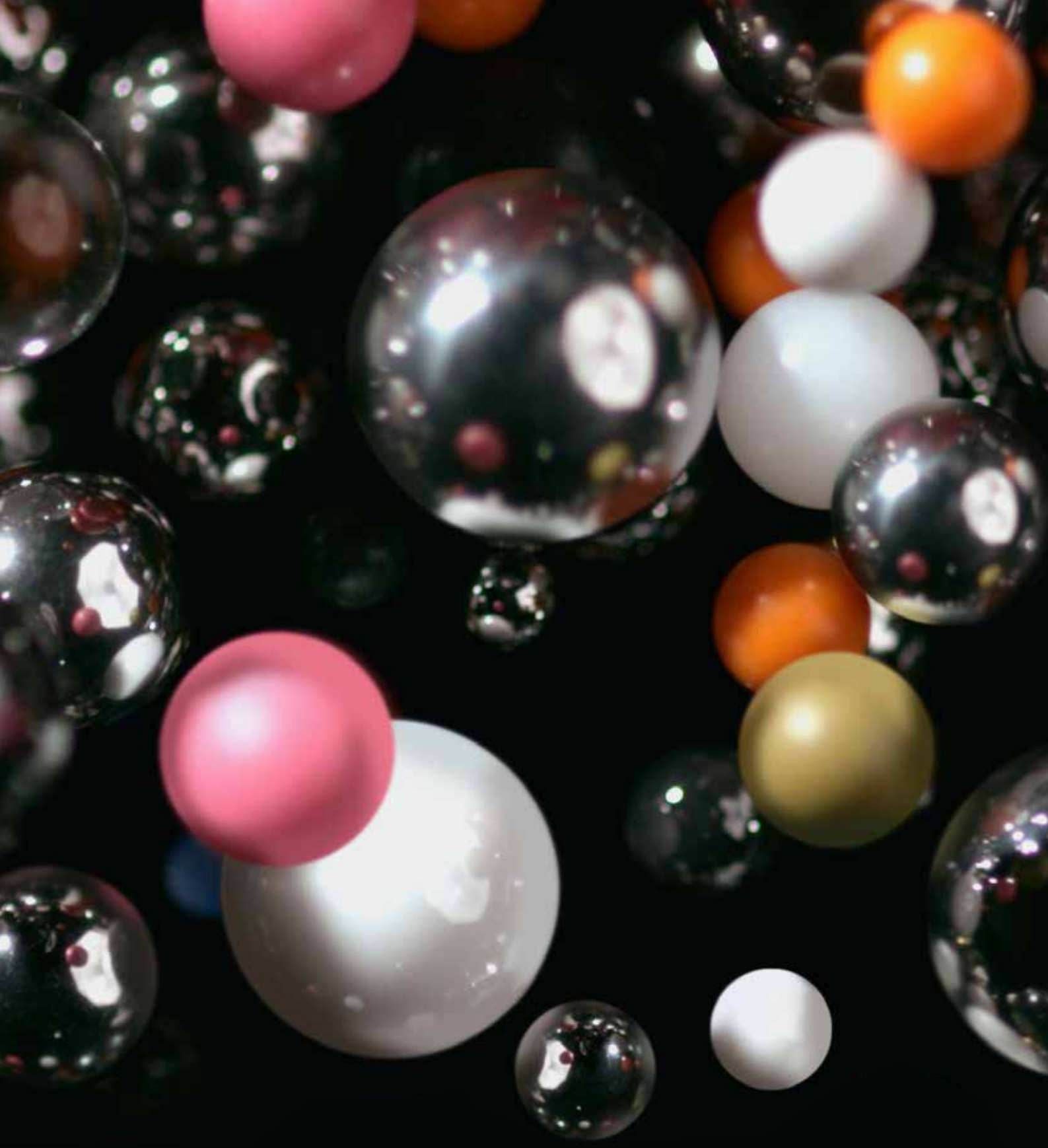


RGP BALLS®

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

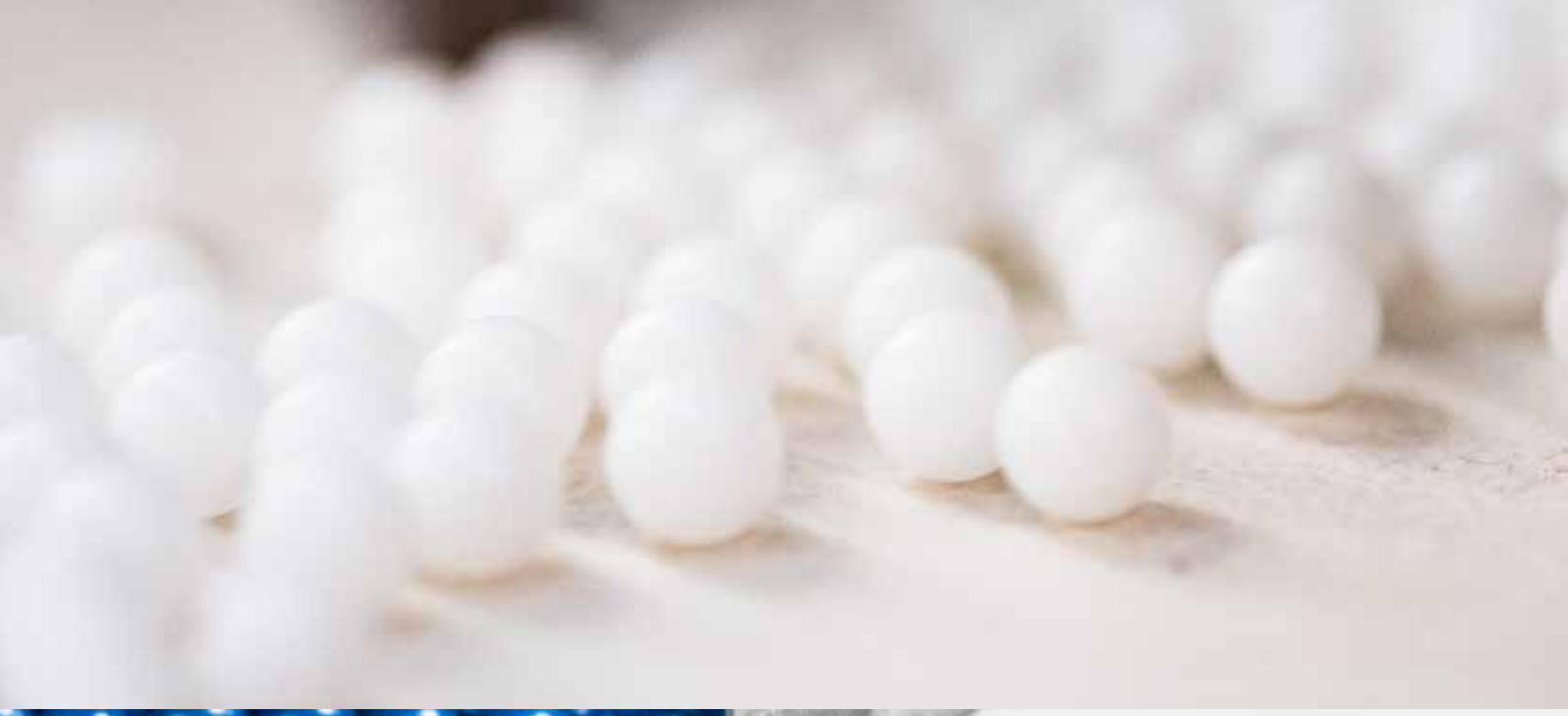
80 employees

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



RUBBER

NBR RUBBER BALLS

Acrylonitrile and butadiene unsatured copolymers balls, they provide good wear/abrasion, heat and compression resistance. Excellent contact compatibility with plastics. Poor resistance to aging. They allow to get closer tolerances despite of the soft components. The natural color of the balls is black.

Applications
Safety pumps and valves (as sealing element), hydraulic and pneumatic applications.

