

National Building Code of Kiribati



NEW FINAL DRAFT

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Introduction

About this Code; The basic objective of the Code is to ensure that the acceptable standards of structural sufficiency, fire safety, health and amenity, are maintained for the benefit of the Kiribati community now and in the future.

The requirements included in this Code are intended to extend no further than is necessary in the Public interest, to be cost effective, not needlessly onerous in their application, and easily understood.

What is in the Code?

The code sets down from the Performance Requirements and the corresponding Deemed-to-Satisfy Provisions which apply to the construction of buildings for all classes of occupancy.

It must be recognised that a building code cannot cover every issue concerned with the design and construction of buildings. In the case of innovative, complex or unusually hazardous building proposals, or other building work beyond the scope of the Code, legislation may be provide for other suitable action.

Where appropriate the Code allows for variations in climate and geological.

The Code covers those aspects of buildings which are controlled by Approval Authorities such as structure, fire resistance, access and egress, fire fighting equipment, and certain aspects of health and amenity.

Performance Requirements

These are described in terms which would allow considerable scope for innovation and the development of new materials and methods of construction. The requirements are in some cases separated into objectives and the required performance.

Objectives are broad statements of intent and are included at the beginning of each Section to identify the objectives that the provisions of the Section are intended to achieve. They are the basic concepts which apply generally to all buildings and structures.

Required Performance gives the fundamental requirements which will satisfy the objectives and are expressed in performance terms. Accreditation certificates, test reports, detailed calculations or other documentary evidence that a particular material, design or construction method meets the performance requirements of this code.

Deemed-to-satisfy Provisions

The Deemed-to-satisfy Provisions have been drafted in sufficiently general terms to allow some flexibility without increasing the need to use administrative discretion. In the absence of National Standards for design, construction and materials, the Standards produced by the standards Association of Australia and New Zealand have been called up. Detailed specifications have been given where necessary.

Professional Certification

This Code allows for certificates from professional consultants to be used as evidence of compliance with particular requirements or standards.

The enabling legislation will determine the extent of the use of professional certification and the procedures for the submission of certificates, reports or other documentation to the Approval Authorities as evidence of compliance

Layout of the Code

The numbering of Sections and Parts has been made on an alpha-numbering system for ease of reference. It provides flexibility to accommodate future additions or deletions and the future consolidation of building regulations presently contained in other legislation, without undue disruption to the layout.

Other than for common provisions contains in Section A and B, the code is divided into two areas – one which covers Class 1&1A building, and the other which covers all other Classes of buildings (2,2A,3&3A).

Administrative Arrangements

This code is brought into effect by enabling building control legislation which prescribes or “calls up” the technical requirements which have to be satisfied in order to gain approval.

The enabling legislation consists of an Act of Parliament and subordinate legislation. It empowers the Administration to regulate certain aspects of the building process and contains the necessary administrative provisions for the work of Approval Authority. The legislation also imposes responsibilities on the authorities or other persons or bodies, and describes particular administrative procedures.

The following administrative matters are covered in the enabling or subordinate legislation-

- Plan submission and approval procedures
- Issue of building permits
- Inspection during and after construction
- Provision of evidentiary certificates.
- Issue of certificates of occupancy and compliance
- Accreditation or approval of materials or components
- Review and enforcement of standards.
- Fees and charges

Administrative Discretion

The Code is drafted with the object of reducing the need for the Approval Authority to make discretionary decisions.

However in many cases it is not possible to draft a provision in purely technical terms and informed judgement is required on the standard which would be suitable in particular circumstances.

Accordingly, in the number of clauses, the Code requires a particular material or construction method to be “suitable” meaning fit in all relevant respects for its intended purpose and use.

The Approval authority for the enforcement of building controls retains the right to question “suitability “ and differences of opinion are open to appeal.

**KIRIBATI
NATIONAL
BUILDING
CODE
2006**

ALL BUILDINGS

SECTION A

General provisions

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A1 INTERPRETATION

A1.1 Definitions

Some of the words and phrases used in the Code have specific defined meanings. Wherever such meaning is intended the words and phrases are printed in italics. The defined meanings are:

Alteration, in relation to a building, includes an addition or extension to a building.

