

Closets for use with chemicals —

Part 1: Specification for portable closets

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Committees responsible for this British Standard

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British Precast Concrete Federation
Chartered Institution of Water and Environmental Management
Department of the Environment, Transport and the Regions
(Building Research Establishment)
Institution of Civil Engineers
Water Services Association of England and Wales

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The Caravan Club
Individual Manufacturers
Inland Waterways Association
National Caravan Council

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Foreword

This part of BS 2081 has been prepared by Subcommittee B/505/40, Wastewater treatment plants. It supersedes BS 2081-1:1980, which is withdrawn.

Parts 1 and 2 of BS 2081 have been revised to reflect current practice in the provision and use of chemical closets. Part 1 deals specifically with portable chemical closets (i.e. closets which may be carried by one person without spillage when filled to their effective working capacity). Part 2 deals specifically with permanently installed closets (i.e. closets which require special tools to remove them from their installed position).

In order to allow the use of new materials and manufacturing methods in the future, this standard specifies performance requirements rather than precise materials and dimensions, except insofar as they are necessary for interchangeability.

Part 3 of this standard is in preparation. It will be a code of practice, relating to the safe use, handling and storage of the chemicals used in chemical closets, and in particular will provide guidance on the safe disposal of wastes from chemical closets.

Annexes A to G of this standard are normative.

Aircraft applications are specialized and remain outside the scope of this standard.

A British Standard does not purport to include all necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 5 and a back cover.

1 Scope

This standard specifies performance requirements and test methods for portable chemical closets.

It covers only those closets which may be used for the following applications:

- a) camping sites, caravan sites and marinas;
- b) caravans and motor caravans;
- c) small boats;
- d) remote facilities without access to other forms of drainage.

It does not cover closet installations in aircraft.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 2893:1989, *Specification for chemical preparations for portable and transportable chemical closets.*

3 Terms and definitions

For the purposes of this part of BS 2081, the following terms and definitions apply.

3.1

chemical closet

sanitary appliance comprising integral or holding waste container, cover, seat, bowl and handle(s), designed to receive and contain human excreta to be treated by chemicals

3.2

portable chemical closet

a chemical closet having an effective working capacity of not more than 20 l which has not been permanently installed

3.3

effective waste capacity

maximum capacity in litres which the waste container is designed to hold

3.4

manufacturer

chemical closet manufacturer

3.5

excreta

human body wastes

3.6

flushing closet

closet with a built-in pumped flushing facility which can be flushed from a position separate from the waste container

4 Instructions for use

Closets shall be provided with instructions for use, which shall include:

- a) information regarding the chemicals to be used, including the dosage and the method and frequency of charging and emptying the waste container;
- b) information on the use, cleaning and maintenance of the closet;
- c) information on the precautions to be taken when handling chemical preparations, including a warning that the mixing of incompatible chemicals may produce toxic results;
- d) advice and guidance relating to the safe disposal of closet wastes.

5 Marking

Closets shall be permanently marked in a readily visible position with the following information:

- a) the number of this British Standard¹⁾;
- b) the manufacturer's name or registered identification mark;
- c) the specified chemical(s) to be used;
- d) the word "portable";
- e) the effective waste capacity in litres.

¹⁾ Marking BS 2081-1:1998 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

6 Design, construction and dimensions

6.1 General

The closet shall be so designed and constructed that it shall be capable of containing the excreta and the chemical preparation specified by the manufacturer in accordance with BS 2893, and without ventilation limit the odour. When used and maintained in accordance with the manufacturer's instructions, the design and finish of the product shall present no risk of personal injury or damage to clothing.

The total height above the base to the top face of the seat, excluding any cover, shall be not less than 300 mm and not more than 490 mm.

6.2 Waste container

The waste container shall have an effective working capacity of not more than 20 l.

The closet shall be so constructed that all solid and liquid excreta is directed into the waste container. Where a removable waste container is provided it shall be fitted with a means to facilitate handling without spillage. The design of the waste container shall be free from features, fittings or internal structures which obstruct cleansing. If it includes an inner or detachable container, this shall be easily removable.

All working parts shall be removable for servicing.

The waste container shall be fitted with an indicator to show when it is more than 75 % full by volume. The indicator shall be visible from a standing position in front of the unit.

6.3 Handles

The waste container, whether a separate unit or part of the base unit of the appliance, shall be provided with an attached carrying handle(s) by which the unit may be carried without risk of spillage of the contents. Handles shall be positioned so as not to be fouled by the contents when the closet is being used or emptied.

