Republic of South Africa

EDICT OF GOVERNMENT

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SANS 10400-Q (2011) (English): The application of the National Building Regulations Part Q: Non-water-borne means of sanitary disposal

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Edition 3

SOUTH AFRICAN NATIONAL STANDARD

The application of the National Building Regulations

Part Q: Non-water-borne means of sanitary disposal

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Table of changes

Change No.	Date	Scope

Acknowledgement

The SABS Standards Division wishes to acknowledge the work of the National Home Builders Registration Council's Technical Advisory Committee, Agrément South Africa, and the South African Institution of Civil Engineering in interpreting functional regulations and updating many of the deemed-to-satisfy requirements relating to structural performance.

Foreword

This South African standard was approved by National Committee SABS SC 138F, *Water and sanitation – Equipment and systems – Drainage*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in March 2011.

This document supersedes the corresponding parts of SABS 0400:1990 (first revision).

Compliance with the requirements of this document will be deemed to be compliance with the requirements of part Q of the National Building Regulations, issued in terms of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977).

SANS 10400 consists of the following parts, under the general title *The application of the National Building Regulations:*

Part A: General principles and requirements.

Part B: Structural design.

Part C: Dimensions.

Part D: Public safety.

Part F: Site operations.

Part G: Excavations.

Part H: Foundations.

Part J: Floors.

Part K: Walls.

Part L: Roofs.

Part M: Stairways.

Part N: Glazing.

Foreword (*concluded*)

Part O: Lighting and ventilation.

Part P: Drainage.

Part Q: Non-water-borne means of sanitary disposal.

Part R: Stormwater disposal.

Part S: Facilities for persons with disabilities.

Part T: Fire protection.

Part V: Space heating.

Part W: Fire installation.

This document should be read in conjunction with SANS 10400-A.

Annexes A and B are for information only.

Contents

The application of the National Building Regulations

Part Q:
Non-water-borne means of sanitary disposal

1 Scope

This part of SANS 10400 specifies deemed-to-satisfy requirements for compliance with part Q (Non-Water-Borne Means of Sanitary Disposal) of the National Building Regulations.

NOTE Part Q of the National Building Regulations, issued in terms of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), is reproduced in annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

SANS 2001-CC1, *Construction works – Part CC1: Concrete works (structural)*.

SANS 2001-CC2, *Construction works – Part CC2: Concrete works (minor works).*

SANS 2001-CM1, *Construction works – Part CM1: Masonry walling*.

SANS 2001-CM2, *Construction works – Part CM2: Strip footings, pad footings and slab-on-the-ground foundations for masonry walling*.

SANS 2001-EM1, *Construction works – Part EM1: Cement plaster*.

SANS 10252-2 (SABS 0252-2), *Water supply and drainage for buildings – Part 2: Drainage installations for buildings*.

SANS 10400-A, *The application of the National Building Regulations – Part A: General principles and requirements.*

SANS 10400-B (SABS 0400-B), *The application of the National Building Regulations – Part B: Structural design.*

SANS 10400-C, *The application of the National Building Regulations – Part C: Dimensions.*

SANS 10400-K, *The application of the National Building Regulations – Part K: Walls.*

SANS 10400-L (SABS 0400-L), *The application of the National Building Regulations – Part L: Roofs.*

SANS 10400-O, *The application of the National Building Regulations – Part O: Lighting and ventilation.*

SANS 10400-P:2010, *The application of the National Building Regulations – Part P: Drainage.*

3 Definitions

For the purposes of this document, the definitions given in SANS 10400-A, SANS 10400-P (some of which are repeated for convenience) and the following apply.

3.1
adequate
adequate

a) in the opinion of any local authority, or

b) in relation to any document issued by the council, in the opinion of the council

3.2
Agrément certificate
certificate that confirms fitness-for-purpose of a non-standardized product, material or component or the acceptability of the related non-standardized design and the conditions pertaining thereto (or both) issued by the Board of Agrément South Africa

3.3
Board of Agrément South Africa
body that operates under the delegation of authority of the Minister of Public Works

3.4
chemical toilet
toilet with a fixed pan, the excreta from which pass into a tank where they are acted upon by chemicals which sterilize and break them down

3.5
competent person (sanitation)
as defined in SANS 10400-P

3.6
deemed-to-satisfy requirement
non-mandatory requirement, the compliance with which ensures compliance with a functional regulation

3.7
functional regulation
regulation that sets out in qualitative terms what is required of a building or building element or building component in respect of a particular characteristic, without specifying the method of construction, dimensions or materials to be used

3.8
grey water
domestic waste water excluding toilet water

3.9
pail toilet
toilet with a removable pail which is systematically emptied or replaced

3.10
rational assessment
assessment by a competent person of the adequacy of the performance of a solution in relation to requirements including as necessary, a process of reasoning, calculation and consideration of accepted analytical principles, based on a combination of deductions from available information, research and data, appropriate testing and service experience