Technical name	Commercial name	Abbreviation
Acrylonitrile Butadiene	Buna-N, Nitrile	NBR

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,20 / 1,40
Young's modulus	E	MPa	Mechanical	-	3,5
Elongation at break	A	%	Mechanical	Room temp.	max 700
Compression set	-	%	Mechanical	Room temp.	25
Friction coefficient	μ	-	Mechanical	Room temp.	0,90
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100ºC)	170
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,25
Electric resistivity		Ohm.mm2/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	Shore A	75 - 90*	-	-
Ultimate tensile strength	Mechanical	MPa	15 - 20	psix10^3	2,15 - 2,90

Property	Type	U.o.M.	Values	U.o.M.	Values
Service temperature	Thermal	ºC	-15 / 100	ºF	5 / 212

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
1,000 - 152,400	mm	3/64 | 6	"	III

Corrosion Resistance
NBR balls are resistant in contact with hydraulic fluids, lubricant oils, transmission fluids, not polar petroleum products, aliphatic hydrocarbons, mineral greases, most diluted acids, basis and salt solutions at room temperature. They are resisting even into air and water environments. They are not resisting against aromatic and chlorinated hydrocarbons, polar solvents, ozone, ketones, esters, aldehydes.

Property	Description
Hardness*	Rubber compounds starting from 40 Shore A can be supplied.

EPDM RUBBER BALLS

Terpolymer EPDM balls provide good resistance against heat, aging, atmospheric agents, UV radiations and good behaviour at low temperatures. They are available even with peroxide crosslinking agent.

Applications
They are used in several industrial applications, as sealing or floating units. They are even used in environment devices, mainly when balls are bleak.

Technical name	Commercial name	Abbreviation
Ethylene-Propylene-Diene Monomer	Buna-EP	EPDM

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,20
Young's modulus	E	MPa	Mechanical	-	8
Elongation at break	A	%	Mechanical	Room temp.	max 600
Compression set	-	%	Mechanical	Room temp.	35
Friction coefficient	μ	-	Mechanical	Room temp.	0,50
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	165
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,15
Electric resistivity		Ohm.mm2/m	Electric	-	> 10^21
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	75 - 90	-	-
Ultimate tensile strength	Mechanical	MPa	11 - 15	psix10^3	1,60 - 2,18
Service temperature	Thermal	ºC	-30 / 130	ºF	-22 / 266

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
1,000 - 152,400	mm	3/64 | 6	"	III

Corrosion Resistance

EPDM rubber is resistant to water, steam, ozone, alkali, alcools, ketones, esters, glycols, salt solutions and oxidizing substances, mild acids, detergents and several organic and inorganic bases. Balls are not resisting in contact with petrol, diesel oil, greases, mineral oils and aliphatic, aromatic and chlorinated hydrocarbons.

VITON RUBBER BALLS

Fluorocarbon elastomer balls, they provide excellent corrosion, aging and high temperature resistance. They are mainly used as sealings and are not flammable.

Applications
Check valves, safety valves and special pumps (sealing elements), for high temperature and aggressive environment applications.

Technical name	Commercial name	Abbreviation
Fluorocarbon (Fluoroelastomer)	Viton	FPM, FKM

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,84
Young's modulus	E	MPa	Mechanical	-	12
Elongation at break	A	%	Mechanical	Room temp.	max 500
Compression set	-	%	Mechanical	Room temp.	26
Friction coefficient	μ	-	Mechanical	Room temp.	0,70
Coefficient of linear thermal		10^-6/ºC	Thermal	(T=0-100ºC)	125,0
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,16
Volume resistivity		*m	Electric	-	> 10^8
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	70 - 90*	-	-
Ultimate tensile strength	Mechanical	MPa	7 - 21	psix10^3	1,00 - 3,00
Service temperature	Thermal	ºC	-18 / 200	ºF	0 / 392

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
1,000 - 152,400	mm	3/64 | 6	"	III

Corrosion Resistance

Viton balls are resistant into water, steam, oxygen, ozone, mineral/silicon/vegetable/animal oils and greases, diesel oil, hydraulic fluids, aliphatic, aromatic and chlorinated hydrocarbons, methanol fuel. They are not resisting against polar solvents, glycols, ammonia gases, amines and alkalis, hot steam, organic acids with low molecular weight.

Property	Description
Hardness*	Rubber compounds starting from 55 Shore A can be supplied.

POLYURETHANE RUBBER BALLS

High performances polyurethane elastomer balls, they are featured by excellent mechanical properties, high wear, laceration and collision resistance, joined with a good elastic behaviour. Good radiation and weather resistance.

