.30	0.020

机械性能：

密度	8.23 g/cm3
熔化范围	1330–1415℃

性能如下：

Haynes 556 在高温下兼具有效的抗硫化，渗碳和含氯环境的能力，具有良好的抗氧化性，可加工性和优异的高温强度。它也抵抗熔融锌，熔融氯化物盐和其他盐类的腐蚀。

加工条件及用途：

工业垃圾焚烧炉，回转式煅烧炉和窑炉，热浸镀锌设备，航天工业高温部件。

Nimonic PE16

Material grades and equivalents: Nimonic PE16/BS HR55, BS HR207/ AFNOR NW 11A

Chemical composition:

Ni + Co	Cr	Mo	Fe	Al	Ti	C
42–45	15.5–17.5	2.8–3.8	Rem	1.1–1.3	1.1–1.3	0.04–0.08
Cu	Si	Mn	Co	B	Zr	S
0.5 max	0.5 max	0.2 max	2.0 max	0.005 max	0.02–0.04	0.015 max

Characteristic as below:

Nimonic PE16 is a precipitation–hard–enable nickel–iron–chromium alloy with an addition of molybdenum for solid–solution strengthening. It has good strength and oxidation resistance at temperatures to about 1380° F (750° C). The alloy is designed to provide a precipitation–hardened material having excellent hot–working, cold–working, and welding characteristics.

Processing conditions and application:

Used for gas–turbine components and in nuclear reactors.

Nimonic PE16

Nimonic PE16 对应的国际牌号: /BS HR55, BS HR207/ AFNOR NW 11AC

化学成分:

Ni + Co	Cr	Mo	Fe	Al	Ti	C
42–45	15.5–17.5	2.8–3.8	Rem	1.1–1.3	1.1–1.3	0.04–0.08
Cu	Si	Mn	Co	B	Zr	S
0.5 max	0.5 max	0.2 max	2.0 max	0.005 max	0.02–0.04	0.015 max

性能如下:

为了固溶强化而添加有钼的析出硬化型镍铁铬合金。在温度达到约 1380° F（750° C）时具有良好的强度和抗氧化性。该合金被设计成提供具有优异的热加工，冷加工和焊接特性的沉淀硬化材料。

加工条件及用途:

用于燃气轮机部件和核反应堆。

Maraging C250

Maraging C250 Material grades and equivalents: BS S162/ UNS K92890/ UNS K92940/ WS 1.6359

Chemical composition:

Maraging 250	Others	C	Si	Mn	P	S	Al
	1.6359	≤0.03	≤0.10	≤0.10	≤0.010	≤0.010	0.05–0.15

Mechanical properties:

Maraging 250	unit	value
Yield strength	N/mm2	640 min.
Ultimate strength	N/mm2	From 930 to 1150
Elongation(A5)	%	8 min.
Reduction of Area	%	45 min.
Hardness	HB	353 max.

Characteristic as below:

Maraging C250 is the lowest strength of the maraging steels.

Processing conditions and application:

Typical usage is in jet engine shafts, missile casings, ordinance mounting blocks and tooling.

Maraging C250

Maraging C250 对应的国际牌号: BS S162/ UNS K92890/ UNS K92940/ WS 1.6359

化学成分:

Maraging	其它元素	C	Si	Mn	P	S	Al
C250	1.6359	≤0.03	≤0.10	≤0.10	≤0.010	≤0.010	0.05–0.15

机械性能:

Maraging C250	unit	value
屈服强度	N/mm2	640 min.
极限强度	N/mm2	From 930 to 1150
伸长率（A5）	%	8 min.
减少面积	%	45 min.
硬度	HB	353 max.

性能如下:

Maraging C250 是马氏体时效钢中强度最低的合金。

加工条件及用途:

典型的用途是喷气发动机轴，导弹外壳，法规安装块和工具。

Maraging 300

Material grades and equivalents: UNS K93120. UNS K93160/ W. Nr.WS 1.6354/WS 1.6358

Chemical Composition

Weight%	C	Si	Mn	S	P	Co	Ni	Mo	Ti	Al	Fe
Maraging 300	0.03 max	0.10 max	0.10 max	0.010 max	0.010 max	8.0–9.5	18.0–19.0	4.6–5.2	0.55–0.80	0.05–0.15	Bal

Typical Mechanical Properties

0.2 % Yield Strength ksi	Ultimate Tensile Strength ksi	Elongation in 4D(%)	Reduction of Area %	Hardness Rc
120	150	16	70	30
280	290	8	40	52

Characteristic as below:
Maraging 300 alloy is a very high strength iron base, nickel , molybdenum, cobalt alloy. It may be age hardened to a strength level of 300 ksi ultimate with a hardness on the order of Rockwell C 53.
Processing conditions and application:
Maraging 300 is used for tooling, transmission shafts, autosport components and light aircraft landing gear.

Maraging 300

Maraging 300 对应的国际牌号：UNS K93120. UNS K93160/ W. Nr.WS 1.6354/WS 1.6358

化学成分：

占比%	C	Si	Mn	S	P	Co	Ni	Mo	Ti	Al	Fe
Maraging 300	0.03 max	0.10 max	0.10 max	0.010 max	0.010 max	8.0–9.5	18.0–19.0	4.6–5.2	0.55–0.80	0.05–0.15	Bal

机械性能：

材质	0.2%的屈服强度	终极拉伸强度	4D 伸长率（%）	减少面积%	硬度
Maraging 300, Solution Annealed 1500° F (816° C), 1hr, AC	120	150	16	70	30
Solution Annealed Plus Aged 900 ° F (482° C), 3 hrs AC	280	290	8	40	52

性能如下：
Maraging 300 是一种非常高强度的铁基，镍，钼，钴合金。它可以被时效硬化到达 300ksi 的最终强度水平，其硬度大约为洛氏硬度 C 53。

加工条件及用途：
Maraging 300 用于工具，传动轴，运动部件和轻型飞机起落架。

Monel Alloys

Monel 400/ UNS N04400

Material grades and equivalents

Nonel 400/ Alloy400 /UNS N04400 / SEW VDIUV W.Nr.2.4360 NiCu30Fe /BS NA 12 / AFNOR Nu 30

Short Introduction:

Monel 400/ Alloy400/UNS N04400 / SEW VDIUV W.Nr.2.4360 NiCu30Fe /BS NA 12 / AFNOR Nu 30 is an extremely combination property that use for largest amount and most widely corrosion resistance alloy. This alloy in the hydrofluoric acid and fluoride gas medium with excellent corrosion resistance, as well as to the hot concentrated alkali. At the same time, is also corrosion resistant to neutral solution, sea water, air, organic compounds. An important feature of this is generally do not generate a stress corrosion cracking, good cutting performance.

Monel 400 Chemical composition

Alloy	%	Ni	Cu	Fe	C	Mn	Si	S
Monel 400	Min.	63	28					
	Max.		34	2.5	0.3	2	0.5	0.024

Monel 400 Physical properties

Density	8.83 g/cm³
Melting point	1300–1390 ℃

Monel 400 Alloy minimum mechanical properties in the room temperature

Alloy state	Tensile strength Rm N/mm²	Yield strength R P0. 2 N/mm²	Elongation A 5 %
Monel 400	480	170	35

Characteristic as below:

Monel 400 is an extremely combination property that use for largest amount and most widely corrosion resistance alloy. This alloy in the hydrofluoric acid and fluoride gas medium with excellent corrosion resistance, as well as to the hot concentrated alkali. At the same time, is also corrosion resistant to neutral solution, sea water, air, organic compounds. An important feature of this is generally do not generate a stress corrosion cracking, good cutting performance.

Monel 400 Metallurgical structure

Monel 400 alloy is high–intensity single–phase solid solution.

Corrosion resistance

Monel 400 alloy in the fluoride gas, hydrochloric acid, sulfuric acid, hydrofluoric acid and their derivatives

have a very good corrosion resistance property, and possess better corrosion resistance more than the copper alloy in the sea water. Acid medium: HY M400have corrosion resistance in less than 85% consistency of sulfuric acid. Monel 400 is an important material that resistant to hydrofluoric acid. Water corrosion: Monel 400 in most corrosion cases of water, not only excellent corrosion resistance, but also less pitting, stress corrosion, the corrosion rate less than 0.025mm / a. High temperature corrosion: HY Monel 400 for the work of the highest temperature at about 600 ℃ in general in the air, in the high temperature steam, the corrosion rate less than 0.026mm / a. Ammonia: HY M400 can be resistant to an hydrous ammonia and aminate conditions corrosion below 585 ℃ due to the high nickel.

Monel 400 Application field:

Monel 400 alloy is a multi–purpose material in many industrial applications:

1. Seamless water pipe in the power factory
2. Sea–water exchanger and evaporator
3. Sulfuric acid and hydrochloric acid environment
4. Crude distillation
5. Sea–water in the use of equipment and propeller shaft
6. Nuclear industry and used in the manufacture of uranium enrichment isotope separation equipment
7. Manufacturing hydrochloric acid equipment used in the production of pump and valve

Specification:

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting	Wire
B165	B725	B163	–	B127	B164	B564	B366	–

Monel 400/ UNS N04400

Monel 400 相似牌号:

Alloy400/UNS N04400 / SEW VDIUV W.Nr.2.4360 NiCu30Fe /BS NA 12 / AFNOR Nu 30 Alloy400 Monel 400/ Alloy400/UNS N04400 / SEW VDIUV W.Nr.2.4360 NiCu30Fe /BS NA 12 / AFNOR Nu 30 是一种用量最大、用途最广、综合性能极佳的耐蚀合金。此合金在氢氟酸和氟气介质中具有优异的耐蚀性，对热浓碱液也有优良的耐蚀性。同时还耐中性溶液、水、海水、大气、有机化合物等的腐蚀。该合金的一个重要特征是一般不产生应力腐蚀裂纹，切削性能良好。

Monel 400 的化学成分:

合金	%	镍	铜	铁	碳	锰	硅	硫
Monel 400	最小	63	28					
	最大		34	2.5	0.3	2	0.5	0.024

Monel 400 的物理性能:

密度	8.83 g/cm3
熔点	1300–1390 ℃

Monel 400 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
Monel 400	480	170	35

此合金具有以下特性:
是一种用量最大、用途最广、综合性能极佳的耐蚀合金。此合金在氢氟酸和氟气介质中具有优异的耐蚀性，对热浓碱液也有优良的耐蚀性。同时还耐中性溶液、水、海水、大气、有机化合物等的腐蚀。该合金的一个重要特征是一般不产生应力腐蚀裂纹，切削性能良好。

Monel 400 的金相结构:
合金的组织为高强度的单相固溶体。

Monel 400 的耐腐蚀性:
合金在氟气、盐酸、硫酸、氢氟酸以及它们的派生物中有极优秀的耐蚀性。同时在海水中比铜基合金更具耐蚀性。酸介质：合金在浓度小于 85%的硫酸中都是耐蚀的。此合金是可耐氢氟酸中为数极少的重要材料之一。水腐蚀：合金在多数水腐蚀情况下，不仅耐蚀性极佳，而且孔蚀、应力腐蚀等也很少发现，腐蚀速度小于 0.025mm/a。高温腐蚀：在空气中连续工作的最高温度一般在 600℃左右，在高温蒸汽中，腐蚀速度小于 0.026mm/a。氨： 由于合金镍含量高，故可耐 585℃以下无水氨和氨化条件下的腐蚀。

Monel 400 应用范围应用领域有：
此合金是一种多用途的材料，在许多工业领域都能应用：
1. 动力工厂中的无缝输水管、蒸汽管
2. 海水交换器和蒸发器
3. 硫酸和盐酸环境
4. 原油蒸馏
5. 在海水使用设备的泵轴和螺旋桨
6. 核工业用于制造铀提炼和同位素分离的设备
7. 制造生产盐酸设备使用的泵和阀

技术规范：

Pipe Smls	Pipe Welded	Tube Smls	Tube Welded	Sheet/Plate	Bar	Forging	Fitting	Wire
B165	B725	B163	–	B127	B164	B564	B366	–

Monel K500 UNS N05500

Material grades and equivalents
Monel K–500/W Nr.2.4375/Nickel–Copper Alloy 500/UNS N05500
Short Introduction:

Monel K–500/W Nr.2.4375/Nickel–Copper Alloy 500/UNS N05500 has approximately twice the tensile strength and triple the yield strength of Alloy 400. The strength of Alloy K–500 is maintained to 1200 degrees Fahrenheit, but stays ductile and tough down to temperatures of –400 degrees Fahrenheit. Alloy K–500 also stays non–magnetic to –200 degrees Fahrenheit.

Monel K–500 Chemical composition:

Alloy	%	Ni	Cu	Al	Ti	Fe	Mn	S	C	Si
Monle K500	Min.	63	27.0	2.30	0.35					
	Max.		33.0	3.15	0.85	2.0	1.5	0.01	0.25	0.5

Monel K–500 Physical properties:

Density	8.44 g/cm3
Melting point	1315–1350℃

Monel K–500 minimum mechanical properties in the room temperature:

Forms	Condition	Max. section Thickness,in.(mm)	Tensile strength Min. Ksi.(Mpa)	Yield strength Min.Ksi.(Mpa)	Elongation in 2 in,or 4D,min.,%	Hardness	
						HB min.	HRC min.
Round bars, Hexagons, squares, rectangles and forgings	hot–worked and age hardened	All Sizes	140(965)	100(690)	20	285	27
Round bars	cold worked and age hardened	1/4(6.4)to 1(25.4)	145(1000)	110(760)	15	300	32
		over 1(25.4)to 3(76.2)	140(965)	100(690)	17	290	29
		over 3(76.2)to 4(101.6)	135(930)	99(655)	20	255	25
Hexagons	cold worked and age hardened	1/4(6.4)to 2(50.8)	140(965)	100(690)	15	285	27
Round bars, Hexagons, squares, rectangles and forgings	Annealed and age hardened	Up to 1(25.4)	130(895)	90(620)	20	250	24
		1(25.4)and over	130(895)	85(585)	20	250	24

Monel K–500 has approximately twice the tensile strength and triple the yield strength of Alloy 400. The strength of Alloy K–500 is maintained to 1200 degrees Fahrenheit, but stays ductile and tough down to temperatures of –400 degrees Fahrenheit. Alloy K–500 also stays non–magnetic to –200 degrees Fahrenheit.

Additional characteristics of Alloy K–500 include outstanding corrosion resistance in a wide range of chemical and marine surroundings, from salts and alkalis, non–oxidizing acids to pure water. HY MK–500 is non–magnetic and spark resistant. It is also recommended that Alloy K–500 be annealed when it is welded and that any weldments be stress relieved prior to aging.

Industries Served:

gas & oil extraction

chemical processing

marine engineering

Specification:

bar/rod	AMS 4676

Monel K500 UNS N05500

Monel K–500 相似牌号：

W Nr.2.4375/Nickel–Copper Alloy 500/UNS N05500

Monel K–500/W Nr.2.4375/Nickel–Copper Alloy 500/UNS N05500 又叫UNS N05500,具有与Alloy 400相同的耐蚀性能，但是具有更高的机械强度和硬度。具有较好的耐热腐蚀性能和长期组织稳定性。

Monel K–500 的化学成分:

合金	%	镍	铜	铝	钛	铁	锰	硫	碳	硅
Monel K–500	最小	63	27.0	2.30	0.35					
	最大		33.0	3.15	0.85	2.0	1.5	0.01	0.25	0.5

Monel K–500 的物理性能:

密度	8.44/cm3
熔点	1288–1343℃

Monel K–500 在常温下合金的机械性能的最小值:

Forms	Condition	Max. section Thickness,in. (mm)	Tensile strength Min. Ksi.(Mpa)	Yield strength Min.Ksi.(Mpa)	Elongation in 2 in,or 4D,min.,%	Hardness	
						HB min.	HRC min.
Round bars, Hexagons, squares, rectangles and forgings	hot–worked and age hardened	All Sizes	140(965)	100(690)	20	265	27
Round bars	cold worked and age hardened	1/4(6.4)to 1(25.4)	145(1000)	110(760)	15	300	32
		over 1(25.4)to 3(76.2)	140(965)	100(690)	17	280	29
		over 3(76.2)to 4(101.6)	135(930)	99(655)	20	255	25
Hexagons	cold worked and age hardened	1/4(6.4)to 2(50.8)	140(965)	100(690)	15	265	27
Round bars, Hexagons, squares, rectangles and forgings	Annealed and age hardened	Up to 1(25.4)	130(895)	90(620)	20	250	24
		1(25.4)and over	130(895)	85(585)	20	250	24

Monel K–500 具有以下特性：

具有与Alloy 400 相同的耐蚀性能，但是具有更高的机械强度和硬度。具有较好的耐热腐蚀性能和长期组织稳定性。

Monel K–500 应用范围应用领域有：

主要用于制造航空发动机上的工作温度在 750℃以下的涡轮叶片及燃气轮机叶片；用于制造船舶上的紧固件、弹簧；化工设备上的泵、阀门零部件；造纸设备上的刮浆刀片等。

技术规范：

bar/rod	AMS 4676

Nimonic Alloys

Nimonic 75 /UNS N06075

Material grades and equivalents

Nimonic 75/ UNS N06075 / W.Nr. 2.4951 / W.Nr. 2.4630 / AFNOR NC20T

Short Introduction:

Nimonic 75/UNS N06075/W.Nr. 2.4951/W.Nr. 2.4630/AFNOR NC20T is a nickel–chromium alloy with good mechanical properties and oxidation resistance at high temperatures. Alloy 75 is most commonly used for sheet metal fabrications which require oxidation and scaling resistance together with medium strength at high operating temperatures. Alloy 75 is also used in gas turbine engines, for components of industrial furnaces, for heat treating equipment and fixtures, and in nuclear engineering.

