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Number and title:
SANS 10400-R: THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS — PART R: STORMWATER DISPOSAL

Remarks:

PLEASE NOTE:

- **The technical committee, SABS TC 59: Construction Standards responsible for the preparation of this standard has reached consensus that the attached document should become a South African standard. It is now made available by way of public enquiry to all interested and affected parties for public comment, and to the technical committee members for record purposes. Any comments should be sent by the indicated closing date, either by mail, or by fax, or by e-mail to**

  SABS Standards Division
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  Fax No.: (012) 344-1568 (for attention: dsscomments)
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  Any comment on the draft must contain in its heading the number of the clause/subclause to which it refers. A comment shall be well motivated and, where applicable, contain the proposed amended text.

- **The public enquiry stage will be repeated if the technical committee agrees to significant technical changes to the document as a result of public comment. Less urgent technical comments will be considered at the time of the next amendment.**

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Edition 3

SOUTH AFRICAN NATIONAL STANDARD

The application of the National Building Regulations

Part R: Stormwater disposal

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SANS 10400-R:2010
Edition 3

Table of changes

Change No.	Date	Scope

Acknowledgement

The SABS Standards Division wishes to acknowledge the work of the South African Institution of Civil Engineering in updating this document.

Foreword

This South African standard was approved by National Committee SABS TC 59, *Construction standards*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in xxxx 2010.

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 R 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.

Part O: Lighting and ventilation.

Foreword (*concluded*)

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.

Annex A forms an integral part of this document.

Contents

The application of the National Building Regulations

Part R:
Stormwater disposal

1 Scope

This part of SANS 10400 provides deemed-to-satisfy requirements for compliance with part R (Stormwater Disposal) of the National Building Regulations.

NOTE 1 Part R 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.

NOTE 2 Part R deals with the disposal of stormwater on an individual site. The disposal of stormwater in townships underlain by dolomites is addressed in SANS 1936-3.

NOTE 3 The drainage of areas in close proximity to buildings in order to minimize ground movements is addressed in SANS 10400-H.

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 1936-1, *Development of dolomite land – Part 1: General principles and requirements.*

SANS 1936-3, *Development of dolomite land – Part 3: Design and construction of buildings, structures and infrastructure.*

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

SANS 10400-F, *The application of the National Building Regulations – Part F: Site operations.*

3 Definitions

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

3.1
competent person (civil engineering)
person who

a) is registered in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000), as either a Professional Engineer or a Professional Engineering Technologist,

b) has a tertiary qualification (degree or diploma) in civil engineering, and

c) is generally recognized as having the necessary experience and training to undertake rational assessments or rational designs in the field of civil engineering

3.2
deemed-to-satisfy requirement
non-mandatory requirement, the compliance with which ensures compliance with a functional regulation

3.3
dwelling unit
unit containing one or more habitable rooms and provided with adequate sanitary and cooking facilities

3.4
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

3.5
interconnected complex
complex of multiple dwelling units, such as terraced or multi-storey complexes, or cluster or retirement-village-type developments (or both), where management of common property usually resides with (but is not limited to) a management body

3.6
major stormwater system
stormwater system which caters for severe, infrequent storm events

3.7
minor stormwater system
stormwater system which caters for frequent storms of a minor nature

3.8
non-colloidal gravel
gravel that does not contain any clay particles

3.9
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

4 Requirements

4.1 General

The functional regulations contained in part R of the National Building Regulations (see annex A) shall be deemed to be satisfied where the means for the control and disposal of stormwater is in accordance with the requirements of 4.2, provided that the stormwater system in

a) interconnected complexes is in accordance with the requirements of 4.2.2; and

b) townships underlain by dolomite that have a dolomite site class designation of D2 and D3 (see SANS 1936-1) complies with the requirements of SANS 1936-3.

4.2 Stormwater control and disposal

4.2.1 General

4.2.1.1 Stormwater emanating from the roof, paving or area in the immediate vicinity of a building shall not cause damage to the building interior, structure, or structural elements, or accumulate in a manner that unduly inconveniences the occupant.

4.2.1.2 Stormwater disposal arrangements (in accordance with SANS 10400-F) shall

a) not result in the undercutting of foundations due to erosion or flooding,

b) drain away from buildings, as far as possible, under the action of gravity and not accumulate against or in close proximity to external walls,

c) make provision for the drainage of sites that are waterlogged or seasonally waterlogged, and

d) be capable of being readily cleaned and maintained.

NOTE Stormwater disposal arrangements on a site include:

a) roof valleys and gutters and downpipes or, where gutters and downpipes have not been provided, other means of ensuring that stormwater from any roof is controlled and will flow away from such building; and

b) any surface stormwater drains, channels or below-ground stormwater drains that might be necessary to convey stormwater away from such site or from one part to another of such site.

4.2.1.3 Valleys and gutters shall be sized either in accordance with the requirements of 4.3, or in terms of a rational design prepared by a competent person (civil engineering).

NOTE The following documents provide guidance on the design of valleys and gutters:

a) *The South African steel construction handbook* (see bibliography); and

b) EN 12056-3.

4.2.1.4 Where required by a local authority, the stormwater disposal arrangements provided on a site shall discharge into a stormwater system provided within a road reserve or any servitude.

4.2.1.5 Stormwater may discharge onto streets where permitted by a local authority and under the conditions imposed by such authority.

