POLARIS
ARCHIMETAL

TECHNICAL SPECIFICATION OF TI-COATED METALS

1.STAINLESS STEEL MATERIAL SPECIFICATION

Grade: SUS 304 / 316
Size : Maximum Length 4000mm
Maximum Width 1500 mm
Thickness 1.5mm

Specified Properties

These properties are specified for flat rolled product (plate, sheet and coil) in ASTM A240/A240M. Similar but not necessarily identical properties are specified for other products such as pipe and bar in their respective specifications. Minor changes to 304 and 304L composition limits were made in 2006-7 to harmonise with similar grades specified in ISO and European standards.

Composition Specification (%)

Grade		C	Mn	Si	P	S	Cr	Mo	Ni	N
304	min.	-	-	-	-	-	17.5	-	8.0	-
	max.	0.07	2.0	0.75	0.045	0.030	19.5		10.5	0.10
304L	min.	-	-	-	-	-	17.5	-	8.0	-
	max.	0.030	2.0	0.75	0.045	0.030	19.5		12.0	0.10
304H	min.	0.04	-	-	-	-	18.0	-	8.0	-
	max.	0.10	2.0	0.75	0.045	0.030	20.0		10.5	

Mechanical Property Specification (single values are minima except as noted)

Grade	Tensile Strength (MPa) min	Yield Strength 0.2% Proof (MPa) min	Elongation (% in 50mm) min	Hardness	
				Rockwell B (HR B) max	Brinell (HB) max
304	515	205	40	92	201
304L	485	170	40	92	201
304H	515	205	40	92	201
304H also has a requirement for a grain size of ASTM No 7 or coarser.					

Physical Properties

(typical values in the annealed condition)

Grade	Density (kg/m³)	Elastic Modulus (GPa)	Mean Coefficient of Thermal Expansion			Thermal Conductivity		Specific Heat	Electrical Resistivity
			0-100°C (µm/m/°C)	0-315°C (µm/m/°C)	0-538°C (µm/m/°C)	at 100°C (W/m.K)	at 500°C (W/m.K)	0-100°C (J/kg.K)	(nΩ.m)
304/L/H	7900	193	17.2	17.8	18.4	16.3	21.5	500	720

Grade Specification Comparison

Grade	UNS No	Euronorm		Swedish SS	Japanese JIS
		No	Name		
304	S30400	1.4301	X5CrNi18-10	2332	SUS 304
304L	S30403	1.4307	X2CrNi18-9	2352	SUS 304L
304H	S30409	1.4948	X6CrNi18-11	-	-
These comparisons are approximate only. The list is intended as a comparison of functionally similar materials **not** as a schedule of contractual equivalents. If exact equivalents are needed original specifications must be consulted.					

2.STAINLESS STEEL MATERIAL FINISHES

HAIRLINE FINISH

Hairline finish: 80-140 grit finish. A well-defined directional polish. Starting base substrate is a No. 4 finish sheet; these sheets are polished to provide a "continuous long grain" Hairline look. A finish which is popular with architects for its aesthetic look, it is equally popular with fabricators due to the ease of fabrication and finish-matching.

MIRROR FINISH

No.8 Mirror finish: This is the most reflective mirror finish on the market. It is achieved by polishing the steel with successively finer abrasives and extensive buffing. It also minimizes grit lines that may occur during preliminary grinding operations.

BEADBLASTED FINISH

This finish involves the controlled bead blasting of the stainless steel sheet with various blasting media that hits the surface to produce a consistent matte finish.

VIBRATION FINISH

Vibration finish is a well-defined non-directional polish with a starting base substrate of 2B or No.4 sheet. This sheets are polished to provide a random hairline look.

3.TITANIUM COATING OF STAINLESS STEEL

Titanium nitride (TiN) (sometimes known as “Tinite” or “TiNite” or “TiN”) is an extremely hard ceramic material, often used as a coating on titanium alloys, steel, carbide, and aluminum components to improve the substrate's surface properties.

Applied as a thin coating, TiN is used to harden and protect cutting and sliding surfaces, for decorative purposes (due to its gold appearance), and as a non-toxic exterior for medical implants. In most applications a coating of less than 5 micrometers (0.00020 in) is applied.

CHARATERISTICS :

Summary of characteristics

Vickers hardness 18-21 GPa

Modulus of elasticity 251 GPa

Thermal conductivity 19.2 W/(m•°C)

Thermal expansion coefficient 9.35×10−6 K−1

Superconducting transition temperature 5.6 K

Magnetic susceptibility +38×10−6 emu/mol

TiN will oxidize at 800 °C at normal atmosphere. It is chemically stable at room temperature and is attacked by hot concentrated acids

TiN has excellent infrared (IR) reflectivity properties, reflecting in a spectrum similar to elemental gold (Au), which gives it a yellowish color. Depending on the substrate material and surface finish,

TiN will have a coefficient of friction ranging from 0.4 to 0.9 versus itself (non-lubricated). Typical formation has a crystal structure of NaCl-type with a roughly 1:1 stoichiometry; however TiNx compounds with x ranging from 0.6 to 1.2 are thermodynamically stable.

A thin film of titanium nitride was chilled to near absolute zero converting it into the first known super insulator, with resistance suddenly increased by a factor of 100,000

Properties	
Molecular formula	TiN
Molar mass	61.874 g/mol
Appearance	Coating of golden color
Odor	Odorless
Density	5.22 g/cm^3
Melting point	2930 °C, 3203 K, 5306 °F
Solubility in water	insoluble
Structure	
Crystal structure	Cubic, cF8
Space group	Fm3m, No. 225
Coordination geometry	Octahedral

COATING PROCESS:

The most commonly used method of TiN thin film creation are physical vapor deposition - PVD

Usually applied via sputter deposition, cathodic arc deposition or electron beam heating.

In this method, pure titanium is sublimated and reacted with nitrogen in a high-energy, vacuum environment. TiN film may also be produced on Ti work pieces by reactive growth in a nitrogen atmosphere.

PVD is preferred for steel parts because the deposition temperatures exceeds the austenitizing temperature of steel. TiN layers are also sputtered on a variety of higher melting point materials such as stainless steels, titanium and titanium alloys.

Its high Young's modulus (values between 450 and 590 GPa have been reported in the literature means that thick coatings tend to flake away, making them much less durable than thin ones.

PROPERTIES OF TITANIUM COLOUR COATING：

1. Hard abrasion resistance and anti-corrosion.

2. Meet POHS Standard. Toxic free with no harmful residues when produce at high temperature.

3. Can be fabricate to most profile easily and adhesive well when bend 90 degree.

4. Good weather resistance against UV Sunlight and rain. Suitable for outdoor use.

ADVANTAGES OF PVD COATING:

1. Excellent resistance to corrosion.
2. Even colour tones, good wear resistance
3. Beautiful Decorative Finish
4. Environmentally Friendly Process

PRODUCT USAGE:

Lift door and car interior, transom, escalator, wall and pillar cladding, door frame, ceiling, floor or wall insert, handrails, railing, signage etc.,

POINTS OF CONTACT:

If you require further assistance please contact our Polaris Technical Department.

POLARIS ARCHMETAL PTE LTD
7 Soon Lee Street, iSpace Building, #04-49 Singapore 627608
Tel: + 65 6261 9751 Mobile: +65 9385 3815
Email : catherine25@polarisam.com