Chemical Composition:

%	C	Cr	Ni	Ti	Fe	Cu	Mn	Si
Min.	0.08	18	Balance	0.2				
Max	0.15	21		0.6	5	0.5	1	1

Nimonic 75 Physical properties:

Density	8.37 g/cm3
Melting point	2450–2520℃

Nimonic 75 minimum mechanical properties in the room temperature:

Alloy	Tensile strength	Thermal conductivity	Coefficient of thermal expansion	HardnessHB
	Rm N/mm2	W/m·°C	μm/m/°C	
Nimonic 75 (solution)	1400–2210	11.7	11	241

Alloy 75 (UNS N06075) is a nickel–chromium alloy with good mechanical properties and oxidation resistance at high temperatures. Alloy 75 is most commonly used for sheet metal fabrications which require oxidation and scaling resistance together with medium strength at high operating temperatures. Alloy 75 is also used in gas turbine engines, for components of industrial furnaces, for heat treating equipment and fixtures, and in nuclear engineering.

Typical Mechanical Properties Alloy 75

Rupture Strength (1000 h)		
Temperature	psi	MPa
760° C / 1400° F	6000	40
815° C / 1500° F	3500	24
870° C / 1600° F	2200	15
925° C / 1700° F	1500	10
980° C / 1800° F	1200	8

Specification:

Rod, Bar, Wire and Forging Stock	BS HR 5, BS HR 504, DIN 17752, AECMA PrEN2306, AECMA PrEN2307, AECMA PrEN2306, AECMA Pr EN2307, AECMA PrEN2402, ISO 9723, ISO 9724, ISO 9725, MSRR 7004
Plate, Sheet, Strip	BS HR 203, DIN 17750, AECMA PrEN2293, AECMA PrEN2302, AECMA PrEN2411, ISO 6208, MSRR 7104
Pipe and Tube	BS HR 403, DIN 17751, AECMA PrEN2294, ISO 6207

Nimonic 75 /UNS N06075

Nimonic 75 相似牌号:UNS N06075 / W.Nr. 2.4951 / W.Nr. 2.4630 / AFNOR NC20T

Nimonic 75/UNS N06075/W.Nr. 2.4951/W.Nr. 2.4630/AFNOR NC20T 在高温下（最高 1250° C）具有良好的耐热性能和抗蠕变性能，并具有良好的机械特性。

Nimonic 75 的化学成分

合金	%	碳	铬	镍	钛	铁	铜	锰	硅
Nimonic 75	最小	0.08	18	余量	0.2				
	最大	0.15	21		0.6	5	0.5	1	1

Nimonic 75 的物理性能

密度	8.37 g/cm3
熔点	2450–2520℃

Nimonic 75 在常温下合金的机械性能的最小值:

合金	抗拉强度	导热率	热膨胀系数	布氏硬度 HB
	Rm N/mm2	W/m·° C	μ m/m/° C	
固溶处理	1400–2210	11.7	11	241

工作温度约量：–200 至 +1100° C

主要特征：在高温下（最高 1250° C）具有良好的耐热性能和抗蠕变性能，并具有良好的机械特性。

用途举例：适合于制造熔炉部件、燃烧室、燃气轮机部件、热处理设备连接件。

品种规格：锻件、棒材、板材、带材、环件、丝材、螺栓、弹簧等协商供应，可根据客户要求生产

技术规范：

Rod, Bar, Wire and Forging Stock	BS HR 5, BS HR 504, DIN 17752, AECMA PrEN2306, AECMA PrEN2307, AECMA PrEN2306, AECMA Pr EN2307, AECMA PrEN2402, ISO 9723, ISO 9724, ISO 9725, MSRR 7004
Plate, Sheet, Strip	BS HR 203, DIN 17750, AECMA PrEN2293, AECMA PrEN2302, AECMA PrEN2411, ISO 6208, MSRR 7104
Pipe and Tube	BS HR 403, DIN 17751, AECMA PrEN2294, ISO 6207

Nimonic 80A/ UNS N07080

Material grades and equivalents

GH4048A/Nimonic 80A /UNS N07080 / SEW VDIUV W. Nr. 2.4952 / AFNOR NC20TA

Short Introduction:

Nimonic 80A /UNS N07080 /SEW VDIUV W. Nr. 2.4952 /AFNOR NC20TA is
a nickel–chromium alloy similar to alloy 75 but made precipitation hardenable by additions of aluminum and titanium. The alloy has good corrosion and oxidation resistance and high tensile and creep–rupture properties at temperatures to 1500° F (815° C). Used for gas–turbine components (blades, rings, and discs), bolts, tube supports in nuclear steam generators, die–casting inserts and cores, and exhaust valves in internal–combustion engines.

Nimonic 80A Chemaical composition:

%	Ni	Cr	Fe	Mn	Si	P	S	Al	Ti	C	Co	B	Zr	Cu
Min.	Balance	18						1.0	1.8					
Max.		21	3.0	1.0	1.0	0.02	0.015	1.8	2.7	0.1	2.0	0.008	0.15	0.2

Nimonic 80A Physical properties:

Density	8.19 g/cm3
Melting point	1320–1365℃

Nimonic 80A minimum mechanical properties in the room temperature :

Status	Tensile strength Rm N/mm2	Yield strength RP0.2N/mm2	Elongation A5 %
Nimonic 80A	930	620	20

Characteristic as below:
A nickel–chromium alloy similar to NIMONIC alloy 75 but made precipitation hardenable by additions of aluminum and titanium. The alloy has good corrosion and oxidation resistance and high tensile and creep–rupture properties at temperatures to 1500° F (815° C).
Used for gas–turbine components (blades, rings, and discs), bolts, tube supports in nuclear steam generators, die–casting inserts and cores, and exhaust valves in internal–combustion engines.

Specification:

Rod, Bar, Wire and Forging Stock	BS 3076 HR1, ASTM B 637, AECMA PrEn2188, AECMA PrEn2189, AECMA PrEn 2190, AECMA PrEn 2396, AECMA PrEn2397, AIR 9165–37
Plate, Sheet and Strip	BS HR 201, AECMA PrEn2191
Pipe and Tube	BS HR 401

GH4048A/Nimonic 80A/ UNS N07080

GH4048A 相似牌号：

Nimonic 80A / UNS N07080 / SEW VDIUV W. Nr. 2.4952/ AFNOR NC20TA

GH4048A/Nimonic 80A /UNS N07080 /SEW VDIUV W. Nr. 2.4952 /AFNOR NC20TA 是可沉淀硬化的合金，高温（最高 815° C）伸张特性极佳。

GH4048A 的化学成分:

合金	%	镍	铬	铁	锰	硅	碳	硫	铝	钛	硼	钴	铜	铅	铋
GH4048A	最小	余	18						1.0	1.8					
	最大	量	21	3.0	1.0	1.0	0.02	0.015	1.8	2.7	0.1	2.0	0.008	0.15	0.2

GH4048A 的物理性能:

密度	8.19 g/cm3
熔点	1320–1365℃

GH4048A 在常温下合金的机械性能的最小值:

合金和状态	抗拉强度 Rm N/mm2	屈服强度 RP0.2N/mm2	延伸率 A5 %
GH4048A	930	620	20

此合金具有以下特性：

主要特征：可沉淀硬化的合金，高温（最高 815° C）伸张特性极佳。

用途举例：船舶、坦克用柴油机的排气阀主要采用此合金锻制而成. 此合金具有很高的耐热 性能,在高温下强度高,变形抗力大,增加了锻造成形的难度.适合于制造螺栓，燃烧室的排气阀。

技术规范：

Rod, Bar, Wire and Forging Stock	BS 3076 HR1, ASTM B 637, AECMA PrEn2188, AECMA PrEn2189, AECMA PrEn 2190, AECMA PrEn 2396, AECMA PrEn2397, AIR 9165–37
Plate, Sheet and Strip	BS HR 201, AECMA PrEn2191
Pipe and Tube	BS HR 401

Nimonic 90 /UNS N09901

Material grades and equivalents Nimonic 90/GB GH90/ UNS N07090 / BS Nimonic90/ W. Nr. 2.4632

Short Introduction:

Nimonic 90/GB GH90/UNS N07090/BS Nimonic90/W. Nr. 2.4632 is aging strengthen ni–based deformation high temperature ally, with a high amount of cobalt and many kinds of strengthening element, this alloy in 815 ~ 870 ° C have high tensile strength and contravariance ability, good oxidation resistance and corrosion resistance, cold and heat alternately repeatedly in under the action of a higher fatigue strength and good formability and weldability. Used for turbine engine turbine dish, leaf, high temperature fasteners, card hoop, seals and elastic components etc.

Nimonic 90 characteristics and application fields of summary:

This alloy is aging strengthen ni–based deformation high temperature ally, with a high amount of cobalt and many kinds of strengthening element, this alloy in 815 ~ 870 ° C have high tensile strength and contravariance ability, good oxidation resistance and corrosion resistance, cold and heat alternately repeatedly in under the action of a higher fatigue strength and good formability and weldability. Used for turbine engine turbine dish, leaf, high temperature fasteners, card hoop, seals and elastic components etc.

Nimonic 90 chemical ingredients: (GB/T14992–2005)

%	Ni	Cr	Fe	Zr	B	Co	C	Mn	Si	S	Cu	Al	Ti
Min	Bal	18.0				15.0						1.0	2.0
Max		21.0	1.5	0.15	0.02	21.0	0.13	0.4	0.8	0.015	0.2	2.0	3.0

Nimonic 90 physical ability:

density g/cm3	M.point° C	Heat transfer Rate λ/(W/m·° C)	specific heat capacity J/kg·° C	modulus of elasticityGPa	shear elasticityGPa	R μ Ω·m	coefficient of linear expansion a/10–6° C–1
8.2	1400	21.76(100° C)		225			12.7(20~100° C)

Nimonic 90 force ablity:

Heat treatment	Tensile Strength σ b/MPa	Yield Strength σ p0.2/MPa	Elongation σ 5 /%	HB HBS
Solution treatment	820	590	8	

Nimonic90 process performance and requirements:

1, the alloy in forging easily produce inside crack, allow hammer blow, don' t allow low temperature chamfering. Ingot outfit furnace temperature is not higher than 700 ° C, 1150 ° C ± final heating temperature 10 ° C, open forging not below 1060 ° C temperature, and forging temperature not less than 950 ° C.

2, the size of the average grain degrees of alloy forgings and deformation degree, eventually forging is closely related to the temperature.

3, alloy in solid solution state can be inert gas protection electric arc welding and tungsten very flash butt weld.

Specification:

bar/wire	BS HR2 Nimonic 90 bars, billet, forgings; BS HR501 Nimonic 90 cold drawn wire for springs; BS HR502 Nimonic 90 cold drawn and solution; treated wire for springs; BS HR503 Nimonic 90 wire for thread inserts;AMS 5829;AECMA PrEN 2295;AECMA PrEN 2296; AECMA PrEN 2297; AECMA PrEN 2400; AECMA PrEN 2401; AECMA PrEN 2669; AECMA PrEN 2670; MSRR 7016; MSRR 7137; Siemens DL 1641-1; ABB Stal 63 73 01
sheet/plate/strip	BS HR202 Nimonic 90 sheet and strip; MSRR 7087; AECMA PrEN 2298; Siemens TLV8525 2100; Siemens TLV8525 31001
Tube	BS HR 402; AECMA PrEN 2299

GB GH90/ Nimonic 90 /UNS N09901

GB GH90 相似牌号：Nimonic 90/ UNS N07090 / BS Nimonic90/ W. Nr. 2.4632

/Nimonic 90/GB GH90/UNS N07090/BS Nimonic90/W. Nr. 2.4632 是时效强化钴镍基变形高温合金，该合金在 815～870℃有较高的抗拉强度和抗蠕变能力、良好的抗氧化性和耐腐蚀、在冷热反复交替作用下有较高的疲劳强度以及良好的成形性和焊接性。用于涡轮发动机涡轮盘、叶片、高温紧固件、卡箍、密封圈及弹性元件等。

GB GH90 的化学成分

合金	%	钴	铬	镍	铁	锰	硅	碳	铝	硅	硫	磷	铜	钛	铝
GB GH90	最小	15.0	18.0	余量										1.0	2.0
	最大	21.0	21.0		1.5	0.15	0.02	0.13	0.14	0.8	0.015	0.02	0.2	2.0	3.0

GB GH90 的物理性能

密度	8.2 g/cm3
熔点	1400℃
热导率	21.76 λ (100℃)
弹性模量	GPa

GB GH90 在常温下合金的机械性能的最小值:

合金	抗拉强度	屈服强度	延伸率
	σ b/MPa	σ p0.2/MPa	σ 5 /%
固溶处理	820	590	8

GB GH90 的特性和应用领域

该合金是时效强化钴镍基变形高温合金，该合金在 815～870℃有较高的抗拉强度和抗蠕变能力、良好的抗氧化性和耐腐蚀、在冷热反复交替作用下有较高的疲劳强度以及良好的成形性和焊接性。用于涡轮发动机涡轮盘、叶片、高温紧固件、卡箍、密封圈及弹性元件等。

GB GH90 的金相组织结构

该合金主要强化相是γ' -Ni3(Ti、Al),在晶内以大小不同的方形颗料关析出，在晶界上也可以见到这种形 状的γ' 相，碳化物在晶界上呈不连续的链状析出。

GB GH90 的工艺性能与要求

1、合金在锻造时易产生内裂，允许重锤打击。刚锭装炉温度不高于 700℃，低温区域先预热 20-30 分钟，最终加热温度 1150℃-1180℃，开锻温度不低于 1050℃，终锻温度不低于 950℃。

2、该合金的晶粒度平均尺寸与锻件的变形程度、终锻温度密切相关。

3、合金在固溶状态可进行惰性气体保护钨极电弧焊及闪光对焊。

技术规范:

bar/wire	BS HR2 Nimonic 90 bars, billet, forgings; BS HR501 Nimonic 90 cold drawn wire for springs; BS HR502 Nimonic 90 cold drawn and solution; treated wire for springs; BS HR503 Nimonic 90 wire for thread inserts;AMS 5829;AECMA PrEN 2295;AECMA PrEN 2296; AECMA PrEN 2297; AECMA PrEN 2400; AECMA PrEN 2401; AECMA PrEN 2669; AECMA PrEN 2670; MSRR 7016; MSRR 7137; Siemens DL 1641-1; ABB Stal 63 73 01
sheet/plate/strip	BS HR202 Nimonic 90 sheet and strip; MSRR 7087; AECMA PrEN 2298; Siemens TLV8525 2100; Siemens TLV8525 31001
Tube	BS HR 402; AECMA PrEN 2299

精密电热电阻合金 Precision electric resistance alloy

牌号：Cr20Ni80、Cr15Ni60、Cr30Ni70、Cr20Ni35、Cr20Ni30、6J10、6J15、6J20、6J22、6J23、6J24 等。执行标准：GB/T 1234–1955 等。
基本性能：Ni–Cr 合金具有优良的综合性能，是制作高质量电阻电热元件的首选品种。具有抗氧性好、强度高、无磁性、较好的耐腐蚀性和焊接性、不软化等一系列优点；在长时间使用时，不变形且永久性伸长很小；电阻值稳定，变化小。

Grades: Cr20Ni80, Cr15Ni60, Cr30Ni70, Cr20Ni35, Cr20Ni30, 6J10, 6J15, 6J20, 6J22, 6J23, 6J24, etc. Implementation of standards: GB/T 1234–1955 and so on.
Basic performance: Ni–Cr alloy has excellent comprehensive performance and is the first choice for producing high–quality electric resistance heating elements. Has a series of advantages such as good oxygen resistance, high strength, non–magnetic properties, good corrosion resistance, weld ability, and non–softening; when it is used for a long time, it is not deformed and the permanent elongation is small; the resistance value is stable and changes. small.

