# Standard Quality Condition of Laboratory glass

**Agreed between:**

**Sklárny Moravia, akciová společnost**

Úsobrno č.p. 79

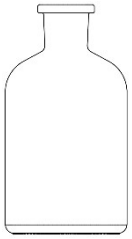
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**and**

## A. Overview of bottles and stoppers

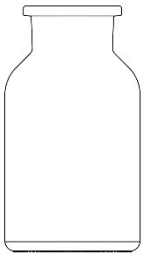
### A.1 Bottle reagent narrow mouth - type LAB2000, 2001, 2002

It is manufactured for filling capacity: 50, 100, 250, 500, 1000 a 2000 ml



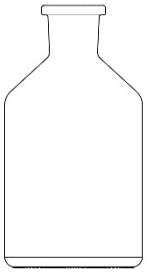
### A.2 Bottle wide mouth – type LAB2004, 2005, 2006

It is manufactured for filling capacity: 50, 100, 250, 500, 1000 a 2000 ml



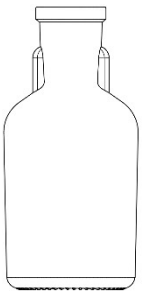
### A.3 Bottle reagent narrow mouth steilbrust – type LAB2008, 2009, 2010

It is manufactured for filling capacity: 50, 100, 250, 500, 1000 a 2000 ml

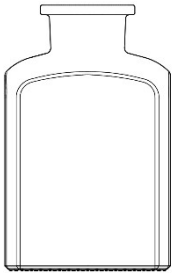


### A.4 Bottle dropping grinded with stopper – type LAB2020

It is manufactured for filling capacity: 50 a 100 ml



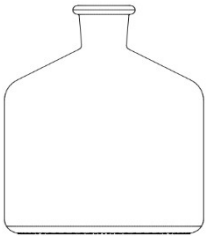
### A.5 Bottle square type, wide mouth – type LAB2041, 2042, 2043



It is manufactured for filling capacity: 100, 150, 250, 350*, 500 a 750 ml

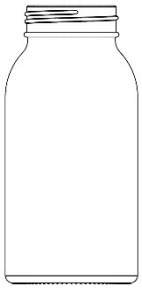
* The 350 ml bottle is only in limited quantities.

### A.6 Burette bottle – LAB2100



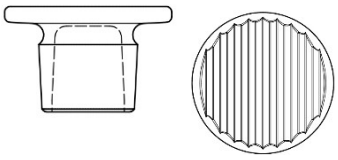
It is manufactured for filling capacity 2000 ml.

### A.7 Bottle with screw round, wide mouth – type 2200, 2210



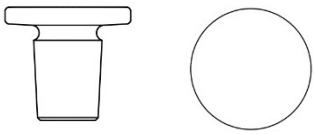
It is manufactured for filling capacity: 75, 300, 800 a 1200 ml.

### A.8 Stopper round wide – type 2752



Can have a smooth fingerboard surface or a grooved surface

### A.9 Stopper round narrow reagent – type 2772 for bottle LAB2002



Can have a smooth fingerboard surface or a grooved surface

### A.10 Stopper dropping – type 4094 for bottle LAB2020



It is manufactured for bottles of capacity: 50 a 100 ml.

# B. General requirements

## B.1 General requirements

1. Bottles and jars („bottles“ hereinafter) are produced from transparent (flint) or coloured glass (amber, black). The transparent glass (flint) is made with low content of cullet - up to 30 %. It may have a slight hue of grey, pink, green, yellow or blue, which is noticeable mainly in larger thickness of the glass. The colouring is measured in the CIE system under D65 light and is related to the wall thickness of **4 mm**. The glass parameters are the following:

| Parameter L (%) | Parameter „a“ red/green | Parameter „b“ yellow/blue |
|---|---|---|
| > 85 | < -0,8; 0,1 > | < -0,2; 2 > |

Amber glass allows for a slight diversity in the colour saturation. In one bottle, a slight diversity in the saturation is only allowed within a range caused by the wall thickness.
The glass parameters are the following (D65 light, **4 mm** wall):

| Parameter L (%) | Dominant wavelength ƛ (nm) |
|---|---|
| 40 - 65 | 575 - 610 |

Black glass is non-transparent glass that can have a hue from brownish black to bluish black when seen against a strong light. The maximum black glass light permeability in visible spectrum (400-720 nm) is **4 %** (measured on a sample with the wall thickness of 3.5 - 4 mm).

2. The bottles are made from third**,** possibly at third and fourth class interface, hydrolytic glass resistance against water at **98°C** (ISO 719).
3. The bottles are produced and supplied in accordance with (EU) 2025/40.
4. Warranty for our bottles is 6 months from delivery date.