3.11
rational design
design by a competent person involving a process of reasoning and calculation and which may include a design based on the use of a standard or other suitable document

3.12
suitable
capable of fulfilling or having fulfilled the intended function, or fit for its intended purpose

3.13
ventilated improved pit toilet
VIP toilet
toilet which comprises

a) a pit into which the excreta fall and from which the liquid fraction seeps into the surrounding ground;

b) a slab which covers the pit and which has two holes, one for the excreta to fall through and one for the vent pipe;

c) a superstructure which provides privacy and which prevents light from entering the pit;

d) a pedestal seat and seat cover;

e) a vent pipe which removes odour from the pit; and

f) a fly screen at the top of the vent pipe which prevents flies from entering the pit through the pipe and prevents flies that have entered the pit through the pedestal from leaving through the vent pipe

4 Requirements

4.1 General

The functional regulation **Q3** contained in part Q of the National Building Regulations (see annex A) shall be deemed to be satisfied where the non-water-borne sanitary disposal system has a closet in accordance with the requirements of 4.2 and

a) complies with the requirements of 4.3 or 4.4;

b) is the subject of a rational design or rational assessment performed by a competent person (sanitation) in accordance with annex B of SANS 10400-P:2010, and that complies with the principles for the design, installation and testing of sanitary drainage contained in SANS 10252-2;

c) is the subject of an Agrément certificate and the system, element or component is used within the scope, conditions and limitations prescribed in the certificate and the element or component is compatible with other elements or components of the drainage system; or

d) comprises pail toilets which are emptied by or on behalf of a local authority.

NOTE The South African government is committed to the eradication of pail toilets.

4.2 Closets

4.2.1 A closet shall be constructed with a floor, walls and a roof of material adequate for its purpose, and such closet shall be provided with a door or other means which shall ensure privacy of the occupant of such a closet.

4.2.2 A closet shall comply with the relevant requirements of SANS 10400-B, SANS 10400-C, SANS 10400-K, SANS 10400-L and SANS 10400-O.

4.2.3 Any pan or container and any other fitting related to a closet shall be suitable.

4.2.4 The minimum internal dimensions of a closet shall be

a) width: 800 mm,

b) length with door opening outwards: 1 100 mm,

c) length with door opening inwards: 2 000 mm, and

d) height: 1 900 mm.

NOTE These minimum dimensions are not necessarily suitable for people with disabilities (see SANS 10400-S).

4.2.5 The clear distance between the pedestal and a door in a closed position shall not be less than 0,6 m.

4.3 Chemical toilets

A chemical toilet shall be provided with a seat and a receptacle of such height that a space of not more than 25 mm is left between the underside of such seat and the top of the receptacle. The aperture in such seat shall be at least 25 mm less in every diameter than the corresponding diameter of the top of such receptacle and such aperture shall be fitted with a self-closing, fly-proof lid.

4.4 Ventilated improved pit toilets

NOTE 1 The successful use of VIP toilets is as much dependent on correct technical construction as the extent to which communities find them acceptable, and have been informed about their correct use, limitations and maintenance requirements, as this unfamiliar technology requires changes in behaviour.

NOTE 2 Guidance on methods for assessing social acceptance can be found in Agrément South Africa's publication ACTMAP3 for sanitation systems (see bibliography).

4.4.1 VIP toilets shall

a) be constructed to minimize odours and the attraction of flies by means of air movements, solar heating and light;

b) not penetrate the water table;

c) only be constructed where the percolation rate measured in accordance with SANS 10400-P does not exceed 50 mm/h and is not less than 2,5 mm/h;

d) not be built under or near trees;

e) where the pit is to be emptied by a vacuum tanker, be lined as described in 4.4.12 and situated so that a vacuum tanker is able to approach it to within 30 m, and the surface upon which the tanker stands is not more than 2,0 m above the top of the pit;

f) be situated downstream of, or more than 30 m away from, a well or water source;

g) be located at least 3 m away from buildings; and

h) where permanent, be located at least 2,75 m away from the erf boundary to allow access for maintenance.

NOTE 1 Regulation **Q2** prohibits the construction of any pit toilet without the permission of the local authority.

NOTE 2 Annex B describes the principles for the design and construction of VIP toilets. The effective volume of a pit for a typical rural household should be at least 2,5 m^3 where it is to be emptied. For temporary toilets, the volume of the pit should be increased to at least 3,5 m^3. Pits should provide for 0,5 m height of free board above the effective volume of the pit.

NOTE 3 For maximum efficiency, a pit should be large and deep. Round pits should have a diameter of 1 m to 1,5 m and square pits a width of 1 m to 1,5 m.

NOTE 4 Ideally VIP toilets should be located at least 5 m away from habitable buildings so as to avoid unpleasant odours.

