SMALL PARTS
BIG DIFFERENCES

Small Parts Big Differences

TAN KONG

TAN KONG PRECISION TECH CO., LTD.

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TAN KONG

Competitive Prices
Finest Quality
Prompt Shipment
Efficient Service

COMPANY PROFILE

Established in 1978, Tan Kong Precision Tech Co.,Ltd. has been a professional ball manufacturer and servicing the world with quality steel ball products.
Our principle has always been to satisfy every client's specific requirement in terms of cost reduction, production efficency, product quality and service.

Our total factory area by the end of year 2014 is 50,000m^2. Our monthly production capacity is approximately 500 metric tons of balls in various sizes. With fully automated production lines, we enjoy high production efficiency.

As a token of our commitment to total quality assurance, Tan Kong has received ISO/TS 16949 certification in year 2006.

TS 16949 certified

PRODUCTION PROCESS

Each type of ball has its special production process. However, the production process can be generalized as follows.

01 WIRE

Wire coils are checked for diameter and chemical composition.

02 100% CHECK

Every single ball is checked before shipment 0 PPM defects promised.

03 FINAL INSPECTION

State-of-the-art measuring equipments are used to ensure excellent quality.

KNOW-HOW

Over the years, Tan Kong has developed a highly stable process control system that assures consistency at each process. Error-proof systems are developed for each production step. State of the art measuring and testing equipment is used throughout the process to assure conformity. Automated inspection systems are also utilized extensively to guarantee zero defect shipments.

While achieving excellent product quality and production efficency, Tan Kong also developes various process options to manufacture our product on any grade, any material at lowest cost.
Our first-rate process capability allows us not only to meet but exceeds industry standards, and customer requirements.

02 HEADING

Wires are cold forged into spherical shapes between two dies.

03 FLASHING

Headed blanks are ground between two metal plates. A ring due to heading dies is thus removed by the flashing process.

04 HARDENING

Specially designed furnaces are used to hardened balls. The balls are then quenched and tempered to reach standard range of hardness.

05 GRINDING

Hardened balls are ground betwern a metal plate and a ceramic wheel. Further Preusion is achieved.

06 FINE GRINDING

Additional grinding process for perfecting the sizing, sphericity, and smoothing surface finish.

07 CLEANING

Ball surfaces are thoroughly cleansed by ultra-sonic washing process.

ISO3290

We manufacture our product to meet all major standards (ISO 3290, DIN 5401, JIS B1501). Our trained engineers also work closely with customers to develop products most suitable for their applications.

Technical Definitions

Grade	A specific combination of dimensional form and surface roughness tolerance
Nomintal ball Diameter	The diameter value that is used for the purpose of general identification of a ball size. Measured by two parallel plane tangent to the surface of the ball.
Mean Diameter of a Ball	The arithmetical mean of the largest and the smallest single diameter of the ball.
Lot Mean Diameter	The arithmetical mean of the mean diameter of the largest ball and that of the smallest balls in the lot. Lot is the definite quantity of ball manufactured under uniformed condition.
Lot Diameter Variation	The difference between the mean diameter of the largest ball and that of the smallest ball in the lot.
Diameter Tolerance	The maximum allowable deviation of any ball mean diameter from the nominal ball diameter.
Sphericity	The greatest radial distance in any racial plane between a sphere circumscribed around the ball surface and any point on the ball surface.
Surface Roughness	Surface roughness consists of all those irregularities such as crack,cuts and dent,which surface relief. And it is conventionally defined within the area where deviation of form are eliminated.
Hardness	The measure of resistance to penetration of the ball surface or truncated flat of the ball by a specific indenting shape.
Case Depth	The distance measured radially from the surface of the ball to the point where the ball hardness becomes Rc 50. This term is applicable to case hardened ball only