典型牌号化学成分 Typical Chemical Composition

牌号Grade	化学成分 Chemical Composition（%）									
	C	S	P	Mn	Si	Cr	Ni	Al	Fe	Cu
	不大于 Max									
Cr20Ni80	0.08	0.02	0.015	0.60	0.75–1.60	20.0–23.0	余 Bal.	≤0.50	≤1.0	–
Cr30Ni70	0.08	0.02	0.015	0.60	0.75–1.60	28.0–31.0	余 Bal.	≤0.50	≤1.0	–
Cr15Ni60	0.08	0.02	0.015	0.60	0.75–1.60	15.0–18.0	55.0–61.0	≤0.50	余 Bal.	–
Cr20Ni35	0.08	0.02	0.015	1	1.00–3.00	18.0–21.0	34.0–37.0	–	余 Bal.	–
Cr20Ni30	0.08	0.02	0.015	1	1.00–3.00	18.0–21.0	30.0–34.0	–	余 Bal.	–
CuNi44	0.10	0.02	0.015	0.5–2.0	–	–	43.0–45.0	–	–	余 Bal.

精密电热电阻合金的应用 Applications Precision electric resistance alloys

广泛应用于高温电炉，退火和干燥炉、家用电器、远红外装置，电热及电子器件的烘烤等领域；电阻温度系数绝对值小，并且稳定性好，广泛应用于精密仪器仪表，如电桥、电位器、电阻器等。
Widely used in high temperature electric furnace, annealing and drying furnaces, household appliances, far–infrared devices, baking of electric heating and electronic devices, etc.; resistance temperature coefficient is small in absolute value, good stability, widely used in precision instrumentation, such as electric bridge , potentiometers, resistors, etc.

NiFe Precision Alloy/镍铁合金

		C	S	P	Mn	Si	Ni	Cr	Co	Cu	Ti	Mo	w	Fe	其他元素 Other elements
		不大于 Max ≤													
膨胀合金 Expansion Alloy	4J28	0.12	0.02	0.02	≤1.00	≤0.70	≤0.50	27.0 – 29.0	–	–	–	–	–	余/balance	N≤0.2
	4J29	0.03	0.02	0.02	≤0.50	≤0.30	28.5 – 29.5	–	16.8 – 17.8	–	–	–	–	余/balance	
	4J32	0.05	0.02	0.02	0.20 – 0.60	≤0.20	31.5 – 33.0	–	3.2 – 3.4	0.4 – 0.8	–	–	–	余/balance	
	4J33	0.05	0.02	0.02	≤0.50	≤0.30	32.1 – 33.8	–	14 – 15.2	–	–	–	–	余/balance	
	4J36	0.05	0.02	0.02	0.20 – 0.60	≤0.30	35.0 – 37.0	–	–	–	–	–	–	余/balance	
	4J40	0.05	0.02	0.02	≤0.25	≤0.15	32.5 – 33.5	–	7.0 – 8.0	–	–	–	–	余/balance	
	4J42	0.05	0.02	0.02	≤0.80	≤0.30	41.5 – 42.5	–	–	–	–	–	–	余/balance	Al≤0.1
	4J50/Alloy 50	0.05	0.02	0.02	≤0.80	≤0.30	49.5 – 50.5	–	–	–	–	–	–	余/balance	Al≤0.1

牌号/Grade	C	S	P	Mn	Si	Ni	Cr	Cu	Al	Fe	其他元素 Other elements
	不大于/Max										
6J10	0.05	0.01	0.01	≤0.30	≤0.20	ni+co 余	9.0 – 10.0		≤0.2	–	≤0.4
6J15	0.05	0.02	0.03	≤1.50	0.40 – 1.30	55.0 – 61.0	15.0 – 18.0		–	≤0.3	余/balance
6J20	0.05	0.01	0.01	≤0.70	0.40 – 1.30	余	20.0 – 23.0		–	≤0.3	≥1.5
6J22	0.04	0.01	0.01	0.5 – 1.5	≤0.20	余	19.0 – 21.5		–	2.7 – 3.2	2.0 – 3.0
6J23	0.04	0.01	0.01	0.5 – 1.5	≤0.20	余	19.0 – 21.5		2.0 – 3.0	2.7 – 3.2	–
6J24	0.04	0.01	0.01	1.00 – 3.00	0.90 – 1.50	余	19.0 – 21.5		–	2.0 – 3.2	≤0.5

性能牌号 /Performance grade	Ni	Mn	Cu	性能牌号/Performance grade	Ni	Mn	Cu	性能牌号 /Performance grade	Ni	Mn	Cu
NC003CuNi1	1	–	余量/balance	NC012CuMn3	–	3	余量 /balance	NC030CuNi23	23	0.5	余量/balance
NCO05CuNi2	2	–	余量/balance	NCO15CuNi10	10	4	余量 /balance	NC035CuNi30	30	1	余量/balance
NCO10CuNi6	6	–	余量/balance	NC020CuNi14	14.2	0.3	余量 /balance	NC040CuNi34	34	1	余量/balance
NCO12CuNi8	8	–	余量/balance	NC0025CuNi19	19	0.5	余量 /balance	NC050CuNi44	44	1	余量/balance

热电偶材料/Thermocouple material

	Ni	Cr	Co	Fe	Si	Mn	C	P	S
NiCr10	余/balance	9 – 10	≤1.2	≤0.1	≤0.8	≤0.2	≤0.05	≤0.02	≤0.02
NiSi2.5	余/balance	–	≤0.6	≤0.10	2.0 – 3.0	≤0.70	≤0.05	≤0.02	≤0.02

膨胀合金 Expansion Alloy

牌号/Grade:4J29、4J36、4J42、4J43、4J44、4J47、4J50 etc 等。
执行标准/Standard:GBT15018–1994、YB/T5231–2005、YBT5241–2005、YB/T5235–2005 等。
基本性能:分低膨胀合金和定膨胀合金,后者又称封接合金。膨胀合金除具有特定的热膨胀系数外,根据不同用途还要求有良好的封接性、可焊性、耐蚀性性、可加工性和易切削性,并且在使用温度范围内不允许有引起膨胀特性明显变化的相变,其产品一般为棒材、板材、带材、丝材和管材等。

Basic performance: It is divided into low–expansion alloy and fixed expansion alloy. The latter is also called sealing joint gold. In addition to a specific thermal expansion coefficient, the expansion alloy also requires good sealing properties, weldability, corrosion resistance, workability, and free–machining properties depending on the application, and is not allowed to occur within the use temperature range. The phase change in which the expansion characteristics change significantly. Its products are generally rods, plates, strips, wires and pipes.

典型牌号化学成分 Typical Chemical Composition

牌号/Grade	执行标准/standard	C	S	P	Mn	Si	Ni	Cr	Co	Cu	Mo	Se	Al	Fe
		不大于 Max ≤												
4J43	GBT15018–1994、YB/T5231–2005、YBT5241–2005、YB/T5235–2005	0.2	0.02	0.02	0.75–1.25	≤0.30	41.0–43.0							余/balance
4J29/Kovar/F15/1.3912/EMAS–1001		0.03	0.02	0.02	≤0.50	≤0.30	28.5–29.5	≤0.2	16.8–17.8	≤0.2	≤0.2			余/balance
4J36/K93600/Invar 36/WNr1.3912		0.05	0.02	0.02	0.20–0.80	≤0.30	35.0–37.0							余/balance
4J42/K94100/Alloy 42/WNr1.3917		0.05	0.02	0.02	≤0.80	≤0.30	41.5–42.5		≤0.1				≤0.1	余/balance
4J47/Alloy 47		0.1			0.75–1.25	≤0.30	46.0–48.0		≤0.03					余/balance

膨胀合金应用 Expansion Alloy

广泛应用于航空电器和仪表,电真空工业及其他电子器件,电光源等领域中的玻璃、金属、陶瓷封接。

Widely used in aviation electrical and instrumentation, electricity and air industry and other electronic devices, electric light sources and other fields of glass, metal, ceramic sealing.

铜镍合金 Copper Nickel Alloy

6J12，锰铜 6J13，康铜 6J40
6J12, Manganese Copper 6J13, Constant Copper 6J40
6J12，6J13 以铜、锰、镍为主要成分。具有较高的电阻率，很小的电阻温度系数，和对铜的热电势。及优良的电阻长期稳定性等特点。由于有较低的电阻温度系数，即电阻率随温度的变化而几乎不变，所以常常用来作为采样电阻来使用。这种精密电阻材料主要用作精密仪器中电阻元件及分流电阻材料。

6J12, 6J13 is mainly composed of copper, manganese and nickel. Has a high resistivity, a very small temperature coefficient of resistance, and a thermoelectric power to copper. And excellent characteristics such as long–term stability of resistance. Because it has a lower temperature coefficient of resistance, that is, resistivity changes almost with temperature, it is often used as a sampling resistor. This kind of precision resistance material is mainly used as a resistance component and shunt resistance material in precision instruments.

主要用于制作仪器仪表，电子以及工业设备中的电子元件
Mainly used for making electronic components in instrumentation, electronics and industrial equipment
特点：具有较低的电阻温度系数，较宽的使用温度范围，加工性能良好，具有良好的焊接性能。
Features: Low temperature coefficient of resistance, wide operating temperature range, good processing performance, and good welding performance.

合金名/Alloy Name	合金牌号/grade	合金化学成分/Alloy chemical composition				合金电阻率/Alloy resistivity			适用温度℃/Alloy resistivity	测试温度℃/Test temperature ° C	电阻温度系数/Temperature coefficient of resistance		平均电阻温度系数/Average temperature coefficient of resistance
		Cu	Mn	Ni	Si						$\alpha\times10^{-6}$/℃	$\beta\times10^{-6}$/℃	$\alpha\times10^{-6}$/℃
锰铜/Manganese copper	6J12	余量/balance	11.0–13.0	2.0–3.0	–	0.47 ± 0.03	锰铜合金线、片/Manganin alloy wire, sheet	1 级/Level 1	5–45	10、20、40	–3 – +5	–0.7–0	–
								2 级/Level 2			–5 – +10		
								3 级/Level 3			–10 – +20		
F1 锰铜/F1 manganese copper	6J8	余量/balance	8.0–10.0	–	1.0–2.0	0.35 ± 0.05	F1 锰铜合金线、片/F1 manganese copper wire, film		10–80	10、40、60	–5 – +10	–0.25–0	–
F2 锰铜/F2 manganese copper	6J13	余量/balance	11.0–13.0	2.0–5.0	–	0.4 ± 0.04	F2 锰铜合金线、片/F2 manganese copper wire, film		10–80		0 – +40	–0.7–0	–
康铜/Kang copper	6J40	余量/balance	1.0–2.0	39.0–41.0	–	0.48 ± 0.03	康铜合金线、片/Kang copper alloy wire and piece		0–50	20、50	–	–	–40 – +40

软磁合金 Soft Magnetic Alloy

牌号 Grade：1J50、1J79、1J85、1J36、1J77、1J87etc.等。

执行标准 Executive standard：GB/T15018–1994、GBn198–1988、GB/T14986–2008 等。

基本性能 Basic Characteristic：

软磁合金是一种在外磁场作用下容易磁化而去除外磁场后磁感应强度又基本小时的磁性合金。所谓的软、指这些材料容易磁化，在磁性上表现“软”。软磁合金分为低碳电工钢和阿姆科铁、硅钢片、镍铁软磁金、铁骨软磁合金、铁硅铝软磁合金等。

The soft magnetic alloy is a magnetic alloy that is easily magnetized under the action of an external magnetic field and the magnetic induction intensity is small after the external magnetic field is removed. The so–called soft refers to the fact that these materials are easily magnetized and appear "soft" in magnetic properties. Soft magnetic alloys are classified into low–carbon electrical steel and acryl steel, silicon steel sheet, nickel–iron soft magnetic gold, iron soft magnetic alloy, iron silicon aluminum soft magnetic alloy and so on.

典型牌号化学成分 Typical Chemical Composition

牌号 Item	执行标准 Executive standard	化学成分 Chemical Composition（%）											
		C	S	P	Mn	Si	Ni	Cr	Co	Mo	Cu	Al	Fe
		不大于（MAX）											
1J50/HyRa50	GB/T15018–1994 GBn198–1988 GB/T14986–2008	0.03	0.02	0.02	0.–3–0.6	0.15–0.30	49–50.5	–	–	–	≤0.2	–	余 Bla.
1J79/HyRa80/Alloy4		0.03	0.02	0.02	0.–3–0.6	0.15–0.30	78.5–80	—	–	3.8–4.2	≤0.2	–	余 Bla.
1J85/Super–permalloy		0.03	0.02	0.02	0.–3–0.6	0.15–0.30	79–81	–	–	4.8–5.2	≤0.2	–	余 Bla.

软磁合金应用 Soft Magnetic Alloy

软磁合金的用途非常广泛。因为它们容易磁化和退磁，而且具有很高的导磁率，可以起到很好的聚集磁力线的作用，所以 软磁合金被广泛用来作为磁力线的通路，即用作导磁材料，例如变压器、传感器的铁芯，磁屏蔽罩，特殊磁路的轭铁、继电器、互感器、磁放大器、电磁离合器、汽车传感器等。

The use of soft magnetic alloys is very extensive. Because they are easy to magnetize and demagnetize, and have a high magnetic permeability, they can play a good role in gathering magnetic lines of force. Therefore, soft magnetic alloys are widely used as magnetic flux paths, ie, as magnetically conductive materials such as transformers and sensors. Cores, magnetic shields, yokes for special magnetic circuits, relays, transformers, magnetic amplifiers, electromagnetic clutches, automotive sensors, etc.

Precision Alloy/镍铁合金

NiFe Alloy S426K

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
S426K	0.07	0.02	0.02	0.25	0.3	41–43	5–7	–	–	REST	–	–	–

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 S426K

化学成分：

牌号	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
S426K	0.07	0.02	0.02	0.25	0.3	41–43	5–7	–	–	余量	–	–	–

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J28

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J28	0.12	0.02	0.02	0.02	1	0.7	<0.5	27–29	–	REST	<0.2	–	–

Characteristic as below：
In a certain temperature range and similar soft glass linear thermal expansion coefficient. Preservative

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J28

化学成分：

牌号	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J28	0.12	0.02	0.02	0.02	1	0.7	<0.5	27–29	–	余量	<0.2	–	–

性能如下：
在一定温度范围内具有和软玻璃相近的线热膨胀系数，耐腐蚀。

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J29

Material grades and equivalents

Trademark	Telcan	UNS	FRANCE	AISI/ASTM	W.Nr	JIS Japan	VAC	Japan
4J29	Nilok	Kovar	DilverP1	ASTM F15	W.Nr 1.981	JIS EMAS–1001	Vacon 12	KV–1

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J29	0.03	0.02	0.02	0.05	0.3	28.5–29.5	<0.2	16.8–17.8	<0.2	REST	–	<0.2	–

Mechanical Properties in the Annealed Condition:

Yield Strength (0.1% Offset)		Tensile Strength		Elongation
psi	MPa	psi	MPa	(%)
49,000	340	75,000	520	42

Characteristic as below：
4J29 is an iron–nickel–cobalt alloy with a coefficient of thermal expansion similar to that of hard (borosilicate) glass. This makes it especially suitable for uses which
require a matched–expansion seal between metal and glass parts.

Processing conditions and application:
Its usage in the electronics industry for metal parts bonded to hard glass envelopes for such devices as power tubes, x-ray tubes, etc, and other applications requiring glass-to-metal seals.

