

GENERAL PREAMBLES FOR TRADES 2017

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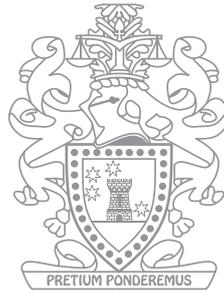
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mlcjhb@mlc.co.za | www.mlc.co.za
+27 (0) 11 283 1500





GENERAL PREAMBLES FOR TRADES 2017

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While the Association of South African Quantity Surveyors (ASAQS) aims to ensure that its publications represent best practice, the ASAQS does not accept or assume any liability or responsibility for any events or consequences which derive from the use of this General Preambles for Trades – 2017 document. This General Preambles for Trades – 2017 document is not exhaustive and is therefore only intended to provide general guidance to those who wish to make use of it. This publication is provided “as is” without warranty of any kind, either expressed or implied including but without limitation to warranties of merchantability, fitness for a particular purpose and non-infringement.

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The publication of this General Preambles for Trades – 2017 bears testimony to the fact that the Association of South African Quantity Surveyors and its members are committed to the ongoing production of outstanding resources of enduring value to the quantity surveying profession and the built environment at large.

Significant documents such as these contribute to the body of knowledge so highly esteemed by our profession and those associated with us. They enhance the provision of professional services by providing the guidelines and standardization so critical to contractual documentation in the construction industry.

This document is another example of our profession rising to the challenge in the face of change and producing a leading resource that will guide its members for years to come. It sets a standard for the professional service we offer to our valued clients and communities, both within and beyond our borders.

I take this opportunity to thank Professors Hans Wegelin and Carl Klopper for their excellent work in producing this document, resulting in another outstanding contribution to the profession. Since it takes progress such as this to maintain our position of strength and keep us at the forefront of change, I wish to invite more of our members to assist us in this endeavour.

Please receive this document with my best wishes.

Dr Stephan Molusiwa Ramabodu

President

The Association of South African Quantity Surveyors

2016/2017

The document

This document is published by THE ASSOCIATION OF SOUTH AFRICAN QUANTITY SURVEYORS (ASAQS) and replaces an existing ASAQS publication titled "Model Preambles for Trades 2008". The contents of the last-mentioned publication have been augmented and updated and are presented in a different style in this document

It is intended that this document will be used by reference only in the text of bills of quantities or lump sum documents and will not be reproduced and bound therein

The basic philosophy

These preambles have been designed with the view of expediting the production of bills of quantities and, as a by-product, enhancing standardisation of documentation by facilitating and promoting the usage of abbreviated descriptions in the text of bills of quantities

Users' attention is drawn to the fact that the contents of this document cover materials and workmanship encountered in a significant majority of building projects (as indicated by the introduction of the word "general" in the revised title). It is by no manner of means exhaustive. It is therefore to be anticipated that some items in the bills of quantities will still require full descriptions and supplementary preambles in the text

Wherever possible, reference has been made in these preambles to South African National Standards (SANS) to describe materials and methods. This includes the third revision of SANS 10400 The Application of the National Building Regulations and the linked parts of SANS 2001 Construction Works which cover building and civil engineering work, replacing SANS 1200

It is incumbent on users of these preambles to have ready access to the relevant standards. Where applicable SANS do not exist, reference has been made to other accredited standards. SANS are available online at www.sabs.co.za

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SANS NUMBERING IN CONSTRUCTION STANDARDS

SANS specification: SANS and number, e.g.

SANS 227 burnt clay masonry units

SANS code of practice: 1 plus four digits, e.g.

SANS 10082 Timber buildings

SANS BS standard: SANS and number, e.g.

SANS 6927 Building construction - Jointing products - Sealants - Vocabulary

SANS EN standard: 5 plus four digits, slash EN plus number, e.g.

SANS 50197-1 / EN 197-1 Cement Part 1: Composition, specifications and conformity criteria for common cements

SANS ISO standard: SANS and number, slash ISO and number, e.g.

SANS 140 / ISO 140 Acoustics - Measurement of sound insulation in buildings

SANS SM (standard method): SANS and 5 or 6 plus three digits, e.g.

SANS 5900 Warpage and squareness of refractory bricks

SANS 6056 Sulphide content of water

There is no longer a distinction between a specification, a code of practice, or a standard method; they are now all referred to as *standards*

Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits

Units, symbols, meaning of terms

Units of measurement, symbols

The units of measurement are metric units as standardised by the “Système International d’Unités” (SI). Note that the comma is the decimal indicator in Europe and South Africa, formally adopted by the *ISO* and the *IEC* as well, and that numerals are grouped into groups of three for readability, separated by a space, e.g. 1 233,55

The following unit symbols (not abbreviations) and notations may appear in this document:

| | | | |
|----------------|-----------------|----------------|--------------|
| °C | degrees Celsius | L | litre |
| g | gram | m | metre |
| H _z | Hertz | m ² | square metre |
| h | hour | m ³ | cubic metre |
| d | day | | |
| kN | kilonewton | mm | millimetre |
| kPa | kilopascal | MPa | megapascal |
| kW | kilowatt | t | tonne |
| < | less than | > | greater than |

Explanation of terms

The following terms and initialisms appear in italics in the text. Their meaning as to this document is hereby explained:

AAAMSA

Association of Architectural Aluminium Manufacturers of South Africa

applicable standard

a national or recognised standard applicable to the works, implying that the relevant standard is a contract document, a copy of which shall be kept in the site office for reference when requested

described / as described

described / as described in the bill of quantities, supplementary preambles, on *drawings* or in a project-specific specification

BS

British Standard

coastal region

area between the coastline and an imaginary line 30 km inland, including the entire area of jurisdiction of any local authority falling within this region

(colon) :

“shall be”; or “shall comply with”; or “shall comply with the requirements of”; e.g. “clay roof tiles: SANS 632” means “clay roof tiles shall comply with SANS 632”

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, as further defined in SANS 10400

comply

meet *described* standards

directed

as *directed* by the Employer's principal agent

drawings

the *drawings* forming part of the contract documents, and any modification thereof or additions thereto delivered to the contractor during the execution of the works; *drawings* include schedules

EN

European Norm

IEC

International Electrotechnical Commission

ISO

universal short name of the International Organization for Standardization, a worldwide federation of national standards bodies of which South Africa, Botswana and Zimbabwe are members and Namibia, Angola, Zambia and Mozambique are correspondent members

MOD AASHTO

an internationally accepted test to determine the density of compacted material such as soil filling, expressed as a percentage of the maximum compaction of the filling at various moisture contents as determined in a laboratory

NHBRC

National Home Builders Registration Council

SANS

South African National Standard

suitable

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

to manufacturer's instructions

the manufacturer's instructions at the time of tender

A. GENERAL

A.1 Application of clauses

These General Preambles for Trades, where applicable, and any Supplementary Preambles contained in the bills of quantities, form part of the descriptions of items in the bills of quantities

Where descriptions or Supplementary Preambles contained in the text of the bills of quantities differ from these General Preambles for Trades, the descriptions and Supplementary Preambles shall take precedence

Except where otherwise *described*, all preambles contained in any individual Trade Preamble shall apply equally to any work of a similar nature in all other trades

A.2 Materials and workmanship

Materials and workmanship shall be to the approval of the Employer's principal agent and shall be executed in accordance with the relevant manufacturer's written recommendations and instructions where applicable. Materials destined for permanent installation into the works shall not be used for any temporary purposes

A.3 Proprietary products

For the purposes of submission of tenders, rates for items *described* in the bills of quantities by trade names, catalogue references, etc. are for the particular type and manufacture specified

Where products or materials etc. other than those specified are used, adjustments in the rates will be made if necessary

A.4 Assembling

Rates for manufactured items shall include assembling complete and handing over in proper working order

A.5 References in descriptions

Any references given in brackets at the end of certain descriptions refer to the relevant references on the *drawings* or schedules

A.6 Water

Water shall be clean and free from injurious amounts of acids, alkalis, organic matter and other substances and shall be *suitable* for its intended use

A.7 Application of the national building regulations

All work shall be executed in accordance with the requirements of SANS 10400

A.8 Accuracy in buildings

Dimensional and positional accuracy of the buildings and their component parts: SANS 10155 Grade II unless otherwise *described*

A.9 Reference to other documents

References in these General Preambles for Trades to other documents, including SANS and BS, pertain to the latest edition thereof including all amendments thereto at the date for submission of the tender

B. DEMOLITIONS**B.1 Demolitions and disposal of buildings and other structures, breaking up and removal of paving, etc.**

Applicable standard: SANS 2001- Construction works Part BS1 Site clearance

Additional clause:

Unless otherwise *described*, materials salvaged from the demolitions shall become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials may not be re-used in any new work without written permission from the Employer's principal agent

C. ALTERATIONS

C.1 Alterations

- a) ensure the stability of all structures during alteration work
- b) give notice when any electrical installations, water supply pipes, telephone and other services are to be disconnected or altered
- c) take all precautions necessary to prevent any nuisance from dust

C.2 Materials from the alterations, credit, etc.

- a) materials recovered from the alterations (except where *described* as to be re-used or to be handed over to the Employer) shall become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities
- b) materials *described* as “removed” shall be removed from the site immediately
- c) materials *described* as “handed over to the Employer” shall be dismantled where necessary, stored under cover on the site where *directed* and protected from damage, until required
- d) materials *described* as “set aside for re-use” shall be dismantled where necessary, cleaned, stored under cover and protected from damage until required for re-use. Allow for and make good any damage caused to such materials during removal, storage or reaffixing

C.3 Disposal of debris etc.

- a) remove from the site all materials, debris and rubbish resulting from the alterations

C.4 Making good damaged work

- a) make good in all trades to existing work where damaged or disturbed through alterations with all necessary new materials to match the existing

C.5 Forming new openings or altering openings in existing walls

- a) where new openings are formed or openings altered in existing walls, break out the wall above the opening and insert new brick, in situ concrete or prestressed concrete lintels, complete with all necessary reinforcement, formwork, turning pieces, etc. Build up the jambs and portions of the openings as described with new brickwork or blockwork properly toothed and bonded to existing. Close cavities of hollow walls where necessary and make good finishes all round and into reveals

C.6 Building up openings

- a) where existing openings are given in number as built-up, prepare the existing surfaces all round as necessary, properly tooth and bond brickwork or blockwork to existing, wedge-up to underside of existing lintel and make good finishes on both sides

D. Earthworks

D.1 Site clearance (removal and disposal of vegetation, trees, etc.)

Applicable standard: SANS 2001-Construction works Part BS1: Site clearance

D.2 Earthworks (general)

Applicable standard: SANS 2001-Construction works Part BE1: Earthworks (general)

D.3 Sinkholes and subsidence

Applicable standard: SANS 2001-Construction works Part BE3: Repair of sinkholes and subsidences in dolomite land

D.4 Classification of materials to be excavated

“Hard rock”: granite, quartzitic sandstone or rock of similar hardness, the removal of which requires drilling, wedging and splitting, or the use of explosives

“Soft rock”: hard material, the removal of which warrants the use of pneumatic tools and includes hard shale, ferricrete, compact outcrop and material of similar hardness

“Earth”: all ground other than that classified as “hard rock” or “soft rock”, including made-up ground and loose stones or concrete pieces not exceeding 0,03 m³ in volume

D.5 Filling

D.5.1 Filling generally

- a) filling over site: spread, levelled, watered and consolidated in layers not exceeding 300 mm thick
- b) filling under floors and backfill to trenches and holes: *suitable* inert material, free from clay, vegetable matter, large stones, etc. having a maximum plasticity index of 10, spread, levelled and compacted to a density of at least 90% MOD AASHTO

D.5.2 Hardcore

- a) hardcore: broken stone or other approved hard material graded from 25 mm to 75 mm with the finer material on top, spread, levelled and consolidated

D.6 Soil insecticides

Applicable standard: SANS 10124 The application of soil insecticides for the protection of buildings

E. Concrete, formwork and reinforcement

E.1 Structural works

Applicable standard: SANS 2001-Construction works Part CC1: Concrete works (structural)

E.2 Minor works

Applicable standard: SANS 2001-Construction works Part CC2: Concrete works (minor works)

E.3 Foundations

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

E.4 Strongrooms

Strongrooms: SANS 10052

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F. Precast concrete

F.1 Structural works

Applicable standard: SANS 2001-Construction works Part CC1: Concrete works (structural)

F.2 Minor works

Applicable standard: SANS 2001-Construction works Part CC2: Concrete works (minor works)

Electronic Version

G. Masonry

G.1 Masonry walling

Applicable standard: SANS 2001-Construction works Part CM1: Masonry Walling

G.1.1 Materials

burnt clay masonry units

- a) burnt clay masonry units: *SANS 227* unless otherwise described
- class of common units: NFP for general masonry above damp-proof level to be plastered; NFX for masonry exposed to damp or in contact with the ground (e.g. foundation walls, manholes), or for fair face work
 - nominal dimensions: 222 x 106 x 73 mm unless otherwise described
 - nominal compressive strength: to table 1 of *SANS 2001-Construction works Part CM1*
 - uniformity of colour and texture of face units: provide sample of 20 units
 - grade of efflorescence: normal for internal walls not exposed to damp; special for visible unplastered foundation walls, retaining walls and free-standing walls
 - limits of water absorption: 6–14%
 - limits of moisture expansion: 0,20%
 - required marking: designation on each dispatch or consignment note

concrete masonry units

- b) concrete masonry units: *SANS 1215*
- nominal compressive strength: *SANS 2001-Construction works Part CM1* table 1
 - average drying shrinkage: normal (0,06%)
 - required marking: designation on each dispatch or consignment note

mortar

- c) sand: to *SANS 1090* unless otherwise *described*
- d) mortar class: II unless otherwise *described*

reinforcement

- e) brick reinforcement in corrosive areas:
- in *coastal regions*: galvanised to *SANS 121*, or stainless steel
 - in tidal splash zones: stainless steel
 - non-metallic ties (engineered polymer) may be used instead of stainless steel ties
- f) metal tie type: butterfly or modified PWD

G.1.2 Work

- a) single-leaf bond: stretcher
- b) multileaf bond: stretcher bond with leaves connected with crimp wire ties at <450 mm horizontal and vertical spacing and staggered, unless otherwise described
- c) position of control and articulation joints: to SANS 10400-K unless otherwise *described*

G.1.3 Additional requirements

- a) wall ties in partial fill insulated cavity walls:
 - to have drip in centre of residual cavity
 - tie spacing: SANS 10164 (2,5/m² or 600 mm vertical, 660 mm horizontal and staggered)
 - tie spacing around openings and construction joints: <300 mm vertical
- b) tie mortar cover: 15 mm minimum to outside face of mortar joint
- c) ancillary fabricated components for masonry, e.g. ties, brackets, lintels, shelves, anchors, meshwork: galvanised to SANS 121 in *coastal regions*
- d) clay facing units (face bricks): manufacturer/supplier to provide the following in writing:
 - the required application e.g. type of building, finish etc.
 - the degree of exposure to weather conditions, proximity to the sea etc.
 - track record of the preferred brick in the area of the building
 - an undertaking or warranty that the bricks delivered will be suitable
 - colour expectations in the case of face bricks
 - acceptable levels of breakage during delivery to site
- e) common solid masonry mortar joints:
 - to be raked out to receive plaster finish
 - to be flushed off where walls are to be bagged or fair-faced
- f) hollow masonry mortar joints:
 - not to be raked out to receive plaster
- g) cramps for wood door frames: 500 x 32 x 1,6 mm hot dip galvanised steel lugs for building in, twice screwed to the outside of frames at 300 mm from bottom and top and intermediately at not exceeding 900 mm apart

G.2 Glass blockwork

G.2.1 Materials

- a) glass blocks: BS EN 1051
- b) mortar: class II

G.2.2 Laying

- a) bond: straight horizontal and vertical joints
- b) coating: surface on which first course is laid to be coated with bitumen emulsion or similar material to permit movement of blocks
- c) reinforcement: every fifth horizontal joint, and vertical joints at 1 m maximum centres, with 25 – 65 mm wide corrosion resistant metal strips or mesh, nailed to the adjacent walls or columns, or with 6 mm diameter hot dip galvanised reinforcing rod drilled 50 mm deep into surrounding structure
- d) isolation joint: 15 mm clear space to be allowed at sides and top of glass block panel; front of space to be filled with polyurethane backing strip and silicone sealant
- e) joints: 10 mm, struck back and smoothed
- f) waterproof grout: where wall is exposed to rain

G.3 Paving

tiles on screed

- a) screed to SANS 2001-Construction works Part EM2; fix tiles in tile adhesive with sealed isolation joints against fixed objects

tiles on waterproofing

- b) on bitumen systems: bed tiles in bitumen and stone chip key

paving slabs on insulation panels

- c) precast concrete paving slabs: SANS 541; laid loose on insulation panels as *described* elsewhere

paving slabs on adjustable pads

- d) precast concrete paving slabs: SANS 541; laid on patent adjustable underlay pads to keep tiles 20 – 40 mm clear of waterproofing; joints between slabs: 5 mm, left open; paving surface: level or to follow gradient as *described*

G.4 Natural stonework

Rubble walling

- a) natural irregular stone: local koppieklip
- b) size: between 150 and 600 mm in section
- c) mortar: class III (50L common cement:0 – 80L lime:300L sand)
- d) laying: stones are to be laid on their natural quarry beds
- e) joints: 25 – 50 mm wide cement mortar class II, finished 25 mm deep square recessed
- f) bond: mainly large stones to homogeneous random pattern
- g) levelling up: tops of walls are to be levelled up with selected long and flat stones; wall faces are to be kept even
- h) tying through stones every 1 m² in double-faced walls

- i) attachment devices where rubble walls are to be joined to brick-, block-, or concrete work: 20 x 3 mm L-shaped stainless steel bonding lugs shot-nailed to background at 1 m intervals and staggered
- j) reference panel: required

