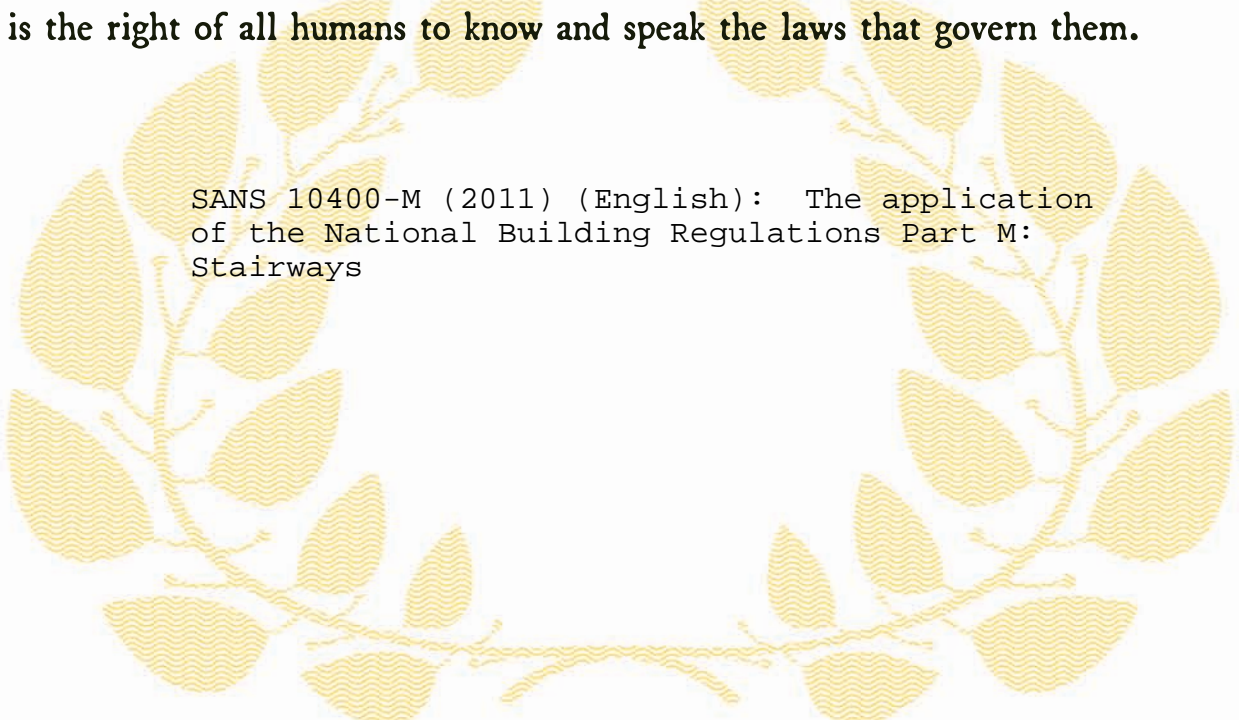




Republic of South Africa

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SANS 10400-M (2011) (English): The application
of the National Building Regulations Part M:
Stairways



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Edition 3

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The application of the National Building Regulations

Part M: Stairways

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SANS 10400-M:2011
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 April 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 M 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.

Foreword *(concluded)*

Part N: Glazing.

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.

Annex A is for information only.

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The application of the National Building Regulations

Part M: Stairways

1 Scope

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

NOTE Part M 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 1460, *Laminated timber (glulam)*.

SANS 1783-2, *Sawn softwood timber – Part 2: Stress-graded structural timber and timber for frame wall construction*.

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 10005, *The preservative treatment of timber*.

[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-K, *The application of the National Building Regulations – Part K: Walls*](#).

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

[SANS 10400-T, *The application of the National Building Regulations – Part T: Fire protection*](#).

