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SANS 10400-R:2012

Edition 3

SOUTH AFRICAN NATIONAL STANDARD

The application of the National Building Regulations

Part R: Stormwater disposal

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SANS 10400-R:2012
Edition 3

Table of changes

Change No.	Date	Scope

Foreword

This South African standard was prepared by National Committee SABS/TC 060, *Standards which address the National Building Regulations (NBRS)*, in accordance with procedures of the South African Bureau of Standards, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in August 2012.

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).

Compliance with this document cannot confer immunity from legal obligations.

Reaffirmed and reprinted in December 2017.
This document will be reviewed every five years and be reaffirmed, amended, revised or withdrawn.

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.

Part X: Environmental sustainability.

Part XA: Energy usage in buildings.

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

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

NOTE 2 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 South African Bureau of Standards.

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.*

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 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 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 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 1 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.

NOTE 2 Regulation **R1(2)** requires the means of stormwater disposal to be in addition to, or in combination with, any drainage works required in terms of Regulation **F4(2)**.

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) SANS 52056-3.

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 Gutters and downpipes

4.3.1 Any roof, eaves or valley 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, eaves and valley gutter sizes

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

Bibliography

Standards

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

SANS 52056-3/EN 12056-3, *Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation.*

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.