Ashlar walling and wall linings

- k) stone: natural stone with high compressive strength and good durability, sourced from an approved quarry, dimensioned for use in ashlar walls and wall linings
- l) joints: 3 mm
- m) pointing: exposed joints to be 12 mm deep, raked out and filled with suitable grout
- n) matching where relevant: slabs of natural stone shall match as to veining, colour and texture; each slab to be numbered and fixed in the same relative position
- o) ashlar work shall be cleaned down and covered up to prevent soiling during progress of the remaining work, removed upon completion and cleaned down again

G.5 Insulation

G.5.1 To wall cavities

- a) full fill cavity insulation:
 - cavity width: equal to the required insulation thickness
 - to be filled with rigid insulation board or fibre batts
- b) partial fill cavity insulation:
 - to be filled with rigid insulation board only
 - insulation to be held tightly against outer face of inner leaf with *suitable* retaining discs or extra wire ties
 - a residual cavity of >35 mm to be maintained to permit moisture drainage
- c) loose fill:
 - loose fill insulation to be pumped/blown in cavities of existing walls through holes drilled in outer leaf, by specialist installer; holes refilled after completion, and to match surrounding face brickwork when relevant
- d) insulation shall be butt joined tight against window/door frames

G.5.2 To external face of walls

- a) patent system of EPS external insulation bonded and mechanically fixed to dry, sound and flat surface, finished with reinforced polymeric plaster, unless otherwise *described*
- b) by registered specialist strictly to supplier instructions

G.5.3 Under precast concrete paving slabs

- a) high density polystyrene insulation panels of required thickness with tight butt joints, to SANS 204

G.6 Miscellaneous

Hoop iron ties between concrete and masonry work, roof ties, cramps and dowels to frames, etc.:
as described

Electronic Version

H. Waterproofing

H.1 Materials

reinforced bitumen membrane

- a) flexible polyester and/or fibreglass reinforced APP polymer modified bitumen membrane: *BS EN 13707* or the subject of an active Agrément Certificate
- b) anti-root: in all planted areas
- c) bonding: heat-fused on primed surfaces

reinforced liquid membrane

- d) in situ reinforced liquid membrane
- e) of light colour
- f) reinforcement: non-woven needle-punched polyester or polypropylene fibre fabric with a mass of 125–150 g/m² for roofs and 95–100 g/m² for parapet walls

slip/protection layer

- g) 0,25 mm polymer sheeting: *SANS 952* type C (green)

geomembranes

- h) thermoplastics sheeting: *SANS 1526*

H.2 Application

- a) waterproofing system: according to *manufacturer's instructions*, including priming procedures, to leave roof, internal wet areas like showers and plant rooms, and below-ground structures in a watertight condition
- b) slip/protection layers, blinding layers, metal lath, ventilators etc.: as *described*

H.3 Waterproofing surface finishes/protection

- a) slip/protection layer: single layer bituminous felt or double layer HDPE sheet as *described*
- b) tile, paving units or panel finish: neatly cut to fit tightly along perimeter

H.3.1 Exposed non-trafficable areas

paint

- a) on plain bituminous systems: heavy brush or two coats of bituminous based aluminium paint to *SANS 802*
- b) on other systems: *suitable* ultra-violet block as recommended by waterproofing manufacturer

crushed stone

- c) layer of light coloured non-absorbent crushed stone of 25 mm nominal size on slip/protection layer or on insulation of required thickness to *SANS 204*

H.4 Joint fillers/sealants

H.4.1 Materials

- a) building construction jointing and sealant products vocabulary: SANS 6927
- b) two-part gun grade polysulphide sealants: SANS 110
- c) one part low modulus silicone rubber sealant: SANS 1305, type 1 for building joints
- d) one part high modulus fungus proof silicone rubber sealant: SANS 1305, type 2 for glazing and sanitary ware
- e) two-part polyurethane base sealant: SANS 1077, type 1 pouring grade, self-levelling
- f) two-part polyurethane base sealant: SANS 1077, type 2 gun grade, non sag
- g) preformed elastomeric compression joint seals: SANS 1023 type 1

H.4.2 Installation

preparation

- a) joints: clean and dry
- b) backing strip: inserted to ensure correct sealant thickness
- c) correct primer: applied to sides of joints
- d) bond-breaking material: where required
- e) edges: masked to ensure neat and clean edges

sealing

- f) *to manufacturer's instructions*
- g) thickness: not less than half the width of the joint
- h) joints to be sealed: around door and window frames, movement joints, joints between walls and columns, floor joints, and other joints where sealing is indicated or to the requirements of SANS 204

I. Roof coverings, claddings, etc.

I.1 General

underlays

- a) reflective foil laminate: SANS 1381-4 class B (reinforced, one surface reflective), and mark-bearing
- b) polymer undertile film: SANS 952 type E (white), mark-bearing

I.2 Slates, tiles and shingles

I.2.1 Materials

- a) concrete roof tiles and accessories: SANS 542 and mark-bearing
- b) clay roof tiles: SANS 632 and mark-bearing
- c) natural slate tiles: from an approved quarry, with two holes per tile, drilled (not punched)
- d) fibre-cement slates: SANS 803, and mark-bearing
- e) metal roofing tiles: SANS 1022, and mark-bearing
- f) accessories: to match roofing material
- g) fixing materials: hot dip galvanised steel SANS 121 in inland regions, or stainless steel grade 304 in coastal regions or corrosive atmospheres, except for clay tiles where all fixings shall be stainless steel
 - length of nails: to penetrate battens to a minimum depth of 25mm
 - steel wire: 1,6 mm diameter, galvanised
- h) mortar for bedding and pointing: 3 parts sand to 1 part cement, pigmented to match tiles
- i) sawn softwood timber battens: SANS 1783-4

I.2.2 Fixing of tiles

- a) Fixing of tiles: SANS 10062 Fixing of Interlocking Roof Tiles

I.3 Thatch roofing

- a) thatch type: *as described*
- b) thickness and minimum mass of thatching: SANS 10400-L
- c) lightning protection: required

I.4 Profiled sheeting of metal, fibre-cement, plastic, etc.

Installation: SANS 10237 Roof and side cladding

I.4.1 Metal sheeting

profile

- a) corrugated: 17,5 mm deep, 76 mm pitch, pierced-fix



- b) trapezoidal (box rib /IBR) 36 mm deep, 172 mm pitch, pierced-fix



- c) trapezoidal clip-on: >40 mm deep, <180 mm rib centres, with beading rolled into trough bottom, concealed-fix, or the subject of an active Agrément Certificate



- d) standing seam: 50 mm deep, 203 (x 2 for double trough = 406) or 445 mm (single trough) seam centres, with beading rolled into trough bottom, concealed-fix, or the subject of an active Agrément Certificate



steel

- e) hot dip zinc coated coil sheeting: SANS 3575/SANS 14713, coating grade Z275 for rural and urban inland regions or Z600 for *coastal regions* or aggressive atmospheric conditions
- f) aluminium/zinc coated sheet: SANS 9364/SANS 14788, coating grade AZ150 for rural and inland regions or AZ200 for *coastal regions* or aggressive atmospheric conditions
- g) required coating marking: thickness, material quality and coating thickness on the reverse side of each sheet at 1 m intervals

aluminium alloy

- h) natural mill finish aluminium alloy: SANS 903 type 3004- temper H14 or alloy A1-Mn1 or A1-Mg2
- i) required marking: thickness on each sheet

stainless steel

- j) stainless steel: grade 304

prepainted metal

- k) prepainted metal sheet: SANS 1845
- l) required prepainting marking: at 1m intervals on underside of sheet, or on delivery slip: trade name, type

I.4.2 Fibre-cement sheet

- a) fibre-cement sheet: SANS 685/9933
- b) thickness: 5 mm
- c) profile: corrugated 57 mm deep, 178 mm pitch (Big-six)

I.4.3 Glass-reinforced polyester sheet

- a) glass-reinforced polyester sheet: SANS 1150
- b) required marking: trade name, type, class, light-transmission grading, mass, weathering side in case of type 1, on each sheet

I.4.4 Polycarbonate sheet

- a) grade: sheeting grade with a co-extruded layer of UV stabilised polymer on the weathering side

I.4.5 Fasteners and washers

- a) fasteners and washers: SANS 1273

I.4.6 Installation

- a) installation: *to manufacturer's instructions* or to an active Agrément Certificate

trough ends on metal trough roofs with slopes less than 15°

- b) trough ends: downturned 15 mm at eaves to form drip; upturned 30 mm at high ends to form stop-end
- c) bend with *suitable* tool (not hammer) without tearing the sheet.

I.4.7 Miscellaneous

- a) finishing of roof: with necessary ridging, closers, upturns, downturns, drips and capillary interstices to provide a watertight and vermin and insect proof construction
- b) of similar material and fasteners as roofing

ridging

- c) on corrugated metal roof sheeting: 460 mm girth with roll-top, lapped 225 mm at heading joints and beaten into corrugations; close roll-top at bottom of hips and at gable ends
- d) on trapezoidal roof sheeting (lapped or interlock) and on standing seam roofing to fall >7°: 430 mm girth without roll-top, lapped 225 mm at heading joints and provided with serrated closers
- e) on narrow standing seam roofing to fall <7°: single-length over-ridge sheet with top 12 mm of seams sawn or snipped at ridge position and bent, cuts to be covered with rib caps set in *suitable* sealant
- f) on fibre-cement roofing: fibre-cement corrugated or plain adjustable or fixed ridges; corrugations to be filled under plain wings of fibre-cement ridging with 1:5 cement:sand mortar

movement joints

- g) watertightness and freedom of movement of structural movement joints shall be ensured under all conditions

I.5 Thermal insulation

I.5.1 Materials

- a) required R-value/thickness: SANS 204
- b) required fire performance classification of thermally insulated building envelope systems: SANS 428

rigid board

- c) expanded polystyrene (EPS) board: SANS 53163 type regular when covered, flame retardant when exposed
- d) extruded polystyrene (XPS) board: SANS 53164, density 32 kg/m³, compressive strength 160–310 kPa depending on thickness
- e) expanded polyurethane (EPU) board: SANS 53165

fibre mats/batts

- f) fibrous thermal insulation mats/batts: SANS 1381-1

reflective foil

- g) reflective foil: SANS 1381-4

metal faced insulation panels

- h) metal faced panels bonded to an insulation core: SANS 54509 and mark-bearing

I.5.2 Installation

- a) installation: SANS 204, to fit snugly between rafters
- b) insulation to be kept clear of incandescent and halogen downlighters/transformers
- c) electrical and other safety issues shall be observed, e.g. defective wiring, adequate lighting during installation

pitched roof insulation

- d) reflective foil under roof covering: with air space of >25 mm between foil and solid surfaces and with reflective surface facing down

flat roof insulation

- e) material: rigid EPS insulation density 32D

I.6 Flat sheet metal

I.6.1 Material

- a) copper sheeting: 0,6 mm x 600 mm wide high purity cold rolled copper SANS 404/405
- b) boarding: 20/22 mm thick solid tongue-and-groove softwood to SANS 629 of genus Pinus, flooring grade, light density group, non-end-matched
- c) roofing felt: range 111 containing 80% wool, density 333 g/m²
- d) fixing clips: 0,6 mm x 40 mm wide copper

- e) clout nails: hard drawn copper wire 2,8 mm diameter x 22 mm with barbed shank
- f) screws: brass, flat head

1.6.2 Laying

- a) softwood boarding: screw fixed onto battens with counter-sunk brass screws
- b) roofing felt: nailed onto boarding with copper clout nails with butt joints
- c) copper sheet: formed with both edges bent up 90 degrees to form troughs 510 mm wide
- d) standing seams: formed with double welts in direction of fall
- e) clips: formed of same material as roof and folded into seams at 300 mm centres and nailed to boarding with copper clout-head nails
- f) eaves: 100—120 mm wide sheet laid at eaves, nailed to boarding with copper nails and bent down with roof covering to form drip
- g) head wall (parapet walls, ventilation pipes and chimneys): sheet troughs bent up
- h) gutters and spouts: formed from copper sheet of 0,6 mm thickness, with movement joints in gutters every 10 m
- i) movement: all sheeting securely fixed without restricting thermal movement; nails and screws to be finished flush when covered by copper

1.7 Flashings

1.7.1 Material

- a) flashings and counter-flashings: sheet metal (reinforced liquid membrane is prohibited)
- b) fibre-cement roofs: 6 mm fibre-cement apron flashing finished off with metal counter-flashing against walls, or sill or U-flashing where required in vertical cladding, all according to *manufacturers instructions*
- c) on tiled roofs: steel sheet hot dip galvanised class Z275 for inland regions, or class Z600 or copper for coastal/corrosive regions, thickness 0,6 mm
- d) on sheet metal roofs: material similar to roofing sheets; side-wall flashings: >75 mm high, >200 mm wide or to cover at least two ribs of profiled metal sheeting; head-wall flashings: purpose made flashings incorporating serrated closers and poly closers to suit metal roof profile, manufactured to roof angle – do not bend on site; counter-flashings: >150 mm high, with anti-capillary fold; end laps: >150 mm for flashing; >75 mm for counter flashings; flashing nails: same material as flashing
- e) flashings to pipes >50 mm diameter: tapered sheet metal collar of diameter to fit around pipe, soldered or sealed to holed flange at same angle as pitch of roof; flashings to pipes <50 mm diameter: tapered sheet metal collar only

1.7.2 Fixing

- a) sheet metal flashings: cut, joined, lapped and formed to make a watertight finish
- b) fixing of flashings: to walls with 75 mm long flashing nails with a 20 mm hook
 - at ends and at 400 mm centres in between

- flashing nails: driven into wall above line of flashing turn-up, hook of flashing nail used to keep flashing in position (nails shall not be driven through flashing)
- c) fixing of flashings to roof sheets: at <600 mm centres or on each alternate rib
- d) undertile flashings: placed under roof tiles on battens at gable, parapet or chimney walls, to discharge onto roof covering or into eaves gutters
- e) chimney gutters: supported on high side of chimney on suitable boarding; turned up 100 mm against chimneys and > 225 mm up the roof slope; chimney gutters lapped onto side flashings or undertile flashings
- f) counter-flashings: fixed in 25 mm deep formed joints in masonry or pre-formed into concrete, kept in place with short rolls of cut-off sheet metal, and joints filled solid with 1:3 cement:sand mortar; counter-flashings shall not be punctured
- g) pipe flashing >50 mm diameter: flanges shall be fixed to roof sheets by means of roof screws similar to those used to fix the roof sheets, or by means of pop rivets; pipe flashings <50 mm: collars shall be soldered onto roof sheet; collars shall be sealed around pipe with suitable clamp and sealant
- h) valley linings:
 - to consist of ridging turned around, without roll for steep slopes, or with roll for low slopes
 - lapped 225 mm minimum
 - valley linings to discharge into eaves gutters
 - valley lining sides: folded back to form open beads in the case of slate and tile covered roofs
- i) exposed verges of corrugated steel roofs: finish with roll flashing

J. Carpentry and Joinery

J.1 Structural timberwork (flooring)

Applicable standard: SANS 2001- Construction works Part CT1: Structural Timberwork (flooring)

J.2 Structural timberwork (roofing)

Applicable standard: SANS 2001-Construction works Part CT2: Structural Timberwork (roofing)

J.3 Structural laminated timber

Structural laminated timber: SANS 1460

J.4 Timber buildings

Applicable standard: Timber buildings: SANS 10082

J.5 Fascias and barge boards

fibre-cement

- a) fibre-cement sheets: SANS 803

fixing

- b) drilled, countersunk and screwed at 750 mm maximum centres with 5 x 50 mm sherardized screws
- c) fixed to purlins, tilting battens or verge battens, and into ends of roof beams; in case of purlins, stub beams shall be built into gable walls between purlins to carry verge battens
- d) board joints: covered with 50 mm girth x 0,5 mm thick H-profile galvanised sheet metal cover strips

J.6 Joinery materials

J.6.1 Solid wood

hardwood

- a) hardwood: SANS 1099
- b) grade: clear and free of sapwood for visible faces; semi-clear for faces that will not be visible
- c) required marking: trade name, grade (clear grade—red, semi-clear grade—blue) on one piece in each bundle

softwood

- d) softwood: SANS 1783-3
- e) grade: clear and free of sapwood for visible faces; semi-clear for faces that will not be visible
- f) preservative treatment: required for exterior work
- g) required marking: trade name on one end, grade on other end (clear grade – black; semi-clear grade – red) on each piece

laminated timber

- h) laminated timber: SANS 1460
- i) type: furniture (F)
- j) appearance and finish: sanded and smoothed (G)
- k) preservative treatment: required for softwood exterior work
- l) required marking: application, exposure class, type, appearance and finish on each board

J.6.2 Wood board

plywood and composite board

- a) plywood and composite board: SANS 929
- b) required marking: trade name, exposure class, thickness, grade, preservative treatment on each board

decorative melamine-faced boards (MFB)

- c) decorative melamine-faced boards (MFB): SANS 1763
- d) required marking: SANS 1763 + 'MFB' + thickness + abrasion and lamina thickness + Z

fibreboard

- e) fibreboard: SANS 540
- f) required marking: type on each board

particle board

- g) particle board: SANS 50312
- h) required marking: SANS 50312 / EN 312

oriented strand board (OSB)

- i) oriented strand board (OSB): SANS 472

J.6.3 Polymer laminate and solid surfaces

high pressure decorative laminates (HPL)

- a) high pressure decorative laminates (HPL): SANS 4586
- b) required marking: SANS 4586 + type + resistance, e.g. HPDL—SANS / ISO 4586—P333

continuous pressed laminates (CPL)

- c) continuous pressed laminates (CPL): SANS 1762/4586

polymer solid surfacing material

- d) synthetic work surfaces: consisting of acrylic and/or polyester resin and mineral fillers
- e) joints: seamless

