RGP BALLS®

PRECISION BALLS

www.rgpballs.com

Welcome

COMPANY PROFILE

WELCOME TO OUR WORLD: PRECISION.

For over fifty years, we have been among Europe's leading companies in the manufacturing, trading and distribution of precision balls, rollers and ball transfer units.

WE MOVE MOUNTAINS TO GET THE DETAILS PERFECT

Over 70 people working together since long time in our headquarter in Cinisello Balsamo: at Rgpballs we have about 10,000 m2 of know-how and expertise. We consistently work on innovations to stay at the forefront. With us, everything is about quality.

CHOOSING RGPBALLS® MEANS CHOOSING EXPERTISE, ...

Nothing says more than time. We have over 50 years of efforts, breakthroughs, and expertise under our belts. And we keep improving everyday.

METHOD, ...

Science pushes us far, a consultative spirit keeps us close to your needs.
And this is how we manage to handle the broadest range of inquiries.

SPEED.

Time is valuable, exactly like our warehouse.
Indeed, more stock available means less time needed to satisfy any demand.

AN "EVERYTHING, RIGHT NOW" WAREHOUSE.

You also know that in an ever-changing business, speed is competitiveness.
Our warehouse is a valuable resource with more than 5,000 tons of products regularly in stock.
We can guarantee prompt delivery for most of our customers' needs worldwide.

WE HAVE MORE THAN 3,000 CUSTOMERS ALL AROUND THE WORLD, AND WE SPEAK THEIR LANGUAGES.

Our catalogue is international; wherever you are, you can select our products and consult with our experts, without worrying about physical or language barriers.
Our team can speak all major languages: Italian, German, English, French, Spanish, Ukrainian, Russian, Chinese, and Romanian.

A FAMILY BUSINESS.

We are a company that is also a big family. You won't find any board of directors with us, only the passion we put into each and every challenge. Our business is so stable that after 50 years we are still here, with all the professionalism of an international business.

10.000 m² headquarter

80 employees

4.000 tons of products

+3.000 customers

CERTIFICATION:

CERTIFICATION FOR MANAGEMENT SYSTEMS:
ISO 9001:2015 – ISO 14001:2015 – ISO 45001:2018
PRODUCT CERTIFICATION ACCORDING TO TUV-PROFiCERT PROCEDURES

CERAMIC

ALUMINUM OXIDE (Al2O3) BALLS	6
RUBY BALLS	12
SAPPHIRE BALLS	13
SILICON CARBIDE (SiC) BALLS	9
SILICON NITRIDE (Si3N4) BALLS	8
ZIRCONIUM OXIDE (ZrO2) BALLS	7
ZTA CERAMIC BALLS	10

ALUMINUM OXIDE (Al2O3) BALLS

Polycrystalline structure light weight oxide balls, they provide good mechanical characteristics, corrosion, abrasion and heat resistance. They are auto lubricant and good electric insulators.
Please note: chromatic appearence of the balls may be subject to variation.

Applications

Special bearings, check valves, pumps and valves that operate in aggressive environments, petroleum pumps, flow meters, measurement instruments, medical devices.

Commercial name	Other name	Formula	Oxide %
Aluminum Trioxide	Alumina	Al2O3	98% +/-1%

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	3,90
Young's modulus	E	GPa	Mechanical	-	365
Friction coefficient	μ	-	Mechanical	Room temp.	0,2
Specific heat	c	J/kg·K	Thermal	Room temp.	795
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	7,8
Thermal conductivity		W/(m·K)	Thermal	Room temp.	31,0
Volume resistivity		*m	Electric	-	> 10^14
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	1250 - 1700	-	-
Ultimate compressive strength	Mechanical	MPa	2100 - 2600	psix10^3	304 - 377
Service temperature	Thermal	ºC	-100 / 1600	ºF	-148 / 2912

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades (ISO 3290 / AFBMA)
0,300 - 100,000	mm	1/64 - 4	"	G10-16-20-25-28-40-60-100

Corrosion Resistance

Excellent corrosion resistance in water, salt solutions, acids, they are resistant even into aggressive environments excepted hydrofluoric, hydrochloric acids, hot sulphuric acid and strong alkaline solutions.

ZIRCONIUM OXIDE (ZrO2) BALLS

Refractory ceramic material balls, they provide excellent corrosion, wear and heat resistance. They improve their hardness when they are subjected to collisions. Yttrium doped Zirconia Oxide, they provide the best properties between ceramic materials in grinding and milling applications.

Applications

Special bearings, pumps and valves that operate in aggressive environments, check valves, flow meters, measurement instruments. They are used in the medical field (very pure material). Grinding and milling applications.