4.2.2 Stormwater disposal arrangements in interconnected complexes

4.2.2.1 Stormwater disposal arrangements in interconnected complexes shall, in addition to complying with the requirements of 4.2.1, be designed by a competent person (civil engineering) to comply with the following requirements:

a) The stormwater emanating from storms which are likely to occur at different recurrence intervals shall, with an appropriate degree of reliability and within the parameters established in 4.2.2.2 to 4.2.2.8, be controlled, safely routed and discharged from interconnected complexes without unduly eroding land, unsurfaced roads or water courses, contaminating water resources or compromising environmentally sensitive areas identified in environmental impact assessment reports.

b) Stormwater structures shall, with an appropriate degree of reliability, perform within established parameters in terms of

   1) design hydraulic load, and

   2) maintenance (ease of access for cleaning and self-cleaning velocities).

4.2.2.2 Major and minor stormwater systems shall be designed for design flood recurrence intervals of 50 years and 2 years, respectively.

NOTE Current legislation requires that flood lines for townships be determined for a 100-year recurrence interval. Flows emanating from such floods are typically 25 % greater than those for the 50-year flood. Major storm systems can be designed for a 50-year flood provided that the certified 100-year flood lines remain unchanged.

4.2.2.3 Terraces created for dwelling units shall be capable of being drained by gravity.

4.2.2.4 Stormwater shall not be concentrated so as to cause erosion.

4.2.2.5 The velocity of stormwater flow in any road-edge channels associated with a minor storm shall not exceed

a) 3 m/s in lined channels,

b) 1,5 m/s in unlined channels comprising coarse non-colloidal gravel, and

c) 1,1 m/s in unlined channels other than those comprising non-colloidal gravel.

4.2.2.6 Channels in soils that are susceptible to erosion shall be lined.

4.2.2.7 The minimum diameter of pipes in servitudes, unless otherwise directed by a local authority, shall be not less than 300 mm.

4.2.2.8 Stormwater structures shall be designed to have sufficient velocity to minimize siltation and facilitate maintenance. The minimum pipe gradients shall be in accordance with table 1. Access to pipes for cleaning purposes shall be provided at intervals of not more than 40 m.

NOTE The CSIR's *Guidelines for human settlement planning and design* (see bibliography) provide guidance on the design of stormwater disposal systems.

Table 1 — Minimum stormwater pipe gradients

1	2	3
Pipe diameter mm	**Desirable minimum gradient** (1 in …)	**Absolute minimum gradient** (1 in …)
300	80	230
375	110	300
450	140	400
525	170	500
600	200	600
675	240	700
750	280	800
825	320	900
900	350	1 000
1 050	440	1 250
1 200	520	1 500

4.3 Roof valleys and gutters

4.3.1 Any valley or gutter shall have a cross-sectional area of not less than that given in table 2 for the rainfall region in question.

4.3.2 The internal cross-sectional area of downpipes shall be not less than 100 mm^2/m^2 of roof plan area served by such downpipe, or 4 400 mm^2.

Table 2 — Roof valley and gutter sizes

1	2
Region	**Internal cross-sectional area of valley or gutter per m² of roof plan area served** mm²
Summer rainfall	140
Year-round rainfall	115
Winter rainfall	80

Annex A
(normative)

National Building Regulations
Part R: Stormwater Disposal

Definitions

acceptable
acceptable

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

approved
approved

a) by any local authority, or

b) by the review board on appeal to the review board in terms of the Act

competent person
person who is qualified by virtue of his education, training, experience and contextual knowledge to make a determination regarding the performance of a building or part thereof in relation to a functional regulation or to undertake such duties as may be assigned to him in terms of these regulations

dwelling house
single dwelling unit and any garage and other domestic outbuildings thereto, situated on its own site

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

site
any erf, lot, plot, stand or other piece of land on which a building has been, is being or is to be erected

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

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

Regulations

R1 Stormwater Disposal Requirement

(1) The owner of any site shall provide suitable means for the control and disposal of accumulated stormwater which may run off from any earthworks, building or paving.

(2) Such means of stormwater disposal may be in addition to or in combination with any drainage works required in terms of regulation **F4(2)**.

(3) The requirements of subregulation **(1)** shall be deemed to be satisfied where such means of stormwater disposal is provided in accordance with SANS 10400-R: Provided that where a local authority is of the opinion that the conditions on any site render it essential for stormwater disposal to be the subject of an acceptable rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such site of its reasons for the necessity for such design, and may require such owner to submit for approval plans and particulars of a complete stormwater control and disposal installation for such site and for any building erected thereon, based on such design.

R2 Saving

(1) These regulations shall not be construed as requiring the installation in any building of any roof gutter or downpipe where other suitable means has been provided to ensure the disposal or dispersal away from such building of rainwater from the roof of such building.

(2) The regulations in this Part shall not apply to any site used exclusively for the erection of any dwelling house or any building appurtenant thereto: Provided that where, due to special site features, the discharge of stormwater from such site may cause significant damage, the local authority may require compliance with regulation **R1**.

Bibliography

Standards

EN 12056-3, *Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation.*

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

Other publications

CSIR. Building and Construction Technology. *Guidelines for human settlements. Planning and design*. Pretoria: CSIR, 2000.

Southern African Institute of Steel Construction. *Southern African steel construction handbook (limit states design)*. 3rd ed. Johannesburg: SAISC, 1997.