

六个牌号，覆盖-253℃深冷到 650℃高温

Six grades covering cryogenic -253℃ to 650℃ service

牌号 Grade	材料类别 Category	UNS	执行标准 Standard	供货状态 Condition
Inconel 718	镍基沉淀硬化高温合金	N07718	ASTM B637 · AMS 5663	冷拉+时效
Monel 400	镍铜固溶强化耐蚀合金	N04400	ASTM B164-03	退火+冷拉
Monel K500	镍铜沉淀硬化耐蚀合金	N05500	ASTM B865	冷拉+时效
MP35N	钴镍铬钼超高强度合金	R30035	ASTM F562-22 · NACE MR0175	冷拉+时效
XM-19	氮强化奥氏体不锈钢	S20910	ASTM A479 · A276	固溶+冷拉
17-4PH	马氏体沉淀硬化不锈钢	S17400	ASME SA564 · ASTM A564	固溶+时效

室温力学性能对照（标准要求值）Mechanical properties · standard requirements

牌号	状态	抗拉 Rm MPa	屈服 Rp0.2 MPa	延伸率 A %	断面收缩 RA %	硬度	使用温度 ℃	密度 g/cm³
Inconel 718	冷拉+时效	≥1462	≥1393	≥12	≥15	34-49 HRC	-253~650	8.24
Monel 400	退火+冷拉	≥600	≥345	≥20	/	HRB87~HRC23	-100~480	8.83
Monel K500	冷拉+时效	≥1138	≥897	≥18	25-50	≤40 HRC	-100~480	8.44
MP35N	冷拉+时效	≥1310	≥1241	≥10	≥40	≤51 HRC	-200~450	8.43
XM-19	固溶+冷拉	≥930	≥724	≥35	/	≤293 HB	-196~550	7.88
17-4PH	固溶+时效	≥1070	≥1000	≥12	≥45	34-40 HRC	-40~315	7.80

规格范围 · Size range

直径 Φ10 – 80 mm，各档规格齐全；长度按需下料，可按图定制非标直径与台阶尺寸

Diameter Φ10 – 80 mm in a full range of sizes; cut-to-length service, custom diameters & stepped dimensions per drawing.

供应形态 · Product forms

锻棒 · 轧棒 · 粗车毛坯 · 阶梯轴锻坯 · 精加工成品轴

Forged & rolled bar · rough-machined blanks · stepped forged blanks · finished shafts



成品泵轴实拍 · Finished pump shaft (full length)

注：718 相近国标牌号 GH4169（GB/T 14992）。
Note: 718 ≈ GH4169 (GB/T 14992).

本页数值均为标准要求值，随供货状态变化，交货以材质证书（EN 10204 3.1/3.2）为准。
Values are standard requirements for the stated condition. Certified mill test reports govern.

Inconel 718 / GH4169

UNS N07718 · W.Nr. 2.4668
ASTM B637 · AMS 5663 · NACE MR0175

650℃以下强度之王 · The strength benchmark below 650℃

≥1462 抗拉 Rm MPa	≥1393 屈服 Rp0.2 MPa	≥12 延伸率 A %	≥15 断面收缩 RA %	34-49 硬度 HRC	-253~650 使用温度 °C
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供货状态 Condition: 冷拉+时效 Cold-drawn + Aged · 密度 8.24 g/cm³ · Nb+Ta 4.75-5.50% 为强度核心

化学成分 wt% · ASTM B637 Chemical composition

化学成分 (一)	Ni	Cr	Fe	Nb+Ta	Mo	Ti	Al	Co
标准要求 Requirements	50.0-55.0	17.0-21.0	余量 Bal.	4.75-5.50	2.80-3.30	0.65-1.15	0.20-0.80	≤1.00
化学成分 (二)	C	Mn	Si	P	S	Cu	B	
标准要求 Requirements	≤0.08	≤0.35	≤0.35	≤0.015	≤0.015	≤0.30	≤0.006	

产品分析允差按 ASTM B637; Fe 为基体余量。 / Product-analysis tolerances per ASTM B637; Fe is the balance.

