



# ***Precision Glass Balls***

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**Medical**



**Bearings**



**Imaging**



**Dispensing**

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Excellent Corrosion Resistance  
Light weight (vs. stainless steel)  
Manufactured to Tight Tolerances  
Cost Effective  
Stable Raw Material Costing



# Precision Glass Ball Specifications

Precision Glass Ball Weights						
Size			Soda Lime Glass		Borosilicate Glass	
Decimal	MM	Inch	Pcs./kg	Pcs./lb.	Pcs./kg	Pcs./lb.
0.0315	0.800	1/32	1492,070	676,792		
0.0394	1.000		763,940	346,517		
0.0625	1.588	1/16	190,769	86,531		
0.0937	2.381	3/32	56,590	25,669	63,440	28,776
0.0984	2.500		48,890	22,176	54,810	24,861
0.1181	3.000		28,290	12,832	31,710	14,383
0.1250	3.175	1/8	23,860	10,823	26,750	12,134
0.1378	3.500		17,810	8,078	19,970	9,058
0.1563	3.969	5/32	12,210	5,538	13,690	6,210
0.1875	4.762	3/16	7,070	3,207	7,930	3,597
0.1969	5.000		6,110	2,771	6,850	3,107
0.2187	5.556	7/32	4,450	2,018	4,990	2,263
0.2500	6.350	1/4	2,980	1,352	3,340	1,515
0.2656	6.747	17/64	2,480	1,125	2,780	1,261
0.2756	7.000		2,220	1,007	2,490	1,129
0.2813	7.144	9/32	2,090	948	2,340	1,061
0.3125	7.938	5/16	1,520	689	1,710	776
0.3150	8.000		1,490	676	1,670	757
0.3437	8.731	11/32	1,140	517	1,280	581
0.3543	9.000		1,040	472	1,170	531
0.3750	9.525	3/8	880	399	990	449
0.4063	10.319	13/32	690	313	770	349
0.4375	11.112	7/16	550	249	620	281
0.4687	11.906	15/32	450	204	500	227
0.4844	12.303	31/64	400	181	450	204
0.5000	12.700	1/2	370	168	410	186
0.5118	13.000		340	154	380	172
0.5313	13.494	17/32	310	141	340	154
0.5512	14.000		270	122	310	141
0.5625	14.288	9/16	260	118	290	132
0.5937	15.081	19/32	220	100	240	109
0.6250	15.875	5/8	190	86	210	95
0.6875	17.462	11/16	140	64	160	73
0.7500	19.050	3/4	110	50	120	54
0.8750	22.225	7/8	65	29	75	34
10000	25.400	1	45	20	50	23
1.1248	28.570	1-1/8	30	14	35	16
1.2500	31.750	1-1/4	24	11	27	12

Mechanical Properties	Soda Lime Glass	Borosilicate Glass
Specific Weight	2.50 kg / ltr	2.23 kg / ltr
Youngs Modulus	65 Gpa	64 Gpa
Hardness (Mohs)	6	7
Linear Thermal Expansion, Th (20-300C)	8.6 x 10 <sup>-6</sup> K <sup>-1</sup>	3.25 x 10 <sup>-6</sup> K <sup>-1</sup>
Transformation Temperature	515°C	530°C
Quality & Tolerances	Soda Lime Glass	Borosilicate Glass
Standard Diameter Tolerance	+/- 0.02mm	+/- 0.02mm
Standard Roundness / Sphericity	≤0.02mm	≤0.02mm
Standard Surface Finish	matte	matte
Special Order Diameter Tolerance	+/- 0.01mm	+/- 0.01mm
Special Order Roundness / Sphericity	≤0.01mm	≤0.01mm
ISO 3290 / 2001/ 12/01	G 100	G 100
Chemical Resistance per DIN Methods	Soda Lime Glass	Borosilicate Glass
Hydrolytic class according to DIN ISO719	3	1
Acidic class according to DIN 12116	2	1
Alcaline class according to DIN ISO 695	2	2
Chemical Composition	Soda Lime Glass	Borosilicate Glass
Silicon Dioxide (SiO <sub>2</sub> )	69.20%	81.20%
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	14%	2.34%
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> )	0.014%	0.016%
Titanium Dioxide (TiO <sub>2</sub> )	0.95%	0.032%
Potassium Oxide (K <sub>2</sub> O)	11.40%	0.85%
Sodium Dioxide (Na <sub>2</sub> O)	6.85%	3.13%
Calcium Oxide (CaO)	2.45%	<0.01%
Manganese Oxide (MgO)	0.10%	<0.01%
Barium Oxide (BaO)	5.98%	<0.01%
Zinc Oxide (ZnO)	0.95%	<0.01%
Antimony Oxide (Sb <sub>2</sub> O <sub>3</sub> )	0.25%	<0.01%
SO <sub>3</sub> /As <sub>2</sub> O <sub>3</sub> /PbO	<0.01%	<0.01%
Boric Oxide (B <sub>2</sub> O <sub>3</sub> )	0.48%	12.30%

Chemical Resistance (Using 2.5mm balls)				Soda Lime Glass	Borosilicate Glass
Medium	Concentration	Temp	Time	Corrosion Rate	
Hydrochloric Acid (HCl)	20.4%	102°C	6 hr	0.002 g/m <sup>2</sup> /h	0.001g/m <sup>2</sup> /h
Nitric Acid (HNO <sub>3</sub> )	30.0%	102°C	6 hr	0.012 g/m <sup>2</sup> /h	0.010 g/m <sup>2</sup> /h
Oxalic Acid (H <sub>2</sub> C <sub>2</sub> O <sub>4</sub> )	30.0%	102°C	6 hr	0.006 g/m <sup>2</sup> /h	0.005 g/m <sup>2</sup> /h
Formic Acid (H <sub>2</sub> CO <sub>2</sub> )	30.0%	102°C	6 hr	0.000 g/m <sup>2</sup> /h	0.000 g/m <sup>2</sup> /h
Sodium Hydroxide (NaOH)	30.0%	102°C	6 hr	1200 g/m <sup>2</sup> /h	1000 g/m <sup>2</sup> /h
Deionized Water (H <sub>2</sub> O)	100.0%	102°C	6 hr	0.005 g/m <sup>2</sup> /h	0.002 g/m <sup>2</sup> /h