## B.2 Physical properties

1. It is required that the bottles are well cooled; sharply unconfined permanent internal stress corresponding to the path difference, max. **100 nm/cm** is allowed for bottle up to 1 l included and **120 nm/cm** for bottle over 1 l (with determination uncertainty of 10%). It is possible to test only bottles made of transparent glass.
2. It is required, that the bottle have to withstand the resistance test against sudden temperature change by **45°C**. (bottles are tested for temperature change from 65°C to 20°C, with method according to ISO 7459). Bottles are not intended for filling by content with temperature higher than **80°C**.
3. Bottles are by default coated by hot-end coating ($SnO_2$) and cold-end coating (TEGOGLASS T5 or RP 40 LT) to improve surface resistance against scratching. If client requires bottle with no hot-end coating or cold-end coating applied, for example by reason of consecutive bottle decoration, this request have to be mentioned in the order.
4. Bottles are produced with resistance for consecutive process of decoration and burning up to **583°C**. For bottles made of black glass, bottles with complicated shape and bottles with uneven glass thickness (bottles with thick bottom), it is necessary to appoint longer heat-up time and also longer cool-down time (Total proces duration is min. **240 minutes**).
5. Internal surface of bottles not older than 6 months from production date must not show significant glass corrosion. For bottles sold from the stock, slight corrosion inside of the bottle is an ussual occurrence and does not affect the use of the bottle for laboratory purposes. Corrosion can be removed by washing the bottle with 1 – 2 % acetic acid solution.

## B.3 Dimensional and volumetric tolerances

1. Deviation from vertical axis of the bottle higher than 120mm incl. must not be higher than **0,3 + 0,1 * H** (value rounded to the entire tenth), where H is bottle height in mm. For bottles lower than 120 mm, the deviation from vertical axis must not be higher than **1,5 mm**. For bottles higher than 300 mm, the deviation from vertical axis must not be higher than **3,5 mm**. Exceptions from this rule have to be mentioned on particular product drawings.
2. Tolerances for other untolerated bottle dimensions (except above mentioned) are set by following table:

| Nominal dimension (mm) | Tolerance (mm) |
|---|---|
| 0 - 10 (incld.) | ± 0,5 |
| 10 - 50 (incld.) | ± 1,0 |
| 50 - 150 (incld.) | ± 2,0 |
| 150 - 250 (incld.) | ± 2,5 |
| 250 - 350 (incld.) | ± 3,0 |

3. If not specified in the drawing documentation, then the dimension tolerance of the bottle finish over the ring and the dimension tolerance of the stoppers over the fingerboard are as follows:

| Nominal dimension (mm) | Tolerance (mm) |
|---|---|
| 0 – 20 | ± 0,5 |
| 20,1 – 40 | ± 0,8 |
| 40,1 – 60 | ± 1 |
| 60,1 – 80 | ± 1,2 |
| Nad 80 | ± 1,4 |

5. The deviation in flatness of the fingerboard surface is max. **0.8 mm** for stopper with a fingerboard diameter up to and including 60 mm, max. **1 mm** for stopper with a fingerboard diameter over 60 mm.
6. The bottles put on the smooth horizontal surface must not sway and spin around.
7. Side seams and seams near the bottom are not allowed higher than **0,5 mm**, seams in the label area must not exceed **0,3 mm**. Seams on the sealing surface of finish must not exceed **0,2 mm**; on the outer side of threaded finish must not exceed **0,3 mm**; on other types of finish must not exceed **0,5 mm**.
8. Deflection from the collinearity of the finish and bottom plane is not allowed for more than **0,5 mm** at the finish with average up to 30 mm and **0,7 mm** at the finish over 30 mm.
9. Thickness of bottle wall and bottom is set by following table:

| | Filling capacity of bottle (l) | | | |
|---|---|---|---|---|
| | ≤ 0,2 (incld.) | 0,2 – 0,5 (incld.) | 0,5 – 1,25 (incld.) | > 1,25 |
| Walls of rotational bottle without handle | > 1,2 mm | > 1,4 mm | > 1,4 mm | > 1,8 mm |
| Walls of non-rotational bottle or with handle | > 1 mm | > 1,2 mm | > 1,4 mm | > 1,6 mm |
| Bottom thickness | > 1,8 mm | > 2 mm | > 2 mm | > 3 mm |

Note 1: For a minimal wall thickness / bottom are considered 2/3 values listed in the table.