4.4.2 Pits in unstable soils shall be fully lined with provisions for seepage as described in 4.4.12(d). Unlined pits shall be circular and shall not exceed 1,5 m in diameter.

NOTE B.4 provides some guidance on the determination of soil stability.

4.4.3 VIP toilets that are to be emptied by the local authority, shall have a capacity such that the cleaning interval is acceptable to such authority.

NOTE Annex B provides guidance on determining the capacity of VIP toilets.

4.4.4 VIP toilets shall be provided with a seat and closing lid such that the space between the underside of the seat and the top of the receptacle is not more than 25 mm. The seat shall be so designed that the aperture at the top of the seat is not less than 250 mm and not more than 300 mm in diameter. For children, an additional seat that has an aperture of between 150 mm and 200 mm shall be provided.

4.4.5 The hole in the floor slab shall have the same dimension or be larger than the inside dimension of the pedestal. The edges shall be smoothly finished off.

NOTE For ease of cleaning, particular attention should be paid to the finishing of the edges of the openings situated below the pedestals.

4.4.6 Measures shall be taken to prevent rainwater, soil, rubbish and other foreign material from entering the system. Separate provisions shall be made for the disposal of grey water and other household waste.

4.4.7 The closet shall be provided with an opening, or openings, of area at least 0,2 m^2 for the purposes of natural lighting and through-ventilation. The inside of the closet, however, shall be adequately dark to discourage flies from exiting the pit via the pedestal.

NOTE 1 Openings dissipate odours and allow the ventilation pipes of VIP toilets to function properly. Any such opening, or openings, should preferably be screened to prevent flies from entering the superstructure.

NOTE 2 Ideally, openings should face into the prevailing wind in order to pressurize the closet and induce air flow into the pit and out through the vent pipe. (See annex B.)

4.4.8 Pits of VIP toilets shall be ventilated with a ventilation pipe of nominal diameter at least 100 mm.

NOTE Ideally, ventilation pipes should be located on the northern side of the superstructure. PVC pipes should either be painted or be manufactured with a special stabilizer, which prevents damage due to ultra-violet radiation.

4.4.9 All ventilation pipes shall be screened with a corrosion-resistant material, which is resistant to ultraviolet radiation, to prevent insects from entering or from escaping from the pit. The apertures in the mesh of screens over the ventilation pipes shall be small enough to trap insects, but large enough to achieve proper ventilation of the pit. The construction shall be such that it is not possible for leaves and other debris to accumulate on top of the screen.

NOTE A square mesh with 2,25 mm apertures will ensure that all flies are trapped.

4.4.10 The ventilation pipe shall have a minimum internal diameter of 100 mm and shall be so installed that its open end is the greater of

a) 2,5 m above the finished ground level, and

b) 500 mm above the highest point of the roof.

NOTE 1 Ventilation of the pit is necessary for the proper functioning of the VIP toilet. When the temperature in the vent pipe is 2 °C warmer than the air in the closet, air flows up the pipe. When the temperature in the closet is higher than that in the vent pipe, the pit vents into the closet unless there is sufficient wind to siphon air from the vent pipe. The temperature within the closet can also be reduced should the roof be insulated or should a double-sheeted roof with a 50 mm airspace be provided. The resulting reduction in temperature reduces the closet's potential to draw air from the pit.

NOTE 2 Where wind cannot be relied upon to pressurize the closet, the vent pipes should be situated on the sunny side of the superstructure and be painted black. (See figure B.1.)

4.4.11 Pedestals, where provided, shall generally be between 350 mm and 450 mm in height.

NOTE In some communities, squatting plates may be provided instead of a pedestal. This is acceptable provided they have lids as described in 4.4.4.

4.4.12 Permanent VIP toilets shall be constructed in accordance with the details shown in figures 1 to 3, and in accordance with the following:

a) The floor level shall be at least 75 mm above the surrounding ground level. In cases where the groundwater level is high or the soil is rocky, the floor slab may be lifted to a maximum height of 1,5 m above the surrounding ground.

b) In multiple toilets, separate pits shall be constructed beneath each opening.

c) The internal walls between pits shall be not less than the thickness of the pit walls.

d) Openings of 15 mm in diameter, that extend through the pit walls in double-leaf construction or open perpend joints in single-leaf construction shall be provided at vertical and horizontal centres not exceeding 400 mm and 900 mm, respectively, from 500 mm below ground level to the bottom of the pit. The walls between pits shall not contain any such openings.

e) The portion of the internal walls of the pits that is raised above the ground shall be plastered in accordance with the requirements of SANS 2001-EM1.

f) All concrete work shall be in accordance with the requirements of SANS 2001-CC1 or SANS 2001-CC2.