Assembly building, a building where people may assemble for -

- (a) civic, theatrical, social, political, or religious purposes;
- (b) educational purposes in a school, early childhood centre, preschool, or the like;
- (c) entertainment, recreational or sporting purposes; or
- (d) transit purposes.

Automatic, applied to a fire door, smoke door, fire shutter, smoke and-heat vent, sprinkler system, alarm system or the like, means designed to operate when activated by a heat, smoke or fire sensing device.

Certificate of Accreditation, a certificate acceptable to the Approval Authority stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of this code.

Combustible -

- (a) applied to a material - means combustible under AS 1530.1
- (b) applied to construction or part of a building - means constructed wholly or in part of *combustible* materials.

(See definition of *non-combustible*)

Common Wall, a wall that is common to adjoining buildings.

Drain, a line of pipes to carry *sewage* or *trade waste*, located within the property boundary, laid above or below ground, and includes all fittings and equipment such as inspection openings, traps and gullies.

It is a branch *drain* if it is intended to receive the discharge from fixture discharge pipes. Branch *drains* join a main drain.

The main *drain* collects the *waste water* from branch *drains* and/or from fixture discharge pipes and conveys them to the disposal system.

Early Childhood Centre, a preschool, kindergarten or Child centre.

Effective height, the height to the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units) from the floor of the highest storey providing egress to a road or open space. The road or open space must be capable of providing unobstructed access to emergency vehicles. The effective height of a stepped or terraced building is the maximum effective height of any segment of the building.

Exit:

- (a) Any, or any combination of the following if they provide egress to a road or open space:
 - (i) An internal or external stairway.
 - (ii) A ramp complying with Section ND.
 - (iii) A *fire-isolated passageway*.
 - (iv) A doorway opening to a road or open space.
- (b) A horizontal exit or a fire-isolated passageway leading to a horizontal exit.

External Wall, an outer wall of a building which is not a *common wall*.

Fire Compartment, a part of a building which is separated from the remainder in accordance with this Code to resist the spread of fire and smoke.

Fire-protective Covering, inert material applied in such a manner that it protects other materials or building elements from the damaging effects of fire. Acceptable materials are:-

- (a) 13 mm fire-protective grade plasterboard;
- (b) 12mm cellulose fibre reinforced sheeting;
- (c) 12 mm mesh-reinforced fibrous plaster in which the mesh is 13 mm x 13 mm x 0.7 mm welded wire located not more than 6 mm from the exposed face;
- (d) other material not less fire-protective than 13 mm fire-protective grade plasterboard, fixed in accordance with the normal trade practice for a *fire-protective covering*.

Fire-resistance Level (FRL), the grading periods in minutes determined in accordance with Specification A2.3, for-

- (a) *structural adequacy*;
- (b) *integrity*, and
- (c) *insulation*,

and expressed in that order.

Fire-resisting Construction, one of the Types of construction referred to in Part NC1.

Fire-separated Section, a part of a building which is separated from the remainder by fire walls in accordance with Part NC2 and thereby regarded as a separate building.

Fire-source Feature –

- (a) the far boundary of a road adjoining the allotment;
- (b) a side or rear boundary of the allotment; or
- (c) an external wall of another building on the allotment.

Fire Wall, a wall that divides a storey or building to resist the spread of fire and smoke and has the FRL required under Specification NC1 .1.

Fixture Unit, a unit of measure based on the rate of discharge, time of operation and frequency and use of a sanitary fixture, that denotes the hydraulic load contributed by that fixture to the sanitary plumbing system.

Flammability index, the index number determined under AS 1530.2.

Floor Area –

- (a) in relation to a storey - the area of that storey measured over the enclosing walls (if any) and that part of any common wall located within the allotment; and
- (b) in relation to a room - the area of the room measured within the finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting.

Habitable Room, a room used for normal domestic activities, and -

- (a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room and sunroom; but
- (b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Health-care Building -

- (a) a nursing home, hospital, convalescent home, infirmary or similar institution or home for sick or disabled persons needing full-time nursing care;
- (b) a clinic or day surgery unit where -
 - (i) prescribed surgical procedures are performed on people who do not require overnight care as in-patients in a hospital; and
 - (ii) the surgical procedures include a potential requirement for general

anaesthesia, major regional anaesthesia or intravenous sedation.