10. The total bottle volume is measured under the stopper (with the exception of the screw-thread powder bottle from series LAB 2200) and unless otherwise stated in the drawing, the total volume tolerance is as follows:

| Filling capacity of bottle (ml): | Tolerance (ml): |
|---|---|
| Up to 100 | ± 6 |
| 100 – 200 (incl.) | ± 8 |
| 200 – 400 (incl.) | ± 10 |
| 400 – 1000 (incl.) | ± 12 |
| 1000 – 1500 (incl.) | ± 15 |
| 1500 – 2000 (incl.) | ± 20 |

11. The volume is determined as the weight difference between an empty bottle and a bottle filled with 17-23 °C water.

## B.5 Identification, packaging, additional information

1. Bottles have identification marks in bottom or near bottom, according to product drawing.
2. Fundamental identification mark for backtracking of bottle in one delivery is pallet label. Each pallet is supplied with two pallet labels and Packaging label from box. If client wants to use own design of pallet labels, it is necessary to mention this in the order. The bottles can be identified by invisible printing (date + time) near bottle bottom.
3. Bottle package is done in a standard cardboard boxes. A different way of packaging can be agreed with the customer. By default, pallets are packed in that way, so the bottles will be protected from weather conditions. Pallets are not hermetically sealed.
4. Laboratory bottles are intended for storage of chemical substances and mixtures. We recommend rinsing the bottles with distilled water before use. In the case of grinded bottles, there may occur glass dust on external and internal wall sand bottom of the bottle from grinding process and surface stains caused by dried rinse water residue. A perfect washing process cannot be ensured within the grinding production process. Such bottles must be rinsed before use. We recommend rinsing with a 2% acetic acid solution followed by distilled water.

   If bottles are intended for food and beverage storage, the beverage / food manufacturer must rinse the bottles properly with drinking water or water with low % alcohol before filling! Grinded bottles are recommended to be rinsed first with 2% acetic acid solution followed by drinking water or water with low % alcohol! We recommend washing the outside of the bottle as well.
5. Absolute tightness cannot be guaranteed for grinded bottles with grinded stoppers. Therefore we do not recommend to transport liquids. Any use of waxes and sealing material to ensure better tightness is solely the responsibility of the user of the sealing material.
6. Occasional washing of bottles in home dishwashers is allowed, however, the conditions from point B.2.2 must be respected. Frequent bottle washing using “efficient” detergents leads to surface corrosion of the glass.

# C. Inspection of deliveries

## C.1 Way of delivery inspection at client's side

Delivery is inspected by statistic inspection in accordance with ISO 2859-1, more specifically by inspection through one selection for control level I.

| Delivery quantity | Scope of selection | Maximum admissible quantity of defective products | | | | |
|---|---|---|---|---|---|---|
| | | AQL=0,025 | AQL=0,65 | AQL=2,5 | AQL=4 | AQL=6,5 |
| 3 201–10 000 | 80 | 0 | 1 | 5 | 7 | 10 |
| 10 001-35 000 | 125 | 0 | 2 | 7 | 10 | 14 |
| 35 001-150 000 | 200 | 0 | 3 | 10 | 14 | 21 |
| 150 001-500 000 | 315 | 0 | 5 | 14 | 21 | 21 |

## C.2 Admissibility of individual defects in delivery – AQL

### Critical defects

**AQL = 0**

Types of defects in this category:

- glass fibers inside of product (“birdswing”), which can easily break
- spikes inside of product, which can easily break
- stuck glass inside of product, it is impossible to remove it by compressed air, flushing out, or turning the bottle upside down
- contamination of the inside of bottle by hazardous chemical substances.

**AQL = 0,025**

Types of defects in this category:

- glass filaments inside of product (“bird swings”), which can not easily break
- spikes inside of product, which can not easily break
- partially or fully choked finish
- overpress on the inside finish
- significant light spots with wall thickness lower than 0,5 mm, which can cause easy destruction of bottle
- teared finish
- sharp seam in finish or body, which expressively overlaps the bottle surface.

### Major defects 1
**AQL = 0,65**

Types of defects in this category:

- finish malformation, which obstructs the application of closure
- split in finish, under finish, fissures in seating area of the finish, chipped finish
- split in the stopper (a chip with a smooth surface up to 1cm on the underside of the stopper leg is not a defect)
- sharp overpressure on the stopper
- pressed edge of the finish at screw-threadpowder bottles, which can lead to efficiency limitations of the sealing compound.
- open blister bigger than 4 mm*
- stone in glass bigger than 2 mm with internal stress.