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

accredited testing laboratory

laboratory that has been accredited by the South African National Accreditation System (SANAS)

3.2

deemed-to-satisfy requirement

non-mandatory requirement, the compliance with which ensures compliance with a functional regulation

3.3

emergency route

that part of an escape route which provides fire protection to the occupants of any building and which leads to an escape door

3.4

escape door

door in an escape route which, at ground level, leads directly to a street or public place or to any approved open space which leads to a street or public place

3.5

escape route

entire path of travel for all persons, including persons with disabilities, from the furthest point in any room in a building to the nearest escape door and may include an emergency route

3.6

flight

that part of a stairway which consists of consecutive steps between landings

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

going

distance (measured on plan) between the nosing of a tread and the nosing of the tread or landing immediately above it

3.9

landing

platform between two consecutive flights of a stairway

3.10

nosing

edge of a step projecting beyond the riser

3.11

person with disabilities

person who has long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, might hinder his full and effective participation in society on an equal basis with others

3.12**pitch line**

notional line which connects the nosings of all the treads in a flight of stairs

3.13**riser**

vertical distance between the tread of a step and the tread of the step immediately above it

3.14**spiral stairway**

succession of tapered treads forming a curved stairway which extends as a single flight from one floor or landing to another

3.15**stairway**

part of a building which provides a route of travel between different levels in such building and is formed by a single flight or by a combination of two or more flights and one or more intervening landings

3.16**tapered tread**

tread which has a greater width at one side than at the other and a going which changes at a constant rate throughout its length

3.17**tread**

upper surface of a step

3.18**winder**

tapered tread that has a going of at least 50 mm and which is used in conjunction with non-tapered treads in a single flight

4 Requirements

4.1 General

4.1.1 The functional regulations pertaining to stairways contained in part M of the National Building Regulations (see annex A) shall be deemed to be satisfied where

- a) the stairway, including any handrail to such stairway, is in accordance with the requirements of 4.2 and 4.3,
- b) the stairway complies with the requirements of
 - 1) SANS 10400-B and SANS 10400-T, or
 - 2) in the case of occupancies classified as H3 and H4 (see Regulation **A20** in SANS 10400-A) in single-storey and double-storey buildings, 4.4 or 4.5, and
- c) any wall, screen, railing or balustrade to such stairway is in accordance with the requirements of either SANS 10400-B or SANS 10400-K and SANS 10400-T.

4.1.2 Specific requirements for stairways in buildings in which facilities for persons with disabilities are provided, shall be in accordance with SANS 10400-S.

NOTE 1 SANS 10400-S reduces the rise of the step, increases the width of the stairway and the length of the landing, requires solid risers where stairs overlap the next lower tread, and requires handrails on both sides of the stairway.

NOTE 2 SANS 10400-T, in the case of emergency routes, increases the width of stairways, prohibits the use of spiral stairways, and requires solid risers on any occupancy class of building other than D4.

4.2 Dimensional requirements

4.2.1 The headroom at any point on any stairway shall be not less than 2,1 m, measured vertically from the pitch line, and the width of any stairway, measured to any enclosing wall or balustrade, shall be not less than 750 mm (see figure 1).

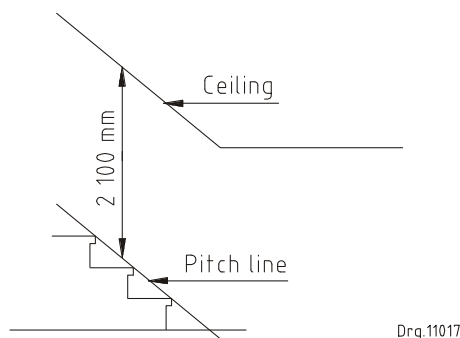


Figure 1 — Minimum permissible headroom on a stairway

4.2.2 Any landing serving two flights in the same straight line shall

- a) have a length of not less than 900 mm, and
- b) have a width of not less than that of such flights.

4.2.3 No flight of stairs shall have a vertical rise greater than 3 m between landings.

4.2.4 No door shall open onto a stairway unless such door opens onto a landing and the width of such landing is not less than that of such door. The position of the door relative to the landing and its direction of opening shall be such that it does not obstruct the flow of persons on the stairway when in the fully open position.

4.2.5 The rise of any step shall not exceed 200 mm.

4.2.6 The going and width of any tread shall be not less than 250 mm, provided that where the stairway does not have solid risers, each tread shall overlap the next lower tread by not less than 25 mm (see figure 2).