- γ" (Ni₃Nb) 沉淀强化, -253℃ 深冷至 650℃ 高温区间保持高强度、抗蠕变与抗疲劳
γ"(Ni₃Nb) precipitation-strengthened; high strength, creep and fatigue resistance from -253℃ to 650℃.
- Ni 50.0-55.0% + Cr 17.0-21.0% 保证高温抗氧化与耐蚀; Nb+Ta 4.75-5.50% 与 Mo 2.80-3.30% 构成主要强化相
Ni 50.0-55.0% with Cr 17.0-21.0% for oxidation and corrosion resistance; Nb+Ta 4.75-5.50% plus Mo 2.80-3.30% form the main strengthening phases.
- 耐 H₂S 酸性环境 (NACE MR0175 / ISO 15156) , B ≤0.006% 控制晶界以保证热加工塑性
Approved for H₂S sour service per NACE MR0175 / ISO 15156; B ≤0.006% safeguards hot-work ductility.
- 焊接性能良好, 裂纹敏感性低, 可供应锻棒、轧棒及精加工成品轴
Good weldability with low cracking susceptibility; supplied as bar, blanks and finished shafts.

检测与验收 · Inspection

超声波探伤按 ASTM A388/A388M-2023, 验收等级 AMS-STD-2154E, 灵敏度 0.8 mm FBH (水浸线聚焦探头) ; 表面与尺寸检验合格后出厂, 随货提供 EN 10204 3.1 材质证书 (可 3.2) 。
UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 高温泵轴 · 燃气轮机与压气机部件 · 油气井下工具 · 电力冶金部件
High-temperature pump shafts · Gas turbine & compressor parts · Downhole tools · Power & metallurgy parts

Monel 400 / UNS N04400

UNS N04400
ASTM B164-03

耐海水、氢氟酸与碱介质的经典镍铜合金 • Proven Ni-Cu alloy for seawater, HF acid and alkalis

≥600 抗拉 Rm MPa	≥345 屈服 Rp0.2 MPa	≥20 延伸率 A %	/ 断面收缩 RA %	HRB87~HRC23 硬度	-100~480 使用温度 °C
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供货状态 Condition: 退火+冷拉 Annealed + Cold Drawn · 密度 8.83 g/cm³ · 磁场强度 ≤10 CGS

化学成分 wt% • ASTM B164-03 Chemical composition

化学成分 Chemical composition	C	Si	Mn	S	Fe	Ni	Cu
标准要求 Requirements	≤0.30	≤0.50	≤2.0	≤0.024	≤2.5	≥63.0	28.0-34.0

Cu 28.0-34.0% 与 Ni ≥63.0% 为耐蚀基础；S ≤0.024% 严格控制以保证耐蚀性与热加工性。
Ni ≥63.0% with Cu 28.0-34.0% forms the corrosion-resistant basis; S is tightly limited to ≤0.024%.

- 镍铜固溶合金，耐海水、氢氟酸与碱性介质，抗氯离子应力腐蚀开裂且无磁
Ni-Cu solid-solution alloy; resists seawater, HF acid and alkalis; chloride-SCC immune and non-magnetic.
- Cu 28.0-34.0% 与 Ni ≥63.0% 的配比兼顾耐蚀性与冷加工塑性；C ≤0.30% 避免晶界碳化物
Cu 28.0-34.0% with Ni ≥63.0% balances corrosion resistance and cold formability; C ≤0.30% avoids grain-boundary carbides.
- 冷拉态屈服强度显著高于退火态（炉号 SH20260801 实测 Rp0.2 495-610 MPa）
Cold-drawn yield markedly above the annealed condition (Rp0.2 495-610 MPa measured, heat SH20260801).
- 退火态塑性与焊接性优异，可供应冷拉圆棒、粗车毛坯与精加工成品轴
Excellent ductility and weldability when annealed; cold-drawn bar, rough-machined blanks and finished shafts.