J.6.4 Miscellaneous**adhesives**

- a) terminology and classification: SANS 10183 part 1
- b) requirements for structural applications: SANS 10183 part 2
- c) requirements for non-structural applications: SANS 10183 part 3
- d) phenolic and aminoplastic resin SANS 1349

steel tubes for furniture

- e) steel tubes for furniture SANS 657 part 4, and mark-bearing

J.7 Joinery**general**

- a) joinery fittings: manufactured in climate zone where it is to be installed
- b) joinery workshop: equipped with modern machinery manned by skilled personnel
- c) wood sizes as *described* are exact finished sizes
- d) overall sizes: to be checked on site before starting any joinery
- e) storing of materials: in a safe and dry place
- f) proprietary materials: applied according to *manufacturer's instructions*
- g) wood member lengths: provided in single lengths whenever possible; unavoidable joints to be placed over supports
- h) joints: mechanical (grooved, doweled, feathered, screwed, proprietary plates) plus adhesive; angle joints: to conceal end grain of natural wood or the edge of laminated or particle board
- i) arrises in solid wood: slightly rounded; vulnerable or exposed arrises: pencil rounded (3 mm radius)
- j) fixings: not visible except inside cupboards or drawers; in open units, or where unavoidable, screws with matching caps shall be used; in natural solid wood surfaces with clear finishes: countersunk to 6 mm below surface and plugged with matching dowels glued in
- k) exposed panel pin heads: punched and filled with stopping; stopping to match wood in case of clear finishes
- l) exposed edges of decorative laminate board: post formed
- m) exposed edges of veneered composite board: solid wood edging to match veneer and to full thickness of board
- n) parts exposed to moisture (e.g. near sinks, wash basins, floors): moisture resistant or exterior grade board shall be used
- o) edges of raw board cutouts: seal to prevent moisture ingress

grain, pattern

- p) grain or pattern: grain of all fitted visible clear-finished timber, or pattern of laminates when relevant, to run vertically on vertical surfaces and parallel to walls on horizontal surfaces, wherever practicable
- q) veneer on any one fitting to match in grain and colour; veneer on pairs of doors to match

plinths

- r) plinths: to be formed with front and back members and full height cross members at <900 mm centres; plinths to be scribed to floor and secured to wall to provide a level platform for carcasses

tops

- s) solid hardwood tops: boards in single lengths or, if not possible, with staggered end joints, jointed with grooved, cross-tongued and glued joints or with grooved rebated and glued joints stopped 25 mm back from visible ends
- t) moisture resistant particle board tops: faced with high pressure decorative laminates with postformed exposed edges
- u) fixing: tops to be screwed to framework to allow for movement: with rebated hardwood clamps or metal cleats at 300 mm centres, screwed from underneath

backs

- v) backs to fittings: hardboard unless otherwise *described*
- w) bevelling: all exposed edges

drawers

- x) drawers: 12 mm softwood front, sides and back, grooved for 6 mm tempered hardboard bottom, screwed to 16 mm drawer face, unless otherwise *described*

shop painting

- y) joinery shall be delivered on site fully painted, unless otherwise *described*

fixing

- z) joinery shall be fixed only after the space is fully enclosed and secure, all wet work is complete and dry, and airconditioning, lighting, site and stormwater works are complete
- aa) joinery shall be fixed to masonry or concrete walls with *suitable* frame fixing anchors; the necessary blocking pieces and subframes shall be provided to take up inaccuracies of wall and floor faces; where exposed hardwood is to be anchor fixed, screw heads shall be sunk and pelleted
- bb) vermin proofing in all food handling areas: all carcass joints with walls and floors, and cable entries, to be sealed with silicone beads

J.8 wood skirtings, quadrant beads, rails, etc.

- a) skirtings of 68 mm and higher: with hollow-rounded backs
- b) fixing to walls:

- in long lengths, with splayed heading joints and mitred corner joints

- with concealed fixings at not exceeding 600 mm centres
- quadrant beads in angle at junction with floor (where so *described*): fixing with panel pins to skirtings (not to floor boards)

J.9 Wood window/door frames

- mechanical performance: SANS 613
- hardwood: SANS 1099, clear grade, of species as *described*
- softwood: SANS 1783-3, clear grade, of species as *described*
- joints (structural): mortise and tenon
- rebated frames: shaped out of solid wood (lay-on door or casement stops are prohibited)
- haunches: top rails of door frames to be provided with bevelled haunches for building in
- glazing beads: with mitred corners, tacked lightly in place before delivery

J.10 PVC-U window/door frames

- PVC-U window and door frames for external use: SANS 1553.

J.11 Polymer compound window/door frames

- polymer material: unsaturated polyester (UP) resin: SANS 713
- to *comply* with minimum safety, heat distortion and compressive strength requirements

J.12 Wood doors

- wood doors: SANS 545 and mark bearing
- required marking on edge or top of each door: manufacturer, exposure class, performance class; in case of flush doors, position of coat rails ('CR') and closer blocks ('CB')

flush panel doors

- edge finish: concealed

additional clauses

- batten doors for external use, or framed panel and glass doors for external or internal use: 44 mm thick, of hardwood (including doors to be painted), mortise and wedge tenoned, with the tenon showing on the outside edge of styles; middle rails in such a position that a mortice lock will not destruct the tenon joint
- single swing double doors: with rebated meeting stiles
- veneer on pairs of doors: to match in grain and colour
- performance rating stamp on door: not to be removed until inspected in the hung position

sealing

- if not prefinished, doors shall be sealed, or knotted and primed, on all four edges immediately after delivery on site

K. Ceilings, partitions and access flooring

K.1 Ceilings

K.1.1 Nailed-up ceilings

timber branderling

Applicable standard: SANS 2001-Construction works Part CT2: Structural Timberwork (roofing)

additional requirements:

- a) size, and span (truss or beam spacing):

| Truss or beam spacing | Dimensions, mm | |
|--------------------------------------|----------------|------------|
| | Soft wood | Eucalyptus |
| 6.4 mm gypsum plaster ceiling board | | |
| <1000 | 38 x 38 | 32 x 32 |
| 1000 – 1200 | 38 x 50 | 38 x 38 |
| 1200 – 1400 | 50 x 75 | 38 x 50 |
| 4 or 6 mm fibre-cement ceiling board | | |
| <1050 | 38 x 38 | 32 x 32 |
| 1050 – 1500 | 38 x 50 | 38 x 38 |

- b) where roof trusses or beams are spaced at more than the required spacing for the intended branderling size, branderling size shall be increased, or support branderling by means of 38 x 114 mm sawn softwood ceiling joists shall be hung between and parallel to trusses or beams on 38 x 38 mm hangers from 38 x 76 mm runners fixed at 1 500 mm centres at right angles and on top of tie-beams of trusses or on top of beams, or at right angles in between tie beams/beams
- c) where heavy light fittings are to be suspended, supporting timber shall be installed
- d) patent steel branderling: hot dip galvanised steel sheet lipped channel branderling system including suspension brackets with adjusting slots
- size or span: 1 200 mm maximum or according to *manufacturer's instructions*
 - fixing: suspension bracket to be nailed or screwed to side of timber truss/beam
 - levelled out by means of adjusting slot
 - perimeter trim: standard or shadowline as described

gypsum plasterboard

- e) gypsum plasterboard: SANS 266
- f) hard wall gypsum plaster, where so described, to be applied to supplier's instructions with smooth polished surface
- g) spacing of branderling: 400 mm (300 mm when plastered)

fibre-cement board

- h) fibre-cement board: SANS 803
- i) spacing of branderling: 600 mm

cover strips

- j) cover strips to gypsum plaster and fibre-cement board joints:
- H-profile prepainted galvanised steel, aluzinc or plastic; or
 - gypsum plaster board; or
 - hardwood: species, profile, etc. *as described*

tongue and groove wood boarding

- k) tongue and groove wood boarding: SANS 1039
- l) secret nailed with lost-head oval wire nails and with end joints staggered

plywood boarding

- m) 3-ply to SANS 929, of exposure class, veneer species, grade etc. *as described*

wood strip

- n) hardwood: species *as described*
- o) fixed with panel pins

cornices

- p) gypsum coved cornice: SANS 622; or
- q) polystyrene core coved cornice: paper covered; or
- r) hardwood: species, profile, etc. *as described*

timber brandered trap door

- s) 650 x 650 mm minimum clear opening in ceiling to be trimmed with 38 x 100 mm sawn softwood trimmers spiked to beams or trusses
- t) trap door: formed of brandering and ceiling board as for ceiling
- u) fillets to carry trap door in closed position: 50 x 13 mm hardwood nailed or screwed to ceiling around trap door opening; corners to be mitred
- v) trap door to be hinged with one pair 75 mm steel hinges screwed to frame, so that trap door opens 180 degrees on to top of ceiling brandering, unless otherwise *described*

pressed steel trap door

- w) 0,6 mm pressed steel ceiling trap door, hinged to open 180 degrees onto ceiling, in 25 x 25 x 3 mm T-profile steel frame
- x) clear opening: >650 x 650 mm
- y) frame: screw fixed to ceiling brandering

K.1.2 Suspended ceilings

performance

- a) fire resistance in minutes, tested to SANS 10177

- b) airborne sound insulation rating: SANS 717/10218
- c) deflection requirements: to South African Building Interior Systems Association (SABISA).
- d) structural performance requirements: all anticipated loads, e.g. luminaires, smoke detectors, air grilles, wind loads, point loads to be safely supported

board

- e) mineral fibre board: EN 13964 unless otherwise *described*

suspension fittings

- f) patent suspension fittings: cold-formed hot dip galvanised steel T's, hold down clips, suspension rods and hooks, suspension clips, T suspension plates, lipped wall angles, shadowline wall angles and wall channel trim

installation

- g) according to *manufacturer's instructions*

K.1.3 Thermal insulation

materials

- a) required R-value/thickness: SANS 204
- b) required fire performance classification of thermally insulated building envelope systems: SANS 428

fibre mats/batts

- c) fibrous thermal insulation mats/batts: SANS 1381-1

loose fill

- d) loose fill (granules, pellets): SANS 1381-2
- e) cellulose loose fill (wood based): SANS 1381-6

installation

- f) bulk insulation: neatly cut to fit snugly between rafters
- g) insulation to be kept clear of incandescent and halogen downlighters/transformers
- h) electrical and other safety issues (e.g. defective wiring, adequate lighting during installation): to be observed

K.2 Partitions

performance

- a) structural requirements: SANS 10160
- b) wall deflection requirements: South African Building Interior Systems Association (SABISA)
- c) required fire resistance in minutes: SANS 10177
- d) required sound insulation grading: SANS 717/10218

boards

- e) gypsum plasterboard: SANS 266
- f) fibre-cement board: SANS 803

studs and tracks

- g) metal studs and tracks: hot dip galvanised steel with wall thickness and size *complying* with the structural requirements of the installed system
- h) timber studs: SANS 10082: for load-bearing or non-load-bearing walls *as described*

aluminium extrusions

- i) extruded aluminium sections: alloy 6063 or 6261 in temper T5 or T6, of wall thickness and strength to meet the structural requirements
- j) anodizing: SANS 1407

powder coating

- k) powder coating: SANS 1274
- l) by applicators approved by the powder manufacturer

glass

- m) glass: SANS 1263/50572
- n) required marking in case of safety glass: permanently on each pane, visible after installation.

drywall partitions, light weight internal walls

- o) framed system clad with gypsum or fibre-cement board, doors, glazing, trim, skirtings, etc.: *as described*

demountable partitions

- p) patent system complete with studs, braces, door and glazing frames, apertures, trims, skirtings, etc.: *as described*

cubicle partitions

- q) patent system complete with stiles, panels, doors and accessories, etc.: *as described*

operable partitions

- r) patent operable partitions consisting of full-height panels of 1200 mm wide 75mm thick, hung on tracks manually operated and stackable
- s) frames: aluminium alloy
- t) panels: medium density fibreboard backed with sound insulation materials
- u) hinges: recessed
- v) seals: all round each panel to achieve the required sound insulation

installation

w) according to *manufacturer's instructions*

K.3 Access flooring

a) raised access flooring: SANS 1549

b) fire resistance in minutes as tested to SANS 10177: *as described*

c) sound insulation single-number grading rated to SANS 717/10218: *as described*

d) class: *as described*

e) floorpanel covering: *as described*

installation

f) according to *manufacturer's instructions*

Electronic Version

L. Floor coverings, wall linings, etc.

L.1 Preparation

- a) all building operations that may damage the floor or lining to be completed before laying flooring or lining
- b) embedded pipes, conduit, cables, etc.: in position and tested
- c) substrate: dry and clean; in case of porous or dusty base, a primer shall be applied to improve bond between base and adhesive when relevant
- d) defects in base: levelling or smoothing compounds to be applied only to repair minor surface irregularities, and *to manufacturer's instructions*
- e) edge/dividing/feature strips, where *described*: to be in position before flooring is laid
- f) sufficient acclimatisation period for the material, when relevant, shall be allowed

L.2 Materials

primers and adhesives

- a) primers, adhesives, additives, patching and repair compounds and waterproofing compounds: low-VOC proprietary products supplied by one manufacturer, suitable for the work at hand, compatible with the floor covering and substrate and applied *to manufacturer's instructions*

L.3 Thermoplastic and similar flexible covering

materials

- a) semi-flexible vinyl tiles: *SANS 581*
- b) flexible vinyl flooring: *SANS 786*
- c) linoleum sheeting or tiles: *as described*
- d) rubber sheeting or tiles: recycled rubber of density between 800 to 1500 kg/m³, of light colour and of thickness, size, and texture *as described*
- e) accessories: skirtings, trim, nosings, etc.: *as described*

laying

- f) laying: *SANS 10070* and *to manufacturer's instructions*
- g) pattern: *as described*, continued through door openings connecting rooms with similar flooring
- h) joints in sheet flooring: welded

finishing

- i) cleaned and polished with two coats polymer floor dressing to *SANS 1042*

L.4 Wood flooring (solid and laminate) on solid substrates

materials

- a) solid wood panels: unpacked, stored dry and under cover, allowed free air circulation to bring panels to equilibrium moisture content

solid wood strip, block, parquet, mosaic, etc.

- b) density: >640 kg/m³ at moisture content of 12%
- c) strip: tongued, grooved and end-matched
- d) block dimensions: face width 57—90 mm, length 200—500 mm, thickness >20 mm
- e) parquet flooring: >6 mm thick

faced plywood or fibreboard

- f) factory assembled in panels of random lengths, and in widths up to 300 mm depending on species
- g) thickness: not less than 18 mm when laid on battens
- h) edges: tongued and grooved to produce a tight sliding fit and a flush joint on face side of strip, and end-matched

decorative melamine laminate

- i) decorative melamine laminate flooring: EN 13329
- j) thickness: 8 mm
- k) *suitable* for floating application to a fully supporting substrate
- l) provided with patent interlocking system
- m) built-in insulating underlay: where *described*

battens

- n) battens: sawn softwood timber to SANS 1783-4
- o) battens for sprung floors: laminated softwood

damp proof membrane

- p) over-slab damp proof membranes: polymer film to SANS 952 class C (green) or an Agrément certificated polyethylene sheet

movement joints

- q) movement joint strip: *suitable* patent

L.4.1 Installation

preparation

- a) partitions: to be in place before floating floors are laid

installation in general

- b) not to be laid over underfloor heating without written approval of the flooring manufacturer and/or the installer
- c) panels or strips to be laid in same direction as angle of light incidence; where this is of no consequence, panels or strips are to be laid parallel to longest side of room

- d) pattern to be continued through door openings connecting rooms with similar flooring
- e) movement joints: 20 mm clear space against all fixed objects including door frames, and every 10 m in both directions; plaster finish on walls shall be stopped or cut back short of finished floor level to ensure skirting covers the joint

nail down

- f) damp-proof membrane to be laid over concrete substrates on the ground; sheets to be lapped by 300 mm
- g) battens to be fixed at 400 mm centres to substrate except in cases of sprung floors where battens are to be laid floating on *suitable* resilient pads
- h) space between battens to be filled with cement-sand mix where underfloor heating is installed
- i) flooring strips to be secret-nailed to battens through the tongue at an angle of 45°; header joints may occur in the spaces between battens, provided that each length of flooring is nailed to at least two supports; header joints to be random staggered

glue down

- j) adhesive to be spread evenly on substrate with a serrated trowel
- k) panels to be placed accurately on setting out lines
- l) panels to be firmly tapped in position within open time of adhesive

floating

- m) damp-proof membrane to be laid over concrete substrate on the ground; sheets to be lapped by 300 mm
- n) foam underlay to be laid as recommended by manufacturer over entire floor area
- o) joints: patent click jointing system with random staggered end joints
- p) manufacturer's accessories shall be used for intermediate joints, movement joints, skirtings, split-level treatments, nosings, and marrying to other flooring materials

finishing solid flooring

- q) sanding: when relevant, adhesive shall be completely cured before starting sanding operations
- r) sanding shall be done with a mechanical floor sander in one operation (fine only) to a smooth and even surface
- s) untreated wood floors: finished with one coat clear wax polish

finishing faced plywood or fibreboard panels

- t) prefinished panels: clean down
- u) panels having to be sanded: only after having made absolutely certain of the process before attempting this work, and only with prior permission

L.5 Textile flooring

L.5.1 Materials

textile flooring

- a) textile flooring (pile construction): SANS 1375
- b) textile flooring (needle punched construction): SANS 1415

carpet underlays

- c) carpet underlays: SANS 1419, with fire and location grade similar to floor covering grade

accessories and fixing materials

- d) as recommended by carpet manufacturer
- e) stair nosings to have distinct colour difference from carpet
- f) where fire ratings are critical: non-flammable contact adhesives to be used only

L.5.2 Installation

- a) according to *manufacturer's instructions*
- b) coverings from the same production run shall be used to ensure uniform colour and texture in one area
- c) direction of seams and pile: pile to lie down stairs; longitudinal seams to be placed away from traffic areas; cross seams to be placed in crotch of stairs
- d) full widths to be started on door side of room; carpets under doors to be finished within thickness of closed door
- e) to prevent bow-wave effects under wheels (for example in medical institutions), carpet shall be stuck to floor with *suitable* adhesive
- f) where no protective nosings occur, stair nosings to have a minimum radius of 12,5 mm
- g) covering shall be secured at each crotch between riser and tread by carpet gripper lengths or by means of adhesive
- h) continuity of level between covering and stair nosing shall be ensured by fixing nosing to suitable spacers, e.g. hardboard or plywood strips with adhesive and screws

M. Ironmongery

M.1 General

- a) sherardizing on ferrous products: SANS 53811
- b) electroplating: SANS 135/136/2081/2082
- c) powder coating: SANS 1274 type 6

M.2 Fasteners

- a) fasteners: SANS 1700
- b) metal screws for wood: SANS 1171
- c) masonry anchors: proprietary expansion or chemical type
- d) plugs: proprietary plastic
- e) mild steel nails: SANS 820
- f) required marking: protective coating on container

M.3 Locks, latches and associated furniture for doors

- a) locks, latches, etc. (domestic type): SANS 4

padlocks

- b) padlocks: SANS 1533

keys

- c) two keys to every lock; no key shall pass more than one lock unless *described* as “en suite”
- d) cylinder locks and locks *described* as “en suite”: clearly marked with consecutive numbers and each key punched with the corresponding number of the relevant lock
- e) proprietary key control security systems: details to be submitted where required

M.4 Hinges

hinges for lightweight doors

- a) type (piano, pivot, flush, european-hidden, adjustable, strap): *as described*

hinges for medium to heavy doors

- b) type: butt hinges for doors opening 90°; projecting hinges for doors opening 180° when frames are set back from wall faces.
- c) aluminium hinges: high tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint
- d) doors fitted with closers shall be provided with low-friction bearing hinges
- e) exterior or security doors opening out shall be provided with fixed pin or security hinges

M.5 Door closers

- a) single action overhead door closers: SANS 1510
- b) manual action: with adjustable closing and latching speed
- c) floor spring sets, consisting of a floor spring unit let into the floor and with bottom and top door strap of size and finish *as described*

M.6 Blinds

- a) indoor venetian blinds: SANS 947
 - cross-straps: flutter-proof
 - screws: cadmium-plated.