镍铁合金 4J29

对应相似牌号：

牌号	Telcan	UNS	FRANCE	AISI/ASTM	W.Nr	JIS Japan	VAC	Japan
4J29	Nilok	Kovar	DilverP1	ASTM F15	W.Nr 1.981	JIS EMAS-1001	Vacon 12	KV-1

化学成分：

牌号	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J29	0.03	0.02	0.02	0.05	0.3	28.5-29.5	<0.2	16.8-17.8	<0.2	余量	-	<0.2	-

机械性能：

屈服强度 (0.1% Offset)		抗拉强度		Elongation
psi	MPa	psi	MPa	(%)
49,000	340	75,000	520	42

性能如下：
4J29 是 Fe-Ni-Co 合金的热膨胀系数类似于硬硼硅酸盐玻璃。这使得它特别适合使用需要 matched-expansion 金属和玻璃之间的密封部件。

加工条件及其用途：
使用在电子行业金属零件连替硬玻璃信封等设备功率管,光管等。

4J33/ NiFe Alloy 4J33

4J33 Material grades and equivalents

Trademark	Japan	Russia	UNS	W.Nr
4J33	KV-4 (Ni33Co17)	33HK (Ni33Co17)	-	-

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J33	0.05	0.02	0.02	0.05	0.3	32.1-33.6	-	14-15.2	-	REST	-	-	-

Status code	State	Tensile strength/Mpa
R	Soft state	< 585
1	Hard state	> 660

4J33 Porcelain Alloy Strip Tensile Strength：

Status code	State	Tensile strength/Mpa
R	Soft state	< 570
1	Hard state	> 700

Hardness of deep-drawn strip：

Delivery Status	Thickness/mm	Hardness HV
Deep Drawing	> 2.5	≥ 170
	≤ 2.5	≥ 165

The linear expansion coefficient of the porcelain sealing alloy:

Grade	Sample heat treatment system	The average linear expansion coefficient $\bar{a}/(10^{-6}/k)$			
		20~300℃	20~400℃	20~500℃	20~600℃
4J33	Heat in a protective atmosphere or vacuum to 900 ± 20° C, keep warm for 1h, cool at a rate of no more than 5 ° C/min to below 200° C		6.0~6.8	6.6~7.4	7.8~9.5
4J34			6.3~7.1		

Typical linear expansion coefficient of the alloy：

Grade	The average coefficient of linear expansion of the metal in different temperature ranges $\bar{a}/(10^{-6}/k)$				
	20~200℃	20~300℃	20~400℃	20~500℃	20~600℃
4J33	7.1	6.5	6.3	7.1	8.5
4J34	7.5	6.9	6.6	6.9	8.3

Characteristic as below：
Similar to 95% alumina ceramic linear thermal expansion coefficient

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J33

对应的国际牌号：

牌号	Japan	Russia	UNS	W.Nr
4J33	KV-4（Ni33Co17）	33HK (Ni33Co17)	-	-

化学成分：

牌号	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J33	0.05	0.02	0.02	0.05	0.3	32.1~33.6	-	14~15.2	-	余量	-	-	-

4J33 瓷封合金 丝材的抗拉强度：

状态代号	状态	抗拉强度/Mpa
R	软态	<585
1	硬态	>660

4J33 瓷封合金 带材的抗拉强度：

状态代号	状态	抗拉强度/Mpa
R	软态	<570
1	硬态	>700

深冲态带材的硬度：

交货状态	厚度/mm	硬度 HV
深冲态	>2.5	≥170
	≤2.5	≥165

4J33 瓷封合金的线胀系数：

合金牌号	试样热处理制度	平均线胀系数$\bar{\alpha}$/(10^{-6}/k)			
	在保护气氛或真空中加热到900± 20℃，保温 1h，以不大于 5℃/min 的速度冷至200℃以下出炉	20~300℃	20~400℃	20~500℃	20~600℃
4J33			6.0~6.8	6.6~7.4	7.8~9.5
4J34			6.3~7.1		

合金的典型线胀系数：

合金牌号	金属不同温度范围内的平均线胀系数$\bar{\alpha}$/(10^{-6}/k)				
	20~200℃	20~300℃	20~400℃	20~500℃	20~600℃
4J33	7.1	6.5	6.3	7.1	8.5
4J34	7.5	6.9	6.6	6.9	8.3

性能如下：

与 95%三氧化二铝陶瓷相近的线热膨胀系数

加工条件及用途：

电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J34

NiFe Alloy 4J34 Material grades and equivalents

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J34	0.05	0.02	0.02	0.05	0.3	28.5~29.5	-	19.5~20.5	-	REST	-	-	-

Characteristic as below：

Similar to 95% alumina ceramic linear thermal expansion coefficient

Processing conditions and application:

It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J34

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J34	0.05	0.02	0.02	0.05	0.3	28.5~29.5	-	19.5~20.5	-	余量	-	-	-

性能如下：

4J34 与三氧化二铝陶瓷有 95%相近的线热膨胀系数。

加工条件及用途：

电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J43

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J43	0.1	0.02	0.02	0.75~1.25	0.3	41~43	-	-	-	REST	-	-	-

Characteristic as below:
In the range of 20 ℃ ~ 400 ℃ has a certain linear thermal expansion coefficient

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J43

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J43	0.1	0.02	0.02	0.75–1.25	0.3	41–43	–	–	–	余量	–	–	–

性能如下：
在 20℃ ~ 400℃范围内具有一定的线热膨胀系数
加工条件及用途：：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J44

4J44 Material grades and equivalents
Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J44	0.03	0.02	0.02	0.05	0.3	41–43	–	–	–	余量	–	–	–

Characteristic as below:
In the range of 20 ℃ ~ 500 ℃ has a certain linear thermal expansion coefficient.

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J44

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J44	0.03	0.02	0.02	0.05	0.3								

性能如下：
4J44 在 20℃ ~ 500℃范围内具有一定的线热膨胀系数。

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J45

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J45	0.05	0.02	0.02	0.8	0.3	44.5–45.5	–	–	–	REST	–	–	<1.5

Characteristic as below:
In a certain temperature range with a certain linear thermal expansion coefficient
Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J45

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J45	0.05	0.02	0.02	0.8	0.3	44.5–45.5	–	–	–	余量	–	–	<1.5

性能如下：
4J45 在一定温度范围内具有一定线热膨胀系数。

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J49

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J49	0.05	0.02	0.02	0.4	0.3	46–48	5–6	–	B<0.2	REST	–	–	<1.0

Characteristic as below:
In a certain temperature range with similar soft glass linear thermal expansion coefficient

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J49

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J49	0.05	0.02	0.02	0.4	0.3	46–48	5–6	–	B<0.2	余量	–	–	<1.0

性能如下：
在一定温度范围内具有与软玻璃相近的线热膨胀系数

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J50/ Russian grade is 50 H

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J50	0.05	0.02	0.02	0.8	0.3	49.5–50.5	–	–	–	REST	–	–	<1

Characteristic as below:
In a certain temperature range with a certain linear thermal expansion coefficient

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J50 /俄罗斯牌号 50H

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J50	0.05	0.02	0.02	0.8	0.3	49.5–50.5	–	–	–	余量	–	–	<1

性能如下：
4J50 在一定温度范围内具有一定线热膨胀系数。
加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J58

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J58	0.03	0.015	0.015	0.6	0.25	57.5–59.9	–	–	–	REST	–	–	–

Characteristic as below:
In the range of 20 ℃ ~ 50 ℃ has a certain linear thermal expansion coefficient. Have a higher dimensional stability

Processing conditions and application:
It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J58

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J58	0.03	0.015	0.015	0.6	0.25	57.5–59.9	–	–	–	余量	–	–	–

性能如下：
4J58 在 20℃ ~ 50℃范围内具有一定的线热膨胀系数，有较高的尺寸稳定性。

加工条件及用途：
电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J32

Chemical composition:

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4J32	0.05	0.2	0.02	0.02	–	–	0.2–0.6	31.5–33	3.2–4.2	REST

Characteristic as below:

Low linear thermal expansion coefficient in the range of 20 ° C to 100 ° C.

Processing conditions and application:

It is suitable for precision instruments and meters, cryogenic vessels, microwave communications, etc.

镍铁合金 4J32

化学成分:

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4J32	0.05	0.2	0.02	0.02	–	–	0.2–0.6	31.5–33	3.2–4.2	余量

性能如下:

4J32 在 20℃ ~ 100℃范围内具有低的线热膨胀系数。

加工条件及用途:

应用于精密仪器仪表，低温容器 ，微波通讯等。

NiFe Alloy Invar 36

Invar 36 material grades and equivalents

Trademark	GB	ASTM	UNS	W.Nr	BS	AFNOR
Invar36	4J36	ASTM F1684/ ASTM B753	UNS K93600	W.Nr.1.3912	BS X1NiCrMoCu	AFNOR Fe–Ni36

Chemical composition:

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Co	Mo	P	S
Invar 36	Min.	35		Balance							
	Max.	38	0.5		0.1	0.06	0.35	1.0	0.5	0.02	0.025

Mechanical properties:

Density	8.1 g/cm3
Melting point	1430 ° C

Characteristic as below:

Invar 36 is a special ultra–low coefficient of heat expansion of low–iron–nickel alloy. One of carbon and manganese element of control is very important. Cold deformation can reduce the coefficient of thermal expansion, in particular within the framework of the heat treatment temperature coefficient of thermal expansion will enable stabilization. Has the following characteristics:

1.Has very low coefficient of heat expansion between the temperature of –250° C and 200° C.

2.Good toughness and plastic

Processing conditions and application:

Applied field

Invar 36 suit for need to apply ultra–low coefficient of heat expansion environment . Typical applications are as follows:

1. Liquefied gas production, storage and transport
2. The measurement and control instruments work temperature lower than 200 ° C, such as temperature regulating device
3. Metals and other materials use the screw connector bush.
4.Bimetal and bimetallic temperature controller
5.Film framework
6.Shadow mask

镍铁合金 Invar 36

镍铁合金 Invar36 对应的国际牌号

Trademark	GB	ASTM	UNS	W.Nr	BS	AFNOR
Invar36	4J36	ASTM F1684/ ASTM B753	UNS K93600	W.Nr.1.3912	BS X1NiCrMoCu	AFNOR Fe–Ni36

化学成分

Alloy	%	Ni	Cr	Fe	C	Mn	Si	Co	Mo	P	S
Invar 36	Min.	35		Balance							
	Max.	38	0.5		0.1	0.06	0.35	1.0	0.5	0.02	0.025

物理性能

Density	8.1 g/cm3
Melting point	1430 ° C

特点如下:

Invar 36 合金是一种特殊的超低合金热膨胀系数。其中碳和锰元素的控制是非常重要的。冷变形可以降低热膨胀系数，特别是在热处理的框架内，热胀系数将使温度稳定。

具有以下特点:

1、在 250° C 和 200° C 之间的热膨胀系数非常低。

2、韧性好，可塑性好。

加工条件及应用:

Invar36 需要应用于超低热膨胀系数的环境，典型应用如下:

1，天然气生产，储运

2，测温控制仪表工作温度低于 200℃，如温度调节装置

3.金属和其他材料使用螺丝连接套
4.双金属和双金属温度控制器
5.电影框架
6.掩码

NiFe Alloy 4J38

Chemical composition:

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4J38	0.05	0.2	0.02	0.02	–	0.1–0.25	<0.8	35–37	–	REST

Characteristic as below:
In the range of 20 ℃ ~ 100 ℃ has a lower thermal expansion coefficient, and easy cutting.

Processing conditions and application:
It is suitable for precision instruments and meters, cryogenic vessels, microwave communications, etc.

镍铁合金 4J38

化学成分：

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4J38	0.05	0.2	0.02	0.02	–	0.1–0.25	<0.8	35–37	–	余量

性能如下：
4J38 在 20℃ ~ 100℃范围内具有较低的热线膨胀系数，而且易切削加工。

加工条件及用途：
应用于精密仪器仪表，低温容器 ，微波通讯等。

NiFe Alloy 4K40

NiFe Alloy 4K40 Material grades and equivalents
Chemical composition:

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4K40	0.05	0.15	0.02	0.02	–	–	≤ 0.25	32.4–33.4	7–8	REST

Processing conditions and application:
It is suitable for precision instruments and meters, cryogenic vessels, microwave communications, etc.

镍铁合金 4K40

化学成分：

Alloy	C	Si	P	S	Cu	Se	Mn	Ni	Co	Fe
	Max									
4K40	0.05	0.15	0.02	0.02	–	–	≤0.25	32.4–33.4	7–8	余量

加工条件及用途：
4K40 应用于精密仪器仪表，低温容器 ，微波通讯等。

NiFe Alloy 6J15

NiFe Alloy 6J15 Material grades and equivalents
Chemical composition:

Alloy	C	Mn	P	S	Al	Si	Ni	Cr	Fe
	Max								
6J15	0.05	1.5	0.03	0.02	0.3	0.4–1.3	55–61	15–18	Rest

Characteristic as below:
With a high resistivity and good plasticity.

Processing conditions and application:
It is suitable for producing all kinds of measuring instruments, meters resistance element components and other special purposes.

镍铁合金 6J15

化学成分：

Alloy	C	Mn	P	S	Al	Si	Ni	Cr	Fe
	Max								
6J15	0.05	1.5	0.03	0.02	0.3	0.4–1.3	55–61	15–18	余量

性能如下：
6J15 具有高电阻率和良好塑性。.

加工条件及用途：：
适用于制作各种测量仪器，仪表电阻元件及其它特种用途。

NiFe Alloy 6J20

Chemical composition:

Alloy	C	Mn	P	S	Al	Si	Ni	Cr	Fe
	Max								
6J20	0.05	0.7	0.01	0.01	0.3	0.4–1.3	Rest	20–23	<1.5

Characteristic as below：
With a high resistivity and good plasticity.

Processing conditions and application:
It is suitable for producing all kinds of measuring instruments, meters resistance element components and other special purposes.

镍铁合金 6J20

化学成分：

Alloy	C	Mn	P	S	Al	Si	Ni	Cr	Fe
	Max								
6J20	0.05	0.7	0.01	0.01	0.3	0.4–1.3	余量	20–23	<1.5

性能如下：
6J20 具有高电阻率和良好塑性。.

加工条件及用途：
适用于制作各种测量仪器，仪表电阻元件及其它特种用途。

NiFe Alloy 3J53

NiFe Alloy 3J53 Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Co	Cu	Fe
	Max													
3J53	0.05	0.02	0.02	0.8	0.8	41.5-43.5	5.2-5.8	–	2.3-2.7	–	0.5-0.8	–	–	REST

Characteristic as below：
With low frequency temperature coefficient and high mechanical quality factor.

Processing conditions and application:
It is used to make various forms of mechanical filter vibrator.

镍铁合金 3J53

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Co	Cu	Fe
	Max													
3J53	0.05	0.02	0.02	0.8	0.8	41.5-43.5	5.2-5.8	–	2.3-2.7	–	0.5-0.8	–	–	余量

性能如下：
3J53 具有低频率温度系数和高机械品质因素。

加工条件及用途：
用于制作各种形式机械滤波器振子。

NiFe Alloy 3J58

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Co	Cu	Fe
	Max													
3J58	0.05	0.02	0.02	0.8	0.8	43-43.6	5.2-5.6	–	2.3-2.7	–	0.5-0.8	–	–	REST

Characteristic as below：
With low frequency temperature coefficient and high mechanical quality factor.

Processing conditions and application:
It is used to make various forms of mechanical filter vibrator.

镍铁合金 3J58

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Ce	Ca	Fe
	Max													
3J58	0.05	0.02	0.02	0.8	0.8	43-43.6	5.2-5.6	-	2.3-2.7	-	0.5-0.8	-	-	余量

性能如下：
3J58 具有低频率温度系数和高机械品质因素。

加工条件及用途：
用于制作各种形式机械滤波器振子。

NiFe Alloy 3J59B

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Ce	Ca	Fe
	Max													
3J59B	0.03	0.02	0.02	0.3-0.5	0.4-0.6	43-43.7	4.8-5.1	0.3-0.5	2.8-3.1	0.2-1.2	0.4-0.6	0.05-0.15	≤0.01	REST

Characteristic as below:
With low frequency temperature coefficient and high mechanical quality factor .

Processing conditions and application:
It is used to make various forms of mechanical filter vibrator.

镍铁合金 3J59B

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Ce	Ca	Fe
	Max													
3J59B	0.03	0.02	0.02	0.3-0.5	0.4-0.6	43-43.7	4.8-5.1	0.3-0.5	2.8-3.1	0.2-1.2	0.4-0.6	0.05-0.15	≤0.01	余量

性能如下：
具有低频率温度系数和高机械品质因素。

加工条件及用途：
用于制作各种形式机械滤波器振子。

NiFe Alloy 3J40

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Ce	Ca	Fe
	Max													
3J40	0.03	0.01	0.01	0.2	0.1	REST	39-41	-	-	-	3.3-3.5	Trace	-	<0.5

Characteristic as below:
With low frequency temperature coefficient and high mechanical quality factor .

Processing conditions and application:
It is used to make various forms of mechanical filter vibrator.

镍铁合金 3J40

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Mo	Ti	Zr	Al	Ce	Ca	Fe
	Max													
3J40	0.03	0.01	0.01	0.2	0.1	余量	39-41	-	-	-	3.3-3.5	Trace	-	<0.5

性能如下：
3J40 具有低频率温度系数和高机械品质因素。

加工条件及用途：
用于制作各种形式机械滤波器振子。

NiFe Alloy 3J1

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J1	0.05	0.02	0.02	0.8	1	34.5-36	11.5-13	2.7-3.2	1-1.8	-	-	-	Rest

Characteristic as below:
With high anti-corrosion non-magnetic, elastic , easy to shape characteristics.
Processing conditions and application:
It is suitable for a membrane, membrane.

镍铁合金 3J1

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J1	0.05	0.02	0.02	0.8	1	34.5–36	11.5–13	2.7–3.2	1–1.8	–	–	–	余量

性能如下：
3J1 具有防腐蚀 无磁、高弹性、易成型的特点。

加工条件及用途：
可用作膜片、膜合。

NiFe Alloy 3J9

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J9	0.22–0.26	≤ 0.03	≤ 0.02	1.3–1.7	1.8–2.2	9–10.5	19–20.5	–	–	1.6–1.85	–	–	Rest

Characteristic as below:
With high anti–corrosion non–magnetic, elastic , easy to shape characteristics.

Processing conditions and application:
It is suitable for a membrane, membrane.