Commercial name	Other name	Formula	Oxides %
Zirconium Dioxide	Zirconia	ZrO2 + Y2O3	(94,6-95,4 %ZrO2 / 4,6-5,4 %Y2O3)

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	6
Young's modulus	E	GPa	Mechanical	-	210
Friction coefficient	μ	-	Mechanical	Room temp.	0,2
Specific heat	c	J/kg·K	Thermal	Room temp.	450
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	10,5
Thermal conductivity		W/(m·K)	Thermal	Room temp.	3,5
Volume resistivity		*m	Electric	-	> 10^11
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HRA	87 - 91	-	-
Ultimate compressive strength	Mechanical	MPa	1750 - 2500	psix10^3	254 - 362
Service temperature	Thermal	ºC	0 / 1350	ºF	32 / 2462

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades (ISO 3290 / AFBMA)
0,300 - 101,600	mm	1/64 - 4	"	G10-16-20-25-28-40-60-100

Corrosion Resistance

Zirconia balls are chemically inert in molten metals, caustic and organic solvents and most acids substances. They are not resisting against hydrochloric acid and strong alkaline solutions.

SILICON NITRIDE (Si3N4) BALLS

Light weight ceramic material balls, they provide very good mechanical/thoughness properties and corrosion resistance. They are auto lubricant materials and good electric insulators. They have excellent resistance to thermal shocks. Balls are manufactured according to ASTM F 2094 Class II standards.

Applications

Special bearings, high-speed bearings, under vacuum pumps, compressors, centrifugal pumps, shafts/mandril, recirculating balls, flow meters, measurement instruments. They are used in aerospace and military industry.

Commercial name	Other name	Formula	Nitride %
Silicon Nitride	Nierite	Si3N4	90,0 - 95,0

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	3,26
Young's modulus	E	GPa	Mechanical	-	300
Friction coefficient	μ	-	Mechanical	Room temp.	0,1
Specific heat	c	J/kg-K	Thermal	Room temp.	740
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	3,4
Thermal conductivity		W/(m·K)	Thermal	Room temp.	23,0
Volume resistivity		*m	Electric	-	> 10^13
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	1400 - 1600	-	-
Ultimate compressive strength	Mechanical	MPa	2300 - 4000	psix10^3	334 - 580
Service temperature	Thermal	ºC	0 / 1200	ºF	32 / 2192

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades
0,4000 - 200,000	mm	1/64 - 8	"	See section International Standards ISO 3290-2

Corrosion Resistance

Excellent corrosion resistance in all almost corrosive environments, apart from acids (except sulphuric acid) and basic solutions at high concentrations.

SILICON CARBIDE (SiC) BALLS

Ceramic balls with good mechanical and stiffness properties, good corrosion and wear resistance. They are electric conductors and suitable for high temperature applications.

Applications

Special bearings and pumps, electric switches and sensors, medical instruments. They are used in automotive, aviation and aerospace, naval, petroleum, chemical and electronic industry.

Commercial name	Other name	Formula	Carbide %
Silicon Carbide	Carborundum	SiC	99,9

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	3,15
Young's modulus	E	GPa	Mechanical	-	405
Friction coefficient	μ	-	Mechanical	Room temp.	0,6
Specific heat	c	J/kg-K	Thermal	Room temp.	695
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	3,7
Thermal conductivity		W/(m·K)	Thermal	Room temp.	144,0
Volume resistivity		*m	Electric	-	> 10^4
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	2200 - 2800	-	-
Ultimate compressive strength	Mechanical	MPa	1700 - 2275	psix10^3	246 - 330
Service temperature	Thermal	ºC	0 / 1500	ºF	32 / 2732

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades (ISO 3290 / AFBMA)
1,000 - 50,000	mm	3/64 - 2	"	G10-16-20-25-28-40-60-100

Corrosion Resistance

Good corrosion resistance in diluted and concentrated acids, fairish in alkalis and halogens, they are resisting in contact with hydrofluoric and sulphuric acids and sodium hydroxide, fair resistance in nitric and hydrochloric acids. They are not resisting in contact with molten metals.

ZTA CERAMIC BALLS

Aluminium Oxide with about 10% content of Zirconium Oxide balls, they feature better mechanical properties, wear and compression resistance and thermal shocks resistance in comparison to nearly pure Aluminium Oxide balls.

Applications

Ball bearings, special pumps and valves mainly when both high corrosion resistance and high heat resistance are required. Medical field applications. They are used even as grinding and machining media.