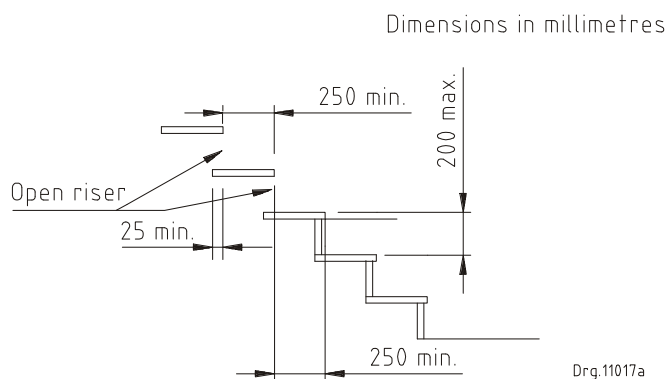


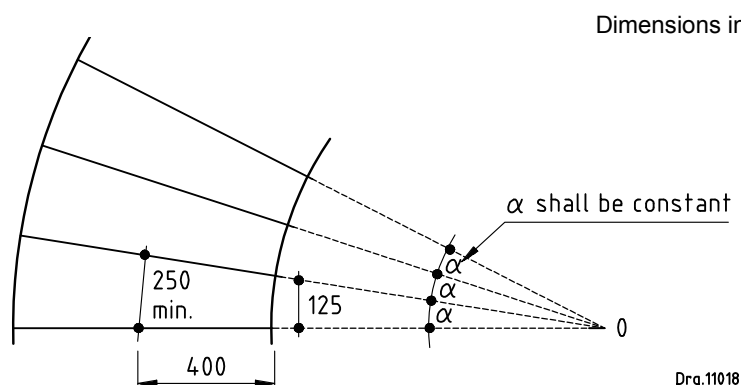
Figure 2 — Dimensions of treads and risers on a stairway

4.2.7 The variation in the dimensions of the risers and the goings of the treads in any one flight shall be not more than 6 mm, provided that this requirement shall not be construed as prohibiting the use of tapered treads in the same flight as non-tapered treads.

4.2.8 The dimension of each step of the stairway shall be such that the sum of the going and twice the riser is not less than 570 mm and not more than 650 mm.

4.2.9 Any tapered tread that is not a winder and that does not form part of a spiral stairway shall (see figure 3)

- a) be so designed that, in respect of that part of the tread which is 400 mm from the narrower end of such tread, the going
 - 1) complies with the requirement of 4.2.6, or
 - 2) equals, in the case of a flight containing both tapered and non-tapered treads, the going of the non-tapered treads,
- b) have a minimum going of 125 mm,
- c) be so constructed that the angle between successive risers, measured in the horizontal plane, is constant, and
- d) comply with the requirement of 4.2.7 for variation in goings, where such variation is, in each case, measured at the same distance from the narrower end of each tread.



To check the variation in going between treads, measure each tread at the same distance from the narrower end.

Figure 3 — Measurement of tapered treads

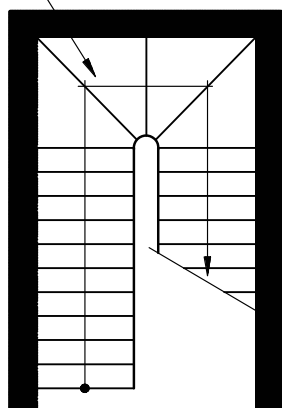
4.2.10 Stairways incorporating winders shall be permitted only in dwelling houses and within individual dwelling units, and at any point on such stairway

- a) there shall be not more than three successive winders, and
- b) such winders shall not turn through more than 90° (see figure 4).

4.2.11 Any spiral stairway shall have a width of not more than 800 mm and such stairway shall not be used

- a) as part of any emergency route,
- b) in any occupancy classified in terms of Regulation **A20** as A1, A2, A3, A4, A5, C1, E1, E2, E3, E4, F1, G1, H1, H2 or H5.