M.7 Number/name plates

symbolic safety signs

- a) symbolic safety signs: SANS 1186

installation

- b) signage shall be fixed level and plumb, securely mounted with concealed theft-resistant fixings
- c) self-adhesive signs shall be fixed free of bubbles and creases

M.8 Drawer runners/slides

- a) type, load capacity, extension: *as described*

M.9 Fixing

- a) ironmongery for doors shall be delivered in individual complete sets for each door, as follows:
 - clearly labelled to show its intended location
 - in a separate dust and moisture proof package
 - including the necessary templates, fixings and fixing instructions
- b) correct handing to be verified on site before supplying
- c) ironmongery to be fixed with matching screws
- d) locks to be eased and adjusted on completion; closers to be adjusted to suit
- e) keys to be handed over at completion; cylinders to which contractor had key access during construction to be replaced with new cylinders with other keys
- f) all keys to be labeled with coloured plastic tags
- g) curtain rail/rod brackets and tie-backs to be plugged and screwed to wall
- h) rails/rods to project 300 mm past reveals wherever possible, or continuous over windows occurring in series.
- i) safety signs to be fixed according to SANS 1186 in positions as shown in *drawings*

- j) ironmongery to be protected during construction

M.10 Proprietary kitchen cupboards

- a) proprietary kitchen cupboards: SANS 1385
- b) required marking on casing of every unit: trade name, production lot
- c) sizes: supplier/m manufacturer is responsible for checking sizes on site and for providing detail layout drawings before any work is started
- d) cupboards to be fixed according to *manufacturer's instructions*
- e) all joints between work tops and walls shall be sealed
- f) all cupboard components shall be inspected and left in perfect working order after fixing
- g) cupboards shall be protected from damage

M.11 Proprietary steel furniture

- a) proprietary steel furniture: SANS 757
- b) powder coated finishes: SANS 1274

N. Structural steelwork

N.1 Structural steelwork

Applicable standard: SANS 2001-Construction works Part CS1: Structural steelwork

Additional clauses:

- a) steel wire rope (cables): SANS 2408
- b) structural steel tubes: SANS 657 part 1, and mark-bearing
- c) shackles: SANS 2415
- d) thimbles: SANS 2262

welding

- e) visible welds: continuous, ground smooth

N.2 Coating

- a) type: *as described*
- b) preparation of steel surfaces: SANS 10064

hot dip galvanizing

- c) hot dip galvanised coatings on prefabricated iron and steel products: SANS 121 / ISO1461
- steel composition: for industrial/mining purposes: Si 0,125 – 0,30% with P <0,02%; for architectural purposes: Si 0,03 with P <0,01% or Si 0,15 – 0,25% with P <0,02%

paint or varnish

- d) corrosion protection of structural steel of not less than 3 mm thickness by paint or varnish: SANS 12944
- all paint shall be sourced from one manufacturer
 - paint system testing: laboratory tests to SANS 12944-6

N.3 Light steel frame building

- a) Light steel frame building: SANS 517, or a rational design by a *competent person*

O. Metalwork

O.1 Metals

O.1.1 Steel

- a) steel: commercial quality mild steel
- b) corrosion protection of manufactured work before delivery to site:
 - preparation of surfaces: SANS 10064
 - coating: zinc phosphate primer or, where so *described*, hot dip galvanizing to SANS 121 / ISO 1461
- c) welding: visible welds continuous and ground smooth
- d) dressing: cut edges to be dressed to remove dross, burrs and irregularities; holes to be dressed where required to remove burrs and protruding and/or sharp edges

O.1.2 Stainless steel

- a) stainless steel: austenitic (300 series) stainless steel grade 304, or grade 316 in coastal areas
- b) finishes: annealed and pickled mill finish/polished/coloured/etched/mirrored/electropolished as *described*

O.1.3 Aluminium

- a) extrusions: 6063-T6 alloy and temper; sheets and strips: 1200-H4 alloy and temper
- b) construction:
 - joints to be formed in an approved manner to be practically invisible
 - screw heads, pins, rivets, etc. to be concealed as far as possible
 - 300 series stainless steel screws and bolts to be used for jointing and fixing
- c) finishes: mill finish/anodising to SANS 999/powder coating to SANS 1274/1578/1796 // matt/satin/high-gloss/hammertone/textured as described
- d) protection:
 - surfaces of aluminium work in contact with other materials when fixed to be suitably insulated with non-absorbent insulating material to prevent corrosion
 - all aluminium work to be protected against damage, deterioration or discoloration caused by mortar droppings, paint, etc. by taping with removable tape, covering with temporary casings or with motor oil

O.2 Doors, windows, curtain walling, shopfronts, etc.

O.2.1 Performance

Unless otherwise *described*, the following performance standards are required to be met:

mechanical performance

- a) mechanical performance of doors, windows, curtain walling, shopfronts, etc. in respect of wind action (deflection and structural strength), water penetration, air penetration and operation within the confines of the perimeter of the main frame, irrespective of the framing material: SANS 613
- b) design wind pressure: SANS 10160
- c) atmospheric temperature range: between -10°C and 35°C
- d) plastic, shrinkage and creep deflection of floor slabs: *as described*

thermal performance

- e) U-value and Solar Heat Gain Factor, including permissible air leakage: SANS 204, or as supplied by the glazing manufacturer as verified according to the test method ASTM C 1199 and ISO 9050 for U-values, and given in NFRC / SAFIERA 100-2004 for SHGC values, or be custom product assessed from suppliers, manufacturers, industry associations (including their online resources), and from competent assessors, who must have assessed the products in the manner prescribed by SAFIERA, or be the subject of a rational design by a *competent person*

fire resistance

- f) fire resistance: *as described*

sound insulation

- g) sound insulation: *as described*

O.2.2 General requirements

- a) fittings to be removable after windows have been glazed

burglar bars

- b) solid mild steel or aluminium alloy, of pattern as described
- c) bars at peg stays or latches to be kinked where required

insect screens

- d) metal gauze screen frames: pressed steel with baked enamel finish, or extruded aluminium with natural anodised finish, filled with 1,5 x 1,5 mm mesh fibreglass gauze, *as described*

installation

- e) install *to manufacturer's instructions* where applicable
- f) service units at completion and leave in perfect working order

O.2.3 Steel frame units

- a) factory finish: prepared to SANS 10064 and primed with zinc phosphate to SANS 1319 inland, or hot dip galvanised to SANS 121 / SANS 14713 in the *coastal region* or corrosive atmospheres

hot-rolled steel framed units

- b) hot-rolled mild steel framed units: SANS 727

pressed steel clisco type window frames

- c) pressed steel clisco type window frames: SANS 1311

pressed steel door frames

- d) pressed steel door frames: SANS 1129
- frames for continuous power floated floors without screeds or toppings to be *suitable* for surface placing without damage to the floor and without compromising proper building in of the frame or the fitment of standard doors
 - steel thickness: *as described*
 - frames for double swing doors: jambs with V-shaped centres to fit rounded edges of doors, and plain heads or transoms, holed and prepared to receive top centres of spring hinges
 - buffers: two rubber buffers on lock side rebate of every frame

pressed steel door and frame combination

- e) doors: 1,2 mm thick pressed steel with 40 mm edge, > two V-shaped vertical ribs over full door height, and three horizontal rails
- f) frame: single rebate pressed metal door frame to SANS 1129
- g) lock box: 1,6 mm pressed steel
- h) hinges: 1 pair 100 mm steel

cold-rolled steel frame units

- i) patent cold-rolled tubular steel profile frame with integrated fittings and gaskets
- j) galvanised to 200 g/m² and prepainted to ASTM D3663 for PVDF fluorocarbon, or AAMA 605.2.92 for baked organic coating

O.2.4 Aluminium framed units

- a) AAAMSA certified as to performance, glazing, surface finishing, ironmongery, fasteners, product certification and, where *described*, energy rating
- b) anodising: SANS 999.
- c) powder coating: SANS 1796, minimum thickness for all areas: 0,06 mm

O.2.5 Skylights and curtain walling

- a) a *competent person's* certificate on design loading compliance shall be obtained
- b) sloping glazing to have an overhang where it sheds rainwater on significant vertical surfaces
- c) glazing bars to allow for water penetration and effective drainage to outside
- d) condensation: to be removed through guttered weep system
- e) screws and fixing bolts: covered with plastic head caps

O.2.6 Adjustable glass louvre units

- a) *suitable* for hand or longarm operation

- b) glass: with polished edges
- c) louvre units shall be fixed
 - after window frame has been painted, when relevant
 - with stainless steel or chromium plated brass dome-head screws
- d) louvres shall be serviced at completion and left in perfect working order

O.2.7 Fire doors and fire shutters

- a) fire doors and fire shutters: SANS 1253
- b) installation: SANS 1253 Annex E

O.2.8 Garage doors

up-and-over garage doors

- a) solid door panel of steel or wooden framework clad in weather boarding, tipping upward into horizontal open position and balanced by springs

sectional overhead doors

- b) curtain of hinged panels sliding upwards and inwards in channel guides and balanced by springs

O.2.9 Roller shutter doors

- a) curtain of interlocking slats or grilles running in channel guides from a spring loaded barrel, mounted overhead on steel support brackets
- b) assembly bolted or welded to the building structure
- c) automatic operation to be supplied with light, safety reverse, manual override, and remote control
- d) electrical operation to include remote push button starter, limit switch assembly, emergency hand operator in event of power failure, and electromagnetic brake

O.2.10 Strongroom/record room doors, ventilators

strongroom and vault doors

- a) strongroom and vault doors: SANS 949
- b) required marking: manufacturer's name on outside of door; door category on inside of door

fire-resisting record room doors

- c) fire-resisting record room doors: SANS 1015
- d) required marking: "FIRE RESISTANT ONLY" , manufacturer's door number

ventilators for strongrooms

- e) double ended steel telescopic ventilator sleeves of 127×127 mm internally and suitable for wall thickness, fitted with baffle plates and flame proof wire gauze screen; face plates 225×225 mm on both sides, the outer face plate fitted with drop shutter mechanism operating from a fusible metal plug; sleeves and baffle plates not less than 2 mm thick

installation

- f) bolted to walls with lugs provided
- g) in openings formed in walls after plastering has been completed
- h) *to manufacturer's instructions*
- i) grouted solid in class I mortar
- j) door to clear finished floor by 25 mm
- k) ventilator(s) built into openings formed in the walls in class I mortar, grouted in solid

P. Plastering

P.1 Screeds, toppings, terrazzo

P.1.1 Materials

cement and aggregate

- a) cement for screeds: SANS 50197-1 type CEM I or CEM II
- b) cement for toppings: SANS 50197-1
- c) cement extenders: SANS 1491
- d) aggregate for screeds: concrete sand (not a plaster sand) passing through a 5 mm sieve; where a smooth surface is required, concrete sand may be blended with plaster sand in the proportion of 4:1
- e) aggregate for toppings: aggregate from natural sources: SANS 1083

| Nominal aggregate size, mm | Minimum thickness of topping, mm |
|------------------------------------|----------------------------------|
| 6,7 | 25 |
| 13 | 40 |
| ¼ thickness of topping, maximum 19 | >40 |

- f) aggregate for terrazzo: marble aggregate consisting of equal parts of sizes ranging from 3 to 4 mm and 4 to 6 mm

proprietary surface treatments

- g) form: dry shakes, coatings or screeds as described
- h) colouring pigment: BS 1014 or BS EN 12878

mesh reinforcement

- i) welded steel fabric for reinforcement of topping when so described: SANS 1024, of fabric reference number 193 or 245

P.1.2 Mix

screed

- a) 1 part cement to 3½ parts sand, or 50 kg (one bag) cement to 130 L sand (two wheelbarrows)
- b) mixing: by hand or preferably by forced-action mechanical mixer for 3 minutes
- c) use within 45 min.

topping

- d) mix proportions of *described* grade may be arrived at by a process of mix design or by the use of recognised tables of trial mixes with South African aggregates

terrazzo

- e) 1 part cement to 2 parts marble aggregate

consistency

- f) slump: 40 – 50 mm as measured by the standard slump test to SANS 5862

colouring pigment

- g) application: mix with dry cement, or add to freshly laid surface as a dry shake

P.1.3 Preparation

- a) all piped services shall be in position in base; services shall not be buried in toppings or screeds
- b) base concrete shall be hard and strong, free of cracks and reasonably accurate to required level; clean, hard concrete shall be exposed by chipping if necessary and all dust removed, preferably using an industrial vacuum cleaner
- c) surface shall be wetted for four hours before laying only if concrete is absorptive; free water shall be removed before grouting (concrete can be tested for absorptiveness by pouring a cupful of water onto the surface; if water is absorbed within a few minutes, suction warrants that the surface should be wetted; if not, do not wet)
- d) bay forms for toppings shall be prepared to coincide with joints in base
- e) edge/dividing/feature strips shall be in position before casting

P.1.4 Laying

- a) grout: a mix of about ½ L water per kg cement, or a proprietary bonding agent, shall be brushed over the surface 10 to 20 minutes before applying screed or topping; bonding agents shall be applied to *manufacturer's instructions*; to be used within 30 minutes of mixing
- b) screed or topping mix to be spread, compacted, and lightly wood-floated to required thickness

screeds

- c) guide strips of screed mix to be laid to establish levels
- d) screeds to be laid in panels as large as possible in one operation without intermediate joints
- e) screeds not to be covered with a floor finish shall be laid in panels not exceeding 9 m² or to acceptable pattern
- f) screed thickness: 25 – 50 mm
- on stair treads: 20 mm
 - on stair risers and skirtings: 10 mm
 - on flat concrete roofs to receive waterproofing: minimum thickness 40 mm and to fall
- g) exposed salient angles: round to 20 mm radius

toppings

- h) levels shall be established by means of bay forms
- i) bays shall be cast in chequerboard fashion in panels not exceeding 9 m² or cast continuously with sawn contraction joints as *described* hereinafter
- j) topping thickness: 25 – 40 mm

- k) mesh reinforcement: placed as close to the upper surface as is permissible

terrazzo

- l) screed mix to be spread, compacted and lightly wood floated to 25 mm thickness as *described* hereinbefore; edge/feature/dividing strips shall be set into screed to form panels not exceeding 1 m², or to pattern as *described*; while screed is still plastic, terrazzo mix shall be spread and compacted in bays to thickness of 15 mm and trowelled to level surface

P.1.5 Finishing

screeds and toppings

- a) ordinary finish: surface left as finished by wood floats to smooth or non-slip finish
- b) hard finish:
- surface bull-floated immediately after levelling before any excess moisture or bleed water appears on the surface
 - finish shall be left undisturbed for two to four hours (longer in cold weather), bleed water and laitance on surface shall be removed
 - surface floated again, and steel trowelled until desired texture is obtained
 - power trowels shall be used if areas are large
 - surface finished with carpet-faced floats or soft brushes or broom to desired texture
- c) water or dry cement shall not be added at any stage; premature and overtrowelling shall be avoided

pigmentation

- d) integral application: mix shall be laid in two thicknesses in one operation, the lower unpigmented thickness brought up to 6 mm of the finished level, and the upper pigmented thickness laid with the required amount of pigment mixed with the dry cement before adding water
- e) dry shake application: added to the final surface and trowelled in to an acceptable finish and pattern

grinding and polishing

- f) surface shall be ground after four days by wet mechanical process until aggregate is fully exposed and surface is even and smooth or non-slip as required
- g) small or awkward surfaces shall be ground by hand with carborundum stone
- h) surface shall be washed clean

P.1.6 Joints

isolation joints

- a) against walls, columns or other fixed objects
- b) 20 mm wide through full thickness of topping, screed or terrazzo
- c) to coincide with isolation joints in base

intermediate sawn contraction joints

- d) in continuously cast unreinforced topping only
- e) halfway through topping thickness with concrete saw
- f) panels shall not exceed 9 m², or shall be to pattern *as described*
- g) top edges of joints: arris-rounded with a radius of 3 – 5 mm

patent movement joint systems

- h) patent movement joint system with flexible inserts shall be used where so *described*
- i) fixed through pre-drilled holes using cross-head stainless steel screws and plugs at 300 mm centres on both sides of joint

joint sealing

- j) joints subjected to heavy traffic: filled with a *suitable* semi-rigid epoxy
- k) joints shall be sealed with a *suitable* elastomeric material where so *described*

P.1.7 Surface regularity

- a) degree of surface regularity: II (SANS 10155) 5 mm along a 3 m straight-edge in any direction, and gradual, unless otherwise *described*
- b) deviation of floor finish from datum level: ±15 mm and gradual; less near door openings or other defined areas where levels are required to be accurate.