Grade and Tolerance

Grade	VDS	W	VDL	Ra
3	0.08	0.08	0.16	0.010
5	0.13	0.13	0.25	0.014
10	0.25	0.25	0.50	0.020
20	0.5	0.5	1.0	0.032
40	1.0	1.0	2.0	0.06
60	1.5	1.5	3.0	0.08
80	2.0	2.0	4.0	0.1
100	2.5	2.5	5.0	0.1
200	5.0	5.0	10	0.15
300	7.5	7.5	15	x
500	12.5	12.5	25	x
800	20	20	40	x
1000	25	25	50	x
2000	50	50	100	x

Unit : micrometer(μm) VDL : Lot diameter variation VDS : Ball diameter variation
Ra : Unit of surface roughness(μm) W : Deviation from spherical form(Roundness) Refernce : ISO 3290-2008

Hardness and Crushing Load

SIZE		CHROME STEEL BALL		CARBON STEEL BALL		
Inch	mm	Surface Hardness	Crushing Load	Surface Hardness	Crushing Load (Kg)	Case Depth (mm)
	0.5	HV760 ~ HV880	Minimum Crush Load ≥ $D^{1.73}$ (KN)	HV760 ~ HV880		
1/32"	0.794					0.1
	1.0					
1/16"	1.588				170	0.4
	2.0				250	
3/32"	2.381				300	
	2.5					0.5
	3.0					
1/8"	3.175	HRC60 ~ HRC66		HRC60 ~ HRC66	500	
5/32"	3.969				800	0.6
	4.0				--	
3/16"	4.762				1100	0.8
	5.0				1100	
7/32"	5.556				1200	0.9
	6.0				1200	
1/4"	6.350				1800	1.1
5/16"	7.938				2400	
3/8"	9.525				3000	1.4
7/16"	11.112				3500	1.7
1/2"	12.7				4500	1.8
5/8"	15.875					1.9
3/4"	19.050					2.0
7/8"	22.225					
1"	25.4					

Note : **Hardness readings taken on spherical surface are subject to the correction shown on Table 1.

**Crushing load shown above is minimum level. Adjustment can be made to meet customer's specifications.

Table 1: Hardness Correction Table

Correction to be added to rockwell "C" readings obtained on spherical surfaces.

Spherical Surface Hardness (Ho)	Ball Diameter (Metric Sizes)						
	4mm (▲H)	5mm (▲H)	6mm (▲H)	7mm (▲H)	8mm (▲H)	9mm (▲H)	10mm (▲H)
51	6.85	5.48	4.56	3.91	3.42	3.04	2.74
53	6.60	5.28	4.40	3.77	3.30	2.93	2.64
54	6.47	5.18	4.32	3.70	3.24	2.88	2.59
55	6.35	5.08	4.23	3.63	3.18	2.82	2.54
56	6.23	4.99	4.15	3.56	3.12	2.77	2.49
57	6.11	4.89	4.08	3.49	3.06	2.72	2.45
58	5.99	4.80	4.00	3.43	3.00	2.66	2.40
59	5.88	4.70	3.92	3.36	2.94	2.61	2.35
60	5.76	4.61	3.84	3.29	2.88	2.56	2.30

Flat Surface Hardness (H) = Spherical Surface Hardness (Ho) + ▲H

Spherical Surface Hardness (Ho)	Ball Diameter (Inch Sizes)						
	1/8" (▲H)	5/32" (▲H)	3/16" (▲H)	7/32" (▲H)	1/4" (▲H)	9/32" (▲H)	5/16" (▲H)
51	8.6	6.90	5.75	4.93	4.31	3.83	3.45
52	8.5	6.77	5.64	4.84	4.23	3.76	3.39
53	8.3	6.65	5.54	4.75	4.16	3.69	3.32
54	8.2	6.52	5.44	4.66	4.08	3.62	3.26
55	8.0	6.40	5.34	4.57	4.00	3.56	3.20
56	7.9	6.28	5.23	4.49	3.93	3.49	3.14
57	7.7	6.16	5.13	4.40	3.85	3.42	3.08
58	7.6	6.04	5.03	4.32	3.78	3.36	3.02
59	7.4	5.92	4.94	4.23	3.70	3.29	2.96
60	7.3	5.81	4.84	4.15	3.63	3.23	2.90

Research and Development

Technology advancement is a major driving force of our core competence. A strong R&D team works with academics and research institutes to develop our unique production, and quality control equipments. Tailor-made ERP system provides dynamic production information and comprehensive traceability of products.