Applications
Special bearings, pneumatic pumps, applications where good elastic properties correlated to high toughness are required.

Technical name	Commercial name	Abbreviation
-	Polyurethane rubber	PUR

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,15
Young's modulus	E	MPa	Mechanical	-	100
Elongation at break	A	%	Mechanical	Room temp.	max 750
Compression set	-	%	Mechanical	Room temp.	11
Friction coefficient	μ	-	Mechanical	Room temp.	0,80
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	180,0
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,25
Volume resistivity		*m	Electric	-	> 10^8
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	50 - 95*	-	-
Ultimate tensile strength	Mechanical	MPa	8 - 45	psix10^3	1,16 - 6,53

Property	Type	U.o.M.	Values	U.o.M.	Values
Service temperature	Thermal	ºC	-20 / 80	ºF	-20 / 176

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
1,000 - 152,400	mm	3/64 | 6	"	III

Corrosion Resistance
Good corrosion resistance in contact with nitrogen, oxygen, ozonemineral oils and greases, aliphatic hydrocarbons, diesel oil. They are attacked by hot water and steam, acids, alkalis.

Property	Description
Hardness*	Available hardness: 50-60/65-75/70-80/80-90/85-95 Shore A

SANTOPRENE® BALLS

Vulcanized thermoplastic elastomer polyolefinic material balls, they combine the quality of rubbers (flexibility and durability) with easiness on workability of thermoplastic materials.

Applications
Check valves, diaphragm pumps, automotive field, they are used even as floating elements.

Technical name	Commercial name	Abbreviation
Santoprene®	Santoprene®	TPV

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	0,96
Young's modulus	E	MPa	Mechanical	-	0,6
Elongation at break	A	%	Mechanical	Room temp.	max 620
Compression set	-	%	Mechanical	Room temp.	25
Friction coefficient	μ	-	Mechanical	Room temp.	0,80
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	91
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,20
Electric resistivity		Ohm.mm2/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	Shore A	60 - 90	-	-
Ultimate tensile strength	Mechanical	MPa	6 - 20	psix10^3	0,87 - 2,90
Service temperature	Thermal	ºC	-40 / 130	ºF	-40 / 266

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
3,000 - 115,000	mm	1/8 | 4.1/2	"	III

Corrosion Resistance

Good corrosion resistance in contact with acid and basic solutions (except strong acids), little attack in presence of alcohols, ketones, esthers, eters, phenols, glycols, acqueous solutions; fair resistance with aromatic hydrocarbons and petroleum products.

SILICONE BALLS

Silicone rubber balls, they can be used in a wide range of temperatures with high elastic properties. They are resisting to weather and radiation and they can be insulating or conducting according to the manufacturing processing. They do not provide good mechanical and wear features.

Applications
Silicone rubber balls are used in applications where good elastic properties are required both at low and high temperatures. They are used in the foodstuff, automotive, medical fields and are excellent sealing elements.

Technical name	Commercial name	Abbreviation
Polysiloxane / Polydimethylsiloxane	Silicone	MQ / VMQ / PMVQ / PDMS

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,20
Young's modulus	E	MPa	Mechanical	-	7
Elongation at break	A	%	Mechanical	Room temp.	max 400
Compression set	-	%	Mechanical	Room temp.	40
Friction coefficient	μ	-	Mechanical	Room temp.	1,00
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	230,0
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,17
Electric resistivity		Ohm.mm2/m	Electric	-	10^4 < < 10^15
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	20 - 90	-	-
Ultimate tensile strength	Mechanical	MPa	8 - 12	psix10^3	1,16 - 1,74

Property	Type	U.o.M.	Values	U.o.M.	Values
Service temperature	Thermal	ºC	-60 / 190	ºF	-76 / 374

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
1,000 - 150,000	mm	3/64 | 5.3/4	"	III

Corrosion Resistance
Good corrosion resistance in contct with water (even hot water), oxygen, ozone, hydraulic fluids, animal and vegetal oils and greases, diluted acids. They are not resisting in contact with strong acids and basis, mineral oils and greases, alkalis, aromatic hydrocarbons, ketones, petroleum products, polar solvents.