P.1.8 Skirtings

- a) 75 mm high, unless otherwise *described*, and of same material as floor finish and in same operation
- b) hollow rounded at junction between floor and skirting, top edge level with slightly rounded edge
- c) to project 10 mm from face brick and bagged wall surfaces, 5 mm from face of plastered walls, and flush with tiled wall surfaces

P.1.9 Curing

- a) surface shall be cured for at least seven days by
 - uniform application of a liquid membrane-forming compound *complying* with AASHTO M148 type 1-D or type 2 *to manufacturer's instructions*, or
 - ponding water on surface, or
 - covering with sand which is kept moist, or
 - covering with plastic sheeting
- b) curing time shall be extended in cold weather when ambient temperature falls below 10°C

P.1.10 Inspection, testing and repair

- a) screeds or toppings shall be inspected as late as possible in the construction programme
- b) adhesion of screeds or toppings to base shall be tested by tapping surface with a hammer or end of a rod; hollow sound indicates lack of adhesion

- c) rejected panels shall be isolated by sawing with a mechanical concrete saw in an acceptable pattern, removed and relaid, using the same procedure as above, starting with preparation of the base

P.2 Epoxy flooring

- a) type: seamless epoxy mortar floor
- b) epoxy mortar: epoxy resin mixed with *suitable* aggregate of *described* colour and size

application

- c) *to manufacturer's instructions*
- d) on scabbled or sandblasted surface to provide necessary grip
- e) surface to be primed with low-viscosity epoxy
- f) final epoxy finish to be applied by trowel or by self-levelling, to thickness and finish *as described*
- g) sample panel: required
- h) movement joints: defined by separate metal strips on both sides of joint

P.3 Plaster

P.3.1 Cement plaster

Applicable standard: SANS 2001-Construction works Part EM1: Cement plaster

- a) sand: SANS 1090
- b) admixtures: not permitted

additional items

- c) full width structural joints shall be maintained through plaster
- d) plaster surfaces to be tiled shall be scored

P.3.2 Gypsum plaster

- a) hardwall gypsum skimming plaster: proprietary retarded hemi-hydrate finishing plaster
- b) application: to supplier's instructions

P.3.3 Lime plaster

- a) lime: SANS 523
- b) mix: SANS 523 Annex C

P.3.4 Insulating plaster

- a) aggregate of low density: SANS 794, density 800 – 960 kg/m³ (clinker), unless otherwise *described*
- b) mix: 1:9 or according to supplier's instructions
- c) low-density foamed mixes by specialist suppliers: prohibited without permission by Employer's principal agent

P.3.5 Barite plaster

- a) plaster grade barium sulphate (BaSO_4)
- b) sand: SANS 1090
- c) mix: one part cement to two parts sand to three parts barite by mass
- d) thickness: 15 – 30 mm

P.3.6 Dividing strips, edge trims, etc.

- a) *as described*

P.3.7 Metal lathing

- a) expanded metal, unless otherwise *described*: SANS 190, hot dip galvanised in external plaster, stainless steel in corrosive atmospheres

Q. Tiling

Q.1 Materials

ceramic and porcelain wall and floor tiles

- a) ceramic wall and floor tiles: SANS 1449
- b) porcelain wall and floor tiles, fully vitrified: SANS 13006 group B1a, water absorption $\leq 0,5\%$
- c) moisture expansion limit: $< 0,06\%$ for external floors, and for internal floors in wet and/or cold areas
- d) scratch hardness on the MOHS scale: > 4 for walls; > 7 for floors
- e) required marking on tile and/or packaging: trade name, country of origin, group, dimensions, class of resistance of glazed tiles to acids and alkalis, surface abrasion resistance of glazed tiles

stone tiles

- f) natural stone: from an approved quarry
- g) cast stone: BS 1217

concrete tiles

- h) precast concrete tiles: SANS 541
- i) terrazzo tiles: precast concrete with a terrazzo facing: BS EN 13748

mosaic

- j) tesserae glued to brown paper or water resistant synthetic mesh fabric in squares of approximately 300 x 300 mm

profiled and decorative tiles

- k) skirting, dado, bullnose and other profiled or decorative tiles: *as described*

accessories

- l) movement joint strip: of depth that allows fixing to the substrate or background: *as described*
- m) stair nosing and movement joint strip: with polyurethane or PVC infills: *as described*

adhesive

- n) proprietary adhesive BS EN 13007, of *suitable* type
- o) adhesive and associated systems: from one manufacturer

grout

- p) proprietary grout: BS EN 13007 of *suitable* type and colour

Q.2 Tiling work

preparation

- a) all adjacent rough construction work shall be complete and all services in background shall be installed and tested before commencing tiling work

- b) backgrounds shall be examined, defects shall be rectified and allowed to dry to equilibrium moisture content; dust, loose matter, efflorescence and laitance shall be removed
- c) in the case of smooth and dense concrete: surfaces shall be keyed with a priming agent as recommended by the adhesive manufacturer prior to application of the adhesive
- d) fields, borders and patterns shall be set out, where relevant

bedding

- e) tiling units shall be bedded in adhesive according to tile and/or adhesive *manufacturer's instructions*
- f) white tile adhesive shall be used for white marble or marble with a delicate colour
- g) field tiles shall be bedded with straight joints in both directions, unless otherwise described
- h) wall field tiles shall be cut only along edges and bottom of field
- i) floor patterns shall be continued through openings connecting areas with similar tiling
- j) internal sills where walls are tiled: joints to coincide with wall tile joints when of similar material
- k) external sills to be
 - symmetrical about opening, with cut tiles at sill ends
 - to slope and projection as described
 - tucked under and behind drip in wood or aluminium window frames, and under leg of steel window frame without removing or bending window lugs
- l) shower thresholds to slope towards shower

Q.3 Jointing

joint width

- a) consistent throughout
- b) pressed ceramic and porcelain tiles:
 - internal: 2 mm
 - internal for large format wall tiles: >3mm, regardless of any instruction from the tile manufacturer
 - external: >3 mm
- c) extruded floor tiles: 6 – 10 mm
- d) terrazzo tiles: 1,5 – 3 mm
- e) stone tiles: butt-jointed

joint depth

- f) at least equal to thickness of tile but >6 mm

grouting and pointing

- g) grout joints of width <3 mm; point wider joints

- h) proprietary grout mixes: applied *to manufacturer's instructions*
- i) epoxy compound or acid-proof cement mortar shall be used if tiles are *described* as acid-proof
- j) grout shall be worked into joints with a squeegee until joints are filled flush with surface
- k) joints: to be tooled to level surface slightly below tile edge

Q.4 Movement joints

in situ movement joints

- a) formed by a temporary filler strip that is removed when tiling is sufficiently firm, leaving a clean and straight open joint
- b) sealed with an elastomeric material where so *described*

preformed compression joint strip

- c) PVC or metal profile with *suitable* flexible infill
- d) extended to substrate and keyed into adhesive bed or fixed through pre-drilled holes using *suitable* fixers as tiling proceeds
- e) level with, or slightly below, floor surface

isolation (perimeter) joints

- f) isolation joint width: 10 mm
- g) formed around perimeter of floor, columns, kerbs, steps and plant bases
- h) joint formed adjacent to skirting in areas where hygiene is important
- i) sealed with an elastomeric material where so *described*

intermediate joints

- j) open to same width as grouted tile joint
- k) position:
 - at 3 m centres maximum externally, or internally in wet areas or in areas where large thermal movement or vibration is expected
 - at 10 m centres maximum internally in areas of up to 500 m² of floor
 - at 5 m centres maximum internally in areas exceeding 500 m² of floor
 - over supporting walls or beams on suspended concrete or timber floors
 - where different background materials meet
- l) adjust spacing to coincide with structural features like columns
- m) left open or sealed with an elastomeric material where so *described*

structural joints

- n) joint width: same as structural joint width in substrate

- o) to align with structural joints in the substrate or background
- p) in the case of structural joints in substrates or backgrounds being irregular, not straight, or not coinciding with that of the tiling: a decision as to its treatment is to be obtained
- q) seal with an elastomeric material where so *described*

Q.5 Cleaning

- a) tiled surface to be sponged with water and polished with clean, dry cloth
- b) acid cleaners, scouring powder or abrasive cleaning materials are not to be used
- c) absorbent floor finishes: to be protected with an application of non-slip wax polish or suitable proprietary sealer where so *described*

R. Plumbing and drainage

R.1 Rainwater disposal

R.1.1 Eaves gutters and down pipes

Materials

galvanised steel

- a) hot dip zinc-coated steel sheet: SANS 3575/4998 Z275 or AZ150 for inland regions, Z600 or AZ200 for coastal regions
- b) nails, bolts and screws: zinc-plated or sherardized steel
- c) brackets: mild steel strip hot dip galvanised SANS 121 after manufacture

copper

- d) copper sheet: high purity cold rolled copper SANS 404/405
- e) brackets, nails, bolts and screws: copper or stainless steel

aluminium

- f) aluminium sheet: aluminium alloy: SANS 903 type 304-temper H14 or ally A1-Mn1 or A1-Mg2
- g) brackets, nails, bolts and screws: aluminium alloy or stainless steel

PVC

- h) PVC-U gutters and downpipes: SANS 11
- i) brackets: aluminium alloy

Installation

- j) to manufacturer's instructions where relevant
- k) sheet metal gutter lengths to be lapped >20 mm; sealed with suitable sealant over full lap before riveting
- l) gutters to be laid in brackets to slight fall to outlets, nailed/screwed to roof timber at 2 m maximum centres in the case of sheet metal gutters, at 1 m in the case of PVC-U gutters, and at angles and outlets
- m) sheet metal gutters to be bolted to brackets close to underside of gutter bead with 6 mm diameter gutter bolts
- n) overflow (to be formed on site in one stop-end in every sheet metal gutter run): a 20 mm lipped weir overflow over full gutter width
- o) gutters shall fall to outlets without ponding
- p) downpipes shall be fixed to walls, 25 mm clear of finished wall face, seam towards wall when relevant, with 25 x 1,6 mm hot dip galvanised mild steel holderbats, bolted around pipe in two halves, and with 6 mm diameter hot dip galvanised steel spiral nail driven into wall, at least twice per downpipe length and at 2 m maximum centres

R.1.2 Flat roof, balcony and floor drainage

roof and balcony outlets

- a) type: patent outlet with grating, or pipe without grating, as described
- b) patent outlet type:
 - ductile iron consisting of flanged funnel-shaped head with outlet threaded to take standard mild steel hot dip galvanised pipes, and with removable domical gratings for roofs or flat gratings for car parks, secured by centre hook bolt
 - outlet heads to be cast with necessary pipework into concrete, at such a level that ponding does not occur after waterproofing

floor outlets

- c) with removable grating
- d) grease and solids trap: easy-clean
- e) with tapered bottom for installation on 100 mm diameter pipe or clamp coupling
- f) set at such a level that ponding does not occur after flooring is installed

outlet downpipes

- g) PVC-U pipes: SANS 967
- h) hot dip galvanised steel pipes with screwed ends: SANS 62
- i) hot dip galvanised malleable cast iron fittings: SANS 14

R.2 Stormwater drainage

R.2.1 Earthworks

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.2.2 Pipes and culverts

Applicable standard: SANS 2001 Construction works Part DP5: Stormwater drainage

pipes

- a) concrete pipes and associated fittings: SANS 677
- b) fibre-cement pipes and associated fittings: SANS 819
- c) PVC-U pipes and associated fittings: SANS 791/1601
- d) GRP pipes and associated fittings: SANS 1748-1
- e) PP pipes and associated fittings: SANS 8773
- f) PE pipes and associated fittings: SANS 4427

culverts

- g) precast concrete culverts SANS 986 type portal

R.2.3 In situ concrete stormwater channels

- a) concrete: grade 30
- b) rainwater channels and spill basins to be cast on well rammed earth filling
- c) channel floors to be laid to even fall of 1:250 minimum or *as described*
- d) angles and sweeps around gulleys to be neatly formed without changing channel profile
- e) stop-ends to be formed at tops of gradients
- f) channels to be finished on exposed surfaces with 2:1 sand:cement plaster, trowelled smooth with rounded salient angles
- g) rainwater channels to be cast with isolation joints against walls and with keyed or doweled construction joints at 1,8 m maximum centres along its length
- h) concrete spill basins to be cast to shape, size and finish *as described*

R.2.4 Agricultural drains

- a) pipes: 100 mm diameter agricultural drain pipes
- b) pattern: main drain with branch spreader drains to pattern and lengths as shown in *drawings*
- c) trenches: 600 mm wide x >700 mm deep at >2 m apart
- d) laying:
 - on 150 mm thick bed of clean, hard, durable stone graded from 35—75 mm, and covered after laying with same to 280 mm above tops of pipes
 - pipes with open joints
 - each joint covered with a flat stone to prevent infiltration of soil
 - lower end of main drain plugged with 2:1 cement mortar
- e) filling: stone filling in trenches to be covered with *suitable* plastic sheeting and trenches filled with earth filling, lightly rammed

R.3 Sewerage**R.3.1 Earthworks**

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.3.2 Sewers (>160 mm)

Applicable standard: SANS 2001- Construction works Part DP4: Sewers

- a) types of pipe, diameter, gradient, etc.: *as described*

R.3.3 Sewers for buildings

Applicable standard: SANS 2001-Construction works Part DP7: Sewers for Buildings

- a) type of pipe, diameter, gradient etc.: *as described*

R.3.4 Surface boxes, manhole covers, gully gratings, frames

- a) polymer concrete surface boxes, manhole and inspection covers, gully gratings and frames: SANS 1882, and mark-bearing
- b) cast iron, cast steel, rolled steel combined with concrete gully tops and manhole tops for vehicular and pedestrian areas: SANS 50124 / EN 124, and mark-bearing
- c) installation: top of dished gullies >150 mm above finished ground level or 50 mm above permanent paving

R.3.5 Grease interceptors

- a) material, type, capacity and size: to approval of the local authority unless otherwise *described*

R.3.6 Pit latrines

- a) masonry type: *as described* in NHBRC Home Building Manual Part 11 and relevant details, internal size of pit 750 x 1 500 x 2 000 mm minimum deep; exposed end of floor slab covered with precast concrete panels
- b) waterless ventilated improved pit (VIP) latrine: consisting of a structurally lined and ventilated underground pit, floor slab, ventilated wall enclosure with roof and door, toilet pedestal, toilet seat and lid
- c) patent type: installed *to manufacturer's instructions* or to the requirements of an active Agrément Certificate
- d) to the approval of the local authority

R.3.7 Conservancy tanks, septic tanks and french drains

- a) conservancy tanks, septic tanks and french drains: SANS 10400-P, of type, construction and capacity *as described*
- b) patent type: installed *to manufacturer's instructions* or to the requirements of an active Agrément Certificate

R.4 Water supply

R.4.1 Earthworks

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.4.2 Below ground medium pressure pipelines

Applicable standard: SANS 2001-Construction works Part DP2: Medium pressure pipelines

- a) type of pipe, size, etc.: *as described*

R.4.3 Below ground water installation for buildings

Applicable standard: SANS 2001-Construction works Part DP6: Below ground water installations for buildings

- a) type of pipe, size, etc.: *as described*

R.4.4 Above ground water installation**materials**

- a) pipes, and associated fittings recommended by pipe manufacturer: material *as described*, supplied from one source
- b) water supply and distribution system components: SANS 1808
- c) float valves: SANS 752

installation

- d) pipes: according to *manufacturer's instructions*
- e) measures to avoid unsightly pipework before any chasing or cutting for pipework is started: to be agreed upon
- f) fixing of pipes <20 mm: chased or surface fixed *as described*
- g) fixing of pipes >20 mm: surface fixed or run in ducts
- h) surface fixing on internal walls: in neat straight horizontal and vertical runs to internal walls only, after plastering, with hot dip galvanised cast iron holderbats to SANS 1209, or plastic holderbats for copper or polypropylene pipes, at centres according to *manufacturer's instructions*; clear space of 15 mm to be left between pipe and finished wall
- i) surface fixing on external walls: prohibited except for short runs of vertical rising main from ground level to floor level
- j) chasing:
 - not in wall faces that are to receive roof flashing
 - in solid masonry only, not deeper than one third of wall thickness vertically and not more than one sixth of wall thickness horizontally; avoid horizontal chasing where possible
 - in walls constructed of structural masonry and hollow blocks: only with permission, or locate pipes in cavities during construction
 - chases, holes and recesses: not to impair strength or stability of walls, or reduce fire resistant properties of walls
 - chases in masonry walls to be filled with class II mortar once pipes are in position
- k) fastening of pipes to roof timber
 - with hot dip galvanised mild steel or copper pipe clips screwed on
 - polypropylene hot water pipes: supported continuously
 - polypropylene cold water pipes: not closer than one metre from hot water geysers
- l) bends to be used in preference to elbows if practicable; if a reduction in size of pipe takes place at an angle, the bend or elbow shall be the size of the larger pipe
- m) no air may lodge in pipes; a proper fall shall be maintained
- n) expansion shall be provided for in long lengths of pipes

- o) long- screws or *suitable* couplings shall be inserted at convenient points to provide for alterations and repairs
- p) unions to be provided at inlets and outlets to geysers

testing

- q) entire water reticulation system shall be filled with water
- r) air shall be evacuated
- s) water in system shall be pressurised to one-and-a-half times the expected design working pressure by means of a pump, maintained for four hours
- t) system to be inspected for leakages and repair
- u) after connecting to mains system shall be inspected again

R.4.5 Water storage tanks

- a) accessories: inlet, outlet, overflow pipe connections, float valve of same bore as supply pipe
- b) drip tray in roof space: SANS 1848

R.5 Electric geysers and solar water heaters

R.5.1 Electric geysers

- a) geysers: SANS 151
- b) required marking: capacity, working pressure, mounting position, design, standing loss per 24h in kWh, moisture resistance class, colour coding (yellow—50 kPa, blue—100 kPa, black—200 kPa, brown—300 kPa, red—400 kPa, green—600 kPa)
- c) installation: to SANS 10254 and to *manufacturer's instructions*, including drip trays
- d) preset geyser thermostat to 50°C

