



## MATERIAL PROPERTY COMPARISON

### The Advanced Ceramic Material's Properties

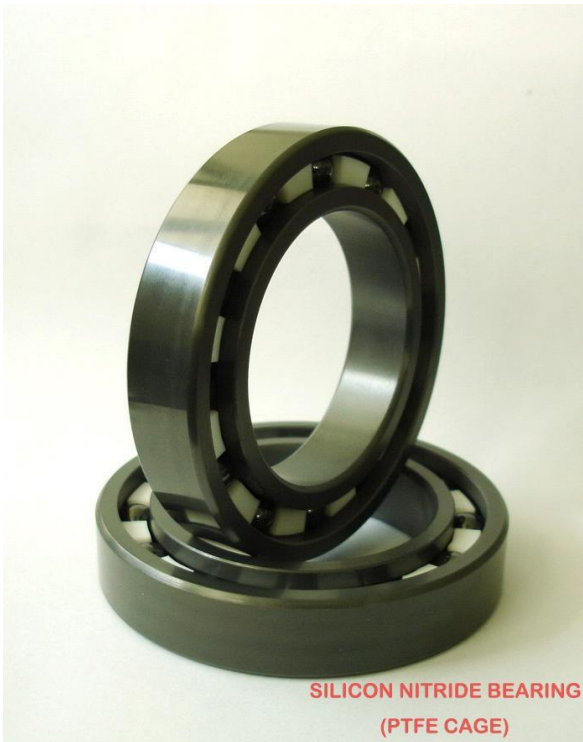
Item	Unit	Typical Steel	Si <sub>3</sub> N <sub>4</sub>	ZrO <sub>2</sub> (Yttria)	Al <sub>2</sub> O <sub>3</sub> (99.7%)
Density	g/cc	7.60	3.20-3.30	6.00	3.95
Hardness	HV	700	1500-1800	1200	1800
	HRC	62	75-80	70	80
Elastic Modulus	GPa	208	300-320	210	380
Thermal Expansion Coefficient	10 <sup>-6</sup> K	10.0	3.20	10.50	9.10
Thermal Conductivity	W/M ° K	30-40	18	2	25
Max Usage Temperature	°C	120	800	500	1850
Poisson's Ratio		0.30	0.26	0.30	0.27
Flexural Strength(800°C)	MPa	2400	200	300	220
Crushing Strength(800°C)	MPa	-	1400	2100	1500
Electrical Resistance(600°C)	Ohms-m	0.1-1	10 <sup>18</sup>	10 <sup>15</sup>	10 <sup>8</sup>
Tenacity	MPam <sup>1/2</sup>	25	18	10	4.6
Corrosion-resistant	-	Common	Excellent	Excellent	Excellent
Self-Lubricating	-	-	Excellent	Common	Common
Magnetism	-	Common	None	None	None
Fatigue Type	-	Scale Off	Scale Off	Smash	Smash

SILICON NITRIDE MATERIAL IS USED FOR HIGH TEMPERATURE(900°C), SELF-LUBRICATION, INSULATION, CORROSION-RESISTANCE(EXCEPT HF ACID) AND HIGH FRICTION(HV>1600) WORKING CONDITIONS;

ZIRCONIA(Y<sub>2</sub>O<sub>3</sub> STABILIZED) MATERIAL IS USED FOR HIGH TEMPERATURE(500 °C ), LOW THERMAL CONDUCTIVITY, INSULATION, CORROSION RESISTANCE(EXCEPT HF ACID AND AVOID STEAM BREAKS THE YTTRIA), MID-FRICTION(HV>1400) WORKING CONDITIONS;

ALUMINA(PURITY AT 99.7 % )CAN BEAR TEMP. AT 1100 °C , INSULATION, CORROSION-RESISTANCE(EXCEPT HF ACID) AND HIGH FRICTION(HV>1600)WORKING CONDITIONS;

## SILICON NITRIDE BEARING



MATERIAL OF INNER AND OUTER RING: SILICON NITRIDE ( $\text{Si}_3\text{N}_4$ )  
MATERIAL OF ROLLING BALL: SILICON NITRIDE ( $\text{Si}_3\text{N}_4$ ) MATERIAL OF  
CAGE: NYLON (PA66) , PTFE, PEEK  
MATERIAL OF SEALS: PTFE, PEEK (JUST FOR -2RS AND -ZZ TYPE) BEARING  
TOLERANCE QUALITY GRADE: ABEC-1~ABEC-5 BEARING NOISE QUALITY  
GRADE: Z1~Z3  
BEARING VIBRATION QUALITY GRADE: V~V2

BEARING TYPE RANGE: 604~6015      624~6215      634~6315      684~6820  
694~6920 1201~1208      UC001~UC015 (OUTER SPHERE TYPE)  
UC201~UC215 (OUTER SPHERE TYPE)