**Major defects 2**
**AQL = 2,5**

Types of defects in this category:

- brimfull capacity out of tolerances
- bottle height and maximum bottle width outside tolerance
- deviation from axis is higher than allowed limit
- dimension of the ground surface of the bottle neck or stopper is out of tolerance
- fissures in finish (except seating area of the finish), neck, body and bottom, which can lead to bottle breakage
- crack in stopper
- stones in glass of size 1-2 mm
- open blister of size 1-4 mm*
- wall or bottom thickness lower than 2/3 of thickness mentioned in part B.3
- significant deformation or warp/sunken bottles, which causes problems with filling or decoration
- reduced sudden thermal shock resistance.

**Minor defects**
**AQL = 4,0**

Types of defects in this category:

- bigger mould seams and shifts
- deformed thread, if it does not affect the application of closures
- bottle finish non-parallel with the bottom
- failure to maintain the flatness of the fingerboard stopper surface
- encapsulated blisters with diameter higher than 4 mm*; encapsulated blisters with diameter 1 – 4 mm*, if their quantity is higher than 4 pcs and they make clumps.
- dust bubbles (less than 1 mm) in a number larger than 8 per 40 $mm^2$; in bottles from transition glass, dust bubbles are allowed without restriction
- accentuated and sharp wrinkles in body or bottom
- area with visible wrinkles (wash boards) bigger than 20 $mm^2$ for bottles from 0,05 to 0,2 l, 40 $mm^2$ for bottles from 0,25 l to 0,8 l, 60 $mm^2$ for bottles 1 l and bigger
- cords in body longer than 20 mm for bottles from 0,05 to 0,2 l, 40 mm for bottles from 0,25 l to 0,8 l, and 60 mm for bottles with capacity 1 l and bigger
- “bald spots” in grounded areas, if their size is higher than 1/5 of the vertical profile of the ground surface
- sunken bottom
- scabby bottom
- distinctive cat scratches
- “maps” on surface, orange surface, pitted surface, dent on surface, ,… more than 25% on the visible surface
- distinctive imprint on the stopper from the conveyor belt.
- contaminated outside surface of bottle (emulsion, lubricants).

Note: * Size is valid for round blisters. Oval-shaped blisters are calculated according to: B = (width+length)/2

Max number of bottle with defect is 4% while number of defects must not exceed the AQL of the given group. Exceeding of applicable AQL for above mentioned defects is reason for complaint.

### C.3 Admissible % of bottle breakage during filling and packaging

Admissible % of bottle breakage during filling and packaging is set by following table:

| Bottle shape | Flint glass | Amber glass | Black glass |
|---|---|---|---|
| Rotational bottle | 0,3 % | 0,4 % | 0,5 % |
| Rectangular bottle | 0,3 % | 0,5 % | 0,7 % |

## D. Additional requirements agreed with client

# E. Rules for complaints

Our target is to supply bottles in agreed quality. In case, that there will be appearance of bottles with defects beyond these agreed standard quality conditions in the delivery, the client has the right to complaint. Warranty for our bottles is 6 months from delivery date, max 12 months from production date, if it wasn´t agreed different condition (in part C).

The procedure for complaint is following:

1) The complaint is placed to the attention of company salesperson, who takes care of particular business case.
2) The complaint has to be placed in written form (fax, letter, e-mail). A letter of complaint has to contain following information:
   - delivery note identification number
   - number of filled bottles
   - total quantity of delivered bottles
   - quantity of defective bottles
   - The reason of complaint (defect description). It is very helpful, if there's also an information, if the problem appears on particular mould number (mould number is located in the bottom or near the bottom of bottle), or if the appearance of defect is not related with mould number
   - copies of pallet labels
   - photos of complained bottles with defect, or samples of defective bottles will be sent to Sklárny Moravia (at supplier costs)
   - Heat-treatment curve for bottles which were decorated.

   All these information are important for complaint qualification and for determination of defect cause. Without these data and information, it is not possible to accept the complaint!
3) It is not allowed to scrap or waste the bottles – this decision have to be made by supplier's salesperson. Salesperson have to inform the client within 3 work days, if supplier wants to withdraw the bottles, or to propose following steps in complaint.
4) The result of complaint (if it was accepted or rejected) will be sent to client within 14 days after all informations about complaint were received (this includes also delivery of samples, if requested, and also visit at client's place, if it is necessary). The client will also obtain proposal of steps, which will be taken by supplier to prevent future appearance of complained problem by supplier salesperson, or supplier quality representative.

It is not possible to apply the complaint, if the bottles damage cause is:

- unappropriate warehousing and manipulation at client's side
- by effect of big temperature shock (this is valid especially for the winter time, when the bottles are transported from non-heated warehouse and filled by hot content, where the difference of temperatures is higher than 45°C)
- the damage appears during decoration of bottles arranged by client (for example by cause of incorrect parameters set for decoration process).

Date of agreement:

Supplier representative: Client representative:

…..... …....

(signature) (signature)