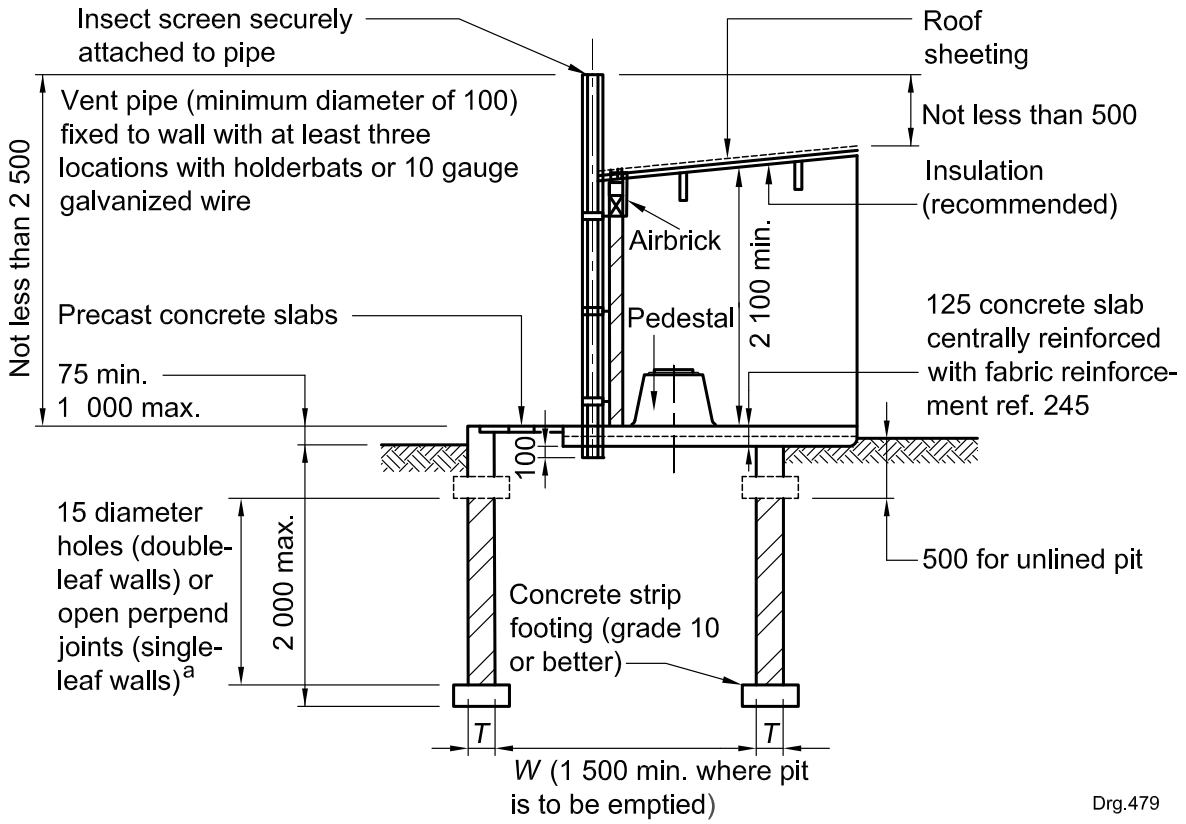
g) Masonry walling and related foundations shall be in accordance with the relevant requirements of SANS 2001-CM1 and SANS 2001-CM2.

NOTE The upper 500 mm of the pit should be impervious to surface water, hence the requirement for openings to be provided from 500 mm below ground level.

4.4.13 Solid and hollow concrete and calcium silicate masonry units shall have a nominal compressive strength of not less than 10,5 MPa and 7,0 MPa, respectively. Burnt clay masonry units shall have a nominal compressive strength of not less than 14,0 MPa and a water absorption of not more than 12 %.

4.4.14 The cores of all hollow masonry units shall be solidly filled with grade 10 infill concrete in the wall separating the pits.

Dimensions in millimetres



T = wall thickness
W = distance between pit end walls

Type of masonry unit	*T*	*W*, max.
Solid	110	1 300
	140	1 750
	190	2 500
	220	2 500
Hollow	140	1 300
	190	1 750

The pit shall be lined up to 500 mm below ground level in stable soils and fully lined in unstable soils or where pit shall be emptied.

Closet walls shall be 90 mm or thicker.

Roofs shall have a 100 mm (min.) overhang and shall be fixed to a 38 mm × 76 mm wall plate tied to the walls in accordance with the requirements of SANS 10400-K.