镍铁合金 3J9

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J9	0.22-0.26	≤0.03	≤0.02	1.3-1.7	1.8-2.2	9-10.5	19-20.5	–	–	1.6-1.85	–	–	余量

性能如下：
3J9 具有防腐蚀 无磁、高弹性、易成型的特点。

加工条件及用途：
可用作膜片、膜合。

NiFe Alloy 3J21

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J21	0.07-0.12	0.01	0.01	0.6	1.7-2.3	14-16	19-21	–	–	6.5-7.5	39-41	–	Rest

Characteristic as below:
With high anti–corrosion non–magnetic, elastic , easy to shape characteristics.

Processing conditions and application:
It is suitable for a membrane, membrane.

镍铁合金 3J21

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J21	0.07-0.12	0.01	0.01	0.6	1.7-2.3	14-16	19-21	–	–	6.5-7.5	39-41	–	余量

性能如下：
3J21 具有防腐蚀 无磁、高弹性、易成型的特点。

加工条件及用途：
可用作膜片、膜合。

NiFe Alloy 3J22

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J22	0.09-0.15	≤0.01	≤0.01	≤0.5	1.8-2.2	15-17	18-20	–	–	3-4	39-41	–	Rest

Characteristic as below:
With high anti–corrosion non–magnetic, elastic , easy to shape characteristics.

Processing conditions and application:
It is suitable for a membrane, membrane.

镍铁合金 3J22

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
3J22	0.09-0.15	≤0.01	≤0.01	≤0.5	1.8-2.2	15-17	18-20	–	–	3-4	39-41	–	余量

性能如下：
3J22 具有防腐蚀 无磁、高弹性、易成型的特点。

加工条件及用途：
可用作膜片、膜合。

NiFe Alloy 5J53

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
5J53	0.05	0.02	0.02	0.8	0.8	41.5–43	5.2–5.8	2.3–2.7	0.5–0.8	–	–	–	Rest

Characteristic as below:
With high anti–corrosion non–magnetic, elastic , easy to shape characteristics.

Processing conditions and application:
It is suitable for a membrane, membrane.

镍铁合金 5J53

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Cr	Ti	Al	Mo	Co	W	Fe
	Max												
5J53	0.05	0.02	0.02	0.8	0.8	41.5–43	5.2–5.8	2.3–2.7	0.5–0.8	–	–	–	余量

性能如下：
5J53 具有防腐蚀 无磁、高弹性、易成型的特点。

加工条件及用途：
可用作膜片、膜合。

NiFe Alloy 1J79

1J79 Material grades and equivalents

Trademark	FRANCE	VAC	Japan	Telcan	Carpenter	Magnetics
1J79	Mumetal Permimphy 1 Permimphy 2 Permimphy 5 Permimphy 6 Permimphy C	Mumetal Vacoperm Ultraperm 10 Ultraperm 200 Ultraperm 300 Ultraperm F80 Ultraperm 200TK Ultraperm Z	PC–2 PC–22 PC–81	Mumetal M2, M2+ Supermumetal SM2 Supermumetal SM150, 250 Supermumetal SM300	HyMu 80 HyMu 77 HyMu 80 II HyRa 80	Mumetal Round NiFe Alloy 80 SuNiFe Alloy Square NiFe Alloy 80

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J79	0.03	0.02	0.02	0.6–1.1	0.3–0.5	78.5–80	–	3.8–4.1	≤0.2	REST

Characteristic as below:
With high initial permeability and the maximum magnetic permeability and low coercive force .

Processing conditions and application:
It is suitable for producing pulse transformer, high sensitive relay, magnetic amplifier, choke coil, etc.

镍铁合金 1J79

镍铁合金 1J79 对应的国际牌号

牌号	FRANCE	VAC	Japan	Telcan	Carpenter	Magnetics
1J79	Mumetal Permimphy 1 Permimphy 2 Permimphy 5 Permimphy 6 Permimphy C	Mumetal Vacoperm Ultraperm 10 Ultraperm 200 Ultraperm 300 Ultraperm F80 Ultraperm 200TK Ultraperm Z	PC–2 PC–22 PC–81	Mumetal M2, M2+ Supermumetal SM2 Supermumetal SM150, 250 Supermumetal SM300	HyMu 80 HyMu 77 HyMu 80 II HyRa 80	Mumetal Round Permalloy 80 Supermalloy Square Permalloy 80

化学成分:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J79	0.03	0.02	0.02	0.6–1.1	0.3–0.5	78.5–80	–	3.8–4.1	≤0.2	余量

性能如下:
1J79 具有较高初磁导率和最大磁导率及低的矫顽力。

加工条件及用途:
用于制作脉冲变压器、高灵敏继电器、磁放大器、阻流圈等。

NiFe Alloy 1J85

NiFe Alloy 1J85 Material grades and equivalents

Trademark	Magnetics	Japan
1J85	Super-NiFe Alloy	PC-80 PC-3

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J85	0.03	0.02	0.02	0.3–0.6	0.15–0.3	79–81	–	4.8–5.2	≤0.2	REST

Characteristic as below:
With high initial permeability and the maximum magnetic permeability and low coercive force .

Processing conditions and application:
It is suitable for producing pulse transformer, high sensitive relay, magnetic amplifier, choke coil, etc.

镍铁合金 1J85

镍铁合金 1J85 对应的国际牌号

牌号	Magnetics	Japan
1J85	Super-permalloy	PC-80 PC-3

化学成分:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J85	0.03	0.02	0.02	0.3–0.6	0.15–0.3	79–81	–	4.8–5.2	≤0.2	余量

性能如下:
1J85 具有较高初磁导率和最大磁导率及低的矫顽力。

加工条件及用途:
用于制作脉冲变压器、高灵敏继电器、磁放大器、阻流圈等。

NiFe Alloy 1J86

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J86	0.015	0.02	0.02	≤1	≤0.3	80.5–81.5	–	5.8–6.2	–	REST

Characteristic as below:
With high initial permeability and the maximum magnetic permeability and low coercive force .

Processing conditions and application:
It is suitable for producing pulse transformer, high sensitive relay, magnetic amplifier, choke coil, etc.

镍铁合金 1J86

化学成分:

Alloy	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J86	0.015	0.02	0.02	≤1	≤0.3	80.5–81.5	–	5.8–6.2	–	余量

性能如下:
1J86 具有较高初磁导率和最大磁导率及低的矫顽力。
加工条件及用途:
用于制作脉冲变压器、高灵敏继电器、磁放大器、阻流圈等。

NiFe Alloy 42

Ni Fe Alloy42 material grades and equivalents

Trademark	GB	AISI/ASTM	UNS	W.Nr	BS	AFNOR	IMPHY	VAC	Telcan	USA Magnetics	Japan
Alloy 42	4J42	USA(ASTM) Glass sealing 42 / Uniseal 42	UNS K94100	WS 1.3917	Ni42	Germany : Vacodil 42 / Nilo 42	Dumet42 / DIN 17745 AFNOR NF A54-301	Vacodil 42	Nilo 42	Glass sealing 42	D

Chemical composition:

Grade	C%	P%	S%	Mn%	Si%	Al%	Co%	Ni%	Fe%
Alloy 42	Max 0.05	Max 0.020	Max 0.020	Max 0.80	Max 0.30	Max 0.10	Max 1.0	41.0–42.5	Bal.

Mechanical properties:

Grade	Tensile Strength N/mm²	
	Soft	Hard
Alloy 42	<590	>700

Characteristic as below:

A nickel–iron controlled–expansion alloy containing 41% nickel. It has a low and nominally constant coefficient of thermal expansion from room temperature to about 300° C.

Processing conditions and application:

Used for glass–to–metal sealing of components that are enclosed in a glass envelope, such as lamps and electron tubes.

镍铁合金 42

镍铁合金 Alloy42 对应的国际牌号

Trademark	GB	AISI/ASTM	UNS	W.Nr	BS	AFNOR	IMPHY	VAC	Telcan	USA Magnetics	Japan
Alloy 42	4J42	USA(ASTM) Glass sealing 42 / Uniseal 42	UNS K94100	WS 1.3917	NI42	Germany : Vacodil 42 / Nilo 42	Dumet42 / DIN 17745 AFNOR NF A54–301	Vacodil 42	Nilo 42	Glass sealing 42	D

化学成分

Grade	C%	P%	S%	Mn%	Si%	Al%	Co%	Ni%	Fe%
Alloy 42	Max 0.05	Max 0.020	Max 0.020	Max 0.80	Max 0.30	Max 0.10	Max 1.0	41.0–42.5	Bal.

物理性能

Grade	抗拉强度 N/mm²	
	Soft	Hard
Alloy 42 Strip	<590	>700

特点如下：

镍铁合金 42 含有 41%镍的镍铁控制膨胀合金。它具有从室温到大约 300℃的低且名义上恒定的热膨胀系数。

加工条件及应用：

用于封装在玻璃外壳中的组件（如灯和电子管）的玻璃到金属的密封。

NiFe Alloy 4J42A

Chemical composition:

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J42A	0.05	0.02	0.02	0.8	0.3	41–43	<0.25	<1	–	REST	–	–	<1

Characteristic as below:

In the range of 20 ℃ ~ 400 ℃ has a certain linear thermal expansion coefficient

Processing conditions and application:

It is suitable for vacuum electronic devices (such as tube, oscillation tube, klystron, magnetron, tube, etc.

镍铁合金 4J42A

化学成分：

Alloy	C	P	S	Mn	Si	Ni	Cr	Co	Cu	Fe	N	No	Al
	Max												
4J42A	0.05	0.02	0.02	0.8	0.3	41–43	<0.25	<1	–	余量	–	–	<1

加工条件及用途：

4J42A 适用于电真空器件如发射管、振荡管、调速管、磁控管、显像管等。

NiFe Alloy 4J49A

NiFe Alloy 4J49A Material grades and equivalents

Trademark	IMPHY	ASTM	VAC	W.Nr
4J49A	FeNi46Cr5	Carpenter456	Vacovit 465	

Chemical composition:

Grade	C	Si	Mn	S	P	Al	Ni	Cr	Fe
4J49A	≤0.03	0.15–0.3	0.15–0.3	≤0.02	≤0.02	0.1–0.25	46–48	5.8–6.5	Rest

Characteristic as below:
Within a certain range with similar soft glass linear expansion coefficient .

Processing conditions and application:
In the vacuum industry and the corresponding soft glass matching seal, in which 4J49A, 4J6A CRT cathode cap, vacuum fluorescent display into a column.

镍铁合金 4J49A

4J49A 对应的国际牌号

Trademark	IMPHY	ASTM	VAC	W.Nr
4J49A	FeNi46Cr5	Carpenter456	Vacovit 465	

化学成分

Grade	C	Si	Mn	S	P	Al	Ni	Cr	Fe
4J49A	≤0.03	0.15–0.3	0.15–0.3	≤0.02	≤0.02	0.1–0.25	46–48	5.8–6.5	余量

特点如下：
4J49A 在一定范围内具有与软玻璃相近的线膨胀系数。

加工条件及应用：
在电真空工业中和相应的软玻璃进行匹配封接，其中 4J49A，4J6A 可显像管阳极帽，真空荧光显示屏成列。

NiFe Alloy 1J30

Chemical composition:

Grade	Chemical composition(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J30	0.04	0.020	0.020	≤0.40	≤0.40	29.5–30.5	–	–	Rest

Characteristic as below:
1J30 is a nickel–iron alloy containing 30–40% nickel with a Curie temperature between 25–160 ° C. Magnetic induction intensity decreases sharply with increasing temperature below the Curie temperature and is used to compensate for the temperature–induced magnetic circuit Magnetic change.
Processing conditions and application:
It is suitable for traveling wave tube, magnetron, voltage regulator, odometer, wind anemometer and meter magnetic shunt compensation components.

镍铁合金 1J30

化学成分

Grade	化学成分(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J30	0.04	0.020	0.020	≤0.40	≤0.40	29.5~30.5	–	–	余量

特点如下：
1J30 是含镍 30%～40%的铁镍合金、居里温度在 25～160℃之间，在居里温度以下磁感应强度随温度升高而剧烈下降，用来补偿磁路中由温度引起的磁性变化。

加工条件及应用：
适用于行波管、磁控管、电压调节器、里程表、风向风速仪和电度表中的磁分路补偿元件。

NiFe Alloy 1J31

Chemical composition:

Grade	Chemical composition(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J31	0.04	0.020	0.020	≤0.40	≤0.40	30.5~31.5	–	–	Rest

Characteristic as below:
1J31 is a nickel–iron alloy containing 30–40% nickel with a Curie temperature between 25–160 ° C. Magnetic induction intensity decreases sharply with increasing temperature below the Curie temperature and is used to compensate for the temperature–induced magnetic circuit Magnetic change.

Processing conditions and application:
It is suitable for traveling wave tube, magnetron, voltage regulator, odometer, wind anemometer and meter magnetic shunt compensation components.

1J31/镍铁合金 1J31

化学成分：

Grade	化学成分(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J31	0.04	0.020	0.020	≤0.40	≤0.40	30.5~31.5	–	–	余量

特点如下：
1J31 是含镍 30%～40%的铁镍合金、居里温度在 25～160℃之间，在居里温度以下磁感应强度随温度升高而剧烈下降，用来补偿磁路中由温度引起的磁性变化。

加工条件及应用：
适用于行波管、磁控管、电压调节器、里程表、风向风速仪和电度表中的磁分路补偿元件。

NiFe Alloy 1J32

Chemical composition:

Grade	Chemical composition(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J32	0.04	0.020	0.020	≤0.40	≤0.40	31.5~32.5	–	–	Rest

Characteristic as below：
1J32 is a nickel–iron alloy containing 30–40% nickel with a Curie temperature between 25–160 ° C. Magnetic induction intensity decreases sharply with increasing temperature below the Curie temperature and is used to compensate for the temperature–induced magnetic circuit Magnetic change.

Processing conditions and application:
It is suitable for traveling wave tube, magnetron, voltage regulator, odometer, wind anemometer and meter magnetic shunt compensation components.

镍铁合金 1J32

化学成分

Grade	化学成分(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J32	0.04	0.020	0.020	≤0.40	≤0.40	31.5~32.5	–	–	余量

特点如下：
1J32 是含镍 30%～40%的铁镍合金、居里温度在 25～160℃之间，在居里温度以下磁感应强度随温度升高而剧烈下降，用来补偿磁路中由温度引起的磁性变化。

加工条件及应用：
适用于行波管、磁控管、电压调节器、里程表、风向风速仪和电度表中的磁分路补偿元件。

NiFe Alloy 1J33

Chemical composition:

Grade	Chemical composition(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J33	0.05	0.020	0.020	0.30~0.60	0.30~0.60	32.8~33.8	–	Rest	

Characteristic as below：
1J33 is a nickel–iron alloy containing 30–40% nickel with a Curie temperature between 25–160 ° C. Magnetic induction intensity decreases sharply with increasing temperature below the Curie temperature and is used to compensate for the temperature–induced magnetic circuit Magnetic change.

Processing conditions and application:
It is suitable for traveling wave tube, magnetron, voltage regulator, odometer, wind anemometer and meter magnetic shunt compensation components.

镍铁合金 1J33

化学成分

Grade	化学成分(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J33	0.05	0.020	0.020	0.30~0.60	0.30~0.60	32.8~33.8	–	余量	

特点如下：
1J33 是含镍 30%～40%的铁镍合金、居里温度在 25～160℃之间，在居里温度以下磁感应强度随温度升高而剧烈下降，用来补偿磁路中由温度引起的磁性变化。

加工条件及应用：
适用于行波管、磁控管、电压调节器、里程表、风向风速仪和电度表中的磁分路补偿元件。

NiFe Alloy 1J38

1J38 Material grades and equivalents

Trademark	GB	ASTM	UNS	W.Nr
1J38	–	Thermo Perm	–	–

Chemical composition:

Grade	Chemical composition(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J38	0.05	0.020	0.020	0.30~0.60	0.30~0.60	–	37.5~38.5		Rest

Characteristic as below:

1J38 is a nickel–iron alloy containing 30–40% nickel with a Curie temperature between 25–160 ° C. Magnetic induction intensity decreases sharply with increasing temperature below the Curie temperature and is used to compensate for the temperature–induced magnetic circuit Magnetic change.

Processing conditions and application:

It is suitable for traveling wave tube, magnetron, voltage regulator, odometer, wind anemometer and meter magnetic shunt compensation components.

镍铁合金 1J38

镍铁合金 1J38 对应的国际牌号

Trademark	GB	ASTM	UNS	W.Nr
1J38	–	Thermo Perm	–	–

化学成分

Grade	化学成分(%)								
	C	P	S	Mn	Si	Ni	Al	Cr	Fe
	Max								
1J38	0.05	0.020	0.020	0.30~0.60	0.30~0.60	–	37.5~38.5		余量

特点如下：

1J38 是含镍 30%～40%的铁镍合金、居里温度在 25～160℃之间，在居里温度以下磁感应强度随温度升高而剧烈下降，用来补偿磁路中由温度引起的磁性变化。

加工条件及应用：

适用于行波管、磁控管、电压调节器、里程表、风向风速仪和电度表中的磁分路补偿元件。

NiFe Alloy 1J36

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J36	0.03	0.020	0.20	0.20	–	35.0~37.0	–	≤0.80	–	Rest

Characteristic as below:

1J36 has a high magnetic induction, low coercivity, corrosion resistance and other characteristics.

