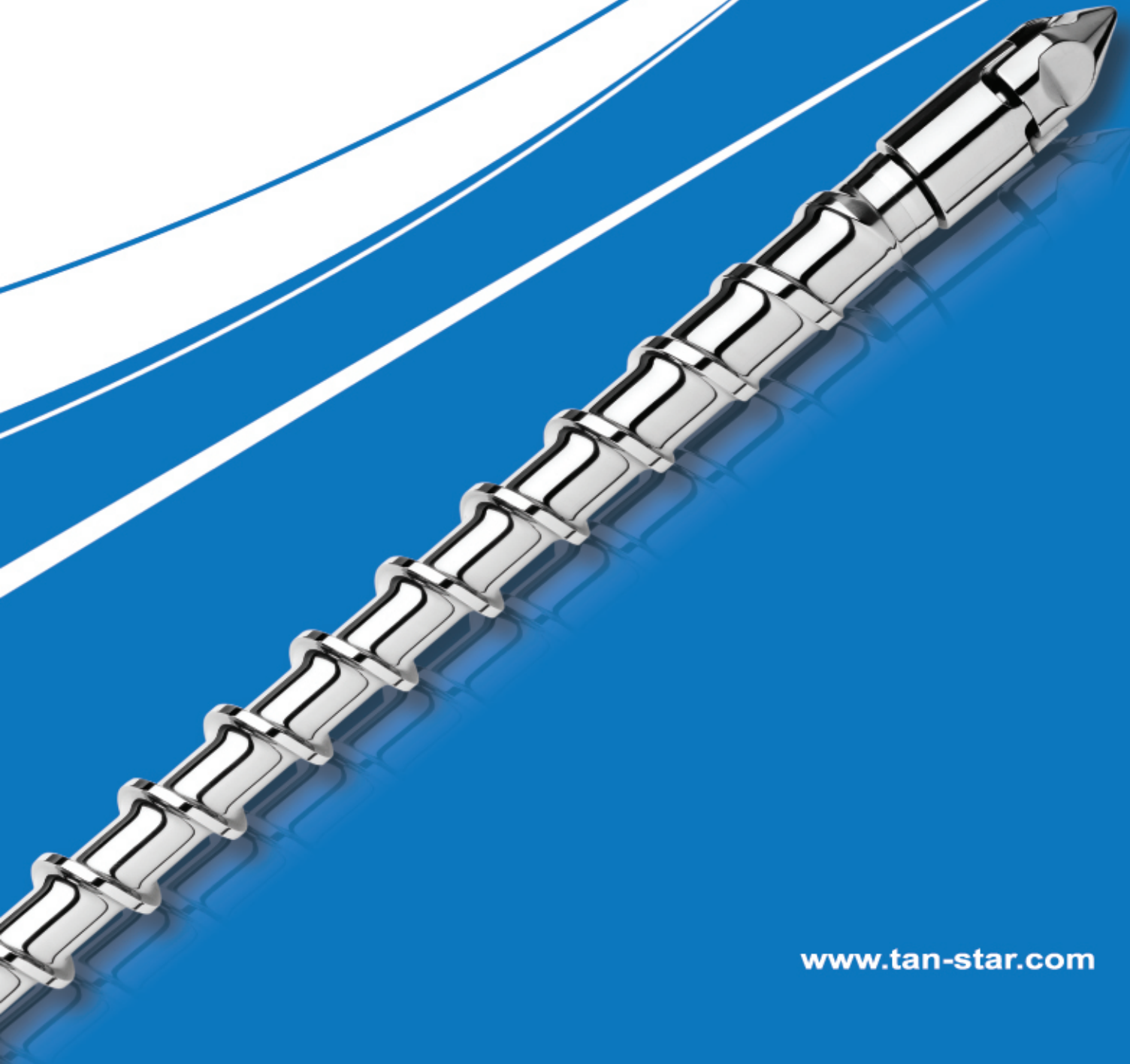




**EXCELLENT ALLOY SOLUTIONS & INNOVATION**



[www.tan-star.com](http://www.tan-star.com)