Horizontal Exit, a required doorway through a required fire wall separating two portions of a building with approximately the same floor level so as to establish an area of refuge affording safety from fire and/or smoke in the portion from which the escape is made.

Insulation, in relation to a FRL, means the ability to maintain a temperature on the surface not exposed to the furnace below the limits specified in AS 1530.4.

Integrity, in relation to a FRL, means the ability to resist the passage of flames and hot gases specified in AS 1530.4.

Internal Wall, excludes a common wall or a party wall.

Junction, a sanitary fitting used to connect one or more branch pipes or channels to a main pipe or channel.

A square *junction* connects the main pipe at right angles and has an airtight removable cap to facilitate inspection and cleaning.

An inspection branch is a *junction* with an airtight removable cap to facilitate inspection and cleaning.

Loadbearing, intended to resist forces and moments additional to those due to its own weight.

Non-combustible -

- (a) applied to a material - means not combustible except that the material may have a combustible surface finish if the finish is not more than 1 mm thick and the Spread-of-Flame Index of the assemblage is 0;
- (b) applied to construction or part of a building - means constructed of non-combustible material on all exposed faces.

The following materials though *combustible* or containing *combustible* fibres may be used wherever *non-combustible* materials are required:-

- (i) plasterboard
- (ii) perforated gypsum lath with a normal paper finish
- (iii) fibrous plaster sheet conforming to AS 2185
- (iv) cellulose fibre cement sheeting
- (v) any other material not less fire-protective than any of the materials from (i) to (iv)

On-site sanitation system, a sanitation system that is not connected to the public sewer system

Open Garage, a carport or garage with 2 or more sides substantially open.

Open Space, a space on an allotment, or a roof or similar part of a building complying with ND2.12, open to the sky and connected directly with a public road.

Open Spectator Stand, a tiered stand substantially open at the front.

Panel Wall, a *non-loadbearing* external wall, in frame or similar construction, that is wholly supported at each *storey*.

Pitch, the maximum angle to the horizontal of a line connecting the nosings of stair treads in a single straight flight of a stairway.

Private Garage - any garage of a Class 1 building.

Professional Consultant, a person with appropriate experience in the relevant field, being

- (a) legislation so requires - a registered professional consultant in the relevant discipline; or
- (b) a Corporate Member of a recognized professional institution.

Public Corridor, an enclosed corridor, hallway or the like which –

- (a) serves as a means of egress from 2 or more sole-occupancy units to a required exit from the storey concerned; or
- (b) is required to be provided as a means of egress from any portion of a storey to a required exit.

Registered Testing Authority -

- (a) Kiribati Government Testing Authority
Refer relevant Ministry,
South Tarawa,
KIRIBATI
- (b) National Building Technology Centre
PO Box 30
CHATS WOOD NSW 2067
AUSTRALIA;
- (c) Commonwealth Scientific and industrial Research Organisation; Division of Building Research
PO Box 56
HIGHETT VIC 3190
AUSTRALIA;
- (d) An organisation registered by the National Association of Testing Authorities (NATA) to test in the relevant field;
- (e) Building Research Association of New-Zealand
Private Bag, PORIRUA
NEW ZEALAND;

- (f) Testing laboratories registered by the Testing Laboratory Registration Council (TELARC of New Zealand to test in the relevant field;
- (g) An organisation recognized by NATA or TELARC through a mutual recognition agreement;
- (h) Fire Insurers Research and Testing Organisation
Melrose Avenue
BOREHAM WOOD
LONDON (UK);
- (i) National Institute of Standards and Technology
GAITHERSBURG, MD 20899
USA;
- (j) Underwriters Laboratories Incorporated
333 Pfingsten Road
NORTHBROOK, IL 60062
USA; or
- (k) National Research Council
Division of Building Research
75 Boul De Mortagne
Boucherville, Quebec
CANADA

Repairs, action taken to restore the structural strength or appearance of a building without making any addition or extension to it.

Required, *required* by this Code.

Resistance to the incipient spread of Fire, in relation to a ceiling membrane, means the ability of a ceiling membrane to insulate the space between the ceiling and roof, or ceiling and floor above, to limit the temperature rise of combustibles in this space during the Standard Fire Test to 180°C.