## ZIRCONIA BEARING



**MATERIAL OF INNER AND OUTER RING: ZIRCONIA (ZrO<sub>2</sub>)**

**MATERIAL OF ROLLING BALL: ZIRCONIA (ZrO<sub>2</sub>) MATERIAL OF**

**CAGE: NYLON (PA66) , PTFE, PEEK**

**MATERIAL OF SEALS: PTFE, PEEK (JUST FOR -2RS AND ZZ TYPE) BEARING**

**TOLERANCE QUALITY GRADE: ABEC-1~ABEC-5 BEARING NOISE QUALITY**

**GRADE: Z1~Z3**

**BEARING VIBRATION QUALITY GRADE: V~V2**

**BEARING TYPE RANGE: 604~6018**

**624~6218**

**634~6318**

**684~6820**

**694~6920**

**1201~1208 UC001~UC015 (OUTER SPHERE TYPE)**

**UC201~UC215 (OUTER SPHERE TYPE)**

## CERAMIC BALL HYBRID BEARING



**MATERIAL OF INNER AND OUTER RING: CHROME STEEL OR SUS440C MATERIAL OF ROLLING BALL: ZIRCONIA (ZrO<sub>2</sub>) OR SILICON NITRIDE BALL MATERIAL OF CAGE: NYLON (PA66), SUS304, PEEK, PI, COPPER ETC. MATERIAL OF SEALS: DOUBLE RUBBER SEALS OR SUS304 DOUBLE SHIELDS SPPED RANGE: SPEED IMPORVE+30%~+170%, BEARING LIFESPAN+50%**

**APPLICATION: MOTOR BEARINGS-EMQ, SMALL ENGINE, BICYCLE BEARING, SKATE BEARING(SKATEBOARD AND INLINE SKATE), MOBILE PHONE AND LAPTOP BEARING ETC. BEARING TOLERANCE QUALITY GRADE: ABEC-1~ABEC-7**

**BEARING NOISE QUALITY GRADE: Z2~Z3 BEARING VIBRATION QUALITY GRADE: V~V2**

**BEARING TYPE RANGE: 603~6015      623~6215      633~6315      683~6818  
693~6918 1201~1208      UC001~UC015 (OUTER SPHERE TYPE)  
UC201~UC215 (OUTER SPHERE TYPE)**



## HYBRID BEARING FOR SPINDLE



**MATERIAL OF INNER AND OUTER RING: HIGH GRADE CHROME STEEL OR MA STEEL MATERIAL OF**

**ROLLING BALL: HIP SILICON NITRIDE BALL**

**MATERIAL OF CAGE: LAMINATED PHENOLIC RESIN OR COPPER CAGE ETC. MATERIAL**

**OF SEALS: OPEN TYPE, CAN FIX -2RS OR ZZ ON TWO SIDE**

**SPEED RANGE : SPEED IMPROVE+100 % ~ +200 %, LOWER NOISE-1 ~5DB, BEARING LIFE  
SPAN+50%~+100%**

**APPLICATION: SPINDLE, PCB ROBOT, CNC COMPONENTS, AIR MODEL BEARING ETC. BEARING**

**TOLERANCE QUALITY GRADE: ABEC-7~ABEC-9**

**BEARING NOISE QUALITY GRADE: Z3 BEARING**

**VIBRATION QUALITY GRADE: V2~V3**

**BEARING TYPE RANGE: 708~7015**

**728~7215**

**738~7315**

**71808~71815**

**71908~71915**

## THRUSTING HYBRID BEARING



**MATERIAL OF INNER AND OUTER RING: CHROME STEEL OR SUS440C**

**MATERIAL OF ROLLING BALL: SILICON NITRIDE BALL**

**MATERIAL OF CAGE: COPPER CAGE OR FULL COMPLEMENT TYPE**

**APPLICATION: HIGH AXIAL LOAD, STRICT WORKING CONDITIONS (HIGH TEMP., NO OIL AND CORROSION)**

**BEARING TYPE RANGE: 51101~51115, 51201~51215**

## SPECIAL COATING BEARING



**MATERIAL OF INNER AND OUTER RING: CHROME STEEL OR SUS440C**

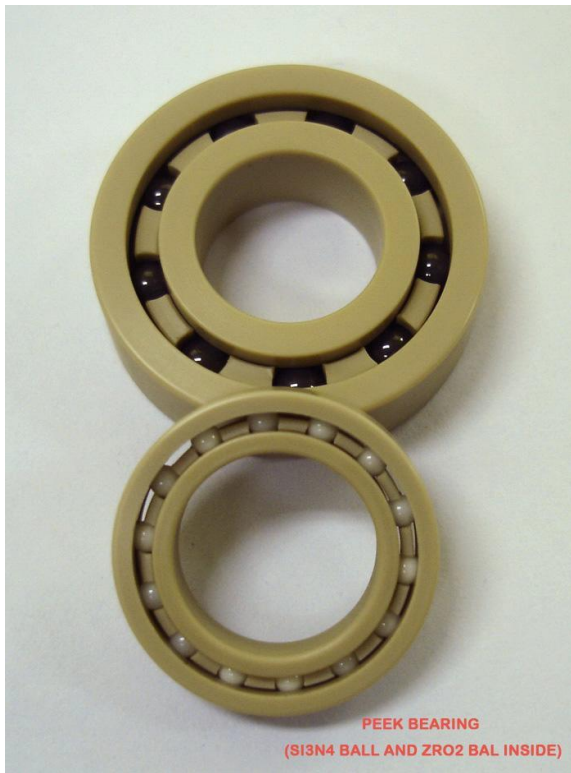
**MATERIAL OF ROLLING BALL: SILICON NITRIDE BALL**

**MATERIAL OF CAGE: NYLON (PA66) , SUS304, PEEK, PI, COPPER CAGE ETC. SPECIAL**

**TREATMENT: COATING WITH Ag OR MoS<sub>2</sub>;**

**APPLICATION: VACUUM, HIGH TEMPERATURE AND NO OIL LUBRICATION**

## IT INDUSTRY-PLASTIC BEARING



**MATERIAL: PEEK, POM AND PE ETC.**

## IT INDUSTRY-LINEARBEARING



**BORE DIAMETER RANGE: 8MM~50MM**

**PRODUCT TYPE: FULL STAINLESS STEEL OR CHROME STEEL TYPE**