NATURAL RUBBER (NR) BALLS

Elastomer polymer balls, the raw material is obtained directly from the rubber tree (Hevea Brasiliensis). They provide good mechanical properties and abrasion, friction, compression and low temperatures resistance. Fair resistance to UV radiation. The addition of stirene-butadiene copolymer allows to obtain a rubber (NR/SBR) with improved mechanical properties.

Applications
They are excellent sealing elements (strong bonding to metal parts), then they are often used in different types of pumps and valves. NR balls are even used in the toys field and for manufacture golf balls.

Technical name	Commercial name	Abbreviation
Polyisoprene	Latex	NR

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,32
Young's modulus	E	MPa	Mechanical	-	5
Elongation at break	A	%	Mechanical	Room temp.	max 700
Compression set	-	%	Mechanical	70° 22h	20
Friction coefficient	μ	-	Mechanical	Room temp.	0,85
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	180
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,14
Electric resistivity		Ohm.mm2/m	Electric	-	> 10^19
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	40 - 80*	-	-
Ultimate tensile strength	Mechanical	MPa	10 - 25	psix10^3	1,45 - 3,63

Property	Type	U.o.M.	Values	U.o.M.	Values
Service temperature	Thermal	ºC	-50 / 80	ºF	-58 / 176

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
2,000 - 152,400	mm	3/32 | 6	"	III

Corrosion Resistance
Good corrosion resistance in contact with water, diluted acids and basis, alcohols. Fair in contact with ketones. The behaviour of balls is not suitable in contact with steam, oils, petrol and aromatic hydrocarbons, oxygen and ozone.

Property	Description
Hardness*	Available hardness: 40-50/50-65/65-75/70-80 Shore A

NEOPRENE® ® (CR) BALLS

Polychloroprene elastomer balls, they feature good mechanical characteristics, collision and abrasion resistance. They have an excellent resistance to weathering, UV radiation and auto extinguish properties. Very good adhesion to metals.
Neoprene® is a registered trademark of DuPont Company.

Applications
Industrial field in pumps and valves as sealing elements, they are used even as decorative elements and in sports applications. Excellent behaviour in external environments.

Technical name	Commercial name	Abbreviation
Polychloroprene	Neoprene®	CR

Physical / mechanical / thermal / electric / magnetic properties

Property	Symbol	U.o.M.	Type	Notes	Values
Density		g/cm3	Physical	Room temp.	1,36
Young's modulus	E	MPa	Mechanical	-	2,5
Elongation at break	A	%	Mechanical	Room temp.	max 600
Compression set	-	%	Mechanical	Room temp.	28
Friction coefficient	μ	-	Mechanical	Room temp.	0,65
Coefficient of linear thermal expansion		10^-6/ºC	Thermal	(T=0-100°C)	139
Thermal conductivity		W/(m·K)	Thermal	Room temp.	0,19
Electric resistivity		Ohm.mm2/m	Electric	-	> 10^17
Relative magnetic permeability	μ	-	Magnetic	Diamagnetic	<~1

Technical data

Property	Type	U.o.M.	Values	U.o.M.	Values
Hardness	Mechanical	Shore A	60 - 80	-	-
Ultimate tensile strength	Mechanical	MPa	10 - 25	psix10^3	0,73 - 2,90

Property	Type	U.o.M.	Values	U.o.M.	Values
Service temperature	Thermal	ºC	-30 / 100	ºF	-22 / 212

Range

Diameters (min/max)	U.o.M.	Diameters (min/max)	U.o.M.	Precision Grade
2,000 - 152,400	mm	3/32 | 6	"	III

Corrosion Resistance
Neoprene® balls feature an excellent resistance against sea and fresh water, diluted acids and basis, refrigerant fluids, ammonia, ozone, alkali. Fair resistance against mineral oils, aliphatic hydrocarbons and steam. Poor resistance against strong acids and basis, aromatic hydrocarbons, polar solvents, ketones.

MOLDED RUBBER BALLS

Unground balls, they are manufactured by molded processing and they provide a seamline. They are useful for applications when tolerances are not important.

Applications
Anti-blinding and screen-cleaning devices, grinding & polishing machines.