Commercial name	Other name	Formula	Chemical composition (%)
Zirconia toughened alumina	ZTA	Al2O3 + ZrO2 + Y2O3	Al2O3 ~ 90 / ZrO2 ~ 10

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	4,13
Young's modulus	E	GPa	Mechanical	-	380
Friction coefficient	μ	-	Mechanical	Room temp.	0,52
Specific heat	c	J/kg-K	Thermal	Room temp.	900
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	8,0
Thermal conductivity		W/(m·K)	Thermal	Room temp.	20,0
Volume resistivity		*m	Electric	-	> 10^15
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	1650 - 1950	-	-
Ultimate compressive strength	Mechanical	MPa	1700 - 2300	psix10^3	247 - 333
Service temperature	Thermal	ºC	-80 / 1500	ºF	-112 / 2732

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades (internal standard*)
0,500 - 50,000	mm	1/32 - 1.15/16	"	G3-5-6-10-25-40-50-100

Corrosion Resistance

Good corrosion resistance in almost all diluted and concentrated solutions (both acid and basic, for example nitric acid, sulphuric acid and caustic soda) except against hydrofluoric acid and phosphoric acid. The chemical compatibility is similar to Aluminum Oxide ceramic. ZTA balls can be used even in contact with halogens and melted metals.

Notes

Property	Description
*Precision grades	Allowed tolerances on the diameter and maximum allowed roundness for the confirmed precision grade are always communicated in the offer.

RUBY BALLS

Monocrystalline aluminum oxide based ceramics balls, the typical red colour of ruby is due to small amounts of impurities. They provide excellent hardness, corrosion resistance and high temperatures resistance properties, good wear resistance and dimensional stability. They are auto lubricant and easy polishing materials.

Applications

Special bearings, pumps and valves (chemical pumps, check valves), measurement instruments, pen tips, optical and probing applications, flow meters.

Commercial name	Other name	Formula	Oxide %
Monocrystalline Aluminum Trioxide	Ruby	Al2O3 (+Cr2O3/Si2O3)	98,0-99,99

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	3,98
Young's modulus	E	GPa	Mechanical	-	420
Friction coefficient	μ	-	Mechanical	Room temp.	0,15
Specific heat	c	J/kg·K	Thermal	Room temp.	750
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	5,8
Thermal conductivity		W/(m·K)	Thermal	Room temp.	39,0
Volume resistivity		*m	Electric	-	> 10^14
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	1570 - 2170	-	-
Ultimate compressive strength	Mechanical	MPa	2030 - 2130	psix10^3	294 - 309
Service temperature	Thermal	ºC	-196 / 1750	ºF	-320,8 / 3250

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades
0,127 - 14,986	mm	0.005 - 0.590	"	G3-5-6-10-25

Corrosion Resistance

Good corrosion resistance in contact with acids (even strong acids), alkalis and halogens, even at high temperatures.

SAPPHIRE BALLS

High purity monocrystalline aluminum oxide balls, they are transparent and provide high hardness, wear, temperature and corrosion resistance.

Applications

Special bearings, chemical, medical ans check valves, flowmeters, pens and styli tips, measurement instruments, bar code readers, fiber optical connectors.

Commercial name	Other name	Formula	Oxide %
Monocrystalline Aluminum Trioxide	Sapphire	Al2O3	99,90-99,99

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	3,98
Young's modulus	E	GPa	Mechanical	-	415
Friction coefficient	μ	-	Mechanical	Room temp.	0,15
Specific heat	c	J/kg-K	Thermal	Room temp.	750
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	6,0
Thermal conductivity		W/(m·K)	Thermal	Room temp.	40,0
Volume resistivity		*m	Electric	-	> 10^14
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	HV	1600 - 2300	-	-
Ultimate compressive strength	Mechanical	MPa	2000 - 2100	psix10^3	290 - 304
Service temperature	Thermal	ºC	-196 / 1800	ºF	-320,8 / 3272

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision grades
0,200 - 20,000	mm	1/128 - 25/32	"	G3-5-6-10-25

Corrosion Resistance

Sapphire balls provide excellent corrosion resistance both in acid and basic environments, even in severe conditions., better than ruby balls. They are attacked only by melt substanbces containing Li, B, F, Na and K elements.

MAKE YOUR WORLD MOVE

® RGPBALLS S.r.l.

Via E. De Amicis 59/C 61/A,
20092 Cinisello Balsamo (MI) - Italia

P.I. / C.F. / Reg. Impr. 08678490965
N. REA: MI-2042305
Cap. soc. € 1.000.000 int. vers.

+39 02 6178 857 / +39 02 6601 7032 / +39 02 6129 4593
rgpballs@rgpballs.com
www.rgpballs.com

2022-11/01