## Company History

More than 35 years of experience

- 1974 Established as "WAN CHUNG INDUSTRIAL ENTERPRISE" .
- 1982 Change company name to "TAN STAR MATERIAL CO., LTD." .
- 1990 Established "YANG SING INDUSTRIAL CO., LTD." as Tainan branch.
- 1991 Start the production of bimetallic barrel and PTA bimetallic alloy screw.
- 1993 Succeeded in setting up the brand new bimetallic barrel centrifugal casting equipment.
- 1995 Purchased HVOF spray coating equipment from JAPAN and include the technical skill transfer.
- 1997 Passed ISO 9002 certification accredited by DNV.
- 2002 Established new factory in Ning-Bo City of CHINA and setting up 2nd generation alloy equipment.
- 2005 Awarded AFAQ/Best ISO 9001,2000 quality management systems certifications.
- 2009 Built the new factory for Tainan branch and set up new 3rd generation alloy equipment.
- 2011 Research and develop for new 3rd generation 4 meter alloy equipment.
- 2012 Succeeded in research and develop new solution for Halogen-Free material.

Taipei Taiwan Headquarter



Tainan Taiwan Branch



Ning-Bo CHINA Branch



## Marketing Area

Marketing over 40 countries around the world



Taiwan. Hong Kong. China. Indonesia. Iran. UAE. India. Omen. Jordan.  
Saudi Arabia. Japan. Thailand. Singapore. Korea. Malaysia. Vietnam.  
Sri Lanka. Pakistan. Philippines.



Germany. France. Poland. Turkey. Serbia. Spain.  
Switzerland. Italy. United Kingdom. Rumania.



Australia. New Zealand.



USA. Canada. Mexico. Ecuador.  
Brazil. Colombia. Argentina.



Egypt. Morocco.  
South Africa.

## Bimetallic Cylinder

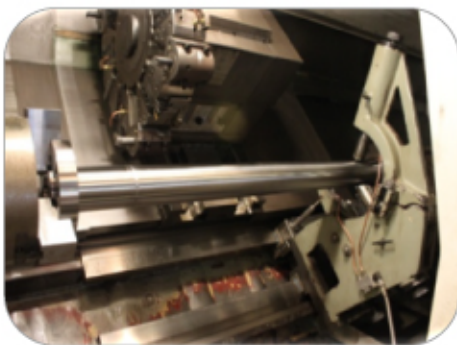
Application	
Injection molding	Extrusion molding
Bakelite molding	Rubber molding

Processing Dimension
Internal diameter: $\phi 14$ to $\phi 200$ mm
Maximum length: 4000mm

With a view to up-grade and achieve better stability in quality products, TAN STAR MATERIAL CO. LTD. had undertaken great efforts in the field of research and development in order to reach this goal. Since our Co. had gained ISO 9002 certification in the year 1997, we have continued to acquire modern equipment to improve the manufacturing process of our bimetallic barrel and screws.

In order to resist the halogen free fire retarding agent for plastic, now Tan Star raises the tungsten carbide percentage to strengthen the ability of anti-corrosive and anti-abrasive. The best new one we called T-60.

CNC Machine



Bimetallic Layer



Centrifugal Casting Furnace



### T-60

**BEST Cylinder** For Halogen Free

Tan Star T-60 bimetallic cylinder is the best grade nickel basis alloy of Tan Star, the maximum hardness can achieve and over HRC 65. It is special for processing halogen free materials.

### T-25

**FUNCTIONALITY Cylinder** TS-B

Tan Star T-25 alloy cylinder is a kind of nickel basis alloy, average hardness is from HRC 56 to HRC 60. It is kind of functionality product for multi-solution.

### T-40

**EXCELLENT Cylinder** TS-A

Tan Star T-40 bimetallic cylinder is a kind of nickel basis alloy of Tan Star, and it is include high percentage of tungsten carbide and the hardness can achieve to HRC 65, and it is suitable for processing almost any materials.