Technical name	Commercial name	Abbreviation
Ethylene-Propylene-Diene Monomer	Buna-EP	EPDM
Polyisoprene	Latex	NR
Acrylonitrile Butadiene	Buna-N, Nitrile	NBR
Polychloroprene	Neoprene®	CR
Polysiloxane / Polydimethylsiloxane	Silicone	MQ / VMQ / PMVQ / PDMS
Fluorocarbon (Fluoroelastomer)	Viton	HK, FKM, FFKM

Technical data

Property	Symbol	U.o.M.	EPDM	NR	NBR	CR	Silicone	Viton
Density		g/cm3	1,20	1,41	1,20	1,24	1,26	1,84
Young's modulus	E	MPa	8	4	3,5	4	7	12
Ultimate tensile strength	Rm	MPa	11-15	5-15	15-20	5-20	8-12	7-21
Elongation at break (maximum)	A	%	600	700	700	600	400	500
Compression set	-	%	35	20	25	28	40	26
Friction coefficient	μ	-	0,50	0,85	0,90	0,65	1,00	0,70
Coefficient of linear thermal expansion		10^-6/ºC	165,0	180,0	170,0	139,0	230,0	125,0
Thermal conductivity		W/(m·K)	0,15	0,14	0,25	0,19	0,17	0,16
Electric resistivity		Ohm.mm2/m	> 10^21	> 10^19	> 10^15	> 10^17	> 10^14	> 10^8(Vol.)

Property	Symbol	U.o.M.	EPDM	NR	NBR	CR	Silicone	Viton
Hardness	-	Shore A	60-90	50-65	80-90	50-90	65-75	65-75
Service temperature (min/max)	-	ºC	-20/130	-50/80	-15/100	-30/100	-65/180	-18/200

Range

Minimum diameter	Maximum diameter	U.o.M.	Tolerance on diameter (grade IV)	U.o.M.	Roundness (grade IV)	U.o.M.
2,000	10,000	mm	± 0,300	mm	0,300 max	mm
10,001	20,000	mm	± 0,500	mm	0,500 max	mm
20,001	40,000	mm	± 0,750	mm	0,750 max	mm
40,001	60,000	mm	± 1,000	mm	1,000 max	mm
60,001	80,000	mm	± 2,000	mm	2,000 max	mm
80,001	150,000	mm	± 3,000	mm	3,000 max	mm

PRECISION GROUND RUBBER BALLS TOLERANCES

Nominal Dimension		Class M1		Class M2		Class M3		Class M4
Above	Up to & including	Fixed F	Clousure C	Fixed F	Clousure C	Fixed F	Clousure C	Fixed & Closure F & C
0	4	+/-0,08	+/- 0,10	+/- 0,10-	+/- 0,15	+/- 0,25	+/- 0,40	+/- 0,50
4	6,3	+/- 0,10	+/- 0,12	+/- 0,15	+/- 0,20	+/- 0,25	+/- 0,40	+/- 0,50
6,3	10	+/- 0,10	+/- 0,15	+/- 0,20	+/- 0,20	+/- 0,30	+/- 0,50	+/- 0,70
10	16	+/- 0,15	+/- 0,20	+/- 0,20	+/- 0,25	+/- 0,40	+/- 0,60	+/- 0,80
16	25	+/- 0,20	+/- 0,20	+/- 0,25	+/- 0,35	+/- 0,50	+/- 0,80	+/- 1,00
25	40	+/- 0,20	+/- 0,25	+/- 0,35	+/- 0,40	+/- 0,60	+/- 1,00	+/- 1,30
40	63	+/- 0,25	+/- 0,35	+/- 0,40	+/- 0,50	+/- 0,80	+/- 1,30	+/- 1,60
63	100	+/- 0,35	+/- 0,40	+/- 0,50	+/- 0,70	+/- 1,00	+/- 1,60	+/- 2,00
100	160	+/- 0,40	+/- 0,50	+/- 0,70	+/- 0,80	+/- 1,30	+/- 2,00	+/- 2,50
160	-	+/- 0,3 %	+/- 0,4 %	+/- 0,5 %	+/- 0,7 %	+/- 0,8 %	+/- 1,3 %	+/- 1,5 %

Note
Balls are meant to belong to Class M1, unless expressly stated in the quote
*Fixed F: balls with no seamline
**Clousure C: balls with seamline

MAKE YOUR WORLD MOVE

® RGPBALLS S.r.l.

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