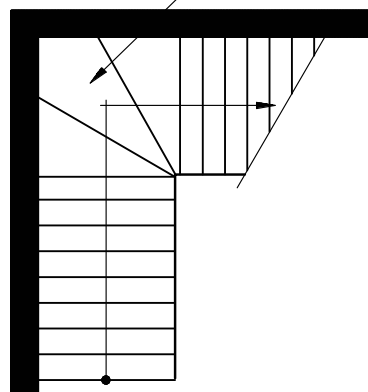
Stairway using winders turning through more than 90° is not permitted



Drg.11019

a) U-shaped stairway

No more than three winders to be used at any one point. Sets of winders shall be separated by a flight of stairs.



Drg.11019b

b) L-shaped stairway

Figure 4 — Examples of winders

4.3 Prevention against falling

4.3.1 Any flight of steps which contains more than three risers shall have protection on both sides provided by a secure wall, screen, railing or balustrade which shall be not less than 1 m high and so erected that any such wall, screen, railing or balustrade in any occupancy classified as E2, E3, E4, H1, H2, H3, H4 or H5 shall not have any opening above the pitch line that permits the passage of a 100 mm diameter ball; provided that such protection in any occupancy that is not an occupancy classified as E2, E3, E4, H1, H2, H3, H4 or H5 shall consist of at least a handrail and one other rail midway between such handrail and the stair tread.

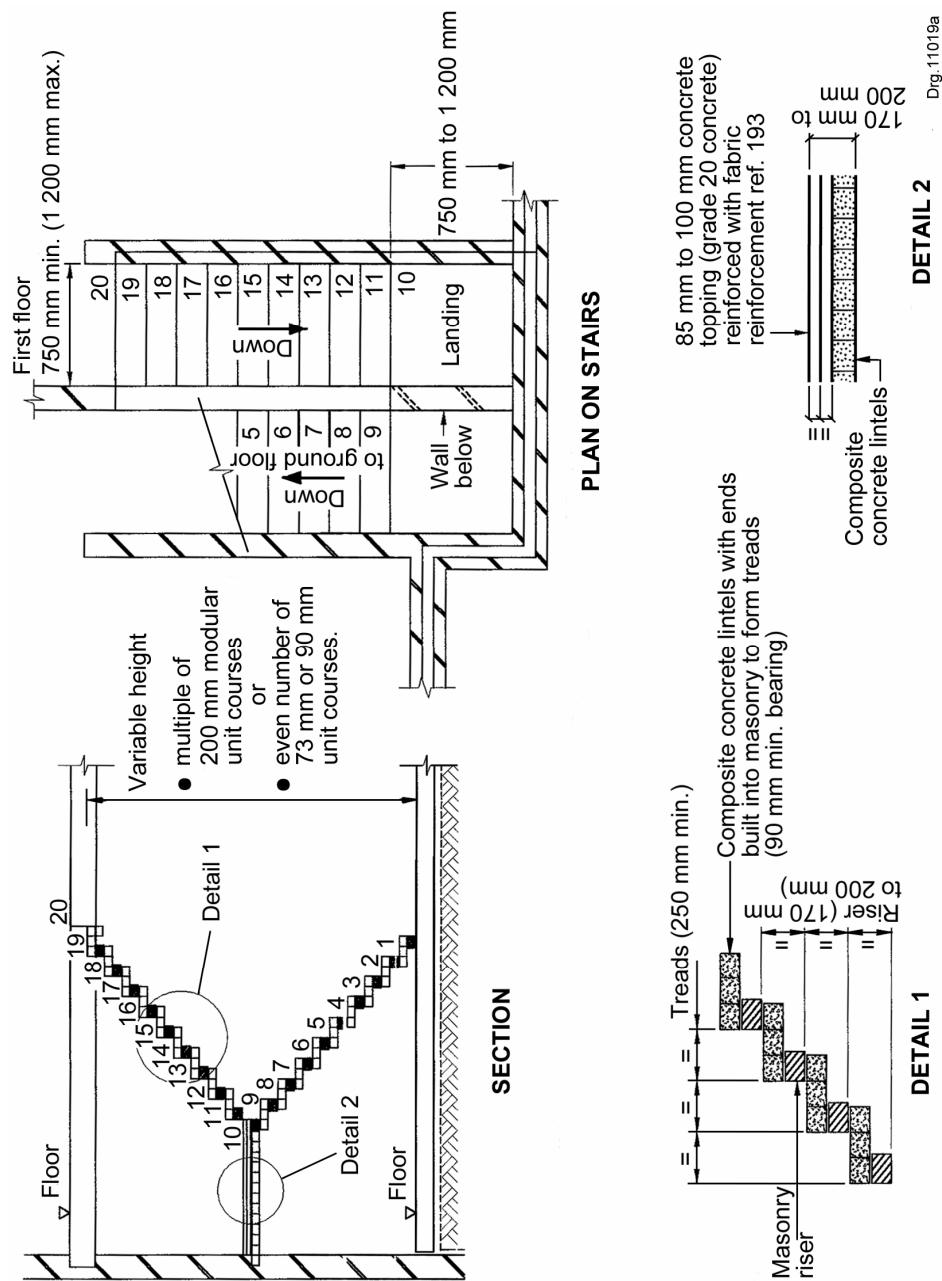
4.3.2 Any flight of stairs which contains more than five risers shall be provided with at least one continuous handrail extending the full length of such flight, provided that this requirement shall not apply to any building classified as H4, or within individual dwelling units in an occupancy classified as H3.