检测与验收 • Inspection

超声波探伤按 ASTM A388/A388M-2023，验收等级 AMS-STD-2154E，灵敏度 0.8 mm FBH（水浸线聚焦探头）；表面与尺寸检验合格后出厂，随货提供 EN 10204 3.1 材质证书（可 3.2）。另按报告项目检测磁场强度（≤10 CGS）。

UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 海水泵轴 · 化工换热 · 船舶部件 · 氢氟酸与碱液工况

Seawater pump shafts · Chemical equipment · Marine parts · HF acid and alkali service

Monel K500 = 400 的强度升级版 · upgraded 400

UNS N05500
ASTM B865

高载荷海水泵轴首选 · First choice for heavily loaded seawater shafts

≥1138 抗拉 Rm MPa	≥897 屈服 Rp0.2 MPa	≥18 延伸率 A %	25-50 断面收缩 RA %	≤40 硬度 HRC	-100~480 使用温度 °C
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供货状态 Condition: 冷拉+时效 Cold-drawn + Aged · 密度 8.44 g/cm³ · Al+Ti 合计 2.85-4.00%

化学成分 wt% · ASTM B865 Chemical composition

化学成分 Chemical composition	Ni	Cu	Al	Ti	Mn	Fe	C	Si	S
标准要求 Requirements	≥63.0	27.0-33.0	2.50-3.15	0.35-0.85	≤1.5	≤2.0	≤0.25	≤0.50	≤0.010

Ni 为基体余量; Al 2.50-3.15% 与 Ti 0.35-0.85% 之和决定时效后的强度水平, C ≤0.25%、S ≤0.010% 为冶金质量控制项。
Ni is the balance; Al 2.50-3.15% plus Ti 0.35-0.85% set the aged strength level; C and S are controlled for metallurgical quality.

- 加 Al/Ti 时效析出 γ' 相, 屈服强度约为 Monel 400 退火态的 3 倍
Al/Ti age hardening forms γ' precipitates; about 3× the yield strength of annealed 400.
- Ni ≥63.0% + Cu 27.0-33.0% 保持与 400 相当的耐蚀性, 兼顾高强度与耐海水
Ni ≥63.0% with Cu 27.0-33.0% retains 400-class corrosion resistance at much higher strength.
- Al 2.50-3.15% / Ti 0.35-0.85% 按上限控制可获得更高屈服, 可按需提供不同强度档
Al and Ti towards the upper limits give higher yield — several strength levels available on request.
- 时效态呈弱磁性; 静止海水与氢氟酸环境选型前请与我司确认热处理状态
Weakly magnetic when aged; consult us on the heat-treatment condition for stagnant seawater or HF service.

检测与验收 · Inspection

超声波探伤按 ASTM A388/A388M-2023, 验收等级 AMS-STD-2154E, 灵敏度 0.8 mm FBH (水浸线聚焦探头); 表面与尺寸检验合格后出厂, 随货提供 EN 10204 3.1 材质证书 (可 3.2)。
UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 高强耐蚀泵轴 · 阀杆 · 钻铤 · 船舶与海洋工程紧固件
High-strength seawater shafts · Valve stems · Drill collars · Marine fasteners

MP35N = 多相超高强度钴基合金 · Multiphase ultra-high-strength

UNS R30035 · W.Nr. 2.4999
ASTM F562-22 · NACE MR0175

无磁 · 超高强度 · 抗 H₂S 酸性服役的高端钴基合金 · Non-magnetic ultra-high-strength Co-alloy for sour service

≥1310 抗拉 Rm MPa	≥1241 屈服 Rp0.2 MPa	≥10 延伸率 A %	≥40 断面收缩 Z %	≤51 硬度 HRC	-200~450 使用温度 °C
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供货状态 Condition: 冷拉+时效 Cold-drawn + Aged · 密度 8.43 g/cm³ · 全状态无磁 (μ < 1.01)