Processing conditions and application:

1J36 Suitable for the solenoid valve core working in the atmosphere, steam, gas, salt spray, ammonia and other environments, but also for the production of electromagnetic clutches, micro–motors and so on.

镍铁合金 1J36

化学成分

Grade	化学成分(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J36	0.03	0.020	0.20	0.20	–	35.0~37.0	–	≤0.80	–	余量

特点如下：

1J36 具有高的磁感应强度、较低矫顽力、耐腐蚀等特点。

加工条件及应用：

1J36 适用于大气、蒸汽、煤气、盐雾、氨气等环境下工作的电磁阀铁芯，也适用于制作电磁离合器、微电机等。

NiFe Alloy 1J116

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J116	0.03	0.020	0.20	0.20	–	–	–	≤0.80	15.5~16.5	Rest

Mechanical properties:

Characteristic as below:

1J116 has a high magnetic induction, low coercivity, corrosion resistance and other characteristics.

Processing conditions and application:

1J116 Suitable for the solenoid valve core working in the atmosphere, steam, gas, salt spray, ammonia and other environments, but also for the production of electromagnetic clutches, micro–motors and so on.

镍铁合金 1J116

化学成分

Grade	化学成分(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J116	0.03	0.020	0.20	0.20	–	–	–	≤0.80	15.5~16.5	余量

特点如下：

1J116 具有高的磁感应强度、较低矫顽力、耐腐蚀等特点。

加工条件及应用：

1J116 适用于大气、蒸汽、煤气、盐雾、氨气等环境下工作的电磁阀铁芯，也适用于制作电磁离合器、微电机等。

NiFe Alloy 1J117

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J117	0.03	0.020	0.20	0.15	0.30~0.70	0.50~0.70	–	0.30~0.70	17.0~18.5	Rest

Characteristic as below:

1J117 has a high magnetic induction, low coercivity, corrosion resistance and other characteristics.

Processing conditions and application:

1J117suitable for the solenoid valve core working in the atmosphere, steam, gas, salt spray, ammonia and other environments, but also for the production of electromagnetic clutches, micro–motors and so on.

镍铁合金 1J117

化学成分

Grade	化学成分(%)									
	C	P	S	Si	Ti	Ni	Al	Mn	Cu	Fe
	Max									
1J117	0.03	0.020	0.20	0.15	0.30~0.70	0.50~0.70	–	0.30~0.70	17.0~18.5	余量

特点如下：

1J117 具有高的磁感应强度、较低矫顽力、耐腐蚀等特点。

加工条件及应用：

1J117 适用于大气、蒸汽、煤气、盐雾、氨气等环境下工作的电磁阀铁芯，也适用于制作电磁离合器、微电机等。

NiFe Alloy 1J51

1J51 Material grades and equivalents

Trademark	IMPHY	VAC	Telcan	USA Magnetics	Japan
1J51	Rectimply	Permenorm 5000 Z	H.C.R	Mver	Sendelta

Chemical composition:

Grade	C	P	S	Ni	Si	Mn	Cu	Fe
	Max							
1J51	0.03	0.020	0.020	40.0~51.0	0.15~0.30	0.30~0.60	≤0.20	Rest

Characteristic as below:

1J51 is a kind of soft magnetic alloy which has anisotropic structure and special magnetic properties. The hysteresis and loop of 1J51 are nearly rectangular, the square coefficient is larger than 0.85, and the permeability is high And saturation magnetic flux density, low coercivity.

Processing conditions and application:

1J51 applies to small power high sensitive magnetic amplifier, pulse transformer magnetic governor in the core and beeper vibration piece.

镍铁合金 1J51

镍铁合金 1J51 对应的国际牌号

Trademark	IMPHY	VAC	Telcan	USA Magnetics	Japan
1J51	Rectimply	Permenorm 5000 Z	H.C.R	Mver	Sendelta

化学成分

Grade	C	P	S	Ni	Si	Mn	Cu	Fe
	Max							
1J51	0.03	0.020	0.020	40.0~51.0	0.15~0.30	0.30~0.60	≤0.20	余量

特点如下：

1J51 是通过特殊的加工工艺使合金呈现各向异性的组织结构，以得到特殊磁性能的软磁合金，1J51 的磁滞和回线近于矩形，方形系数大于 0.85，具有较高的磁导率和饱和磁感应强度，较低的矫顽力。

加工条件及应用：

1J51 适用于小功率高灵敏磁放器，脉冲变压器的磁调控器中的铁芯和蜂鸣震动片。

NiFe Alloy 1J46

1J46 Material grades and equivalents

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter	Japan
1J46	Anhyster DS/Superanhyster 50/	Permenorm 5000 H2/Permenorm 5050 H2	Radiometal R4550/Radiometal SR	Alloy 48SL Alloy 48Rotor	High Permability 45 High Permability 49	PB-1 PB-2

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J46	0.03	0.020	0.020	0.60~1.00	0.15~0.30	45.0~47.0			≤0.20	Rest

Characteristic as below:

1J46 is about 50% nickel–iron soft magnetic alloy, with high permeability, high magnetic induction and low coercivity.

Processing conditions and application:

1J46 is suitable for primary and secondary power transformers, micro–motor rotor, relays, electromagnetic clutches, torque motor street iron, barrier shielded magnetic shield, electronic stepper motor wire frame, electronic clock stator, buzzer vibrator and telephone components.

镍铁合金 1J46

镍铁合金 1J46 对应的国际牌号

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter	Japan
1J46	Anhyster DS/Superanhyster 50/	Permenorm 5000 H2/Permenorm 5050 H2	Radiometal R4550/Radiometal SR	Alloy 48SL Alloy 48Rotor	High Permability 45 High Permability 49	PB-1 PB-2

化学成分

Grade	化学成分(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J46	0.03	0.020	0.020	0.60~1.00	0.15~0.30	45.0~47.0			≤0.20	余量

1J46 是含镍 50%左右的铁镍

特点如下：软磁合金，具有较高的磁导率，较高的磁感应强度和低的矫顽力。

加工条件及应用：

1J46 适用于中小学功率变压器、微电机转子、继电器、电磁离合器、力矩马达街铁、阻流畔圈磁屏蔽、电子表步进电机线架、电子钟定子、蜂鸣器震动片和电话机元件。

NiFe Alloy 1J50

1J50 Material grades and equivalents

Telcan	Trademark	IMPHY	VAC	USA Magnetics	USA Carpenter
HCR SR	1J50	Rectimply	Permenorm 5000 Z	Square Orthonol	HyRa 49

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J50	0.03	0.020	0.020	0.30~0.60	0.15~0.30	49.0~51.0			≤0.20	Rest

Characteristic as below:

1J50 is about 50% nickel–iron soft magnetic alloy, with high permeability, high magnetic induction and low coercivity.

Processing conditions and application:

1J50 is suitable for primary and secondary power transformers, micro–motor rotor, relays, electromagnetic clutches, torque motor street iron, barrier shielded magnetic shield, electronic stepper motor wire frame, electronic clock stator, buzzer vibrator and telephone components.

镍铁合金 1J50

镍铁合金 1J50 对应的国际牌号

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter
1J50	Rectimply	Permenorm 5000 Z	HCR SR	Square Orthonol	HyRa 49

化学成分：

Grade	化学成分(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J50	0.03	0.020	0.020	0.30~0.60	0.15~0.30	49.0~51.0			≤0.20	余量

特点如下：

1J50 是含镍 50%左右的铁镍软磁合金，具有较高的磁导率，较高的磁感应强度和低的矫顽力。

加工条件及应用：

1J50 适用于中小学功率变压器、微电机转子、继电器、电磁离合器、力矩马达街铁、阻流畔圈磁屏蔽、电子表步进电机线架、电子钟定子、蜂鸣器震动片和电话机元件。

NiFe Alloy 1J48DF

1J48DF Material grades and equivalents

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter
1J48DF	Rectimply	Permenorm 5000 Z	HCR SR	Square Orthonol	HyRa 49

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J48DF	0.015	0.010	0.010	≤0.80	≤0.30	46.0~49.0		1.5~2.5		Rest

Characteristic as below：

1J48DF is about 50% nickel–iron soft magnetic alloy, with high permeability, high magnetic induction and low coercivity.

Processing conditions and application:

1J48DF is suitable for primary and secondary power transformers, micro–motor rotor, relays, electromagnetic clutches, torque motor street iron, barrier shielded magnetic shield, electronic stepper motor wire frame, electronic clock stator, buzzer vibrator and telephone components.

镍铁合金 1J48DF

镍铁合金 1J48DF 对应的国际牌号

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter
1J48DF	Rectimply	Permenorm 5000 Z	HCR SR	Square Orthonol	HyRa 49

化学成分：

Grade	化学成分(%)									
	C	P	S	Mn	Si	Ni	Cr	Mo	Cu	Fe
	Max									
1J48DF	0.015	0.010	0.010	≤0.80	≤0.30	46.0~49.0		1.5~2.5		余量

特点如下：

1J48DF 是含镍 50%左右的铁镍软磁合金，具有较高的磁导率，较高的磁感应强度和低的矫顽力。

加工条件及应用：

1J48DF 适用于中小学功率变压器、微电机转子、继电器、电磁离合器、力矩马达街铁、阻流畔圈磁屏蔽、电子表步进电机线架、电子钟定子、蜂鸣器震动片和电话机元件。

NiFe Alloy 1J77

1J77 Material grades and equivalents

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter
1J77	Mumetal Permimphy 1 Permimphy 2 Permimphy 5 Permimphy 6 Permimphy C	Mumetal Vacoperm Ultraperm 10 Ultraperm 200 Ultraperm 300 Ultraperm F80 Ultraperm 200TK Ultraperm Z	Mumetal M2, M2+ Supermumetal SM2 Supermumetal SM150, 250 Supermumetal SM300	Mumetal Round NiFe Alloy 80 SuNiFe Alloy Square NiFe Alloy 80	HyMu 80 HyMu 77 HyMu 80 Ⅱ HyRa 80

Chemical composition:

Grade	Chemical composition(%)							
	Mn	Si	Ni	Cr	Co	Mo	Cu	Fe
1J77	0.30~0.6	0.15~0.3	75.0~78			3.9~4.5	4.80~6	Rest

Characteristic as below：

With high initial permeability and the maximum magnetic permeability and low coercive force .

Processing conditions and application:

It is suitable for producing pulse transformer, high sensitive relay, magnetic amplifier, choke coil, etc.

镍铁合金 1J77

镍铁合金 1J77 对应的国际牌号

Trademark	IMPHY	VAC	Telcan	USA Magnetics	USA Carpenter
1J77	Mumetal Permimphy 1 Permimphy 2 Permimphy 5 Permimphy 6 Permimphy C	Mumetal Vacoperm Ultraperm 10 Ultraperm 200 Ultraperm 300 Ultraperm F80 Ultraperm 200TK Ultraperm Z	Mumetal M2, M2+ Supermumetal SM2 Supermumetal SM150, 250 Supermumetal SM300	Mumetal Round Permalloy 80 Supermalloy Square Permalloy 80	HyMu 80 HyMu 77 HyMu 80 Ⅱ HyRa 80

化学成分：

Grade	化学成分(%)							
	Mn	Si	Ni	Cr	Co	Mo	Cu	Fe
1J77	0.30~0.6	0.15~0.3	75.0~78			3.9~4.5	4.80~6	余量

性能如下：
1J77 具有较高初磁导率和最大磁导率及低的矫顽力。

加工条件及用途：
用于制作脉冲变压器、高灵敏继电器、磁放大器、阻流圈等。

钴铁精密合金

CoFe Alloy 2J4

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J4	0.12	0.025	0.02	0.7	0.7	2.3~6.7	44~45	3.5~4.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.
Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J4

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J4	0.12	0.025	0.02	0.7	0.7	2.3~6.7	44~45	3.5~4.5	余量

性能如下：
2J4 具有良好的磁滞性能及加工性能。

加工条件及用途：
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J7

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J7	0.12	0.025	0.02	0.7	0.7	≤0.7	51~53	6.5~7.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.
Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J7

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J7	0.12	0.025	0.02	0.7	0.7	≤0.7	51~53	6.5~7.5	余量

性能如下：
2J7 具有良好的磁滞性能及加工性能。
加工条件及用途：
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J9

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J9	0.12	0.025	0.02	0.7	0.7	≤0.7	51~53	8.5~9.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.

Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J9

化学成分:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J9	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	8.5–9.5	余量

性能如下:
2J9 具有良好的磁滞性能及加工性能。

加工条件及用途:
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J10

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J10	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	9.5–10.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.

Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J10

化学成分:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J10	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	9.5–10.5	余量

性能如下:
2J10 具有良好的磁滞性能及加工性能。

加工条件及用途:
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J11

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J11	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	10.5–11.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.

Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J11

化学成分:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J11	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	10.5–11.5	余量

性能如下:
2J11 具有良好的磁滞性能及加工性能。

加工条件及用途:
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J12

Chemical composition:

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J12	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	11.5–12.5	REST

Characteristic as below:
It has a good hysteresis property and processing performance.

Processing conditions and application:
It is suitable for making all kinds of hysteresis motor rotor.

钴铁合金 2J12

化学成分：

Alloy	C	P	S	Si	Mn	Ni	Co	V	Fe
	Max								
2J12	0.12	0.025	0.02	0.7	0.7	≤0.7	51–53	11.5–12.5	余量

性能如下：
2J12 具有良好的磁滞性能及加工性能。

加工条件及用途：
适用于制作各种磁滞电动机转子。

CoFe Alloy 2J84

Chemical composition:

Alloy	C	Mn	S	P	Cr	Co	Si	Mo	Ti	Fe
	Max									
2J84	0.03	0.2	0.02	0.02	25.5–27	14.5–16	–	3–3.5	0.5–0.8	REST

Characteristic as below:
It has a good hot and cold processing performance.

Processing conditions and application:
It is suitable for the instrument, desktop computers, telephone receiver, etc.

钴铁合金 2J84

化学成分：

Alloy	C	Mn	S	P	Cr	Co	Si	Mo	Ti	Fe
	Max									
2J84	0.03	0.2	0.02	0.02	25.5–27	14.5–16	–	3–3.5	0.5–0.8	余量

性能如下：
2J84 具有良好的冷热加工性能。

加工条件及用途：
可应用于仪表、台式计算机、电话机的受话器等。

CoFe Alloy 2J85

Chemical composition:

Alloy	C	Mn	S	P	Cr	Co	Si	Mo	Ti	Fe
	Max									
2J85	0.03	0.2	0.02	0.02	23.5–25	11.5–13	0.2–1.1	–	–	REST

Characteristic as below:
It has a good hot and cold processing performance.

Processing conditions and application:
It is suitable for the instrument, desktop computers, telephone receiver, etc.

钴铁合金 2J85

化学成分：

Alloy	C	Mn	S	P	Cr	Co	Si	Mo	Ti	Fe
	Max									
2J85	0.03	0.2	0.02	0.02	23.5–25	11.5–13	0.2–1.1	–	–	余量

性能如下：
2J85 具有良好的冷热加工性能。
加工条件及用途：
可应用于仪表、台式计算机、电话机的受话器等。

CoFe Alloy 1J21

Chemical composition:

Chemical composition(%)										
S	C	P		Mn	Si	Ni	Cu	V	Co	Fe
	Max									
1J21	0.04	0.02	0.02	0.03	0.03	0.5	0.20	0.80–1.20	49.0–51.0	Rest

Characteristic as below:
1J21 cobalt–based soft magnetic gold, saturated magnetic flux density can reach 2.35T. It has a high Curie temperature (980 ℃) and magnetostriction coefficient (60 * 10–6) and other characteristics.
Processing conditions and application:
1J21 is suitable for vibrating diaphragms, magnetostrictive transducers and buzzer elements for small size, light weight, large power spaceflight, aeronautic motors, electromagnet pole shoe power transformers, voltage and hearing aids.

钴铁合金 1J21

化学成分

Grade	化学成分(%)									
	C	P	S	Mn	Si	Ni	Cu	V	Co	Fe
	Max									
1J21	0.04	0.02	0.02	0.03	0.03	0.5	0.20	0.80~1.20	49.0~51.0	余量

特点如下：

1J21 钴基软磁全金，饱和磁感应强度可以达到 2.35T。它具有居里温度高（980℃）和磁致伸缩系数大（60*10–6）等特点。

加工条件及应用：

1J21 适用于体积小，重量轻，功率大航天，航空电机，电磁铁极靴电源变压器、电压和助听器的震动膜片、磁致伸缩换能器和蜂鸣器元件。

CoFe Alloy 1J22

Chemical composition:

Grade	Chemical composition(%)									
	C	P	S	Mn	Si	Ni	Cu	V	Co	Fe
	Max									
1J22	0.04	0.02	0.02	0.03	0.03	0.5	0.20	0.80~1.20	49.0~51.0	Rest

Characteristic as below:

1J22 cobalt-based soft magnetic gold, saturated magnetic flux density can reach 2.35T. It has a high Curie temperature (980 ℃) and magnetostriction coefficient (60 * 10–6) and other characteristics.