PRODUCTS

Carbon Steel Ball

Material Available

- Low Carbon : AISI 1010~AISI 1018
- Medium Carbon : AISI 1045
- High Carbon: AISI 1065~AISI 1086

Chemical Composition

AISI Number	C%	Si%	Mn%	P%	S%	Hardemess
AISI 1010	0.08~0.13	0.30Max	0.50Max	0.07Max	0.06Max	Case Hardened
AISI 1015	0.13~0.18	0.10~0.30	0.30~0.60	0.04Max		Case Hardened
AISI 1045	0.43~0.50	0.10~0.30	0.60~0.90	0.04Max	0.05Max	Through Hardened
AISI 1086	0.83~0.88	0.10~0.30	0.30~0.70	0.04Max	0.04Max	Through Hardened

*Low silicate carbon ball (Si 0.04% Max) also available

Application : Light duty bearing, conveyer belt, bicycle and automobile parts,slide bearing, caster wheels,computer peripheral products,toys,metal milling,hand tools and etc.
Density : 7.861 g/cm³
Grade : 80~milling
Size : 1.0mm~1"

Chrome Steel Ball

Chemical Composition

C%	Si%	Mn%	Cr%	Cu%	S%	P%	Hardemess
0.90~1.05	0.15~0.35	0.25~0.45	1.35~1.65	0.3Max	0.03Max	0.03Max	Through Hardened

- Application : Heavy duty and high-speed bearing,linear motion guidance system,metal milling, ink and paint grinding,chemical industry,food indystry.
- Density : 7.833g/cm³
- Grade : 5~milling
- Size : 1.0mm~1"

PRODUCTS

Stainless Steel Ball

Material Available
- AISI 304~AISI 316
- AISI 420~AISI 440

Chemical Composition

AISI Number	C%	Si%	Mn%	Cr%	Ni%	Mo%	P%	S%	Property
AISI 304	0.07 Max	1.00 Max	2.00 Max	17.0~19.0	8.0~10.5		0.045 Max	0.03 Max	Slightly magnetic, Flat surface HRC 25min. Better corrosion resistance than 4 series stainless steel
AISI 316	0.07 Max	1.00 Max	2.00 Max	16.5~18.5	10.5~13.5	2.00~2.50	0.045 Max	0.03 Max	Slightly magnetic, Flat surface HRC 25min. Better corrosion resistance than SS304 specially against Sulfuric acid and ink,bleach/nitric acid
AISI 420	0.07~0.25	1.00 Max	1.00 Max	12.0~14.0			0.045 Max	0.03 Max	Magnetic, martensite steel, flat surface HRC 50min, better corrosion resistant than SS440
AISI 430	0.08 Max	1.00 Max	1.00 Max	15.5~17.5			0.045 Max	0.03 Max	Ferritic stainless steel, better corrosion resistant than 3 series at higher temperature Flat surface HRB 85 min
AISI 440	0.95~1.20	1.00 Max	1.00 Max	16.0~18.0			0.045 Max	0.02 Max	For diameter under 1/8", Hardeness HV700-800, Above 1/8",HRC60min

*Austenitic steel (AISI 304/316)can be demagnetized by solution heat treatment.