### T-10

**FINE Cylinder** TS-C

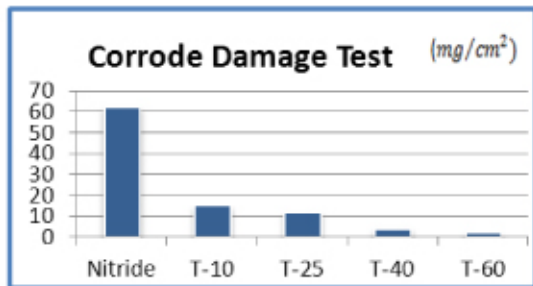
The hardness of Tan Star T-10 alloy cylinder is around HRC52-56, and it is suitable for normal corrosive material, and also recycle material of extruder.



## Overall Compare

Model	Base	Process	Average Hardness	Thickness	Glass Fiber
T-60(Halogen Free)	Nickel	Centrifugal Casting	HRC>65	1.5-2.0mm	For Halogen-Free
T-40			HRC 60-65		Under 50%
T-25			HRC 56-60		Under 30%
T-10			HRC 52-56		Under 15%

Model	Anti-Abrasion	Anti-Corrosion
T-60	★★★★★	★★★★★
T-40	★★★★☆	★★★★★
T-25	★★★★★	★★★★★
T-10	★★★★	★★★★★



## Nitride Cylinder

Application	
Injection molding	Extrusion molding
Bakelite molding	Rubber molding

Processing Dimension
Internal diameter: $\phi 12$ to $\phi 250$ mm
Maximum length: 6500mm(One Piece Forming)

## Nitride Technical Statistics

Base Material : SACM645(1.8509), ACM2(1.8550)  
 Maximum Hardness : Over HV 1000  
 Effective Diffuse Thickness : 0.20mm(Over HV 800)  
 Maximum Diffuse Thickness : 0.60mm  $\pm$  0.10mm  
 Normal Nitride Hours : 72 hours  
 Exceptional Nitride Hours : 100 hours

Temper Furnace



Gas Nitride Furnace



## Bimetallic Screw

With a view to meet the ever increasing market demands, present day plastic processors have resorted to the use of plastic raw materials which included all kinds of sophisticated ingredient such as glass fiber additive, carbon fiber, mineral stone powder additive, heat-resisting chemical additive, etc., thereby causing serious abrasion and to the barrel and screw as well as reducing their life span. To meet this challenge, our Co. had several kinds of screw which has shown a remarkable anti-abrasion and anti-corrosion resistance in its practical application. Not only PTA treatment on screw flights, also developed the technique of hardness coating of the entire screw surface, so as to bring more benefits to the processors.

### Processing Dimension

Internal diameter:  $\phi 12$  to  $\phi 250\text{mm}$

Maximum length: 6000mm(One Piece Forming)



### Fully-Hard

- Powder Steel  
S-23  
S-04
- Tool Steel  
S-79
- Stainless Steel  
S-88

Model	Process	Hardness	Application Glass Fiber	Recycle Material	Wear Resistant	Corrosion Resistant
S-23	Vacuum+ Plasma nitriding	HRC > 60	> 30%	> 50%	★★★★☆	★★★★☆
S-04	Vacuum+ Plasma nitriding	HRC 58-60	15%-30%	30%-50%	★★★★	★★★★☆
S-79	Vacuum+ Plasma nitriding	HRC 58-60	15%-30%	30%-50%	★★★★	★★★★
S-88	Vacuum+ Plasma nitriding	HRC 48-50	< 15%	< 30%	★★	★★★★

**Powder Steel** : The mechanical specifications of powder steel are better than tool steel. The heat treatment stability is also better than tool steel; furthermore, it is easier to estimate the deformation after heat treatment. Due to the better hardness, toughness and it can temper in the high temperature, so powder material is suitable for PVD coating.