R.5.2 Solar water heaters

- a) domestic solar water heaters: SANS 1307, mark-bearing

R.6 Pipe insulation

- a) bonded preformed mineral fibre pipe sections: SANS 1445-3, mark-bearing with expected maximum service temperature and exposure conditions; an adequate vapour barrier to pipe sections intended for use in temperatures below ambient shall be provided
- b) insulation exposed to weather and sunlight to be covered with protective material as recommended by insulation manufacturer/supplier
- c) bends and tees shall be tightly mitred

R.7 Gas supply

Gas installation: SANS 10087

R.8 Fire equipment

- a) all fire equipment to approval of local authority

fire hydrants

- b) fire hydrants: SANS 1128 part 1

fire hose reels

- c) fire hose reels: 30 m long x 20 mm diameter light duty rubber fire hose, fixed base, couplings, connections, branch pipes and nozzles: SANS 543 and SANS 1128 part 2
- d) reels fixed against walls with *suitable* frame anchors or expansion bolts at a height of 2 100 mm from floor to spindle, or to height as *described*
- e) enclosed in security cupboards with clear acrylic cover and suitable closer where so *described*

portable fire extinguishers

- f) general purpose, non-refillable fire extinguishers: SANS 1322 and mark-bearing
- g) water, foam or dry powder rechargeable extinguishers: SANS 1910
- h) CO₂ type extinguishers: portable rechargeable carbon dioxide extinguishers: SANS 1567 and mark-bearing
- i) BCF type extinguishers: halogenated hydrocarbon fire extinguishers: SANS 1151 and mark-bearing
- j) extinguishers shall be hung on wall hooks screwed and plugged to wall
- k) enclosed in security cupboard with clear acrylic cover and suitable closer where so *described*

R.9 Sanitary plumbing

R.9.1 Sanitary appliances

- a) fitted with waste, plug and chain as required

baths

- b) acrylic baths: SANS 1402/50198
- c) handles: where so *described*

basins

- d) glazed ceramic wash-hand basins: SANS 497
- e) stainless steel wash-hand basins: SANS 906

wash troughs

- f) stainless steel wash troughs: SANS 906
- g) concrete wash troughs:
 - of reinforced concrete, with reeded front
 - drainers to be of reinforced concrete with lip to fit over side of trough and fixed to trough with copper dowels and to wall with bracket supplied by manufacturer
 - pedestals to be of reinforced concrete

- pedestals to be bedded on floor, and trough on pedestals, with 1:2 cement-sand mortar

water closets

- h) glazed ceramic water closets: SANS 497

flushing cisterns

- i) glazed ceramic flushing cisterns: SANS 497
 j) plastic flushing cisterns: SANS 821
 k) cistern flush valves: SANS 1509

urinals

- l) glazed ceramic urinals: SANS 497
 m) stainless steel urinals: SANS 924

sinks

- n) glazed ceramic sinks: SANS 497
 o) stainless steel sinks with draining boards for domestic use: SANS 242
 p) stainless steel sinks for institutions: SANS 907

shower enclosures

- q) shower enclosures
- shower enclosures for domestic purposes: SANS 549
 - glass: SANS 1263
 - anodizing: SANS 999
 - powder coating: SANS 1274/1578/1796

bains marie

- r) bains marie and hot cupboards: SANS 1174

R.9.2 Taps, valves, showerheads

- a) water taps (metallic): SANS 226, class as *suitable* to dynamic supply pressure
 b) water taps (plastic bodies): SANS 1021, class as *suitable* to dynamic supply pressure
 c) taps for cold and hot water: mark-bearing blue and red respectively
 d) aerators: where so *described*
 e) wall type taps: with sliding flange
 f) single control mixer taps: SANS 1480
 g) flush valves: SANS 1240, type as *described*
 h) showerhead: type: as *described*

R.9.3 Traps

- a) plastic waste traps: SANS 1321, part 1
- b) rubber waste traps: SANS 1321 part 2

R.9.4 Miscellaneous

- a) holders, shelves, cabinets: *as described*

R.9.5 Installation of sanitary fittings generally

- a) protective wrappings to be left in position for as long as possible
- b) fixing shall be in a manner that will facilitate future removal
- c) installation shall be *to manufacturer's instructions*
- d) fixed securely; using manufacturer's brackets and fixing methods wherever possible; using frame anchors for fixing brackets –not screwed and plugged
- e) water closet pans bedded in 1:3 cement-sand mortar; squat pans in grade 10 concrete
- f) open sides of build-in type baths bricked up
- g) acrylic baths bedded in 1:5 cement-sand mortar on masonry, or bedded solidly on dry river sand or concrete
- h) shower heads at 2 100 mm above shower floor level
- i) urinals at 610 mm from floor to front lip of urinal bowl
- j) all joints sealed

S. Electrical works

S.1 Earthworks

Applicable standard: SANS 2001-Construction Works Part DP1: Earthworks for buried pipelines and prefabricated culverts

S.2 Cable ducts (underground)

Applicable standard: SANS 2001-Construction Works Part DP3: Cable ducts

S.3 Materials and installation

S.3.1 Wiring

Electrical wiring: *SANS 10142–The wiring of premises*

conduits

- a) conduits: *SANS 950/61386*
- b) embedded in wall chases with cement mortar and clamps
- c) not chased in wall faces that are to receive roof flashing
- d) fixed on wall surfaces and in roof spaces with clamps
- e) embedded in concrete surface beds
- f) surface fixing level, plumb, and in straight lines

conductors

- g) PVC isolated copper conductors: *SANS 150*

electric cables

- h) PVC armoured copper cable: *SANS 1574/1411*

distribution board and meter cabinets

- i) prepainted pressed steel with door and latch: *SANS 1973*, with isolator, earth leakage protection unit: *SANS 767*, and circuit breakers where required
- j) cabinets on walls: built in or surface mounted, *as described*
- k) all functions in distribution board labelled with legend card provided

switches and sockets

- l) switches: *SANS 60669*, including dimmer, remote-control, isolating and time-delay switches *as described*

plug and socket systems

- m) 3 pin 16 Amp wall switch sockets: *SANS 164*
- n) boxes and enclosures with covers: *SANS 1085/60670*
- o) boxes for switches: built in at 1 500 mm above floor level or *as described*

- p) boxes for sockets: built in at 300 mm above floor level except above work tops where these shall be 1 200 mm above floor level or *as described*
- q) telephone or television points: boxes built in at 300 mm above floor level or as described, connected by conduit to roof space and through roof overhang to nearest telephone connection or television antenna; conduit to be provided with draw wire

S.3.2 Fittings

luminaires

- a) type: *as described*
- b) luminaires: SANS 60598, complete with lamps, ballasts, control gear and earth terminals; control gear within luminaires to be mark-bearing
- c) luminaires fixed at as late a stage as possible, and protected from damage
- d) all luminaires earthed

stove, hob, oven, cooker hood

- e) stoves: SANS 153
- f) commercial kitchen extraction systems: SANS 1850

S.4 Testing

- a) local authority to be informed at completion of electrical installation for inspection
- b) a copy of the electrical test certificate to be provided before handing over

S.5 Lightning protection

To SANS 10313/SANS 61024

T. Mechanical works

T.1 Installation

- a) equipment and services shall
 - be installed level and plumb; securely fixed; reticulated services neatly organised
 - be fixed directly to structure wherever possible, independently of suspended ceilings; trimmed around holes or penetrations through non-structural elements
- b) fire and acoustic rating integrity of suspended ceilings etc. shall be maintained
- c) movement in both structure and services shall be allowed for
- d) cables, ducts, trays, pipes etc. shall be concealed unless installed in plant spaces, ceilings, riser cupboards, etc.
- e) heavy items of equipment shall be provided with permanent fixtures for lifting as recommended by the manufacturer

T.2 Building penetrations

- a) pipes that operate under pressure shall not be embedded in concrete or surfacing material
- b) penetrations through fire rated elements shall be sealed according to fire regulations
- c) penetrations through non-fire rated elements around conduits and sleeves, and around cables within sleeves shall be sealed; if the building element is acoustically rated, the rating shall be maintained
- d) roof penetrations shall be sealed with metal upstand flashings and counter flashings –the use of fabric reinforced paint or bitumen is prohibited
- e) primed metal or PVC sleeves shall have a diameter sufficient to allow 12 mm space around interior pipe (or pipe insulation) or cable

T.3 Location and access

All services and equipment shall be located and arranged so that:

- a) inspection and maintenance operations can be carried out with minimum inconvenience and disruption to building occupants or damage to the building structure or finishes
- b) services and equipment are readily accessible for inspection and maintenance and arranged so that inspection and maintenance can be carried out in a safe and efficient manner

T.4 Vibration suppression

Transmission of vibration from rotating equipment to building elements shall be minimised by means of:

- flexible connections,
- inertia bases,
- restricting of maximum rotation speed to 1500 r/min,
- isolation mountings or spring mountings

U. Glazing

U.1 Materials

glass

- a) float glass (basic soda lime silicate glass): SANS 50572
- b) safety and security glass: SANS 1263
 - symbol 1 (impact), 2 (burglar/vandal) or 3 (bullet) to be engraved permanently and visible after glazing on each sheet
- c) pattern glass: where relevant, direction of pattern shall be established before cutting
- d) low-emissivity glass (low-e): spectrally selective coated glass to *BS EN 1096*
- e) glass louvres: 6,5 mm NS safety glass, regardless of length or width, with polished edges
- f) frameless doors: 10 mm thick safety glass for internal use and 12 mm thick safety glass for external use, unless otherwise *described*
- g) insulated glass (double glazing): factory-prepared sealed insulated glazing units (SIGU), consisting of two panes of clear float glass separated by a sealed spacer to entrap a dehydrated air gap, indelibly mark-bearing with the trade name of the assembler/manufacturer visible after installation
- h) work on glass: SANS 1817

U.2 Glazing

U.2.1 Glazing in frames

Applicable standard: SANS 2001-Construction works Part CG1: Installation of glazing

U.2.2 polymer glazing

- a) polymer glazing: *as described*

U.2.3 Patent glazing

gaskets and sealants

- a) elastomeric structural glazing and panel gaskets: SANS 635
- b) sealants: compatible with extrusion surface, glazing tape and glass, backed by regular test reports regarding adhesion of sealant to aluminium frame in accordance with ASTM/C 794-80 (standard test for adhesion-peel of elastomeric joint sealants)
- c) adhesion of sealant to aluminium, whether anodised or organic coated:
 - capable of maintaining an ultimate adhesive bond strength between aluminium and sealant of 0,828 MPa
 - design stress not to exceed 0,138 MPa
 - glazing contractor to test adhesion of cured sealant on representative test joints on site before proceeding with installation
 - tests to be carried out periodically throughout installation period

- d) only freshly manufactured sealant shall be used
- e) only compatible accessory materials shall be used as recommended by the sealant manufacturer, for example degreasing solvents, primers, back-up material with integral bond breaker, spacer and setting blocks
- f) sealant cavities shall be completely filled

quality assurance

- g) disciplined quality assurance during all stages of fabrication and installation shall be ensured
- h) factory glazing is preferred over site glazing

U.2.4 Protection and cleaning

- a) glass shall be protected against harmful splashes and weld splatter
- b) glass shall be cleaned as soon as practicable after installation with mild soap and water
- c) cleaning materials shall not be harmful to plastic glazing materials and glazing compounds

U.3 Mirrors

- a) silvered float glass mirrors: SANS 1236, class A with chamfered and/or polished edges as described
- b) privacy mirrors: clear glass with mirrored venetian strips for visual privacy and/or security
- c) stainless steel mirrors: 0,9 mm thick bright annealed mirrored stainless steel
- d) glass mirrors shall be fastened with chromium plated mirror screws to wall, allowing 3 mm air space at back for ventilation, or with vertical strips of double sided tape; mirrors larger than 1 m² shall be supported with additional clips, anchors or beads
- e) stainless steel mirrors shall be fastened with screws and/or glue in an *acceptable* manner

V. Paintwork

V.1 Materials

- a) materials shall be *suitable* for their intended purpose and for the surface to which they are to be applied
- b) all paint shall be restricted to one manufacturer where possible; complete paint systems – primer, undercoat and finishing coat – to be as recommended by the same manufacturer
- c) containers to reach site unopened, bearing SANS -mark and specification number when relevant
- d) exterior quality paint shall be used for exterior work

primers

- e) alkali-resistant plaster primers: SANS 1416
- f) primers for interior and exterior wood: SANS 678.
- g) zinc phosphate primers for steel: SANS 1319.
- h) pretreatment, wash or etching primers (one- or two-pack) for metals: of *suitable* type
- i) primer-sealers, penetrating primers, masonry sealers, bonding liquid and universal primers for plaster, concrete, brick, block and stone: of *suitable* quality or the subject of an active Agrément Certificate

undercoats

- j) universal undercoats: SANS 681

finishing paints

- k) alkyd high gloss finishing paint: SANS 630
- l) decorative paint for interior use: SANS 515
- m) emulsion paint: SANS 1586
- n) textured emulsion wall coating: SANS 1227
- o) aluminium paint, general purpose: SANS 682
- p) micaceous iron oxide paint, masonry paint, cement paint and lime-wash: of *suitable* quality or the subject of an active Agrément Certificate

varnishes, varnish stains, stains and sealers

- q) varnish or varnish stains for interior use: SANS 887
- r) stains: water-borne or solvent-borne as described
- s) sealers: water-borne acrylic exterior quality, *suitable* for application on the material to be coated; sealers for wood to contain fungicides that inhibit the development of blue-stain fungi

bituminous and tar-based coatings

- t) bituminous aluminium paint: SANS 802
- u) other bitumen-based coatings: of *suitable* quality (preferably the subject of an active Agrément Certificate)

specialized coatings

- v) two-pack epoxy primers, two-pack coal-tar epoxy coatings, one- and two-pack epoxy and polyurethane coatings, cellulose coatings, and vinyl primers, undercoats and finishes: of *suitable* quality (preferably the subject of an active Agrément Certificate)

knotting, stopping, fillers

- w) knotting for the treatment of knots in wood: quick-drying resin solution or an aluminium primer
- x) stopping and fillers: *suitable* to fill holes and imperfections in the material to be painted
- y) fillers: oil-based, emulsion-based or supplied in powdered form

stirring

- z) paint materials to be stirred before use and at intervals during use unless the manufacturer's instructions state otherwise

thinning

- aa) paint to be thinned only to improve penetration or facilitate application, for example on surfaces of high or variable porosity, or for spray application; thinner type and proportion: as recommended by the manufacturer

two-pack materials

- bb) manufacturer's instructions regarding mixing proportions, induction period (standing time), pot life and the possible extension of pot life shall be observed

V.2 Preparation of surfaces

- a) time shall be allowed for the drying of surface moisture
- b) work by others that might affect painting shall be completed
- c) factory-primed components: the primer shall be in a satisfactory condition; if not, remedial action shall be taken
- d) excess pipe jointing material shall be removed
- e) ironmongery, light fittings and other removable fittings that can be contaminated shall be removed, marked, stored and refixed after completion
- f) fittings that cannot be removed shall be masked
- g) cracks between frames, skirtings, cornices etc. and walls shall be sealed with paintable acrylic sealant
- h) surfaces not to be painted shall be protected

cleaning

- i) all surfaces shall be cleaned of dirt, grease, soot, mould and marks
- j) cleaning shall be limited to dry abrading and dusting wherever possible
 - by means of stiff brush (not wire), abrasive paper, emery cloth, steel wire wool or nylon fibre pads as required

- always sandpaper wood in direction of grain
 - pencil marks and other surface discolouration shall be removed
 - in the case of window frames, care shall be taken not to scratch the glass, especially with abrasive paper
 - dusting: after dusting down, floors shall be swept or vacuumed; sweeping or dusting whilst painting is in progress is prohibited
- k) superficial dirt may be removed by washing:
- with a solution of sugar soap, household detergent, cleaning powder or mild soap
 - using proprietary cleaning materials strictly in accordance with the manufacturer's instructions
 - rinsing surfaces with clean water before the solution dries
 - allowing to dry before coating
 - proprietary emulsion cleaners or degreasing solutions may be used for removing heavy deposits of oil or grease

existing coatings

- l) existing coatings shall be kept only when in a sound condition and compatible with the coating to be applied
- m) complete or partial removal of any coating shall be done under condition of poor adhesion, flaking, peeling, blistering, cracking, crazing and severe chalking or powdering, and when adhesion is generally sound but with a rough surface
- n) complete removal shall be done if the coating to be applied is not compatible with the existing one; seek specialist information from the manufacturer in case of doubt
- o) removal shall be by burning off or by the use of paint removers, washing, scraping, abrading, steam, abrasive blast cleaning or other suitable method

burning off

- p) burning off shall be done using a blowtorch or hot-air gun
- q) care shall be taken not to burn or crack the background
- r) all flammable materials shall be removed from the work area while burning off is in progress
- s) other methods shall be used on wood that is to be refinished with a clear coating system, on carved or heavily moulded woodwork, or for removal of highly flammable coatings
- t) means of extinguishing fires shall be readily available when burning off

paint removers

- u) type: *suitable* for the removal of the coating at hand
- v) alkaline (or caustic) type paint removers shall not be used on zinc or aluminium
- w) solvent type paint removers: use under conditions of proper ventilation and the removal of possible sources of ignition

- x) paint removers shall be applied liberally and in sufficient applications to enable easy removal
- y) surfaces shall be cleaned *to manufacturer's instructions* when removal is complete

abrasive blast cleaning

- z) abrasive blast cleaning: SANS 10064
- aa) care shall be taken not to damage the background
- bb) surrounding surfaces shall be masked

treatment of organic growth

- cc) mould (mildew) and algae (green and black stains) shall be removed before painting by scraping or brushing, blast-cleaning or high-pressure water cleaning, followed by the application of a *suitable* fungicidal wash such as a solution of 1 part bleach to 4 parts water or, in the case of proprietary materials, as *directed* by the manufacturer
- dd) washes shall be applied in dry weather
- ee) a further application of fungicidal wash shall be applied after removal of the dead organisms to delay re-establishment of the growth
- ff) allow to dry before overcoating