- Application: Valve,aerosol and finger pump,bearings,and electronic components
- Density: 7.94g/cm^3
- Grade: 5~milling
- Size: 1.0mm~1"

Hollow Ball

- Material Available: AISI 52100, AISI 304,AISI 440
- Application: Aerospace and chemcial industry
- Grade: 25~1000
- Size: 0.5"~2.5"

Burnishing Media

- Material Available: Carbon and stainless
- Shapes: Oval,satellite,eclipse,diagonal,pins and cylinder
- Size: Please contact us for detailed information

PRODUCTS

Brass and Bronze Ball

Material Available

CDA270 (C2700) Yellow Brass	Copper(Cu)	Zinc(Zn)	Density	Features	Hardness
	63.0~68.5%	33.5~36.5%	8.47g/cm^3	HRB 75~85 (Flat Surface)	Good resistance to seawater, alcohol, gasoline, oil, pesticide

*Also available : Bronze(85% Cu,15% Zn);Copper(99.9%CU)

- Application: Chemical industries,check valve, electrical industries
- Grade: 100~1000
- Size: 1.0mm~1"

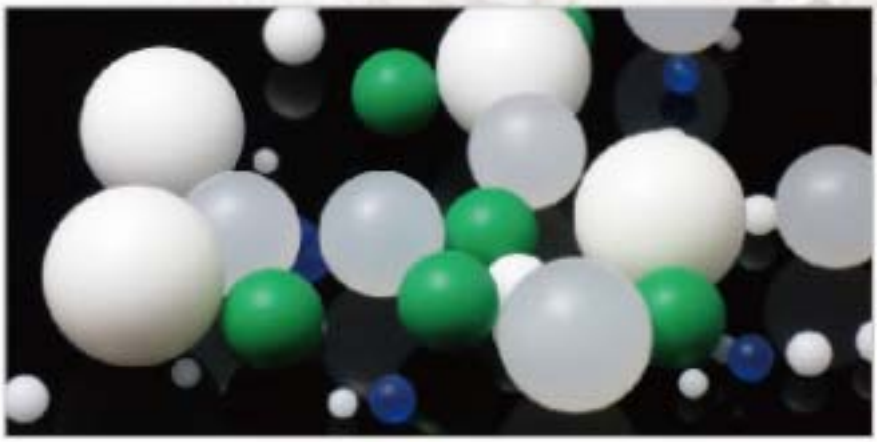
Ceramic Ball

Material Available

Alumin (Al_2O_3)	Alumin(Al)	Density	Hardness	Features
	95% Min	3.7g/cm^3	HV 1500 min	Hard,wear-resistant, Excellent dielectric, Resists strong acid and at high temperatures,Good thermal conductivity
Zirconia (ZrO_2)	Zirconia(Zr)	Density	Hardness	Features
	95% ZrO_2 5% Y_2O_3	6.2g/cm^3	HV 1100 min	High density, low thermal conductivity(20% of Alumina), Wear resistance, High fracture toughness, Ionic electrical conduction
Silicon Nitride (Si_3N_4)		Density	Hardness	Features
		3.2g/cm^3	HV 1500 min	Light weight, high polished surface, excellent wear resistant, good chemical resistance, High strength over a wide temperature range

- Grade: 5~milling
- Size: 0.5mm~1"

PRODUCTS



Plastic Ball

Grade	Diameter Tolerance	Roundness Tolerance	Diameter Tolerance	Roundness Tolerance
Unit	inch	inch	mm	mm
0	+/- 0.0005	0.0005	+/- 0.0127	0.0063
1	+/- 0.001	0.0005	+/- 0.0254	0.0127
2	+/- 0.002	0.001	+/- 0.050	0.025
3	+/- 0.005	0.005	+/- 0.127	0.127
4	+/- 0.015	N/A	+/- 0.381	N/A

Material and Characteristics

Item	POM	PA66	PP	Delrin AF
Material	Polyacetal	Nylon 66	Polypropylene	20% Teflon+80% Delrin
Density(g/cc)	1.42	1.14	0.91	1.50
Hardness(Rockwell R scale)	120	110	90	115
Wear resistant(kgf/cm^2)	0.37	0.18	385~560	0.19
Wear Absorption(%)	0.22~0.25	8.4	0.03	0.2
Heat Resistance (°C)	160~170	180~230	120	340
Resistance to weak acid	O	Δ	◎	O
Resistance to strong acid	×	×	Δ	×
Resistance to weak alkali	O	◎	◎	O
Resistance to strong alkali	O	O	O	O
Resistance to organic solution	O	O	O	O
Feature	High strength and stiffness, enhanced dimensional stability, and is easy to machine.	Excellent wear resistance, good tensile strength; high durability.	Light weight, good dielectric; good tensile strength Colors easily, Matte surface finish.	Good wear/heat resistance; good corrosion resistance Dark brown color.