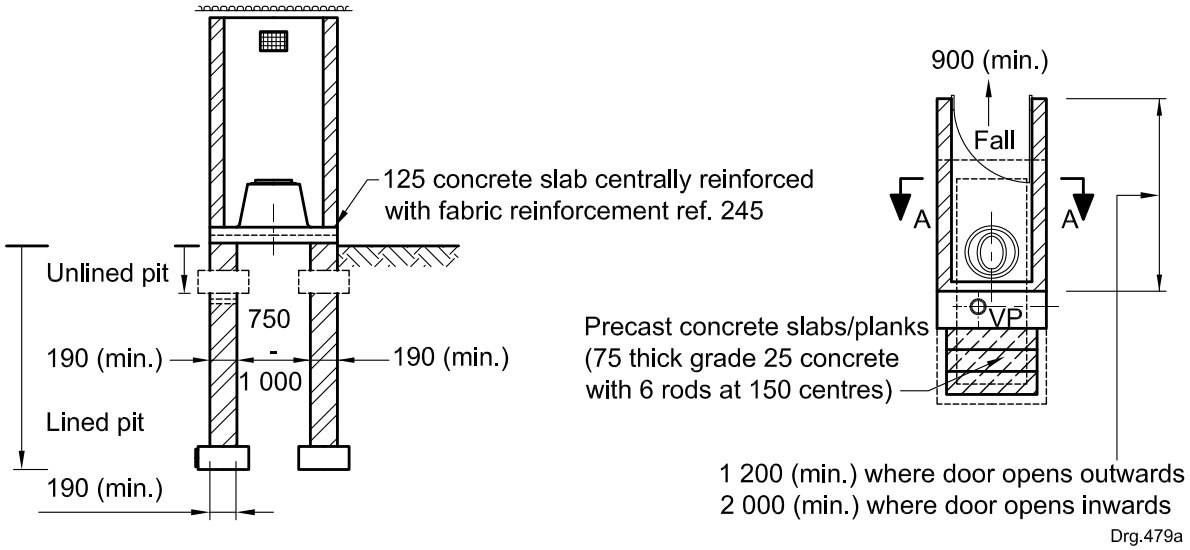
Strip foundations shall be 200 mm deep and 450 mm wide.

NOTE A gap may be left between the top of both sides of the wall and the underside of the roof as an alternative to the installation of an airbrick.

[a] To be provided at vertical centres not exceeding 400 mm and horizontal centres not exceeding 900 mm to within 500 mm of ground level.

Figure 1 — Longitudinal section through a masonry VIP toilet

Dimensions in millimetres



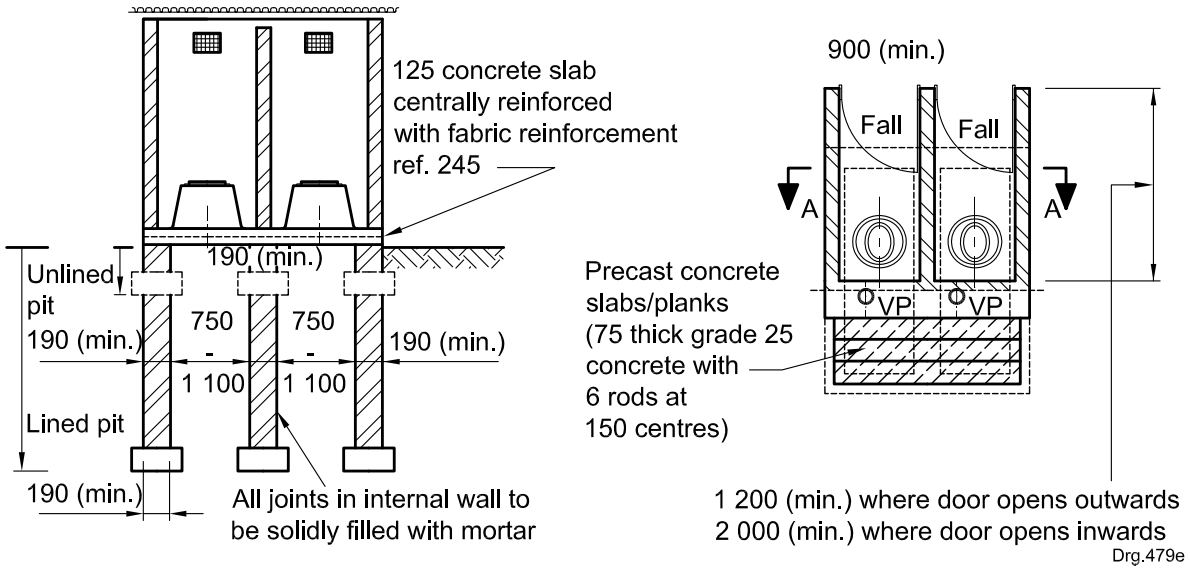
Section A-A **Plan view**

VP = vent pipe

NOTE 40 mm cover to reinforcement (see figure 1).

Figure 2 — Plan view of and cross section through a single masonry VIP toilet

Dimensions in millimetres



Section A-A **Plan view**

VP = vent pipe

The wall between pits shall have the same thickness as the pit wall.

NOTE 40 mm cover to reinforcement (see figure 1).