V.3 Colours

- a) colours of undercoats to match finishing coat but with enough difference to be able to distinguish between coats
- b) colour samples of finishing coats shall be prepared before any bulk paint is purchased
- c) identification colour marking (e.g. pipes transporting different fluids/gases): SANS 10140

V.4 Preparation for painting

- a) paint systems: most suited to the environment, compatible with substrate and other components of the system
- b) manufacturer's instructions shall be followed and manufacturer's recommendations in respect of temperature and its relation to curing time and pot life shall be observed
- c) all coats of paint and varnish shall be sandpapered and left to dry before the next coat is applied
- d) no painting shall be done when conditions are unsuitable, for example dust, insufficient light, direct sunlight or inclement weather; paint shall not be applied if the ambient temperature is $<10>35^{\circ}\text{C}$, or if the relative humidity is $<10>85\%$
- e) all surrounding surfaces shall be masked when spray-painting; spray painting in windy weather is prohibited

V.5 Knotting, stopping, filling and priming

- a) knotting: to cover wood knots
- b) stopping: for stopping up holes, wide cracks, open joints and similar imperfections, including the repair or removal and replacement of defective glazing putties

- c) cement plaster or a proprietary plaster repair product shall be used for stopping holes in plaster;
- d) all plaster repairs, fillers etc. on walls shall be spot primed with a masonry primer once fully cured
- e) fillers: for filling and levelling, for example shallow depressions, open grain, surface roughnesses, nail and screw heads, fine cracks and restoration of the original film thickness where this was locally damaged
- f) stopping and fillers shall be applied by flexible putty knife on broad surfaces, and by brush on mouldings; surfaces shall be allowed to dry and shall be rubbed down to a smooth surface
- g) woodwork to be built in shall be primed or sealed before building in or fixing; this applies to structural timber, all frames, all six sides of a door, and to rebates and backs of beads in glazing apertures

V.6 On-site pre-treatment and priming of non-ferrous metals and stainless steel

aluminium

- a) smooth aluminium surfaces (sheets, extrusions and aluminized steel): degrease, and lightly abrade or pretreat with a twin-pack vinyl wash primer, followed by one coat zinc phosphate primer
- b) rough aluminium surfaces (castings and sprayed metal coatings): lightly abrade, remove dust and dirt; sprayed metal coatings might require washing; pretreat sprayed metal coatings with a wash primer or etching primer immediately after application of the coating, followed by one coat zinc phosphate primer

zinc, zinc aluminium alloy and sprayed coatings

- c) zinc sheet, zinc-coated steel (hot dip galvanised, sherardized or electroplated), and zinc aluminium alloy coated steel (hot dip): degrease, and lightly abrade or pretreat with a wash or etching primer, followed by one coat zinc phosphate primer
- d) sprayed zinc and zinc aluminium alloy coatings: wash if required, and pretreat with a wash or etching primer, preferably immediately after application of the coating, followed by one coat zinc phosphate primer
- e) where hot dip galvanised steel was unavoidably welded on site: clean joint and repair coating using a zinc rich paint or epoxy

copper, brass and bronze

- f) copper, brass and bronze coatings: degrease, and lightly abrade or pretreat with a wash or etching primer

lead

- g) lead: wet abrade and pretreat with a wash or etching primer

cadmium coatings

- h) cadmium coatings: degrease and lightly abrade or pretreat with a wash or etching primer

tin coatings

- i) tin coatings: degrease and lightly abrade

chromium and nickel coatings

- j) chromium and nickel coatings (if corroded): abrade and pretreat with a wash or etching primer

stainless steel

- k) stainless steel: degrease and lightly abrade or pretreat with a wash or etching primer

V.7 Application of paint

- a) paint shall be applied by brush, roller or spray-gun as required

brush or roller

- b) wood surfaces shall be primed by brush only, well worked in
- c) brushes and rollers shall be cleaned after use and hung to dry

spray gun

- d) spray painting is allowed only where this is the accepted method of application
- e) spray painting shall be by air spray, airless spray or electrostatic spray of appropriate type, suitable to the material and type of work
- f) adjacent surfaces not to be sprayed are to be masked or otherwise protected
- g) conventional primers shall not be spray-applied
- h) spraying equipment shall be cleaned every time after use, or when changing the paint colour, by spraying copious amounts of thinner or solvent through the spray gun

general

- i) paint coats are to be applied *to manufacturer's instructions*
- j) paint coats shall be allowed to dry before applying subsequent coats
- k) colours: to sample
- l) tints of undercoats: distinguishable from succeeding coats.

V.8 Paint systems for on-site application

Paint system and colours: *as described*

V.8.1 Cement-based surfaces, brick and stone

(cement plaster, concrete, brick, block and stone; fibre-cement goods; cement-based boards, tiles and panels; glass-fibre reinforced cement (GRC) cladding)

alkyd paint

- a) one coat alkali-resistant primer; or, for plaster only,
- b) a water-thinned primer, followed by, for interior work only,
- c) one universal undercoat and one coat alkyd gloss finish; or
- d) two coats alkyd semi-gloss or matt finish; or, for exterior work,

- e) one universal undercoat and one or two coats alkyd gloss finish

emulsion paint

- f) a water-thinned first coat of emulsion paint on surfaces of high or variable porosity; and, for interior work only,
- g) two coats matt, high-opacity finish “contract” emulsion paint to SANS 1586 grade 4; or
- h) one coat matt, high-opacity finish “contract” emulsion paint to SANS 1586 grade 4, spray applied; or, for exterior work,
- i) two or three coats matt or semi-gloss finish general purpose emulsion paint, or
- j) for fibre-cement roofs in *coastal areas*, an anti-fungicidal paint

textured emulsion paint

- k) *suitable* primer; and, for interior work only,
- l) one coat sand-textured paint, over-painted if required

masonry paint

- m) *suitable* primer; and
- n) mineral type masonry paint for interior or exterior work; or, for exterior work only,
- o) two coats smooth or fine-textured solvent-borne or emulsion-based masonry paint; or
- p) one or two coats heavy-textured solvent-borne masonry paint; or
- q) one coat heavy-textured emulsion-based masonry paint.

cement paint

- r) two coats cement paint for interior or exterior work (not on gypsum plaster)

masonry sealers

- s) one or two coats according to *manufacturer's instructions*

lime wash

- t) two coats lime wash, applied with a block brush.

V.8.2 Ferrous metals

- a) clean iron and steel; total film thickness shall be 115 to 145 μm

alkyd paint on blast-cleaned surfaces

- b) two coats solvent-borne primer; and
- c) one coat solvent-borne undercoat; and
- d) two coats alkyd gloss finish

alkyd paint on manually cleaned surfaces

- e) two coats etching primer (one-pack or two-pack) or zinc phosphate primer; and

- f) one coat solvent-borne undercoat; and
- g) two coats alkyd gloss finish

alkyd paint on factory primed surfaces

- h) inspect primer for soundness and touch up where required, and
- i) one coat solvent-borne undercoat; and
- j) two coats alkyd gloss finish

alkyd paint on cast iron

- k) remove bitumen until clean, sound substrate is achieved
- l) paint one coat metal primer, and one coat high gloss alkyd paint, or
- m) two coats general purpose semi-gloss emulsion paint

micaceous iron oxide paint on blast-cleaned or manually cleaned surfaces

- n) two coats micaceous iron oxide paint, high-build type

aluminium paint on blast-cleaned or manually cleaned surfaces

(fencing material)

- o) two coats aluminium paint

heat-resistant paint

- p) heat-resistant paint system on steel: of *suitable* type, applied according to *manufacturer's instructions*

V.8.3 Wood

alkyd paint on interior wood

- a) wood primer; and
- b) one coat universal undercoat and one coat alkyd gloss finish; or
- c) two coats alkyd gloss finish

alkyd paint on interior plywood doors

- d) water-borne primer (check compatibility with water-repellant organic solvent preservatives); and
- e) one coat universal undercoat and one coat alkyd gloss finish; or
- f) two coats alkyd gloss finish

alkyd paint on exterior softwood and plywood

- g) one coat solvent or water-borne semi-transparent primer (base coat); followed by
- h) one or two coats universal undercoat; and
- i) one or two coats alkyd gloss finish

textured coatings on exterior softwood and plywood

- j) one coat solvent-borne or aluminium textured primer; and
- k) one or two coats emulsion or solvent-borne textured coating

alkyd paint on exterior hardwood

- l) one coat aluminium primer; and
- m) one or two coats universal undercoat; and
- n) two coats alkyd gloss finish

paint on exterior plywood doors

- o) transparent preservative primer/base coat; and
- p) multi-coat paints formulated for improved performance according to manufacturer's recommendations, gloss finish

alkyd paint on wood fibre and particle board

(hardboard, mediumboard, medium density fibreboard (MDF) and softboard not factory-primed or sealed)

- q) one coat primer-sealer or water-thinned primer or aluminium primer; or
- r) one coat alkali-resistant primer for flame-retardant treated board; or
- s) one coat aluminium wood primer for bitumen-impregnated softboard; or
- t) one coat resin-based wood primer or primer-sealer or water-thinned primer or aluminium primer for particle board; and
- u) one coat universal undercoat and one coat alkyd gloss finish; or
- v) two coats alkyd semi-gloss finish

emulsion paint on wood fibre and particle board

(hardboard, mediumboard, medium density fibreboard (MDF) and softboard not factory-primed or sealed)

- w) no primer, except for absorbent board in which case first coats shall be thinned; or
- x) one coat alkali-resistant primer for flame-retardant treated board; or
- y) no primer for bitumen-impregnated softboard; or
- z) no primer for particle board, except for single layer board in which case a resin-based primer shall be applied; and
- aa) two or three coats semi-gloss finish general purpose emulsion paint

alkyd paint on softwood or hardwood gates and fences

- bb) one coat solvent-borne or aluminium primer; and
- cc) one or two coats universal undercoat; and

dd) two coats alkyd gloss finish

transparent finish systems for wood (interior)

ee) decorative wood stain, as required; and

ff) one or two coats interior alkyd, urethane or urethane/alkyd resin varnish, on worktops, or

gg) one or two coats urethane varnish, two-pack or moisture-curing, for surfaces requiring exceptional abrasion resistance, or

hh) one or two coats wood sealer suitable for interior use

transparent finish systems for wood (exterior)

ii) two or three coats exterior wood sealer

V.8.4 Plaster board

(ceilings, bulkheads, partitions)

alkyd paint

a) a primer-sealer or water-thinned primer; and

b) one coat universal undercoat; and

c) one coat alkyd semi-gloss finish; or

d) two coats alkyd semi-gloss finish

emulsion paint

e) two coats matt, high hiding, scrub resistant emulsion paint on walls

f) two coats matt utility grade emulsion paint on ceilings and bulkheads

V.8.5 Plastics

paint on unplasticized polyvinyl chloride (PVC-U)

a) two-pack wash primer followed by conventional alkyd gloss or emulsion paint finish system; or

b) a long-life coating of a specialized type, such as two-pack polyurethane or epoxy

paint on glass-reinforced polyester (GRP)

c) remove wax coating; and

d) one coat two-pack epoxy primer; and

e) one coat two-pack polyurethane

paint on plastic coatings on metals

f) paint systems on plastic coatings on metals shall be of a *suitable* type

paint on polystyrene

g) two coats matt utility grade emulsion paint

paint on glass

(glass, glazed brick, terracotta, faïence, ceramic tiles and vitreous enamel)

- h) a conventional alkyd gloss or emulsion paint finish system; or
- i) a long-life coating of a specialized type, such as two-pack polyurethane or epoxy.

V.8.6 Intumescent paint

- a) *suitable* intumescent paint on structural steelwork, electrical cables, PVC pipes, wood and thatch by brush, roller or spray where *described*, to achieve the required fire resistance

V.9 Signwriting and gilding

To be executed by *competent persons*

W. Paperhanging

wallpaper

- a) type, pattern, colour: *as described*

preparation

- b) plaster surfaces shall be mature and dry
- c) a primer coat shall be applied on very porous plaster only
- d) loose or blistering paint on previously painted surfaces shall be removed
- e) surfaces shall be cleaned down and filled with *suitable* filler to a smooth surface
- f) wood surfaces are to be knotted, primed, stopped and sanded down

hanging

- g) wallpaper: hung vertically with close-fitted and plumb vertical joints; no horizontal joints are allowed; adjacent sheets shall match in pattern
- h) tightly fitting against skirtings, ceilings, door frames and windows
- i) patent wallpaper adhesive shall be applied to the back of the wallpaper using a brush
- j) wallpaper shall be hung while adhesive is still wet
- k) lightly rolled to remove air bubbles
- l) spills to be wiped with damp cloth

X. External work

X.1 Landscaping

X.1.1 Definition of terms

- a) topsoil: soil composed of 15–25% clay, 10% silt and 65–75% sand with a minimum of 2% organic material, or red soil mixed with kraal manure in the ratio of 1 m³ kraal manure to 6 m³ red soil; topsoil to be free from deleterious matter and weed seeds
- b) compost: properly decomposed organic material, free from deleterious salts, waste products and impurities and with a pH-value between 4 and 7
- c) mulch: mixture of organic material such as leaves, straw, small particles of bark, etc., free from fungus, disease, etc.
- d) lime: agricultural lime of approved manufacture
- e) fertilizer: mixture of material complying with the specification under Law 36 of 1947; order and store in plastic bags

X.1.2 Contouring

Applicable standard: SANS 2001 – Construction works Part BE1: Earthworks (general)

X.1.3 Cleaning of site

- a) site shall be cleaned for planting by removing existing grasses, weeds, foreign material and stones larger than 50 mm diameter before commencement of soil preparation
- b) site shall be cleaned for hydroseeding by clearing out existing natural grasses without damage to the latter; remove loose foreign material from bare patches

X.1.4 Preparation

soil for grass sods

- a) existing topsoil: loosened throughout to a depth of 100 mm and thoroughly mixed with 2:3:2 fertiliser in the ratio of 20 kg fertiliser to 150 m² of topsoil
- b) wetted, leveled off and compacted slightly on flat surfaces and mildly on inclined surfaces

soil for ground cover and shrub beds

- c) existing topsoil: loosened throughout to a depth of 200 mm and thoroughly mixed with 2:3:2 fertiliser in the ratio of 30 kg fertiliser to 150 m² of topsoil and with compost in the ratio of 6 m³ compost to 100 m² of topsoil
- d) wetted, leveled off and compacted slightly on flat surfaces and mildly on inclined surfaces

soil for shrubs

- e) holes: 450 x 450 x 450 mm deep for shrubs in bags 10 kg or larger; excavated material placed aside
- f) holes shall be filled with a mix of two parts excavated soil and one part compost
- g) fertiliser: 500 g 2:3:2 and 200 g bone phosphate added and mixed throughout per shrub hole
- h) soil shall be compacted slightly with due allowance for decrease in volume

soil for trees

- i) holes: 900 x 900 x 900 mm deep for trees; excavated material placed aside
- j) base of hole shall be finished with fall in general direction of slope of site
- k) holes shall be filled with a mix of two parts excavated soil and one part compost
- l) fertiliser: one kg 2:3:2 and 300 g of bone phosphate added and mixed throughout
- m) soil shall be compacted slightly with due allowance for decrease in volume

soil for hydroseeding

- n) all visible bare patches of existing soil shall be scarified 100 mm deep in both directions at 500 mm centres
- o) clods larger than 50 mm diameter shall be broken up, raked and leveled off

X.1.5 Plant quality

- a) all plant material shall be from a registered nursery
- b) plants shall be typical of their species or variety with normal densely developed branches and vigorous and healthy root system
- c) plants shall be free from damaged parts, parasites, fungus, disfiguring knots, insects, pests and infestation
- d) grass sods: approximately 1000 mm long and 500 mm wide and of uniform thickness; sods shall be clipped short and soil base shall be free from stones and clods
- e) ground covers: well bushed with high leaf density and height of 300 mm above ground level, delivered ex nursery in minimum 4 kg bag containers
- f) shrubs: multi-stemmed with generous side branches and well bushed to ground; shrubs shall be >500 mm high as measured from crown of roots to outer leaf circumference, delivered ex nursery in minimum 4 kg bag containers except where specifically *described* otherwise
- g) trees: >1,5 metre in height as measured from crown of roots to average top of tree (not to highest branch) and stem diameter >25 mm at ground level except where *described* otherwise
- h) pruning wounds shall be limited to 25 mm in size, showing vigorous bark growth all round
- i) all dead plants shall be replaced free of charge
- j) plants shall be stored under nursery conditions

X.1.6 Planting**grass sods**

- a) grass sods shall be laid close together on wet prepared topsoil; joints and hollows shall be filled with topsoil
- b) area reduction shall be allowed for
- c) surface shall be rolled to keep surface tolerance to a minimum and to allow a gradual change in slope at berms and embankments

- d) planted area shall be thoroughly irrigated after laying and rolling

ground covers

- e) ground covers: planted in prepared topsoil and in holes somewhat larger than the plant bulb and at least 200 mm deep so that top of bulb coincides with finished level
- f) edges of ground cover beds shall be worked upwards to a height of 100 mm and compacted
- g) planted area shall be thoroughly irrigated after planting

shrubs

- h) shrubs shall be removed from containers and planted in backfilled holes so that top of soil originally in the containers is level with the finished ground level
- i) compacted around shrubs including 500 mm diameter x 150 mm deep soil dams formed around each shrub
- j) plants shall be thoroughly wetted after planting with 25 L of water per shrub

trees

- k) at distances from buildings, drains and freestanding walls that take into account the type of soil, especially expansive soils, and species and mature height of tree (see tree distance guidelines in SANS 10400-H Annex E)
- l) trees shall be removed from containers and planted in backfilled holes so that top of soil originally in containers is level with finished ground level
- m) compacted around trees including 1000 mm diameter x 150 mm deep soil dams around each tree
- n) plants shall be thoroughly wetted after planting with 40 L of water per tree