× poor Δ fair O good ◎ excellent

NEEDLE ROLLER

We are most prominent precision roller manufacturers and needle roller exporters in Taiwan selling premium range of roller as per customer desigs as well as in dustry standards.

- Tan Kong started precision rollers manufacturing in 2012, and produces rollers
  - According to DIN 5402 / ISO 3096 standard,
  - In different steels (100Cr6, 440C, High carbon…)
  - Having hardness (740+140) HV or (60+6) HRC after heat treatment (in 100cr6, SUJ-2).
- Available in a wide range of dimensions and precision grades
  - with gauges selected according to standard sorting groups.
- Main applications are in automotive industry, Seat tracks, Linear motions components.

Tan Kong's Strength

- Flexible and custom made manufacturing processes
- Product precision level meets DIN / ISO / JIS G1 standard
- High level 100% sorting technology

Cutting 1

End grinding 2

Hardening 3

CNC O.D.Grindimg 4

Surface Finish 5

Product Range

- O. D. 2~12 mm
- Length 2~12 mm

Product Precision

- O.D. tolerance 1um
- Cylindricity 1um
- Length tolerance 0.01~0.05mm
- O.D. roughness Ra 0.05um
- End roughness Ra 0.1um

PACKING

Diameter (inch)	Diameter (mm)	Weight/Piece (g)	Pcs (pcs/kg)	G100 Carton	G5~G40 Box	Drum
				pcs	Pcs	
	0.5000	0.0005099	1,961,169	39,000,000	6,000,000	
	0.8000	0.002088	478,927	9,600,000	1,500,000	
	1.0000	0.004079	245,158	4,900,000	800,000	
	1.2000	0.007048	141,884	2,800,000	500,000	
	1.5000	0.013872	72,088	1,800,000	250,000	
1/16"	1.5875	0.01632	61,275	1,250,000	200,000	
	2.0000	0.03263	30,647	600,000	110,000	
3/32"	2.3812	0.05507	18,159	360,000	65,000	
	2.5000	0.06373	15,691	320,000	55,000	
	3.0000	0.1101	9,083	200,000	30,000	
1/8"	3.1750	0.1305	7,663	150,000	25,000	
5/32"	3.9687	0.2550	3,922	80,000	12,500	Small Drum 250kg or 500kg Max.
	4.0000	0.2610	3,831	80,000	13,000	
3/16"	4.7625	0.4406	2,270	50,000	8,000	
	5.0000	0.5137	1,947	40,000	7,000	Big Drum 950kg Max.
7/32"	5.5562	0.6996	1,429	30,000	5,000	
	6.0000	0.8810	1,135	25,000	4,000	
1/4"	6.3500	1.044	958	20,000	3,500	
9/32"	7.1440	1.4986	667	15,000	2,300	
5/16"	7.9375	2.040	490	10,000	1,700	
3/8"	9.5250	3.525	284	6,000	1,000	
7/16"	11.1125	5.639	177	4,000		
1/2"	12.700	8.355	120	2,500		
9/16"	14.2880	11.9890	83	1,800		
5/8"	15.8750	16.32	61	1,300		
3/4"	19.0500	28.20	35	750		
7/8"	22.2250	44.78	22	450		
1"	25.4000	66.84	15	300		

**Precision balls are packed 5 boxes/carton.
**This chart applies to carbon and chrome steel ball.
**Please contact Tan Kong for other material reference.
**Customized package also available