化学成分 wt% · ASTM F562-22 Chemical composition

化学成分 (一)	Ni	Cr	Mo	Ti	Fe	Co
标准要求 Requirements	33.0-37.0	19.0-21.0	9.0-10.5	≤1.00	≤1.00	余量 Bal.
化学成分 (二)	C	Mn	Si	P	S	B
标准要求 Requirements	≤0.025	≤0.15	≤0.15	≤0.015	≤0.010	≤0.015

产品分析允差 Cr ±0.25 / Ni ±0.30 / Mo ±0.15; C ≤0.025%、B ≤0.015% 为 2022 版明确限值。
Product-analysis tolerances Cr ±0.25 / Ni ±0.30 / Mo ±0.15; C ≤0.025% and B ≤0.015% are explicit in the 2022 edition.

- 钴镍铬钼多相合金，强度由冷拉变形+时效共同获得；本页为常规交货档 Rm ≥1310 MPa（实测 1520），更高强度档可另行确认
Co-Ni-Cr-Mo multiphase alloy; standard delivery temper Rm ≥1310 MPa (1520 MPa measured); higher tempers on request.
- Mo 9.0-10.5% 提供优异抗点蚀与缝隙腐蚀能力，C ≤0.025% 极低碳避免晶界碳化物析出
Mo 9.0-10.5% gives excellent pitting and crevice resistance; C ≤0.025% avoids grain-boundary carbides.
- NACE MR0175 / ISO 15156-3 批准用于苛刻 H₂S 酸性服役（冷拉+时效态硬度上限 51 HRC），各交货状态均无磁
Approved for severe sour service per NACE MR0175 (≤51 HRC aged); non-magnetic in all conditions.
- 无韧脆转变温度，深冷至 -200°C 仍保持韧性；抗海水点蚀、缝隙腐蚀与氢脆
No ductile-to-brittle transition; tough down to -200°C; resists seawater pitting, crevice attack and hydrogen embrittlement.

检测与验收 · Inspection

超声探伤按 ASTM A388/A388M-2023，验收等级 AMS-STD-2154E，灵敏度 0.8 mm FBH（水浸线聚焦探头）；表面与尺寸检验合格后出厂，随货提供 EN 10204 3.1 材质证书（可 3.2）。

UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 无磁泵轴 · 井下工具 · 酸气阀杆与紧固件 · 医疗器械

Non-magnetic shafts · Downhole tools · Sour-service valve stems & fasteners · Medical devices

XM-19 / Nitronic 50

UNS S20910
ASTM A479 · A276

耐氯离子点蚀的氮强化奥氏体不锈钢，海水泵轴长寿命之选 · Long-life austenitic for chloride service

≥930 抗拉 Rm MPa	≥724 屈服 Rp0.2 MPa	≥35 延伸率 A %	/ 断面收缩 RA %	≤293 硬度 HB	-196~550 使用温度 °C
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供货状态 Condition: 固溶+冷拉 Solution + Cold-drawn · 密度 7.88 g/cm³ · Fe 为基体余量

化学成分 wt% · ASTM A479 Chemical composition

化学成分 (一)	C	Si	Mn	P	S	Fe
标准要求 Requirements	≤0.06	≤1.00	4.0-6.0	≤0.045	≤0.030	余量 Bal.
化学成分 (二)	Cr	Ni	Mo	Nb	V	N
标准要求 Requirements	20.5-23.5	11.5-13.5	1.5-3.0	0.10-0.30	0.10-0.30	0.20-0.40

Nb 与 V 各 0.10-0.30% 分别控制；Mn 4.0-6.0% 与 N 0.20-0.40% 为氮强化核心，C ≤0.06% 保证耐晶间腐蚀。
Nb and V are specified separately (0.10-0.30% each); Mn 4.0-6.0% with N 0.20-0.40% drive nitrogen strengthening; C ≤0.06% ensures intergranular corrosion resistance.