6.4 Cover, seat and bowl

The cover and seat shall be hinged or attached in another way to the base unit. The dimensions of the seat opening shall be not less than 235 mm and not more than 300 mm in length and not less than 180 mm and not more than 250 mm in width at the widest point. The dimensions of the bowl aperture shall be not less than those of the seat opening.

The distance from the top of the seat to the lower aperture of the bowl shall be not less than 175 mm. When the lower aperture of the bowl is operated by the weight of the excreta, this distance shall be not less than 160 mm.

The internal diameter of the lower aperture of the bowl shall be not less than 65 mm.

6.5 Flushing mechanism

The pump or bellow of the flushing mechanism shall be capable of wetting the whole area of the bowl below the flush rim.

7 Materials and workmanship

7.1 General requirements

All materials and finishes used in manufacture shall conform to the appropriate British Standards for those products. When tested in accordance with annexes A to G, these materials and finishes shall show no deterioration.

7.2 Physical requirements

7.2.1 Stability of the closet assembly

When tested in accordance with annex A, the deflection of the closet assembly shall not exceed 20 mm at any position around the closet periphery. One hour after removal of the load the residual deflection shall not exceed 5 mm. The closet shall not have sustained any damage or deformation during the test and any mechanical parts shall operate as intended after removal of the load. There shall be no leaks from the closet.

7.2.2 Impact resistance of the cover and seat

When tested in accordance with annex B, the seat and cover hinge shall be capable of withstanding the impact test described in annex B without damage, and any mechanical part shall operate as intended after the test.

7.3 Chemical resistance requirements

7.3.1 General

All materials of manufacture with which the excreta and/or the specified chemical are likely to come into contact shall be capable of withstanding the expected corrosive action.

7.3.2 Chemical resistance of the bowl and container

When tested in accordance with C.1.1 and C.1.2, there shall be no physical deterioration of the container tank and bowl. There shall be no staining of the tank and bowl, but internal staining or bleaching of the container tank is permissible.

7.3.3 Chemical resistance of the cover and seat

When tested in accordance with C.1.3, there shall be no physical deterioration or staining of the seat or cover.

7.3.4 Resistance to water absorption of the cover and seat

When tested in accordance with annex D, the percentage increase in mass of either the seat or the cover shall be no greater than 0.75. There shall be no changes in dimensions and surface characteristics of either the seat or cover.

7.3.5 Stain transfer from the cover and seat

When tested in accordance with annex E, no transfer of colour pigment from the seat or cover to the white cloth shall occur.

7.4 Mechanical requirements**7.4.1 Efficiency and durability of the flushing mechanism**

When tested in accordance with annex F, the variation in the flushing volume shall be less than $\pm 10\%$ over the range of samples collected. There shall be no obvious loosening or tightening of the flushing mechanism after the completion of the test. The pump or bellow shall continue to wet the whole area of the bowl below the flush rim on completion of the test.

7.4.2 Strength of the handles and fixings

When tested in accordance with the strength test described in annex G, there shall be no failure of a handle and after the test, when the container has been emptied, there shall be no permanent distortion of the assembly.

Annex A (normative)**Load test on the closet assembly****A.1 Test conditions**

Carry out the test at a temperature of $20\text{ °C} \pm 5\text{ °C}$.

A.2 Apparatus

A.2.1 Plywood board, with a minimum thickness of 25 mm.

A.3 Procedure

Place the closet upon a firm, flat, horizontal surface with the seat in the closed position and the cover in the raised position. Place the plywood board on the seat so as to cover the seat ring completely without it being in contact with any other part of the closet. Measure the distance of the board above or below any convenient fixed datum level (e.g. the surface on which the closet stands).

Apply a steady load of $400\text{ kg} \pm 1\text{ kg}$ to the board, at a position corresponding to the centre of the seat ring over an area of not more than 0.025 m^2 , and measure the distance of the board above or below a datum line at 1 min intervals. When this distance has remained constant for two successive readings, note this value and remove the load. Leave the closet unloaded for 1 h and then take the same measurement in this unloaded condition.

Annex B (normative)**Impact tests on the seat and cover****B.1 Test conditions**

Carry out the test at a temperature of $20\text{ °C} \pm 5\text{ °C}$.

B.2 Procedure**B.2.1 Closet, seat and cover**

Assemble the seat and cover in the closed position on the closet. Raise them into the vertical position and allow them to swing downwards together and freely onto their normal support surface.

Repeat the procedure 100 times.