FACTORY TOUR

01 Heading ▶▶

Blanks are formed by a pair of dies

02 Flashing Plant ▶▶

Using a pair of cast iron plates to remove poles and equator

03 Hardening

Hardening balls to increase mechanical strength

04 Grinding

Using grinding wheel and plate to grind increase precision level

05 Fine Grinding

Same concept as grinding; but with higher precision

INSPECTION

Laser Scan Microscope

100% Roller Sorting

Competitive Prices
Finest Quality
Prompt Shipment
Efficient Service

Optical And Eddy Curent Check

Digital Comparater

Surface Roughness

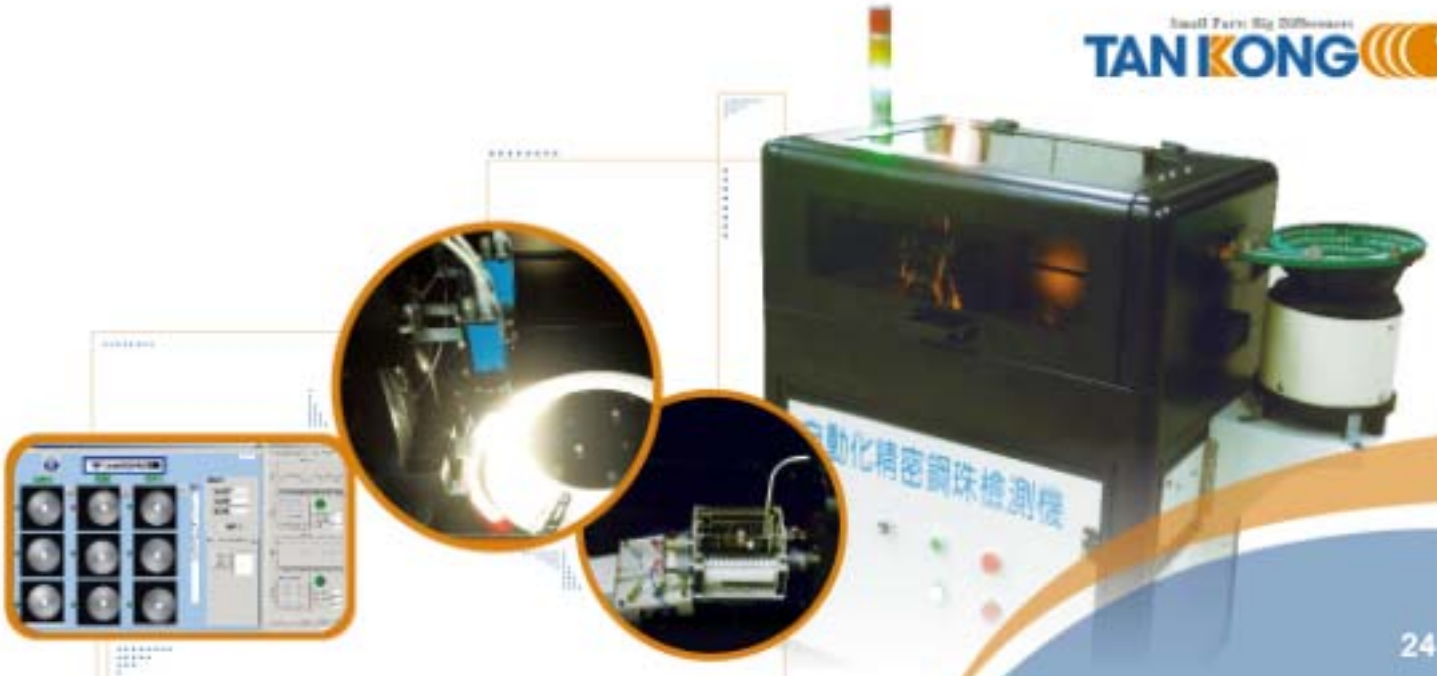
roundness and waviness measurement

Rockwell Hardness

Crush Load Testing

Microhardeness (HV) Checking

TAN KONG



天工精密・巧奪天工

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