Processing conditions and application:

1J22 is suitable for vibrating diaphragms, magnetostrictive transducers and buzzer elements for small size, light weight, large power spaceflight, aeronautic motors, electromagnet pole shoe power transformers, voltage and hearing aids.

钴铁合金 1J22

化学成分

Grade	化学成分(%)									
	C	P	S	Mn	Si	Ni	Cu	V	Co	Fe
	Max									
1J22	0.04	0.02	0.02	0.03	0.03	0.5	0.20	0.80~1.20	49.0~51.0	余量

特点如下：

1J22 钴基软磁全金，饱和磁感应强度可以达到 2.35T。它具有居里温度高（980℃）和磁致伸缩系数大（60*10–6）等特点。

加工条件及应用：

1J22 适用于体积小，重量轻，功率大航天，航空电机，电磁铁极靴电源变压器、电压和助听器的震动膜片、磁致伸缩换能器和蜂鸣器元件。

Cobalt Alloy/钴合金

MP35N Material grades and equivalents

MP35N/UNS R30035/ W.Nr 2.4999/ AMS 5844

Introduction:

MP35N is a nickel–cobalt base alloy of the Multiphase alloy system that has a unique combination of properties–ultra high strength, toughness, ductility and outstanding corrosion resistance. The alloy is work–strengthened and aged to obtain strength levels of 260 to 300 ksi(1793–2068 MPa). HY MP35N alloy resists corrosion in hydrogen sulfide, salt water and other chloride solution, as well as the mineral acids(nitric, hydrochloric, sulfuric).In addition, it has exceptional resistance to crevice and stress corrosion cracking in sea water and other hostile environments.

Chemical composition:

Weight%	Ni	Co	Cr	Mo	Ti	Fe	Si	Mn	P	B	S	C
MP35N	33	Balance	19	9	1	1	0.15	0.15	0.015	0.01	0.01	0.03
	37		21	10.5	Max	Max	Max	Max	Max	Max	Max	Max

Mechanical properties:

MP35N Alloy	Ultimate Tensile Strength	0.2% Offset Yield Strength	Elongation in 4D	Reduction of Area	Hardness	Shear Strength**
Typical Properties of Solution Treated (Annealed)	130 ksi(896 MPa)	55 ksi(379 MPa)	65%	75%	90 HRB	—
Typical Properties of AMS 5844 Product after 4 Hour Age at 1050 ℉ (556℃)	290 ksi(2000 MPa)	280 ksi(1931 MPa)	10%	45%	51 HRC	—
AMS 5844 Specification Requirements after Aging 4 Hours at 1000–1200℉ (538–648℃)	260 ksi(1795 MPa),min.	230 ksi(1585 MPa),min.	8%,min.	35%,min.	—	150 ksi(1034 Mpa),min.

The above data are longitudinal properties.

*Tensile properties will change depending on product size.

**Not required by AMS 5844, but this is guaranteed shear strength.

MP35N application :

MP35N alloys can be applied to fasteners, springs, non–magnetic components and instrumentation in medical, seawater, oil and gas wells, chemical and food processing environments.

MP35N

MP35N 相似牌号：

MP35N/UNS R30035/ W.Nr 2.4999/ AMS 5844

产品介绍:

MP35N 是一种多相合金系统的镍钴基合金，具有独特的性能， 超高强度，韧性，延展性和杰出的耐腐蚀性。 该合金经过强化和时效后以获得 260 至 300ksi (1793–2068MPa) 的强度水平。 HY MP35N 合金在硫化氢，盐水和其他氯化物溶液以及无机酸 (硝酸，盐酸，硫酸) 中都具有抗腐蚀性。此外，它还具有优异的耐海水和其他恶劣环境中裂缝和应力腐蚀开裂的能力。

化学成分:

%	Ni	Co	Cr	Mo	Ti	Fe	Si	Mn	P	B	S	C
MP35N	33	余量	19	9	1	1	0.15	0.15	0.015	0.01	0.01	0.03
	37		21	10.5	最大	最大	最大	最大	最大	最大	最大	最大

机械性能:

MP35N	最终抗拉强度	0.2% 补偿屈服强度	四维伸长率	断面收缩率	硬度	剪切强度
典型属性固溶态处理 (退火)	130 ksi(896 MPa)	55 ksi(379 MPa)	65%	75%	90 HRB	—
典型属性 AMS 5844 在 1050℉ (556℃) 时效处理 4 小时后	290 ksi(2000 MPa)	280 ksi(1931 MPa)	10%	45%	51 HRC	—
AMS 5844 规格要求 时效处理 1000–1200 ℉4 小时 (538–648℃)	260 ksi(1795 MPa),min.	230 ksi(1585 MPa),min.	8%,min.	35%,min.	—	150 ksi(1034 Mpa),min.

以上数据是纵向属性。

拉伸特性会根据产品尺寸而改变。

MP35N 应用领域：

MP35N 合金可应用于医疗、海水、油气井、化学以及食品加工过程环境中的紧固件、弹簧、非磁性组件和仪器器件。

Stellite 1

Material grades and equivalents: Stellite 1/ UNS R30001

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal	32	12	2.45	<3.0	<1.0	<3.0	<2.0	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
(SF)A 5.21 ER CoCr-c	51-56

Characteristic as below:

Stellite 1 is a hardfacing alloy possessing excellent abrasion and corrosion resistance for applications such as pump sleeves, rotary seal rings, wear pads, expeller screws and bearing sleeves. It retains its hardness at temperatures in excess of 760° C (1400° F).

Processing conditions and application:

Stellite 1 is available as welding wire, rod, powder, and electrodes, finished castings and HIP consolidated blands or parts. Deloro Stellite also offers hardfacing services.

司太立 1 /Stellite 1

司太立 1 对应的国际牌号：UNS R30001

化学成分：

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal	32	12	2.45	<3.0	<1.0	<3.0	<2.0	<0.5

机械性能：

ASME/AWS	硬度(HRC)
(SF)A 5.21 ER CoCr-c	51-56

性能如下：

司太立 1 是一种表面硬化合金，具有优异的耐磨性和耐腐蚀性，适用于泵套，旋转密封环，耐磨垫，螺旋桨和轴承套等应用。它在温度超过 760° C（1400° F）时仍能保持其硬度。

加工条件及用途：

司太立 1 可用作焊丝，棒，粉末和电极，成品铸件和 HIP 固结坯或零件。

Stellite 6

Material grades and equivalents: Stellite 6; UNS R3006; AMS 5387C-2001

Introduction:

Stellite 6 is the most widely used of the wear resistant cobalt-based alloys and exhibits good all-round performance. It is regarded as the industry standard for general-purpose wear resistance applications.

Stellite 6 Chemical components

C	Cr	Si	W	Fe	Mo	Ni	Mn	B	Co
1.2	28	1.1	4.5	3		3	1		bal

*The chemical composition shown above is an outline only,and should not be taken as a full specification.
*Note that cored wire may have higher Fe contents than other product forms.

Stellite 6 Physical property (Room Temp.)

Density (lb/in³)	Specific Gravity	Solidus	Liquidus	Specific heat (J/kg·K)	Magnetic Permeability	Electrode Potential	Electrical Conductivity	Electrical Resistivity
0.305	8.46	2340° F	2540° F	0.101° F Btu/lb-	<1.2@200 Oersteds	-0.25 Volts	1.9%IACS (Int. Annealed Copper Std.)	41.73 microhms -inch

Stellite 6 Thermal Properties-Conductivity & Expansion

Thermal Expansion Coefficient				Thermal Conductivity by Temperature			
° F	Microinch / inch-° F	° C	Microns/ m-° C	° F	Btu/ft2/in/ hr/° F	° C	W/mk
212	6.3	100	11.34	70	102.7	21.11	14.82

司太立 6

司太立 6 对应国际牌号 UNS R3006; AMS 5387C-2001

司太立 6 是一种钴基合金，用于磨损环境，防咬死，防磨损，防摩擦。合金 6B 的摩擦系数很低，能和其他金属产生滑触，在多数情况下不会产生磨损。即使不用润滑剂，或者不能用润滑剂的应用中，6B 合金可以把咬死和磨损降至最低。司太立 6 的耐磨性能是与生俱来的,不依靠冷作加工或热处理,因此也能减少热处理工作量和后续加工的成本。合金 6B 耐受气蚀，耐冲击,耐热冲击和多种腐蚀介质， 在赤热状态下,司太立 6 能保持很高的硬度(冷却后可以恢复原来的硬度). 在既有磨损又有腐蚀的环境中。

化学成分：

C	Cr	Si	W	Fe	Mo	Ni	Mn	B	Co
1.2	28	1.1	4.5	3		3	1		bal

在常温下合金的机械性能的最小值:

Density (lb/in³)	Specific Gravity	Solidus	Liquidus	Specific heat (J/kg · K)	Magnetic Permeability	Electrode Potential	Electrical Conductivity	Electrical Resistivity
0.305	8.46	2340 ° F	2540 ° F	0.101° F Btu/lb-	<1.2@200 Oersteds	-0.25 Volts	1.9%IACS (Int. Annealed Copper Std.)	41.73 microhms -inch

热性能-电导率&膨胀系数：

Thermal Expansion Coefficient				Thermal Conductivity by Temperature			
° F	Microinch/ inch-° F	° C	Microns/ m-° C	° F	Btu/ft2/in/ hr/° F	° C	W/mk
212	6.3	100	11.34	70	102.7	21.11	14.82

司太立 6 用途；

可用于制造阀门零件,泵柱塞,蒸汽机防腐蚀罩,高温轴承,阀杆,食品加工设备,针阀,热挤模具,成型磨具等。

Stellite 12

Stellite 12 Material grades and equivalents；Stellite 12/ UNS R30012

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	30	8	1.4-1.8	<3.0	<1.0	<3.0	<2.0	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
(SF)A 5.21 ER CoCr-A	40-45

Characteristic as below：

The higher tungsten content provides better high-temperature properties compared to Stellite 6, and it can be used at temperatures up to about 700°C.

Processing conditions and application:

Stellite 12 is typically used for cutting tools that need to withstand abrasion, heat and corrosion. Examples include industrial knives for cutting carpets, plastics, paper and synthetic fibres; and saw tips in the timber industry. It is also used for control plates in the beverage industry, pump vanes, bearing bushes and narrowneck glass mold plungers; and for hardfacing of engine valves, pinch rollers in the metal-processing industries, and rotor blade edges.

司太立 12

司太立 12 对应的国际牌号：UNS R30012

化学成分：

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
余量	30	8	1.4-1.8	<3.0	<1.0	<3.0	<2.0	<0.5

机械性能：

ASME/AWS	硬度(HRC)
(SF)A 5.21 ER CoCr-A	40-45

性能如下：

司太立 12 经常与司太立 6 或司太立 1 自行配对或运行 较高的钨含量与司太立 6 相比具有更好的高温性能，可在高达 700° C 的温度下使用。

司太立 12 加工条件及用途：

司太立 12 通常用于需要耐磨，耐热和耐腐蚀的切削工具。例如：包括用于切割地毯，塑料，纸张和合成纤维的工业刀具;并看到了木材行业的提示。它也用于饮料行业的控制板，泵叶片，轴承衬套和窄颈玻璃模具柱塞;以及用于发动机阀门，金属加工工业中的夹送辊以及转子叶片边缘的表面硬化。

Stellite 20

Material grades and equivalents：Stellite 20

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	33	16	2.45	<3.0	<1.0	<3.0	<2.0	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
–	53–59

Processing conditions and application:

Stellite 20 can be supplied as steel plate/ sheet, round steel bar, steel tube/pipe, steel stripe, steel billet, steel ingot, steel wire rods. electroslag, forged ring/ block,etc.

司太立 20

司太立 20 相似牌号 Stellite 20

化学成分

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
余量	33	16	2.45	<3.0	<1.0	<3.0	<2.0	<0.5

机械性能：

ASME/AWS	硬度(HRC)
–	53–59

加工条件及用途：

司太立 20 可作为钢板，圆钢，钢管，钢条，钢坯，钢锭，钢丝等供货。电渣，锻造环块等。

Stellite 21

司太立 21 Material grades and equivalents: Stellite 21/ UNS R30021

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	28	–	0.25	3	5.2	<3.0	<1.5	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
(SF)A 5.21 ER CoCr–E	28–40

Characteristic as below：

It has excellent resistance on high heat, corrosion and abrasion.

Processing conditions and application:

Recommended use for making fuild valve,brass casting die , vlave seat, etc.

司太立 21

司太立对应的国际牌号：Stellite 21/ UNS R30021

化学成分：

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
余量	28	–	0.25	3	5.2	<3.0	<1.5	<0.5

机械性能：

ASME/AWS	硬度(HRC)
(SF)A 5.21 ER CoCr–E	28–40

性能如下：

司太立 21 在高温，腐蚀和磨损方面具有优异的耐磨性。

加工条件及用途：

司太立 21 可作为钢板，圆钢，钢管，钢条，钢坯，钢锭，钢丝等供货。电渣，锻造环块等。

Stellite 25

HY ST25 Material grades and equivalents：Stellite 25 / UNS R30605

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	20	14	0.1	10	<1.0	<3.0	<1.0	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
–	20–45

Characteristic as below：

Stellite 25 is resistant to oxidation and carburization up to 1900° F. The alloy resists wet chlorine at ambient temperatures and is resistant to nitric and hydrochloric acids under certain conditions. Exposure testing is recommended to verify performance.

Processing conditions and application:

Metal working tools where a combination of metal–on–metal wear, thermal fatigue and hot corrosion resistanceare required, such as piercing points, forming tools, and extrusion dies. Also used for furnace hardware.

司太立 25/Stellite 25

司太立 25 对应的国际牌号：Stellite 25 / UNS R30605

化学成分：

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	20	14	0.1	10	<1.0	<3.0	<1.0	<0.5

机械性能：

ASME/AWS	硬度(HRC)
–	20–45

司太立 25 特点如下：

抗氧化和渗碳至 1900° F，该合金在室温环境下可以耐受潮湿的氯气，并且在一定条件下耐硝酸和盐酸，建议使用曝光测试来验证性能。

加工条件和应用：

对需要磨损，热疲劳和耐热腐蚀性能的金属加工的工具，例如穿孔点，成型工具和挤压模具,也用于炉子硬件。

Stellite31

Stellite 31 Material grades and equivalents: Stellite 31/ UNS R30031

Chemical composition:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	26	7.5	0.5	10	–	<2.0	<1.0	<0.5

Mechanical properties:

ASME/AWS	Hardness(HRC)
–	20–35

Characteristic as below：

Stellite31 is a cobalt–base, high–temperature super alloy having high tensile and creep properties in pre–cision casting. It is superior in stress–rupture properties to most alloys commercially available, especially at 1700 and 1800° F.

Processing conditions and application:

Stellite31 is mainly used in gas turbine engines in areas subject to hot gas erosion.

司太立 31

Stellite31 相似牌号：Stellite 31/ UNS R30031

化学成份:

Co	Cr	W	C	Ni	Mo	Fe	Si	Other
Bal.	26	7.5	0.5	10	–	<2.0	<1.0	<0.5

机械性能:

ASME/AWS	Hardness(HRC)
–	20–35

特点如下：

司太立 31 是一种钴基高温超合金，在预切铸造时具有很高的拉伸和蠕变性能。 此合金比在大多数合金的应力断裂性能上都优越，特别是在 1700 和 1800℉。

加工条件和应用：

司太立 31 主要用于受热气侵蚀的燃气涡轮发动机。

Titanium alloy/钛合金

Titanium alloy 10V–2Fe–3Al /UNS R56410

Material grades and equivalents Titanium alloy 10V–2Fe–3Al /UNS R56410

Short Introduction:

Titanium alloy 10V–2Fe–3Al is a near beta alloy developed as a high strength forging alloy. This grade provides the best combination of strength and toughness of the commercially available titanium alloys. Its strength permits about a 27% weight savings when compared to Ti–6Al–4V. At the 180 ksi tensile strength level, the $K1_c$ value is 40 ksi–in ½ minimum. Solution treated and aged material possesses excellent resistance to stress corrosion cracking, typically $K1_{scc}$ being greater than 0.8 $K1_c$. Solution treated material should not be subject to long term exposure in the 500–800° F range. This could result in high strength but low ductility.

