



SiLibeads Glass beads Type P Borosilicate

First created on: 2016-10-12 Updated on: 2019-11-05
 Next inspection on: 2019-12-31 Printed on: 2019-11-05

Version: V17/2019

Product: SiLibeads Glass beads Type P Borosilicate

Material: Precision Glass beads made of Borosilicate glass with polished or (fine-)matt surface
 Specific weight: 2.23 kg/l
 Hydrolytic resistance: (DIN ISO 720) HGB 1
 Acidic resistance: (DIN 12116) S 1
 Alkaline resistance: (DIN ISO 695) A 2

Application:

- Glass beads are used as high precision beads for ball bearings in aggressive and corrosive media (solutions)
- Mixing bead in insulin cartridges
- Valves of dosage pumps and dispensers in the cosmetic- and food industry
- Many other special applications in the optical and medical technique.

Technical Data:

Roundness: ≥ 0.99 (ratio width/length (x_{min}/x_{max}))
 Bulk density: mean value 1.30 kg/l (belonging to diameter)
 Refractive index: 1.46
 Size (Diameter): see table Standard Sizes
 Transformation temperature: 586 °C
 Softening point (Littleton point): 787 °C
 Melting point: 1663 °C
 Specific thermal Conductivity: 1.268 W/(m·K)
 Specific thermal capacity: 1.447 kJ/kg K [>600 °C]
 Youngs-Module: 64 GPa
 Hardness according to Mohs: 7
 Linear thermal expansion: $3.3 \times 10^{-6} \text{ K}^{-1}$

Assessment acc. to Food Legislation:

The Glass beads are a consumer good in the sense of §2 clause 6 no. 1 German Code for Food Stuff (LFGB), Commodities and Feeding Stuff. Therefore they have to comply with the legal requirements.

The Glass beads comply with the requirements § 31 of the German Food and Feed Code (LFGB) and of the European Food Regulation 1935/2004/EC, Article 3.

Conformity to Pharmacopoeia:

The Glass beads are in accordance with the current versions of Pharmacopoeia Ph.Eur., USP and JP.

Chemical Analysis; Glass beads made of Borosilicate glass; CAS-No. 65997-17-3 / EINECS 266-046-0:

Name	Method	Weight (Reference values)	CAS-No.	EINECS
Silicon dioxide SiO ₂	DIN 51001	81 %	7631-86-9	231-545-4
Boric oxide B ₂ O ₃	DIN 51086-1	13 %	1303-86-2	215-125-8
Sodium oxide Na ₂ O +	DIN 51001	} 4 %	1313-59-3	215-208-9
Potassium oxide K ₂ O	DIN 51001		12136-45-7	235-227-6
Aluminium oxide Al ₂ O ₃	DIN 51001	2 %	1344-28-1	215-691-6

The heavy metal content of the Glass beads keeps the permitted limits of EU directive 2011/65/EC (RoHS).

Lead < 1000 ppm Cadmium < 100 ppm Chrome VI < 1000 ppm Mercury < 1000 ppm

Product Data Sheet



The German spirit of quality since 1854



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Standard Sizes (special diameters by request):