Figure 3 — Plan view of and cross section through a multiple masonry VIP toilet

Annex A
(informative)

National Building Regulations
Part Q: Non-Water-Borne Means of Sanitary Disposal

Definitions

sewage
waste water, soil water, industrial effluent and other liquid waste, either separately or in combination, but does not include stormwater

stormwater
water resulting from natural precipitation or accumulation and includes rainwater, surface water, subsoil water or spring water

Regulations

Q1 Means of Disposal

Where water-borne sewage disposal is not available other means of sewage disposal shall be permitted by the local authority: Provided that:

(a) it stores, conveys, processes and disposes of human body wastes and wastewater in such a way that the pathogens, pollutants and contaminants associated therewith do not compromise the health and safety of the original user or others; and

(b) in the case of chemical or toilet a satisfactory means is available for the removal and disposal of sewage from such closets.

Q2 Permission

No person shall construct any pit toilet without the permission of the local authority.

Q3 Construction, Siting and Access

(1) Any such other means of sewage disposal shall be so constructed, sited and provided with access that the health and convenience of persons using such means shall not be adversely affected.

(2) The number of sanitary receptacles shall be adequate for the population of the building served by such receptacles.

(3) **(a)** The requirements of subregulation **(1)** shall be deemed to be satisfied where the design and construction, siting of, and access to such other means of sewage disposal complies with SANS 10400-Q: Provided however that where a local authority is of the opinion that the nature of the means of sanitary disposal is such that it is essential for such installation to be the subject of an approved rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such building of its reasons for the necessity for such design and may require such owner to submit for approval plans and particulars of a complete installation based on such design.

(b) The requirements contained in subregulation **(2)** shall be deemed to be satisfied where the number of receptacles is in accordance with the requirements for the provision of sanitary fixtures contained in regulation **F11** or **P2**, as the case may be.

Annex B
(informative)

Ventilated improved pit toilets

B.1 Introduction

The VIP toilet is a simple, low-cost sanitation system that requires no water for its operation. Urine and small amounts of water used for cleaning the seats either seep through the walls of the pit into the surrounding soil or evaporate.

There are two types of VIP toilets, namely those with a permanent closet and those with a temporary closet. VIP toilets with a permanent closet are intended for permanent or long-term use, and have access to the pit for emptying purposes. Temporary VIP toilets are intended for short-term use and as such have a single pit and have no access to the pit for emptying purposes as these toilets are moved to a new pit as soon as the first pit is full.

A variation on the permanent VIP toilet is the ventilated improved double pit toilet in terms of which two pits are constructed side by side and are straddled by a single closet. The pits are then used alternatively, that is, the user moves the pedestal seat when the first pit is full to the second pit and caps the hole. After a minimum period of two years, the full pit can be emptied either manually or mechanically, provided that the wall separating the two pits does not allow seepage from one pit to the other.

B.2 Basic principles

B.2.1 Conventional pit toilets have two major disadvantages: they have an unpleasant odour and they attract flies. Both these disadvantages are minimized in the case of the VIP toilet, because the pit is fitted with a ventilation pipe through which ventilation is induced by two elements of nature (see figure B.1):

a) air movements over the top of the ventilation pipe which cause suction at the top end of the ventilation pipe so that air is withdrawn from the pit; and

b) solar heating of the ventilation pipe. (Air heated in the ventilation pipe rises to be replaced by cooler air from the pit, which in turn is supplemented by air from the closet.)

B.2.2 It should be noted that

a) Shaded closets discourage flies from exiting the pit via the seat opening.

b) The lid to the seat reduces the amount of light entering the pit.

c) Wind causes suction at the top end of the ventilation pipe so that air is drawn from the pit.

d) Ventilation is induced by air pressure at the openings in the closet if located on the windward side of the closet.

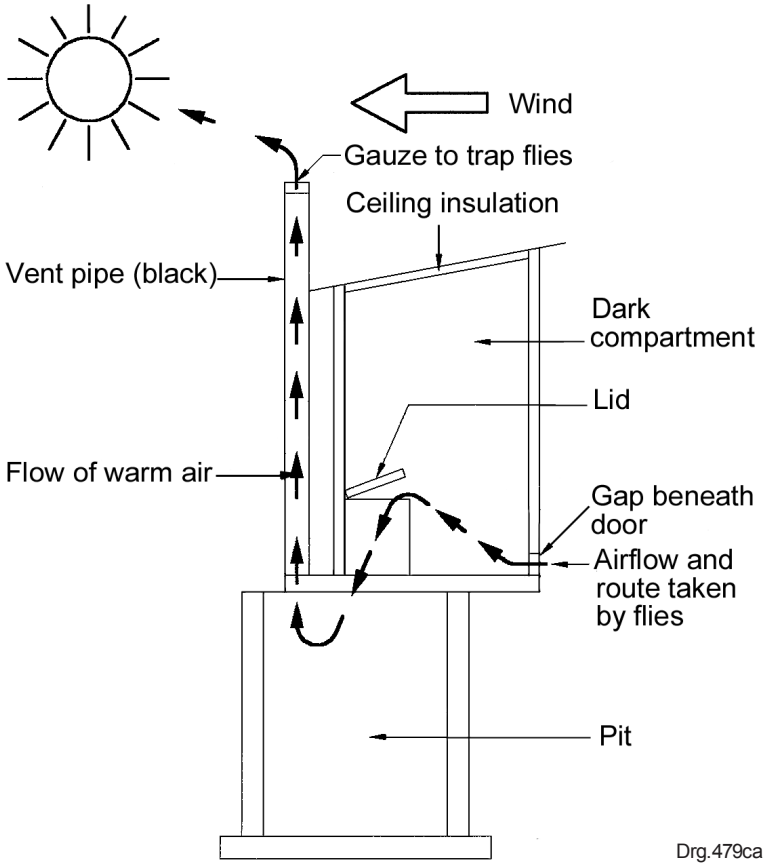
e) Solar heating of the ventilation pipe causes heated air to rise and creates an upward flow of air through the pipe.