- 氮强化奥氏体不锈钢，固溶态屈服强度约为 316 的两倍，且不可通过热处理硬化
Nitrogen-strengthened austenite; about twice the yield of annealed 316 and not hardenable by heat treatment.
- Cr 20.5-23.5% + Mo 1.5-3.0% + N 0.20-0.40% 使耐氯离子点蚀与缝隙腐蚀能力优于 316/317
Cr 20.5-23.5% with Mo 1.5-3.0% and N 0.20-0.40% out-performs 316/317 in chloride pitting and crevice resistance.
- Nb 与 V 各 0.10-0.30% 稳定组织，-196℃ 低温韧性好，冷作后磁导率仍低
Nb and V (0.10-0.30%) stabilise the structure; good toughness at -196℃ and low permeability after cold work.
- 无相变强化，强度靠冷作提高；冷作量与表面质量直接影响疲劳寿命
No transformation hardening — strength comes from cold work; cold reduction and surface finish govern fatigue life.

检测与验收 · Inspection

超声波探伤按 ASTM A388/A388M-2023，验收等级 AMS-STD-2154E，灵敏度 0.8 mm FBH（水浸线聚焦探头）；表面与尺寸检验合格后出厂，随货提供 EN 10204 3.1 材质证书（可 3.2）。
UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 海水泵轴 · 阀杆 · 链条紧固件 · 船用五金
Seawater shafts · Valve stems · Chains & fasteners · Marine hardware

17-4PH / 05Cr17Ni4Cu4Nb

UNS S17400
ASME SA564 · ASTM A564

性价比之选的马氏体沉淀硬化不锈钢 · Cost-effective martensitic precipitation-hardening stainless steel

≥1070 抗拉 Rm MPa	≥1000 屈服 Rp0.2 MPa	≥12 延伸率 A %	≥45 断面收缩 RA %	34-40 硬度 HRC	-40~315 使用温度 °C
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供货状态 Condition: 固溶+时效 Solution + Aged (证书 H1025 态 · H900–H1150 可选) · 密度 7.80 g/cm³ · Nb 含量随 C 调整

化学成分 wt% · ASME SA564 Chemical composition

化学成分	C	Si	Mn	P	S	Cr	Ni	Cu	Nb
标准要求 Requirements	≤0.07	≤1.00	≤1.00	≤0.04	≤0.03	15.5-17.5	3.0-5.0	3.0-5.0	0.15-0.45

Cu 3.0-5.0% 与 Nb 0.15-0.45% 为时效沉淀硬化核心；C ≤0.07% 兼顾耐蚀性与马氏体组织稳定性。
Cu 3.0-5.0% with Nb 0.15-0.45% drives ageing precipitation hardening; C ≤0.07% balances corrosion resistance and martensitic stability.

- 马氏体沉淀硬化不锈钢，H900–H1150 四档时效强度韧性可调，证书主推 H1025 态
Martensitic PH steel; strength/toughness adjustable across H900–H1150 tempers, H1025 as the certified mainstream condition.
- Cr 15.5-17.5% 耐蚀性接近 304，H1025 态抗拉 ≥1070 MPa、硬度 34-40 HRC，兼顾耐蚀与韧性
Cr 15.5-17.5% gives 304-class corrosion resistance; H1025 delivers ≥1070 MPa at 34-40 HRC, balancing strength and toughness.
- 切削加工性能好，交货周期短，综合性价比高
Good machinability, short lead time and high overall cost-effectiveness.
- 耐蚀与韧性要求更高时可选 H1150 态；湿 H2S 环境选材需另行评估
H1150 temper available for higher toughness; evaluate separately for wet H2S service.

检测与验收 · Inspection

超声波探伤按 ASTM A388/A388M-2023，验收等级 AMS-STD-2154E，灵敏度 0.8 mm FBH（水浸线聚焦探头）；表面与尺寸检验合格后出厂，随货提供 EN 10204 3.1 材质证书（可 3.2）。

UT to ASTM A388/A388M-2023, acceptance AMS-STD-2154E, 0.8 mm FBH; surface and size inspected; EN 10204 3.1 (or 3.2) certificate with each lot.

典型应用 Typical applications: 泵轴阀杆 · 齿轮 · 紧固件 · 食品医药设备

Pump shafts & stems · Gears · Fasteners · Food & pharma equipment