TECHNICAL DATA SHEET

Borosilicate Glass 3.3 Laboratory Glassware

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1. Product Overview

This Technical Data Sheet covers performance specifications, material composition, physical properties, and compliance data for laboratory glassware manufactured using Borosilicate Glass 3.3.

The material is designed for high chemical resistance, excellent thermal stability, and precision laboratory applications.

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2. Material Composition (Typical Values)

Component	Chemical Formula	Percentage (%)
Silicon Dioxide	SiO_2	80.5 – 81.5
Boron Oxide	B_2O_3	12.5 – 13.5
Sodium Oxide	Na_2O	3.5 – 4.5
Aluminum Oxide	Al_2O_3	2.0 – 2.5
Potassium Oxide	K_2O	0.3 – 0.8

Values are typical and may vary slightly within standard tolerance limits.

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3. Physical Properties

Property	Unit	Value
Density	g/cm^3	2.23
Coefficient of Thermal Expansion (20 – 300° C)	10^{-6} /K	3.3
Softening Point	° C	820

Property	Unit	Value
Annealing Point	°C	560
Strain Point	°C	515
Thermal Conductivity	W/m · K	1.2
Refractive Index (nd)	—	1.47
Modulus of Elasticity	GPa	64

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4. Thermal Performance

Parameter	Value
Maximum Recommended Continuous Operating Temperature	500°C
Maximum Short-Term Exposure	550°C
Thermal Shock Resistance	ΔT ≈ 160°C
Working Temperature Range	-70°C to +500°C

Borosilicate 3.3 glass demonstrates excellent resistance to thermal shock due to its low coefficient of expansion.

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5. Chemical Resistance Classification

Test Standard	Classification
Hydrolytic Resistance (ISO 719)	Class HGB 1
Hydrolytic Resistance (ISO 720)	Class HGA 1
Acid Resistance (ISO 1776)	Class 1
Alkali Resistance (ISO 695)	Class 2

Highly resistant to:

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Acids (except hydrofluoric acid and hot phosphoric acid)

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Saline solutions

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Organic solvents

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Water and neutral solutions

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6. Calibration & Dimensional Tolerance (Example – Class A Volumetric Flask)

Capacity	Tolerance (± ml)
10 ml	0.02
25 ml	0.03
50 ml	0.05
100 ml	0.08
250 ml	0.12
500 ml	0.20
1000 ml	0.30

Calibration performed at 20°C reference temperature.

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7. Ground Joint Specifications

Joint Size	Tolerance
14/23	ISO 383
19/26	ISO 383
24/29	ISO 383
29/32	ISO 383

Precision ground for leak-proof connections.

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8. Mechanical Resistance

Test	Result
Impact Resistance	High
Internal Stress	Controlled via annealing process
Surface Finish	Smooth, low-defect

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9. Compliance & Standards

Manufactured in accordance with:

- ISO 3585 (Borosilicate Glass 3.3)
- ASTM E438 Type I, Class A
- DIN / ISO volumetric calibration standards
- ISO hydrolytic resistance standards

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10. Storage & Handling Guidelines

- Avoid direct flame contact unless specified
- Use gradual heating and cooling procedures
- Avoid impact stress and sudden temperature changes

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Inspect joints and surfaces before use

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11. Disclaimer

The data provided herein represents typical values and is intended for technical guidance only. Users should perform suitability testing under actual working conditions.