**Tool Steel** : Because of include high percentage of C and Cr, tool steel has good anti-abrasion performance and also good toughness performance. Mo and V provide the tool steel has high impact and good heat treatment stability.

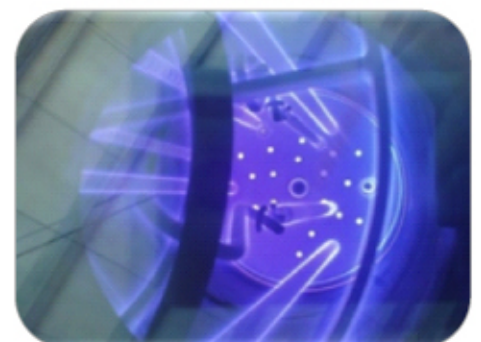
**Stainless Steel** : High percentage of Cr provides stainless steel has outstanding anti- corrosive. The hardness can achieve to over HV 1000 after plasma nitride.



Plasma Nitride Furnace



Plasma Nitride Treatment

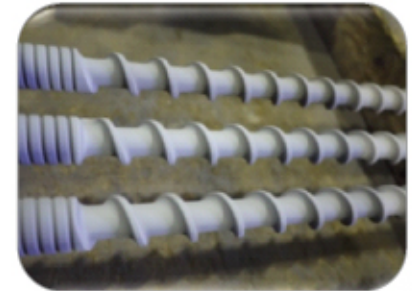
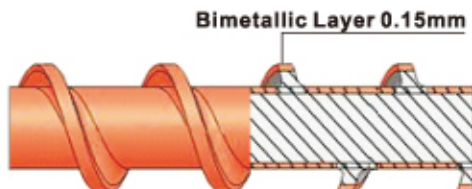




### Fully-Coat

S-42  
S-75

Model	Process	Hardness	Application Glass Fiber	Recycle Material	Wear Resistant	Corrosion Resistant
S-42	Powder coating	HV 1100-1400	30%-50%	> 50%	★★★★★	★★★★☆
S-75	Powder coating	HV 900-1100	>30%	30%-50%	★★★★☆	★★★★★

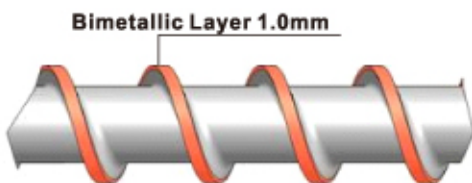


Fully Coat screw is use HP/HVOF (High pressure/ High velocity Oxygen Fuel) technology to coat the alloy powder on the entire screw surface. It means alloy powder spraying is under high pressure and high velocity (3-4 times sonic). The adhesive force is over 10000PSI, and the powder density can achieve to 99.8%.

### PTA-Weld

S-59

Model	Process	Hardness	Application Glass Fiber	Recycle Material	Wear Resistant	Corrosion Resistant
S-59	PTA welding	HRC 52-55	<15%	<30%	★★★	★★★



Plasma is a gas which is heated to an extremely high temperature and ionized so that it becomes electrically conductive. The plasma transfer arc welding process uses this plasma to transfer an electric arc to the screw flight. The metal to be welded is melted by the intense heat of the arc and fuses together.

## Nitride Screw

### Manufacturing Capabilities

CNT Screw Cutting Machine  
Screw Root Grinding  
Machines External Thread  
Grinding Machine High Speed Lathe/ High  
Speed Coating Machine PTA Welding  
Equipment Screw Milling Machines  
Screw Polishing Machines Milling Machines/  
CNC Milling Machine

Application	
Injection molding	Extrusion molding
Bakelite molding	Rubber molding

Processing Dimension
Internal diameter: $\phi 12$ to $\phi 250$ mm
Maximum length: 6000mm (One Piece Forming)





Base Material : SACM645(1.8509). ACM2(1.8550)  
Maximum Hardness : Over HV 1100  
Effective Diffuse Thickness : 0.20mm (Over HV 800)  
Maximum Diffuse Thickness : 0.60mm  $\pm$  0.10mm

## Non-Return Valves (Screw Tip)

The key of the injection- We provide lots of materials for all kinds of design. Both for ODM or OEM are available for you. Non-Return Valves plays a very important role for your molding process and Tan Star are always dedicate to research and develop for new solution to all coming challenges around the world.