Chemistry Composition

Element	V	Al	Fe	C	N	O	H	Y	Others, Each	Others, Total	Ti
MIN	9.0	2.6	1.6	–	–	–	–	–	–	–	–
MAX	11.0	3.4	2.22	0.05	0.05	0.13	0.015	0.005	0.10	0.30	Balance

Features

- High strength and toughness
- Weight savings when compared to Ti–6Al–4V
- Excellent resistance to stress corrosion cracking

Applications

- Hand and die forgings
- Aircraft landing gear
- Golf club driver faces

Physical Properties

Density: 0.168 lb/inch³

Nominal Beta Transus: 1470° F

Poisson's ratio: 0.32

Thermal Expansion: 75–800° F, 5.4 × 10–6 in/in° F

Tensile Modulus: 15.9 × 106 psi

Modulus: 16.2 × 106 psi

* 70° F to indicated temperature.

Mechanical Properties

Minimum Mechanical Properties AMS 4984, solution treated and aged

Ultimate Tensile Strength, ksi	173
Ultimate Tensile Strength, ksi	160
0.2% Yield Strength, ksi	4
Reduction of Area, %	Report
fracture toughness, k_{sc}	40 ksi

AMS 4987, single solution heat treat & overage

Ultimate Tensile Strength, ksi	140
0.2% Yield Strength, ksi	130
Elongation, %	8
Reduction of Area, %	20
fracture toughness, k_{sc}	80 ksi

Titanium alloy 10V–2Fe–3Al /UNS R56410

材料相似牌号 Titanium alloy 10V–2Fe–3Al /UNS R56410

Titanium alloy 10V–2Fe–3Al /UNS R56410 发展开发的是一种高强度锻造合金。这个合金等级提供了所有钛合金的强度和韧性的最佳组合 。相比于 Ti 6AL–4V 时，其强度可以保证约 27%的重量。 在 180 ksi 的拉伸强度水平，则 $K1_c$ 值是 40 KSI–½中最低。固溶处理和材料具有优异的抗应力腐蚀开裂，通常 $K1_{scc}$ 大于 0.8 $K1_c$。 固溶处理的材料不应该受到在 500–800° F 范围内长期暴露。 这可能导致高的强度，但低延展性。

合金介绍

Titanium alloy 10V–2Fe–3Al 发展成为一个高强度锻造合金。这个合金等级提供了所有钛合金的强度和韧性的最佳组合 。相比于 Ti 6AL–4V 时，其强度可以保证约 27%的重量。 在 180 ksi 的拉伸强度水平，则 $K1_c$ 值是 40 KSI–½中最低。固溶处理和材料具有优异的抗应力腐蚀开裂，通常 $K1_{scc}$ 大于 0.8 $K1_c$。固溶处理的材料不应该受到在 500–800° F 范围内长期暴露。 这可能导致高的强度，但低延展性。

化学成分

元素	V	Al	Fe	C	N	O	H	Y	其它	其它	Ti
MIN	9.0	2.6	1.6	-	-	-	-	-	-	-	-
MAX	11.0	3.4	2.22	0.05	0.05	0.13	0.015	0.005	0.10	0.30	平衡

物理性能：
密度：0.168 lb/inch³
标称β转变：1470° F
泊松比：0.32
热膨胀：75–800° F, 5.4 x 10–6 in/in° F
拉伸模量：15.9 x 106 psi
模数：16.2 x 106 psi
* 70° F 至指定的温度。
机械性能
AMS 4984 标准下机械性能的最小值（固溶处理和时效）

极限抗拉强度，KSI	173
极限抗拉强度，KSI	160
0.2%屈服强度，KSI	4
断裂韧性，K_{Ic}	40 KSI
面积减少，%	20
断裂韧性，K_{Ic}	80 KSI

Titanium alloy 6Al–4V /UNS R56400

Material grades and equivalents Titanium alloy 6Al–4V /UNS R56400

Short Introduction:

Titanium alloy 6Al–4V is the most widely used of all the alpha–beta titanium alloys. It is typically used in the annealed condition, at service temperatures through 750° F. However it may be heat treated for high strength in sections under 4" thick. Harden ability is limited and sections over one inch may not develop full properties. HY Titanium 6–4 is welded with matching or with ELI filler wire.

Mill anneal: 1300–1450° F 2 hours, air cool. Re–crystallization anneal bar for better ductility and fatigue strength, 1750° F 2 hours, furnace cool.

For maximum fracture toughness and SCC resistance: Beta anneal 1950° F 1–2 hours, water quench. Then age 1150–1300° F 2 to 4 hours, air cool.

For maximum strength: solution–treated and aged (STA) condition is: For sheet, 1675–1725° F 5 to 25 minutes, water quench. Age 975° F 4 to 6 hours, air cool. For bars and forgings, 1675–1725° F 1 hour, water quench. Age 975–1025° F 3 hours, air cool.

For increased fracture toughness, but lower tensile strength: precipitation treat (overage) 1150–1250° F 4 hours, air cool. Stress relief annealing is commonly 1000–1200° F 1 to 4 hours, air cool.

Titanium alloy 6Al–4V is resistant to general corrosion but may be quickly attacked by environments that cause breakdown of the protective oxide. These include hydrofluoric (HF), hydroelectric (HCl), sulfuric and phosphoric acids. Inhibitors may help for the last four but not for HF. HY Titanium 6–4 resists attack by pure hydrocarbons, and most chlorinated and fluoridated hydrocarbons (provided water has not caused formation of small amounts of HCl and HF.

Titanium alloy 6Al–4V is susceptible to chloride stress corrosion cracking (SCC), although being among the better of the titanium alloys in this regard. For marine environments silver plated bolts are not used, as silver bonds easily with chlorine in this environment. HY Titanium 6–4 is also susceptible to SCC in environments such as methyl alcohol, red fuming HNO_3, and N_2O_4. In the case of red fuming nitrate acid, the problem is limited to environments containing less than 1.5% water, or more than 6% NO_2. Failure in N_2O_4 has occurred when oxygen and chlorides were present as impurities.

Chemistry Composition

Element	Al	V	C	N	O	H	Fe	Y	Others, Each	Others, Total	Ti
MIN	5.5	3.5	-	-	-	-	-	-	-	-	-
MAX	6.75	4.5	0.08	0.05	0.2	0.0125	0.3	0.005	0.1	0.4	Balance

Features
- High strength to 600° F
- Excellent general corrosion resistance
- High strength–to–weight ratio

Applications
- Turbine blades, discs and rings
- Aircraft structural components
- Weapons structural components
- Fasteners
- Medical and dental implants
- Hand tools
- Sporting equipment
- Chemical process equipment

Physical Properties

Density: 0.160 lb/inch3

Melting Range: 2929 - 3020° F

Beta Transus: 1825 ± 25° F

Temperature, ° F	70	200	400	600
Coefficient of Thermal Expansion, in/in° F x 10–6	–	5.3	5.4	5.5
Thermal Conductivity, Btu • Ft/Ft² • Hr° F STA	4.0	4.3	5.2	6.1
Modulus of Elasticity, psi X 106 STA	16.7	16.0	15.0	14.0

Mechanical Properties

Specified, AMS 4911, annealed sheet & plate

	Anneal 1300° F, Air Cool	Anneal 1300° F, Solution anneal 1750° F , Age 1000° F
Ultimate Tensile Strength, ksi	138–155	150–172
0.2% Yield Strength, ksi	128–147	137–156
Elongation, %	15–20	15–17
Reduction of Area, %	38–51	41–46

Typical Tensile Strength and Fracture Toughness, Various Heat Treatments for Flat–rolled Products (MCIC–HB–02 1985 reprint)

	0.2% Yield Strength, ksi	Fracture Toughness K_{Ic}, ksi √in
Annealed (Continuously Rolled Sheet)	132 142 (transversea)	128 140 (transversea)
Beta Annealed (plate)	131	134
Beta STA 1250° F b	128	150
Beta STA 1000° F b	143	120
STA 1250° Fc	137	105
STA 1000° Fc	159	80

(a) Directional variations,

(b) Beta heat treated followed by solution treating and overaging 1250°F, or aging 1000°F

(c) Solution treating and overaging 1250°F, or aging 1000°F

Titanium alloy 6Al–4V /UNS R56400

相似牌号 Titanium alloy 6Al–4V /UNS R56400

Titanium alloy 6Al–4V 是所有钛合金里最为广泛使用的。 它通常用于在退火状态下，在通过 750° F 的工作温度。 然而，此合金热处理后在厚度 4 英寸中部分有高强度。 淬理性是有限的，超过一英寸的部分可能不会发展全面性能。

化学成分：

元素	Al	V	C	N	O	H	Fe	Y	其它	其它	Ti
Min	5.5	3.5	-	-	-	-	-	-	-	-	-
MAX	6.75	4.5	0.08	0.05	0.2	0.0125	0.3	0.005	0.1	0.4	余量

物理性能

密度：0.160 lb/inch3

熔化范围：2929 - 3020° F

β 转变：1825 ± 25° F

温度，° F	70	200	400	600
热膨胀系数，在° F x 10 ˜–6	–	5.3	5.4	5.5
导热系数，Btu • Ft/Ft² • Hr° F STA	4	4.3	5.2	6.1
弹性模量，PSI x 106STA	16.7	16	15	14

机械性能

AMS 4911 标准，退火板

	退火 1300° F，风冷	退火 1300° F，固溶处理 1750° F，年龄 1000° F
极限抗拉强度，KSI	138–155	150–172
0.2%屈服强度，ksi 的	128–147	137–156
伸长率，%	15–20	15–17
面积减少，%	38–51	41–46

Titanium alloy 6Al–4V ELI /UNS R56401

Material grades and equivalents Titanium alloy 6Al–4V ELI /UNS R56401

Short Introduction:

Titanium alloy 6Al–4V ELI is normally used in the annealed condition. And is the preferred choice for the medical implant field.

Introduction

Low interstitial version of Titanium alloy 6Al–4V ELI, for maximum toughness. Preferred for marine and cryogenic applications. This grade is normally used in the annealed condition. Titanium alloy 6Al–4V ELI is the preferred choice for the medical implant field.

Stress relief 900–1200° F 1 to 4 hours, air cool. Duplex anneal, bar and forgings: Solution anneal 50–100° F below the beta transus, hold 1 hour minimum, air cool. Then reheat within the range 1300–1400° F, hold 1 hour minimum, air cool. Stress - relief annealing is performed after welding.

Chemistry Composition

Element	Al	V	Fe	O	C	N	H	Y	Others, Each	Others, Total	Ti
MIN	5.5	3.5	-	-	-	-	-	-	-	-	-
MAX	6.5	4.5	0.25	0.13	0.08	0.03	0.0125	0.005	0.1	0.4	Balance

Physical Properties

Density: 0.160 lb/in3

Melting Range: 2370 - 2460° F

Beta Transus: 91790+25° F

Minimum Tensile Properties, AMS 4919, Duplex Annealed

Temperature, ° F	68–212	68–600	68–1000	68–1200	68–1500
Coefficient* of Thermal Expansion, in/in° F x 10–6	9.18	9.54	10.08	10.44	10.8

Mechanical Properties

Typical hardness Rockwell: C 30–34 Specific minimums, AMS 4931, bar and forging

Representative Tensile Properties, Sheet

Diameter, in	< 3.0	< 3.0 < 4.0	< 4.0) < 6.0
Tensile Strength, ksi	125	123	120
0.2 % Yield Strength, ksi	115	110	110
Elongation, % *L (**ST)	10 (8)	10 (8)	8 (8)
Reduction of Area, % *L (**ST)	25 (-)	20 (15)	15 (15)

* Longitudinal ** Short Transverse

Typical Elevated temperature Properties

Temperature, ° F	93 (200)	149 (300)	204 (400)	260 (500)
Ultimate Tensile Strength, ksi	843.3 (121)	772.2 (112)	723.9 (105)	657.7 (96)
0.2 % Yield Strength, ksi	710.2 (103)	641.2 (93)	586.1 (85)	531.0 (77)
Elongation, %	13	15	16	16

Titanium alloy 6Al–4V ELI /UNS R56401

相似牌号：Titanium alloy 6Al–4V ELI /UNS R56401

Titanium alloy 6Al–4V ELI 特别适合应用海洋和低温， 这个等级在退火状态下正常使用，也是对于医用植入物领域的首选

合金介绍

Titanium alloy 6Al–4V ELI 是低填隙和最大韧性的钛合金。 特别适合应用海洋和低温。 这个等级在退火状态下正常使用，也是对于医用植入物领域的首选。

应力消除 900–1200° F 1～4 小时，空冷。 复式退火，棒材和锻件：固溶处理 50–100° F 的 β 转变之下，按住 1 小时最低，空冷。 然后，范围 1300–1400° F 范围内再热，按住 1 小时最低，空冷。 应力 - 退火是焊接后进行。

化学成分

	Al	V	Fe	O	C	N	H	Y	其它	其它	Ti
MIN	5.5	3.5	-	-	-	-	-	-	-	-	-
MAX	6.5	4.5	0.25	0.13	0.08	0.03	0.0125	0.005	0.1	0.4	Balance

物理性能

密度：0.160 lb/in3

熔化范围：2370 － 2460° F

β 转变：91790 + 25° F

最小拉伸性能，AMS 4919，复式退火

温度，° F	68–212	68–600	68–1000	68–1200	68–1500
热膨胀系数*，在° F × 10 ^–6	9.18	9.54	10.08	10.44	10.8

Titanium alloy 6Al–2Sn–4Zr–2Mo /UNS R54620

Material grades and equivalents

Titanium alloy 6Al–2Sn–4Zr–2Mo /UNS R54620

Short Introduction:

Titanium alloy 6Al–2Sn–4Zr–2Mo is primarily used for high strength and toughness, with good creep resistance up to 1000° F. Forging and machining characteristics similar to those of Ti 6Al–4V. Applications include compressor components, hot airframe skin, and engine afterburner structures. The weld ability of Ti 6–2–4–2 is fair, using AMS 4952 weld wire. Several different treatments are available.

Chemistry Composition

	Al	Sn	Zr	Mo	C	N	H	O	Si	Fe	Y	Others, Each	Others, Total	Ti
MIN	5.5	1.8	3.8	1.8	–	–	–	–	0.08	–	–	–	–	–
MAX	6.5	2.2	4.4	2.2	0.05	0.05	0.015	0.12	0.1	0.25	0.005	0.1	0.3	Balance

Features

- Machinability similar to austenitic stainless steels
- Easily welded if proper precautions are taken to prevent oxygen, nitrogen and hydrogen contaminations
- Long term stability for temperatures up to 800° F

Applications

- Compressor discs, blades
- Airframe structure, skin
- Engine afterburner components
- Hush kits

Physical Properties

Density: 0.160 lb/in^3

Beta Transus: 1825 ± 25° F

Thermal Conductivity: 4.00 Btu · hr/ft^2 · hr° F

Coefficient of Thermal Expansion: 32–212° F 4.3 x10^{-6} in/in° F

Modulus of Elasticity: 16.5 × 10^6 psi

Mechanical Properties

Minimum Tensile Properties, AMS 4919, Duplex Annealed

Thickness	0.025 ≤ 0.062	> 0.062 ≤ 1.000	> 1.000 ≤ 3.000
Tensile Strength, ksi	135,000	135,000	135,000
0.2% offset Yield Strength, ksi	125,000	125,000	125,000
Elongation, %	8	10	10

Titanium alloy 6Al–2Sn–4Zr–2Mo /UNS R54620

相似牌号 Titanium alloy 6Al–2Sn–4Zr–2Mo /UNS R54620

Titanium alloy 6Al–2Sn–4Zr–2Mo 一种首选的高强度和韧选及具有，主要用于高强度和韧性，具有高达 1000° F 的良好的抗蠕变性。 锻造和机加工特性相似的 Ti 6AL–4V 的。 应用包括压缩机部件，热机身皮肤和发动机加力结构。 此合金的焊接能力是公平的，使用 AMS 4952 焊丝。也可应用于几种不同的理疗。

化学成分

元素	Al	Sn	Zr	Mo	C	N	H	O	Si	Fe	Y	其它	其它	Ti
MIN	5.5	1.8	3.8	1.8	–	–	–	–	0.08	–	–	–	–	–
MAX	6.5	2.2	4.4	2.2	0.05	0.05	0.015	0.12	0.1	0.25	0.005	0.1	0.3	Balance

特点

- 1.切削性类似于奥氏体不锈钢
- 2. 如果采取适当的预防措施，以防止氧气，氮气和氢气污染易焊接
- 3.对于温度长期稳定性可达 800° F

应用

- 1.压缩机盘件，叶片
- 2.机身结构，表面
- 3.发动机加力燃烧室部件

物理性能

密度: 0.160 lb/in^3

导热系数: 4.00 Btu · hr/ft^2 · hr° F

导热系数: 32–212° F 4.3 x10^{-6} in/in° F

弹性模量: 16.5 × 10^6 psi

机械性能

最小拉伸性能，AMS 4919，复式退火

厚度	0.025 ≤ 0.062	> 0.062 ≤ 1.000	> 1.000 ≤ 3.000
拉伸强度 KSI	135,000	135,000	135,000
0.2%偏置屈服强度 KSI	125,000	125,000	125,000
延伸率 %	8	10	10