B.2.2 Closet cover

Raise the cover into the vertical position and allow it to swing downwards and freely onto the seat.

Repeat the procedure 100 times.

B.2.3 Closet seat

Assemble the seat alone in the closed position on the closet. Raise it to the vertical position and allow it to swing downwards and freely onto its support surface.

Repeat the procedure 100 times.

Annex C (normative)**Chemical resistance tests****C.1 Procedure****C.1.1 Container and bowl**

Fill the container and bowl with a quantity of undiluted chemicals as specified by the manufacturer for normal use and leave for a minimum of 24 h. If the chemicals are in powder form, use a saturated solution.

After 24 h, empty, rinse with clean water and examine for changes of dimension and deterioration in both the materials of construction and in their surface finish.

C.1.2 Container tank

Fill the tank with a diluted chemical solution as specified by the manufacturer for normal use. Leave this charge in the container for a minimum period of four weeks. After four weeks, empty, rinse with clean water and examine for changes of dimension and deterioration in the materials of construction and in their surface finish.

C.1.3 Seat and cover (splash test)

Fully immerse the seat and cover in undiluted chemicals as specified for use by the chemical manufacturer, then remove and leave for 1 h. If the chemicals are in powder form, use a saturated solution. After 1 h rinse with clean water and examine for changes of dimension and deterioration in the materials of construction and in their surface finish.

Annex D (normative)**Water absorption tests on the seat and cover****D.1 Apparatus**

D.1.1 Humidity cabinet, capable of maintaining a temperature of $20\text{ °C} \pm 2\text{ °C}$ and a relative humidity of $70\% \pm 10\%$.

D.1.2 Balance, capable of weighing the seat or cover to an accuracy of 0.1 g.

D.1.3 Vessel, capable of containing enough water to submerge the seat or cover.

D.2 Procedure

Condition the seat or cover in the humidity cabinet at $20\text{ °C} \pm 2\text{ °C}$ and at $70\% \pm 10\%$ relative humidity, for a minimum of 24 h.

Weigh the seat or cover. Record this mass to the nearest 0.1 g (M_1).

Immerse the whole of the seat or cover in water for a minimum of 24 h at $20\text{ °C} \pm 2\text{ °C}$.

Remove the seat or cover from the water and immediately blot off the surface water and weigh the specimen again. Record this mass to the nearest 0.1 g (M_2).

D.3 Calculation and expression of results

Calculate the percentage increase in mass to two decimal places using the following formula:

$$\text{percentage increase} = \frac{100 (M_2 - M_1)}{M_1}$$

where

- M_1 is the initial mass of the seat or cover;
 M_2 is the mass of the seat or cover after immersion in water.

Annex E (normative)**Staining test on the cover and the seat****E.1 Apparatus**

E.1.1 *White cotton cloth.*

E.2 Procedure

Ensure that the seat and cover are dry. Rub the seat and cover rapidly with the cloth for a period of not less than 5 s. Examine the white cloth and observe whether any stain has been transferred to it.

Annex F (normative)**Test for the flushing mechanism****F.1 Apparatus**

F.1.1 *Full flow three-way valve*, inserted into the feed hose from the pump to the bowl.

F.1.2 *Measuring cylinder*, capable of holding the full contents of a flushing cycle.

F.1.3 *Flexible pipe*, feeding from the side arm of the three-way valve into the measuring cylinder.

F.2 Procedure

Fill the tank to half its maximum capacity with water and add the requisite amount of undiluted chemical for normal operation of a tank of that capacity. With the three-way valve feeding to the bowl, operate the flushing mechanism for a minimum of 20 cycles to ensure thorough mixing of the water and chemical, and adequate priming of the pumping mechanism.

Change the three-way valve to discharge into the measuring cylinder and operate the flushing mechanism for one cycle. Record the volume collected and return this liquid to the bowl.

Change the three-way valve to feed to the bowl and operate for a minimum of 499 cycles.

Change the three-way valve to discharge into the measuring cylinder. Operate the flushing mechanism for one cycle, record the volume of liquid collected and return the liquid to the bowl.

Repeat the above procedure for a minimum of 5 000 cycles, collecting and recording the volume of a single cycle every 500 cycles.

Annex G (normative)**Strength test for handles and fixings****G.1 Procedure**

Fill the container with sufficient sand to give an overload of 25 % by mass above its design limit. Lift and suspend the container by the handle or handles for a minimum of 15 min.

Examine the handles, fixings and container tank for residual deformation and cracking.

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