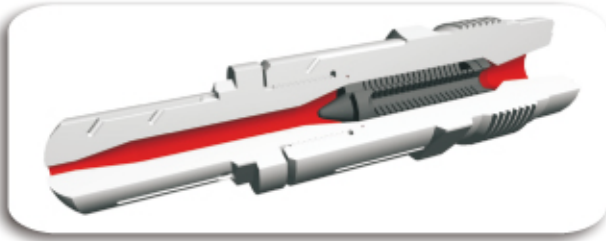

Model	Type	Main Technical	Application
NR 1	Normal. Clutch	HVOF Spray Coating	Special for Halogen- Free Material.
NR 2	Normal. Clutch	PTA Welding+ TiAlN	For under 50% Glass Fiber.
NR 3	Normal. Clutch	TiAlN PVD Coating	For under 30% Glass Fiber.
NR 4	Normal. Clutch	Plasma Nitride	For under 15% Glass Fiber.
NR 5	Normal. Clutch	Gas Nitride	For normal plastic material.
NR 6	Clutch Only	Plasma Nitride	For normal plastic material.



NR1 Clutch Collar	NR3 Clutch Collar	NR4 Valves	NR5 Valves
Spray Coating	TiAlN PVD Coating	Plasma Nitride	Gas Nitride
			

## End Cap. Nozzle. Adapter

We provide various kinds of end caps, nozzles and adapters for any kinds of plastic materials.

Filter Nozzle	Hydraulic Nozzle
To Filtrate Impurities and better mixing	To Seal up the Plastic Material
	

External Spring nozzle	Internal Spring Nozzle	Conical Nozzle
To Seal up the Plastic Material	To Seal up the plastic Material	For Better Fluidity
		



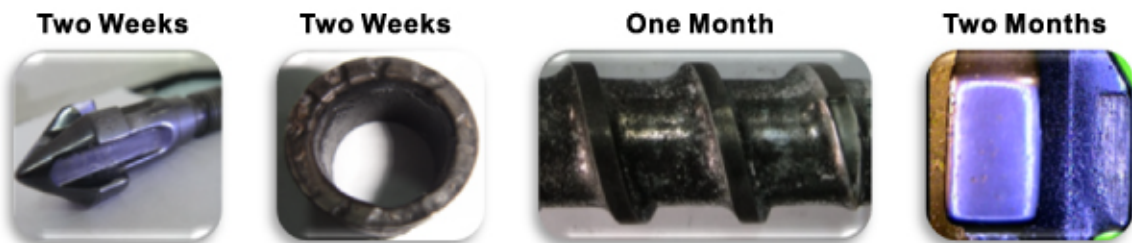
## Solution for Halogen-Free Material

### What is Halogen Free material?

We call it "Halogen-Free Material", but the full name of it must be "Plastic material with Halogen-Free Fire Retardant". A fire retardant is a substance that reduces flammability of fuels or delays their combustion. Generally speaking and make it easy, in order to prevent the fire accident or any risks happen, the fire retardant will be added to the plastic material, especially in parts of electronic products, cable or rug and so on. For common fire retardant is all includes halogen element. But halogen will bring the virulent gas after heating and burning. In order to protect the environment, the halogen fire retardant was already forbidden by UN, so the halogen-free retardant replaces it and become the mainstream in this industry.