4.3.3 The handrail to any flight of stairs provided in terms of 4.3.2 shall be

- on at least one side of the flight where the width of the flight is less than 1,1 m, and on both sides where the width exceeds 1,1 m,
- securely fixed to such wall, screen, railing or balustrade at a height of not less than 850 mm and not more than 1 m measured vertically from the pitch line to the upper surface of the handrail, and
- of such a design and so fixed that there shall be no obstructions on, above or near to it which might obstruct the movement of a hand moving along it.

4.4 Masonry stairways

Masonry stairways and landings in occupancies classified as H3 and H4 in single-storey and double-storey buildings shall be in accordance with the provisions of figure 5 and the relevant requirements of SANS 2001-CM1 and SANS 2001-CC1 or SANS 2001-CC2.



NOTE The number of steps will vary.

Figure 5 – Composite concrete lintel and masonry stairway construction details

4.5 Timber stairways

4.5.1 Timber stringer beams to support timber treads in stairway construction that does not exceed 1,2 m in width in occupancies classified as H3 and H4 in single-storey and double-storey buildings, shall be of minimum size 48 mm × 225 mm, of grade 5, comply with the requirements of SANS 1460 or SANS 1783-2, and be sufficiently free of warp in any direction to be fit for purpose.

4.5.2 Timber treads shall be a minimum of 36 mm thick. Timber treads may be built into masonry walls with a minimum end bearing of 90 mm, or be supported on a steel angle cleat that has minimum dimensions of 50 mm × 50 mm × 4 mm, and is bolted to a wall with two masonry anchors per cleat in accordance with the manufacturer's instructions. Such anchors, when embedded in grade 20 concrete, shall have a safe working load in shear of not less than 1,25 kN, certified by the manufacturer. Such certification shall be substantiated by test reports or certificates from recognized local or international accredited testing laboratories.

4.5.3 All timber (see subregulation **A13(b)**) used in timber stairways shall be preservative treated in accordance with SANS 10005, as relevant.

Annex A
(informative)

National Building Regulations
Part M: Stairways

M1 General Requirement

Any stairway, including any wall, screen, railing or balustrade to such stairway, shall:

- (a) be capable of safely sustaining any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking) or deformation do not compromise its functioning;
- (b) permit safe movement of persons from floor to floor; and
- (c) have dimensions appropriate to its use.

M2 Fire Requirement

A stairway contemplated in regulation **M1** shall comply with the relevant requirements in part T of these regulations.

M3 Deemed-to-Satisfy Requirements

The requirements of regulations **M1** and **M2** shall be deemed to be satisfied where the design of any stairway complies with SANS 10400-M.

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