

Material Types and Features of Metal Protection Tubes and Thermowells

金属保護管材料の種類と特長

Type, JIS Symbols or Name of products are specified in (). 種類()内はJIS記号/商品名	Chemical Components (%) 化学成分 (%)	Normal Operating Temp. Limit(°C) 常用使用温度限界(°C)※1	Features 特長	
軟鋼 Mild Steel	STPG 0.25~0.3C 0.3~1.0Mn 残 Fe Rest: Fe	600	酸化性雰囲気には弱い。非腐食性流体に使用。 ガラス・樹脂等で表面加工し、耐食性を増して使用される。 Since weak in the acid atmosphere, usually used in non-corrosive fluid. To make its anti-corrosion stronger, surface finishing with glass or resin is processed.	
高温圧力容器用 合金鋼鍛鋼 Forged Steel of Alloy for high temp. & pressure containers	SFVAF22 2.25Cr-1Mo-Fe (C≤0.15)	600	低炭素合金鋼であり、Mo Crの添加で高温での耐食性良好。 高圧部での溶接材料に注意が必要。 Low carbon alloy steel. Having good resistance against corrosion at high temperatures by adding Mo and Cr. Welding material at high pressure points should be chosen with care.	
オーステナイト系 ステンレス鋼 Austenitic stainless steel	304SS (SUS304)	18Cr-8Ni-Fe	900	ステンレス鋼として最も広く使用。食品設備、一般化学設備、原子力用等。 The most widely used as stainless steel in various industries such as Food, Chemical and Atomic.
	304LSS (SUS304L)	18Cr-9Ni-低C-Fe	800	304の低炭素鋼。耐粒界腐食性を高めたもの。 Low carbon grade of 304SS. Having good resistance against intergranular corrosion.
	310S SS (SUS310S)	25Cr-20Ni-Fe	1000	耐酸化性に優れ、耐熱鋼として使用される。硫化物に弱い。 Widely used as heat resistant steel. Having excellent resistance against acid but fragile to sulfide.
	316SS (SUS316)	18Cr-12Ni-2.5Mo-Fe	900	海水をはじめ各種媒質に304より優れた耐食性がある。耐孔食材料。 Having better corrosion resistance against various mediums such as seawater than 304SS. Anti-pitting corrosion material.
	321SS (SUSU321)	18Cr-9Ni-Ti-Fe	900	Tiを添加し、耐粒界腐食性を高めたもの。 Added Titanium to make its intergranular corrosion resistance stronger.
	347SS (SUSU347)	18Cr-9-NiNb-Fe	900	Nbを添加し、耐粒界腐食性を高めたもの。 Added Niobium to make its intergranular corrosion resistance stronger.
	253MA	21Cr-11Ni-1.7Si-Fe	1150	高温での耐食性に優れる。高温強度が高い。 Having good resistance against corrosion at high temperatures. Also having excellent mechanical strength at high temperatures.
フェライト系 耐熱鋼 Heat resistance Ferritic Steel	SANDVIK P4 (SUH446)	25Cr-0.2N-0.2C	1000	高温腐食に強く、1082°Cまで剥離しやすいスケールの発生が無い。耐硫化性に優れる。 Strongly resistant to corrosion at high temperatures. Up until 1082°C, flaky scales are not likely to appear and having good resistance against sulfide.
耐食耐熱超合金 Anti-Corrosion and Heat Resistance Super Alloy	INCONEL600 (NCF600)	15.5Cr-72Ni-7Fe	1050	高温酸化性雰囲気・還元性雰囲気下での耐食性に優れる。 耐浸炭性・耐窒化性に優れる。 Having good resistance against corrosion under the oxidation and reducing atmospheres. Also having resistances against carburization and nitriding.
	INCOLOY-800H (NCF800H)	20.5Cr-32Ni-44.5Fe-Ti-AL-Cu	1000	耐浸炭性及び内部酸化に対し強い抵抗がある。安定したオーステナイト組織を持ち耐食性も良好。特にBOOHは高温強度・クリープラプチャー強度に優れる。 Having strong resistance against carburization and inner oxidation. Thanks to its stable Austenite structure, having good corrosion resistance. Especially this type is far superior in mechanical strength at high temperatures and creep-rupture strength to other types.
	MCアロイ MC ALLOY	45Cr-1Mo-Ni	1000	耐サルファーアタック、耐バナジウムアタックに優れている。 Having high resistance against sulfur and vanadium attacks.
Ni基耐熱耐食合金 Heat Resistance and Anti-Corrosion Ni Base Alloy	HASTELLOY-C276	15Cr-52Ni-16Mo-5.5Fe-4W	1000	商品名HASTELLOY-C276。酸化・還元雰囲気での酸及び混酸に優れた耐食性を示す。 Having high resistance against acid and mixed acid under oxidation and reducing atmospheres.
	HASTELLOY-X	22Cr-48Ni-9Mo-18Fe-1.5CO-0.6W	1150	商品名HASTELLOY-X。代表的な耐熱合金。1090°Cにおいても強度と耐酸化性を保持。 Typical heat resistance alloy. Even at 1090°C, it still keeps its mechanical strength and high acid resistance.
Co基耐熱耐食合金 Heat Resistance and Anti-Corrosion Co Base Alloy	UMCO50	28Cr-21Fe-1Si-50Co	1150	商品名UMCO50。耐熱衝撃性・耐摩耗材料と硫化物やバナジウムに対し優れる。高温強度も高い。 Having resistances against thermal shock, abrasion, sulfide and vanadium. Also having excellent mechanical strength at high temperatures.
チタン Titanium	—	0.2Fe-Ti	250	低温域での耐食性、特に耐海水に優れる。 Having high resistance against corrosion and especially against seawater at low temperatures.

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