f) Flies entering the pit are attracted to the light at the top of the ventilation pipe by the mesh and are trapped at the top of the pipe when they try to exit.

g) Insulation in the closet roof reduces the internal air temperature and, in doing so, reduces the closet's potential to draw air from the pit, provided that the closet is thermally sound.

B.2.3 Toilet doors, where provided, should preferably be self-closing and lockable from the inside and outside. They should be inward opening, as outward opening doors are susceptible to wind damage.

Door entrances should not face east or west so as to prevent direct sunlight from penetrating the interior.



NOTE Solar radiation is far less effective than wind-induced ventilation in reducing unpleasant odours.

Figure B.1 — The concept behind ventilated improved pit toilets

B.3 Siting of VIP toilets

Human excreta can be a source of infection. Great care is necessary in siting pits so as to avoid possible pollution of the ground and water supplies.

A VIP toilet in an ideal soil, such as a sandy loam, at least 1 m above the highest seasonable water table, produces little spread of contaminants. If the pit penetrates the groundwater then bacteria, virus and chemical contamination might travel downwards and be laterally transported by groundwater. For this reason such penetration should be avoided.

VIP toilets should preferably be located downhill from a well or water source to prevent possible contamination of water supplies. Where the pit has to be located uphill from the water source, it should be located at least 30 m away from it.

NOTE Further particulars in this regard may be found in the Department of Water Affairs and Forestry's *Protocol to manage the potential of ground water contamination from on-site sanitation* (see bibliography).

B.4 Field test for determining soil stability

B.4.1 As a guide, the following test can be conducted on a representative sample of soil taken from the pit wall to determine whether or not a pit should be fully lined:

a) Place the representative sample in the palm of your hand or in the lid of a tin.

b) Manually remove any stones, pebbles and large granules from the sample.

c) Add a minimum amount of water and then knead the sample for 1 min to 2 min. Add more water if necessary.

d) Press the dampened soil together and try to roll it between your fingers, or rub one palm over the other in order to determine if the sample consolidates and rolls.

B.4.2 If the sample crumbles on rolling, it generally means that the pit should be fully lined. The pit should also be lined if the soil contains large amounts of sand, silt or unigranular material (or a mixture of all three), or if the soil is loose and comes away from the walls when touched lightly.

B.4.3 If the soil consists of shale, layered rock or semi-weathered rock and is hard to excavate, the pit need not be fully lined.

B.5 Sizing of pits

B.5.1 Dry pits are pits found in permeable soils. Wet pits are found in less permeable soils where liquid, such as water and urine, seeps away more slowly. Excreta decompose more quickly in wet pits than in dry pits.

B.5.2 The effective pit volume of a VIP toilet (V) can be calculated as follows:

$$V = C \times P \times N$$

where

C is the solids accumulation rate per person per year given in table B.1 in cubic metres;

P is the number of people using the toilet;

N is the pit-cleaning interval in years or the desired lifespan of the pit (usually 10 years to 15 years).

B.5.3 The effective depth of the pit (d_e) can then be calculated as follows:

$$d_e = \frac{V}{A}$$

where

V is the effective pit volume, in cubic metres;

A is the internal cross-sectional area of the pit, in square metres.

A free board of 0,5 m shall be added to the effective depth of the pit (d_e) to allow free flow of air through the pit and to prevent overflow to obtain the depth of the pit (d).

Alternatively, the nomogram in figure B.2 can be used to determine the effective volume and total depth of each pit.