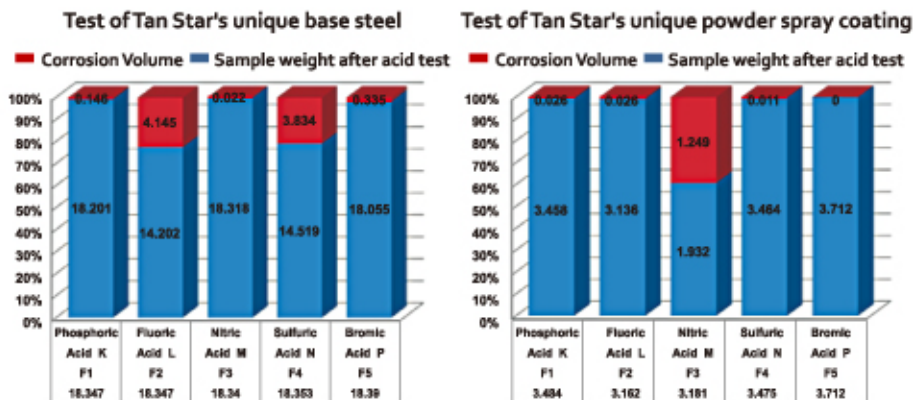
### What is the biggest problem of Halogen-Free material?

Although the halogen-free material won't destroy the environment, it will release the strong acid gas and it will damage the screw and barrel in the very short period of time.



### Tan Star's unique solution for Halogen-Free Material

Tan Star's unique base steel + Tan Star's unique powder spray coating = Excellent solution for Halogen-Free Material.



**Tan Star unique solution test with five kinds of most acid and corrosive elements**

- F1. Phosphoric Acid**
- F2. Fluoric Acid**
- F3. Nitric Acid**
- F4. Sulfuric Acid**
- F5. Bromic Acid**

### Process test data

Plastic Material : Polyamide (PA or Nylon)  
 Additive 1 : Glass Fiber 50%  
 Additive 2 : Halogen-Free Fire Retardant  
 Status : Intact and still in good condition





## PVD Coating

Physical vapor deposition (PVD) is a variety of vacuum deposition and is a general term used to describe any of a variety of methods to deposit thin films by the condensation of a vaporized form of the desired film material onto various work piece surfaces. The coating method involves purely physical processes such as high temperature vacuum evaporation with subsequent condensation, or plasma sputter bombardment rather than involving a chemical reaction at the surface to be coated as in chemical vapor deposition.

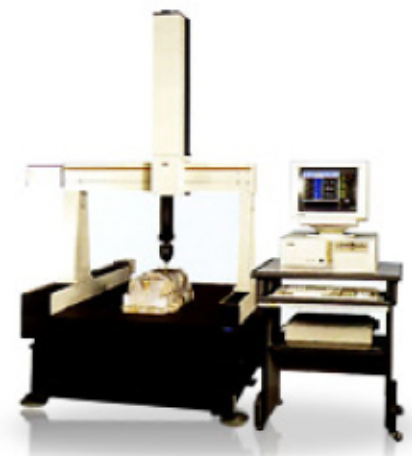
Model	TiN	CrN	TiAlN
<b>Hardness</b>	HV 1800~2000	HV 1700~1900	HV 2600~3200
<b>Thickness</b>	0.002~0.004mm	0.002~0.004mm	0.001~0.004mm
<b>Color</b>	Golden	Silver	Purple Black
<b>Application</b>	Transparent Material Optical Purpose	Material with glass fiber Optical Purpose	Halogen-Free Material with glass fiber Optical Purpose
<b>Wear Resistant</b>	★★★★	★★★★	★★★★★
<b>Corrosion Resistant</b>	★★★★	★★★★★	★★★★★



## QC Test instrument

Tan Star always insists on produces and supplies high quality products for our clients. As far as the quality of our products and services are concerned, besides winning the general approval from our customers, TAN STAR MATERIAL CO. LTD. has also passed the ISO 9001 qualification test by the international standardization organization. In spite of all these achievements, we will continue to exert our best to satisfy the needs of our customers.

Multi-Purpose precision testing and measuring equipment (three-dimensional), Surface roughness testing instrument, Micro structure testing instrument, Straightness gauge, RC hardness testing instrument, Bore scope for internal cylinder, Electro-plating testing instrument, Internal diameter hardness gauge and so on.





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