Rise, in storeys, means the greatest number of storeys calculated in accordance with NC1 .2 at any part of the external walls of the building -

- (a) above the finished ground next to that part; or
- (b) part of the external wall is on the boundary of the allotment, above the natural ground level at the relevant part of the boundary.

Sanitary Compartment, a room or space containing a toilet fixture, closet pan, soil pan, chemical toilet, or the like.

Sarking-type Material, a material such as a reflective foil or other flexible membrane of a type normally used for a purpose such as water-proofing, vapour proofing or thermal reflectance.

School, includes a primary or secondary school, college, university or similar educational establishment.

Self-closing, applied to a door or window means equipped with a device which returns the door or window to the fully closed and latched position immediately after each manual opening

Service Station, a garage which is not a private garage and is for the servicing of vehicles, other than only washing, cleaning or polishing.

Sewage, waterborne human waste from domestic and commercial premises including faeces and urine, and waste from kitchens, showers, baths, domestic laundries etc.

Site, the part of the allotment of land on which a building stands or is to be erected.

Smoke-Developed Index, the index number for smoke developed under AS 1530.3.

Soil Fixture, a water closet pan, urinal, sanitary napkin disposal unit, slop hopper, bed pan washer or autopsy table.

Soil Pipe, a pipe which conveys discharge from soil fixtures.

Sole-occupancy Unit, a room or other portion of a building for occupation by one owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier.

Spread-of-Flame Index, the index number for spread of flame under AS 1530.3.

Stack, a vertical drain including offsets and extending to more than one storey.

Standard Fire Test, the Fire-resistance Test of Structures under AS 1530.4.

Storey, a space within a building which is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but not -

- (a) a stairway or meter room;
- (b) a bathroom, shower room, water closet, or other sanitary compartment, or
- (c) a combination of the above.

Structural Adequacy, in relation to a FRL means the ability to maintain stability and adequate load bearing capacity under AS1530.4.

Structural Member, a component or part of an assembly which provides vertical or lateral support to a building or structure.

Sweep Junction, a long radius bend entering a main pipe at 45° or a 45° junction fitted with a 45° bend.

Trade Waste, waterborne waste from business, trade or manufacturing process containing predominantly non human waste, but not unpolluted water.

Ward Area, that portion of a storey of a Class 9a building for residing patients and includes areas for sleeping, recreation and sanitary facilities, and nurses stations.

Waste Fixture, a sanitary fixture other than a soil fixture. Examples are: basins, bidets, kitchen sink, laundry trough etc.

Waste Pipe, a pipe which conveys the discharge from waste fixtures.

Waste Water, dissolved and suspended waterborne waste which may consist of sewage and/or trade waste.

Window, includes a roof light, glass panel, glass brick, glass louver, glazed sash, glazed door, or other device which transmits natural light directly from outside a building to the room concerned when in the closed position.

AI.2 - Adoption of Standards and other references

The adoption of a Standard, rule, specification or provision included in any document issued by the Standards Association of Australia, Standards Association of New Zealand or other body, does not include a provision -

- (a) specifying the respective rights, responsibilities or obligations between that body and any manufacturer, supplier or purchaser;
- (b) specifying the responsibilities of any tradesman or other building operative, architect, engineer, authority, or other person or body;
- (c) requiring the submission for approval of any material, building component, form or method of construction, to any person, authority or other body;
- (d) specifying that a material, building component, form or method of construction, must be submitted to the Standards Association of Australia, Standards Association of New Zealand or other body or a committee of either Association for expression of opinion; or
- (e) permitting a departure from the Standard, rule, specification or provision at the sole discretion of the manufacturer or purchaser, or by arrangement or agreement between the manufacturer and purchaser

AI.3 Referenced Standards, Etc.

A reference to a document under AI.2 refers to the latest edition or issue, together with any amendment, listed in Specification AI.3 and only so much as is relevant in the context in which the document is quoted.