Table B.1 — Solids accumulation rate per person per year (*C*)

1	2	3
Anal cleaning material	**Solids accumulation rate per person per year** m^3	
	Wet pits	**Dry pits**
Soft paper, water, etc.	0,02 to 0,04	0,03 to 0,06
Bulky materials, e.g. corn cobs, newspaper, or cement bags	0,03 to 0,06	0,045 to 0,09

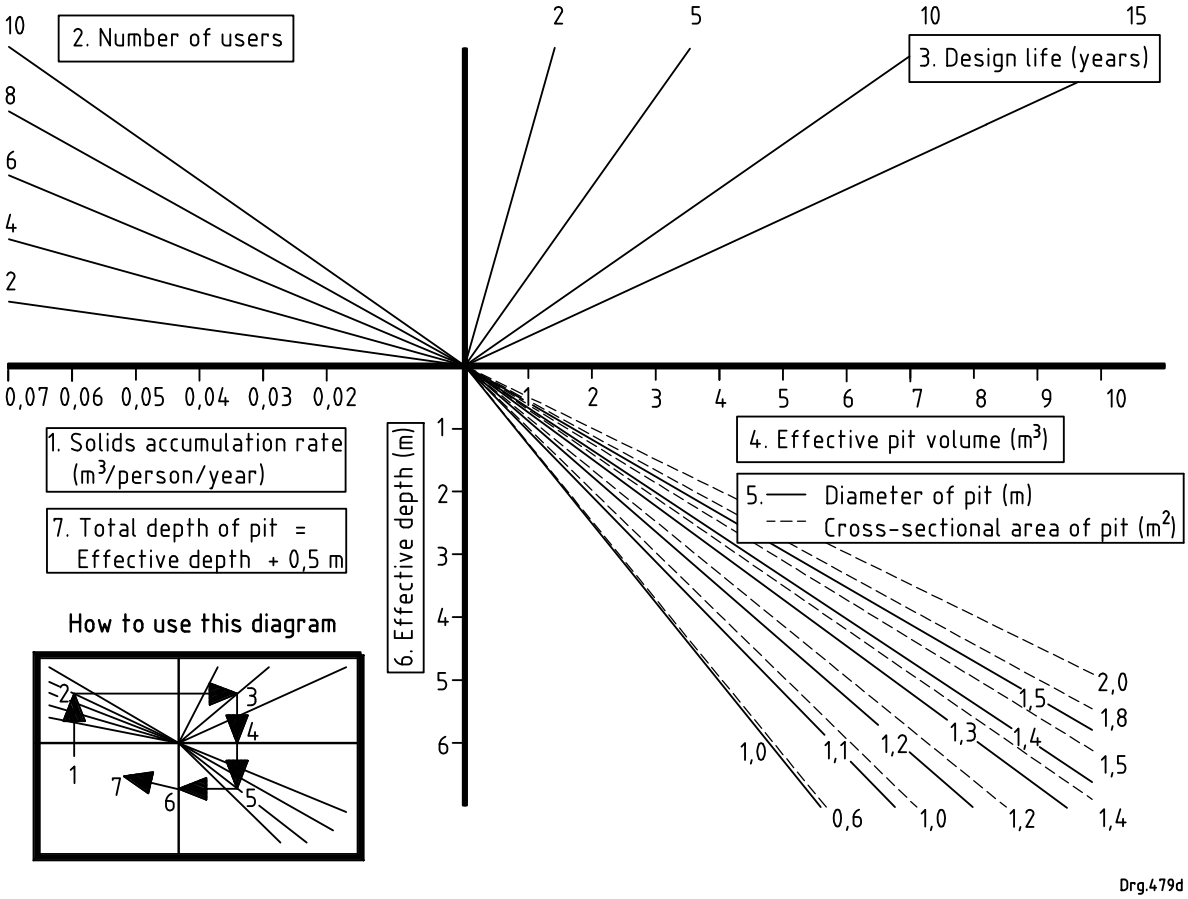


Figure B.2 — Nomogram for determining the required pit depth

Bibliography

Standards

SANS 10400-S (SABS 0400-S), *The application of the National Building Regulations – Part S: Facilities for persons with disabilities.*

Other publications

ACTMAP3, *Agrément criteria and test methods applicable to a product (ACTMAP) for sanitation systems*, available at <http://www.agrement.co.za>.

Bester JW and Austin LM. *Building VIPs – Guidelines for the design and construction of domestic ventilated improved pit toilets*. Division of Building Technology, CSIR, Pretoria. 1997.

Department of Water Affairs and Forestry, RSA (2003). *Protocol to manage the potential of ground water contamination from on-site sanitation.*

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Amendments and Revisions

South African National Standards are updated by amendment or revision. Users of South African National Standards should ensure that they possess the latest amendments or editions.

The SABS continuously strives to improve the quality of its products and services and would therefore be grateful if anyone finding an inaccuracy or ambiguity while using this standard would inform the secretary of the technical committee responsible, the identity of which can be found in the foreword.
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South African National Standards are also available online from the SABS website http://www.sabs.co.za

Information on Standards

The Standards Information Centre provides a wide range of standards-related information on both national and international standards, and is the official WTO/TBT enquiry point for South Africa. The Centre also offers an individual updating service called INFOPLUS, which ensures that subscribers automatically receive notification regarding amendments to, and revisions of, international standards.
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