X.1.7 Hydroseeding

- a) shall take place on prepared soil
- b) watering: 10 000 L per hectare
- c) fertiliser: lime at 4 t per hectare worked into the soil
- d) superphosphate: 0,3 t per hectare worked into the soil
- e) 2:3:2 shall be applied at 0,5 t per hectare with seed mix
- f) LAN: 0,5 t per hectare worked into soil after 6 and 12 weeks
- g) anti-erosion compound: 200 kg per hectare with seed mix
- h) mulch: 400 kg per hectare with seed mix
- i) germinating agent: as per specialist's instruction
- j) seed mix: *as described*

X.1.8 Tree supports

- a) every tree shall be supported with a 2,5 m long x 50 mm diameter treated eucalyptus stake driven 500 mm into soil

- b) trees shall be tied to stakes with two steel wires sleeved in 300 mm long plastic hose-pipe section

X.1.9 Precast concrete tree rings

- a) rings shall be in two halves, of size as described
- b) halves shall be placed firmly and horizontally in soil dams around trees
- c) grass sods shall be trimmed around tree rings where applicable

X.1.10 Maintenance

- a) plant material: maintained for the *described* period including at least three months of the growing season namely the September to March period:
- b) all planted areas shall be kept free from weeds, soil loosened around ground covers, shrubs and trees, once every two weeks
- c) shrubs and trees shall be pruned regularly according to accepted horticultural practice
- d) sick or dead plants shall be replaced immediately
- e) grass sod areas shall be mown weekly and cut grass removed
- f) all hydroseeded veld grass areas shall be mown once every 3 months and cut grass removed
- g) 2:3:2 fertiliser shall be applied at a rate of 5 kg per 100 m² of grass sod area once monthly
- h) planted areas shall be watered once per week during September to March and once every fortnight during April to August as follows: shrubs 25 L at a time; trees 40 L at a time

X.2 Retaining structures

X.2.1 Gabions

Applicable standard: SANS 1200 Standardized specification for civil engineering construction Section DK: Gabions and pitching

materials

- a) hexagonal woven steel wire mesh gabions and revet mattresses: SANS 1580

laying

- b) bases shall be prepared
- c) cages shall be assembled on site and filled with clean, hard, unweathered boulders or rock fragments with minimum size two-thirds of basket thickness or 300 mm, whichever is smallest

X.2.2 Concrete retaining blocks

blocks

- a) concrete retaining blocks: SANS 508

geomembranes

- b) thermoplastic geomembranes: SANS 1526

preparation

- c) position and depth of existing buried services shall be ascertained before excavating; damage to existing services shall be avoided
- d) level and compacted earth foundation trench shall be prepared, of depth *as described*
- e) compacted granular base material such as crushed rock or gravel shall be laid where so *described*
- f) concrete strip foundations shall be laid where so *described*
- g) behind wall when so *described*, provision shall be made for:
 - perforated drain pipe with positive gravity flow to outlets
 - aggregate blanket drain
 - geofabric covering

placing

- h) units shall be stacked by hand, without mortar, true to line, level and in pattern *as described*
- i) *suitable* granular backfill shall be placed and compacted
- j) geofabric reinforcement shall be laid when so *described*
- k) walls shall be cleaned, debris and pockets cleared, ready to accept planting

X.3 Roadwork**X.3.1 Materials**

- a) bituminous premix road surfacing:
 - prime coat of cutback bitumen to SANS 308
 - semi-gap graded crushed stone having the following grading:

| Sieve size (mm) | % By mass passing sieve |
|-----------------|-------------------------|
| 13,2 | 100 |
| 4,75 | 45-60 |
| 2,36 | 42-55 |
| 1,18 | 40-52 |
| 0,3 | 25-45 |
| 0,075 | 5-12 |

- bituminous road tar binder: SANS 748
- clean, dry quartzite sand
- b) precast concrete segmental paving blocks: SANS 1058
- c) burnt clay paving units: SANS 1575
- d) precast concrete paving slabs: SANS 541

- e) in-situ concrete: see E Concrete, formwork and reinforcement
- f) sand for bedding and jointing of flexible paving
 - free of soluble salts or contaminants likely to cause efflorescence or staining
 - moisture content: 5 – 8%
 - grading limits:

| Sieve size (mm) | % passing |
|-----------------|-----------|
| 9,25 | 100 |
| 4,75 | 95-100 |
| 2,36 | 80-100 |
| 1,18 | 50-85 |
| 0,60 | 25-60 |
| 0,30 | 10-30 |
| 0,15 | 5-15 |

- g) jointing sand: to pass a 1,18 mm sieve, containing 10 – 50% material passing a 0,075 mm sieve
- h) mortar for rigid paving:
 - sand with fineness modulus in the region of 2,2 – 4,0 to minimize permeability
 - mortar: SANS 2001-Construction works Part CM1, class I external, class II internal
 - use minimum water
- i) infill concrete: grade 25/10

X.3.2 Preparation

site clearance

Applicable standard: SANS 2001-Construction Works Part BS1: Site clearance

earth works

Applicable standard: SANS 2001-Construction Works Part BE1: Earthworks (general)

subgrade

- a) excavation: to achieve finished levels and falls as described
- b) soft spots and biodegradable material shall be removed and replaced with *suitable* filling material
- c) installation of all sub-soil drainage pipes shall be complete
- d) compaction: to 90% *MOD AASHTO*; taking special care to compact trenches and around manholes – stabilised with 5% cement prior to compaction if so *directed*

sub-base for flexible paving

- e) sub-base material and construction: *as described*

- f) paving surface profile shall be formed on finished surface of sub-base (irregularities in surface are not to be made up with bedding sand)

concrete sub-base for rigid paving

- g) sub-base concrete: grade 10 to SANS 2001-Construction Works Part CC2: Concrete works (minor works) to thickness and with reinforcement *as described*

weed killer

- h) area to be paved shall be treated with suitable weed killer where so *described* (taking care that trees or shrubs that have to be retained are not affected)

levels, falls, pattern

- i) kerbs and edge restraints shall be complete and levels and falls correct
- j) pattern, edges, cutting of units etc. shall be confirmed before laying

X.3.3 Laying

flexible block/brick paving

Applicable standard: SANS 1200 MJ Standardized specification for civil engineering construction: Segmental paving long axis square to line of traffic flow

- a) Pavers shall be laid true to line and level on loose and evenly spread sand bedding of compacted thickness 25 ± 10 mm
- b) full units shall be laid first
- c) joints: 2 – 6 mm wide
- d) areas in which a full unit will not fit shall be filled with clean-cut units or, if less than 25% of a full unit, with concrete left for at least 24 h before compacting
- e) surface shall be compacted as soon as practicable, not closer than 1 m from free edges or working faces, with high frequency, low amplitude mechanical flat plate vibrator capable of producing a centrifugal force of 7 – 16 kN at a frequency of approximately 75 – 100 Hz on a plate size of 0,35 – 0,5 m²; sufficient passes to compact sand bedding to 15 – 35 mm thickness; at least two passes
- f) joint filling sand: brushed into joints after first pass and excess sand removed on completion
- g) concrete anchor beams: cast across steeply inclined roads where so *described* or *directed*

flexible slabs

- h) bedding: clean river sand
- i) joints: filled with class I cement mortar and strike off with jointer, or left open where so *described* or *directed*

rigid block/brick paving

- j) base concrete shall be clean
- k) pavers shall be set out with string, templates or gauge rods, or entire area dry laid
- l) 1:1 cement:fine sand slurry shall be brushed over the surface

- m) clay pavers with high absorption rate shall be dipped in water before laying; otherwise not wetted
- n) each paver shall be buttered, bedded solid in mortar, and joint filled in one operation
- o) joints shall be tooled flush or bucket handle
- p) 10 mm movement joints shall be provided at 4,5 m intervals at right angles in both directions, and against edge restraints such as buildings, manholes and columns
- q) movement joints shall be filled with *suitable* sealant where so *described* or *directed*

in situ concrete paving

- r) see E Concrete, formwork and reinforcement as hereinbefore

cutting

- s) pavers shall be cut with a masonry disc cutter

accuracy

- t) gradual allowed deviation under 3 m straight edge: 10 mm maximum
- u) allowed difference in level between adjacent units: 3 mm maximum
- v) allowed deviation of line of pattern: 15 mm in 3 m maximum

cleaning

- w) paving shall be left clean and free from stains

X.4 Concrete culverts, kerbs and channels

X.4.1 Materials

- a) precast concrete culverts: SANS 986, portal type
- b) kerbs, edgings and channels: SANS 927
- c) mortar: SANS 2001-Construction works Part CM1, class I
- d) bedding material: crushed stone, sinter, slag, sand or suitable porous material with a particle size of 13 mm maximum
- e) backing concrete: grade 15
- f) sealant: *as described*

X.4.2 Laying

- a) trenches for kerbs and channels shall be excavated to below required level and backfilled with >70 mm of bedding material, compacted to required level and slope to density of >90% MOD AASHTO
- b) kerbs and channels shall be bedded on 50 mm thick bedding material with 10 mm joints filled in with mortar (joints shall be well wetted before jointing)
- c) kerbs and channels shall be laid in 1 000 mm maximum lengths for straight, or curved kerbs with a radius of >20 m, in 500 mm maximum lengths for curved kerbs with a radius between 4 and 20 m, or 300 mm maximum for radii up to 4 m

- d) 12 mm wide movement joints shall be provided in channels at intervals not exceeding 20 m and left open, or filled with polysulphide when dry where so *described* or *directed*
- e) backs of kerbs shall be supported with well-compacted backing concrete
- f) filling in behind kerbs shall be with *suitable* material in layers not exceeding 150 mm, and wetted and compacted to 90% *MOD AASHTO* density
- g) concrete units shall be protected against damage and discolouration

accuracy

- h) maximum deviation of any edge, centre line or vertical surface from *described* position: 25 mm
- i) maximum allowed deviation of any invert level: 10 mm

X.5 Fencing

X.5.1 Line wire and chain-link mesh fencing

- a) zinc-coated fencing line wire (plain and barbed): *SANS 675*, of zinc coating class “light” for inland areas and “heavy” for coastal or corrosive regions
- b) chain-link (diamond) mesh fencing and wire accessories: *SANS 1373/675/10244*

straining eye bolts

- c) straining eye bolts: 10 mm diameter x 300 mm threaded mild steel bolt with eye, washer and nut, hot dip galvanised to *SANS 121* / *SANS 14713* (permanent wire pullers are prohibited)

posts, stays, standards and droppers

- d) precast concrete posts: prestressed alkali aggregate reactive concrete
- e) wood posts, stays and droppers: preservative treated to *SANS 1288* hazard class H4: hardwood *SANS 457-3*, 145—174 mm diameter posts and stays, 32—50 mm droppers
- f) posts shall be provided with necessary holes for hinges, straining bolts, binding wire etc.

erection

- g) fence route: cleared, roughly leveled to obtain uniform gradient
- h) holes: excavated 400 x 400 x 800 mm deep for posts and 300 x 300 x 600 mm deep for stays
- i) posts and stays: planted in grade 15 concrete to 50 mm above ground level with chamfered top surface: at gates, ends, corners, intersections and at intermediate distances not exceeding 90 m, or at acute changes in level
- j) stays: provided to all straining posts in direction of line of fence
- k) standards: driven 450 mm deep into ground at 3 m centres
- l) straining wire: threaded through holes in standards at bottom, top and intermediate centres not exceeding 300 mm for wire fencing, or at intermediate centres not exceeding 600 mm for wire mesh fencing; bound around posts or straining eye bolts, and strained
- m) droppers: bound to straining wire with binding wire

- n) wire mesh cover: where *described*, tensioned and bound securely to straining wire at every third mesh; roll ends joined with a spiral to form a continuous fence; welded mesh tied or clipped to straining wire at 300 mm centres; roll ends trimmed by overlapping 100 mm
- o) in the case of PVC-coated wire, care shall be taken not to crack or puncture the coating
- p) any damaged protective coatings shall be made good
- q) preservative treated timber shall not be cut where it will be below ground
- r) fence shall be checked on completion; hinges greased; projecting bolt threads cut off; bolt ends burred over to prevent nut removal and coated with bitumen paint

fencing gates

- s) steel gates: with tubular frames and wire or mesh filling
- t) gates shall be hung on adjustable hinges
- u) gates shall be supplied with steel spring or U-shaped catches, drop bolts and locking devices, *as described*
- v) drop bolts to drop in *suitable* length of pipe set in concrete to 30 mm above ground level

finish

- w) finish to gates and accessories: two coats bituminous aluminium paint to SANS 682 grade 1 inland; hot dip galvanised to SANS 121/14713 in the *coastal region* or corrosive atmospheres

X.5.2 Weld mesh fencing

- a) material, mesh size, finish: *as described*
- b) erection: according to *manufacturer's instructions*

X.5.3 Barbed tape fencing

- a) barbed tape security barriers: SANS 1620, of material and form *as described*
- b) erection: according to *manufacturer's instructions*

X.5.4 Palisade fencing

steel

- a) steel palisade fences and gates: SANS 301-12
- b) pale points: forked or spiked
- c) panels: 3 m length, safety bolted to steel posts
- d) pale height: *as described*
- e) posts planted in grade 15 concrete bases in accordance with the manufacturer's instructions

concrete

- f) posts, rails and pales: steel reinforced precast concrete grade 30
- g) bolts: galvanised carriage bolts

- h) posts: planted in 600 x 600 x 600 mm concrete base at approximately 2 m centres
- i) rails: bolted to posts (two per bay)
- j) pales: bolted to rails (nine per bay)
- k) bolts: countersunk on both sides with holes grouted solid
- l) erection: according to *manufacturer's instructions*

X.5.5 Electric fencing

- a) electric fencing system: stranded wire on plastic or porcelain isolators on brackets, complete with energizer, batteries etc. as required
- b) wire: galvanised A grade high-tensile steel inland, or stainless steel for *coastal areas* or corrosive atmospheres
- c) electric fencing safety: SANS 10222-3/60335-2

X.5.6 Gate automation

- a) electric gate motor: with battery backup, crush protection, fine position control and remote control
- b) theft-resistant cages: with padlock where so *described*

X.5.7 Private swimming pool fencing

- a) private swimming pool fencing: SANS 1390, of height and protective coating as *described*

X.6 Precast concrete panel walling

- a) precast concrete posts and panels: SANS 1372
- b) posts: planted 500 mm deep in grade 15 concrete at approximately 1,6 m centres
- c) panels: slipped in between posts, and leveled

X.7 Timber decking

X.7.1 Materials

poles

- a) softwood: SANS 457-2
- b) hardwood: SANS 457-3
- c) preservative treated to SANS 1288 hazard class H3 when above ground, class H4 when in ground contact
- d) top diameter: colour marked
- e) required marking: metal tag with hazard class on each pole or bundle

sawn structural softwood

- f) sawn softwood SANS 1783-2 grade 5

sawn structural hardwood

- g) sawn hardwood (Eucalyptus) SANS 1707-1 grade 5

structural laminated timber

- h) structural laminated timber: SANS 1460
- i) exposure class: 1 (exterior)
- j) type: G (stocklam)
- k) stress grade: 5
- l) preservative treatment of softwood: SANS 1288 hazard class H3
- m) fire retardant treatment: where so *described*
- n) required marking: on each piece a combination of code letters: application, exposure class, type, appearance and finish, stress grade, e.g. S2GP5.

deck boarding

- o) softwood: industrial planed wood: SANS 1783-3
- p) hardwood: planed strip flooring: SANS 281
- q) shape: rectangular (not tongue and groove) with arris rounded edges
- r) in long lengths
- s) preservative treatment: SANS 1288 hazard class H3

fixings

- t) brackets, shoes, threaded rod, etc.: mild steel, hot dip galvanised to SANS 121 / SANS 14713
- u) nails, bolts, nuts, washers: SANS 1700, hot dip galvanised to SANS 121 / SANS 14713
- v) screws: countersunk head to SANS 1171, of material *as described*

balustrades

- w) material, construction, etc.: *as described*

X.7.2 Installation

- a) poles: plant in ground, or fix on brackets cast into concrete footings as described
- b) poles planted in 300 mm diameter holes in ground on a bed of gravel or concrete; holes backfilled with gravel, tamped and topped up with a collar of 200 mm concrete, shaped sloping away from pole
- c) structure of poles, beams, joists, cross bracing and strutting: bolted to comply with SANS 10082; bolt heads, washers and nuts: recessed
- d) joists: spaced at centres less than 20 x deck plank thickness
- e) decking boards: fixed at right angles to joists with a space of 7 mm between boards

- f) boards: fixed with screws with countersunk heads; plugged with matching wood where so described
- g) holes: pre-drilled to prevent splitting
- h) board header joints: supported on double joists; space shall be left for ventilation between board heads
- i) end grain: protect with metal caps where so described
- j) top surfaces of rails: chamfered or rounded to assist the shedding of rainwater; round all sharp edges

X.7.3 Wood finish

- a) wood: sealed with one coat of *suitable* sealant or oil before installation
- b) end-grain: sealed as the work proceeds after sawing to length
- c) finish: three coats sealant or oil after installation

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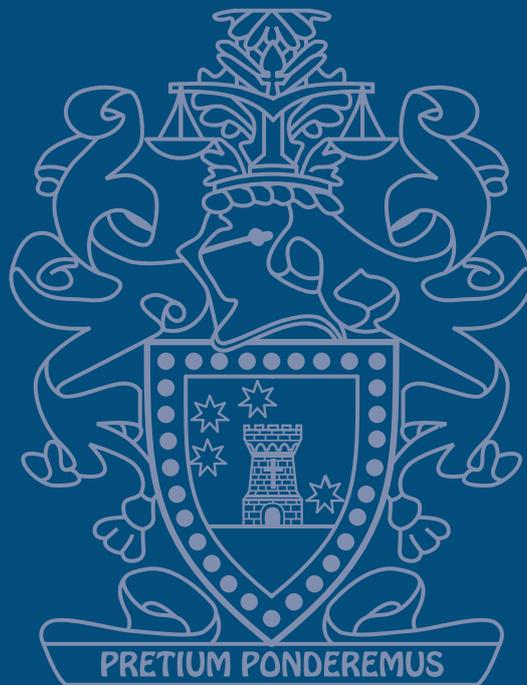


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