Diameter *)	Tolerance **)	Roundness**)	Surface	Weight per 1000 pieces	Amount (pieces per kg)
2.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	9.34 g	107,055
2.381 mm 3/32"	+/- 0.02 mm	≤ 0.02 mm	polished	15.76 g	63,448
2.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	18.24 g	54,812
2.700 mm	+/- 0.02 mm	≤ 0.02 mm	polished	22.98 g	43,512
2.780 mm	+/- 0.02 mm	≤ 0.02 mm	polished	25.09 g	39,862
3.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	31.53 g	31,720
3.175 mm 1/8"	+/- 0.02 mm	≤ 0.02 mm	polished	37.37 g	26,759
3.400 mm	+/- 0.02 mm	≤ 0.02 mm	polished	45.89 g	21,790
3.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	50.06 g	19,975
3.969 mm 5/32"	+/- 0.02 mm	≤ 0.02 mm	polished	73.00 g	13,698
4.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	74.73 g	13,382
4.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	106.40 g	9,398
4.762 mm 3/16"	+/- 0.02 mm	≤ 0.02 mm	polished	126.09 g	7,931
5.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	145.95 g	6,851
5.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	194.26 g	5,148
5.556 mm 7/32"	+/- 0.02 mm	≤ 0.02 mm	polished	200.26 g	4,994
5.800 mm	+/- 0.02 mm	≤ 0.02 mm	polished	227.82 g	4,389
6.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	252.21 g	3,965
6.350 mm 1/4"	+/- 0.02 mm	≤ 0.02 mm	polished	298.97 g	3,345
6.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	320.66 g	3,119
6.747 mm 17/64"	+/- 0.02 mm	≤ 0.02 mm	polished	358.62 g	2,788
7.000 mm	+/- 0.02 mm	≤ 0.02 mm	polished	400.50 g	2,497
7.144 mm 9/32"	+/- 0.02 mm	≤ 0.02 mm	polished	425.72 g	2,349
7.500 mm	+/- 0.02 mm	≤ 0.02 mm	polished	492.59 g	2,030
7.938 mm 5/16"	+/- 0.02 mm	≤ 0.02 mm	polished	584.03 g	1,712
8.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	597.83 g	1,673
8.500 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	717.07 g	1,395
8.731 mm 11/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	777.14 g	1,287
9.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	851.20 g	1,175
9.525 mm 3/8"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1009.02 g	991
10.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1167.63 g	856
10.319 mm 13/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1282.97 g	779
10.500 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1351.68 g	740
11.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1554.11 g	643
11.112 mm 14/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1602.07 g	624
11.906 mm 15/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	1970.62 g	507
12.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2017.66 g	496
12.303 mm 31/64"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2174.39 g	460
12.500 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2280.52 g	438
12.700 mm 1/2"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2391.75 g	418
13.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2565.28 g	390
13.494 mm 17/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	2868.97 g	349
14.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	3203.97 g	312
15.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	3940.74 g	254
15.081 mm 19/32"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	4004.93 g	250



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Diameter *)	Tolerance **)	Roundness**)	Surface	Weight per 1000 pieces	Amount (pieces per kg)
15.875 mm 5/8"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	4671.39 g	214
16.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	4782.60 g	209
17.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	5736.56 g	174
18.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	6809.61 g	147
19.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	8008.76 g	125
19.050 mm 3/4"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	8072.15 g	124
20.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	9341.02 g	107
22.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	12432.90 g	80
24.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	16141.29 g	62
25.000 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	18244.19 g	55
25.400 mm 1"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	19133.99 g	52
31.750 mm 1 1/4"	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	37371.08 g	27
38.100 mm	+/- 0.02 mm	≤ 0.02 mm	(fine-)matt	64577.23 g	15

*) special diameters by request

**) for special request tolerance +/- 0.01 mm and roundness ≤ 0.01 mm possible

Chemical resistance of Glass beads Type P (Borosilicate) 2,5 mm Ø, in further media:

Medium	Concentration	Temperature	Time	Corrosion rate
Hydrochlorid Acid (HCl)	20.4 %	102 °C	6 h	0.001 g / m ² / h
Nitric Acid (HNO ₃)	30.0 %	102 °C	6 h	0.010 g / m ² / h
Sulphuric Acid (H ₂ SO ₄)	30.0 %	102 °C	6 h	0.040 g / m ² / h
Oxalic Acid (H ₂ C ₂ O ₄)	30.0 %	102 °C	6 h	0.005 g / m ² / h
Formic Acid (H ₂ CO ₂)	30.0 %	102 °C	6 h	0.000 g / m ² / h
Sodium Hydroxide (NaOH)	30.0 %	102 °C	6 h	1.200 g / m ² / h
Distilled Water (H ₂ O)	100.0 %	102 °C	6 h	0.002 g / m ² / h

Test Report No. 43383/6/AU-04560 (19.01.2001), Dorfner Analysezentrum, D-92242 Hirschau

Additional Information:

Storage indication: Store in a dry manner in closed (original) container by room temperature.
 Disposal: Please consult national laws and local regulations in force for disposal or landfill.
 Safety advice: High risk of slipping due to spillage of product
 Product information: Sample card ... glass beads for technical applications, Safety Data Sheet SiLibeads Type P+M (Borosilicate); Test Reports

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All data are reference values – subject to change without prior notice