AI.4 Differences between referenced documents and this Code

This Code overrules in any difference arising between it and any Standard, rule, specification or provision in a document listed in Specification AI.3. Further, references in this Code to any Standard or Code of Practice issued by the Standards Association of Australia or of New Zealand or such other body, exclude the need for:

- (a) compliance with NZS 1900 wherever it is quoted in any standard;
- (b) compliance with any laws and regulations that are not of this country; and
- (c) recognition of the meaning of Engineer

Also, references to FRR in Standards issued by the Standards Association of New Zealand mean Fire resistance level' as defined in this Code.

AI.5 Mandatory provisions

- (a) The following provisions of the Code are mandatory:
 - (i) all provisions of Section A; and
 - (ii) the Performance Requirements stated at the beginning of all the other Sections.
- (b) The Deemed-to-Satisfy Provisions of the Code are one means of satisfying the Performance Requirements. The Performance Requirements can also be met by any other means. When this latter approach is taken, it must meet the final objectives and performance that would have been achieved had the Deemed-to-Satisfy Provisions been followed.

A2 – ACCEPTANCE OF DESIGN AND CONSTRUCTION

A2.1 Suitability of materials

Every part of a building must be constructed in a manner which will achieve the required level of performance, using materials and methods that are not faulty or unsuitable for the purpose for which they are intended.

A2.2 Evidence of suitability

Evidence to support the use of a material, method, form of construction or design may be:-

- (a) a report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building;
- (b) a current Certificate of Accreditation;
- (c) a certificate from an appropriately qualified professional consultant which -
 - (i) certifies that a material, design or form of construction complies with the requirements of this Code; and

- (ii) sets out the basis on which it is given and the extent to which relevant specifications, rules; codes of practice or other publications have been relied upon; or
- (d) a Standards Mark Certificate issued by the Standards Associations of Australia or the Standards Association of New Zealand; or
- (e) any other form of documentary evidence that correctly describes the properties and the performance of the material or form of construction and adequately demonstrates its suitability for use in the building,

and any copy of documentary evidence submitted under this Code, must be a complete copy of the original report or document.

A2.3 Fire Resistance of building elements

The FRL of structural member or other building element must be determined in accordance with specification DCS1 and DCS2. Any relevant testing or certification must be by an appropriately qualified professional consultant or Registered Testing Authority.

A2.4 Early Fire Hazard indices

The Early Fire Hazard Indices of a component or assembly must be determined in accordance with specification DCS1 and DCS2

A3 – CLASSIFICATION OF BUILDINGS AND STRUCTURES

A3.1 Principles of classification

The classification of a building or part of a building is determined by the purposes for which it is designed, constructed or adapted to be used.

A3.2 Classifications

Buildings are classified as follows:

Class 1: a residence which may comprise one or more buildings including any outbuildings such as a private garage which in association constitute-

- (a) a single dwelling-house; or
- (b) a dwelling-house used as a boarding-house, hostel, or the like, in which not more than 12 persons would ordinarily be resident; or
- (c) a building that contains -
 - (i) 2 or more sole-occupancy units where no such unit is located one above the other,
 - (ii) only 2 sole-occupancy units located one above the other,

and each unit has direct egress to a road or open space

Class 1A: a Class 1 building built to traditional local methods and entirely from traditional local materials eg. buia, kia kia.

Class 2: a residential building, other than a building of Class 1, which is a common place of living for a number of unrelated persons, including -

- (a) a boarding-house, guest house, hostel, or lodging-house;

- (b) a residential part of a hotel or motel;
- (c) a residential part of a school;
- (d) accommodation for the aged, disabled or children; and
- (e) a residential part of a health-care building which accommodates members of staff.
- (f) a dwelling in a building that is Class 3 if it is the only dwelling in the building.

Class 2A: a Class 2 building built to traditional local methods and entirely from traditional local materials eg. maneaba

Class 3: All other buildings. Examples are -

- (a) office buildings
- (b) shops
- (c) restaurants, bars and other eating places
- (d) warehouse or storage buildings
- (e) health-care buildings
- (f) assembly buildings.

Class 3A: a Class 3 building built to traditional local methods and entirely from traditional local materials eg. maneaba

A3.3 Multiple classification

Each part of a building must be classified separately, and where parts have different purposes - if not more than 10% of the floor area of storey which is not a laboratory is used for a purpose which is a different classification, the classification applying to the major use may apply to the whole storey.

AS1.3 STANDARDS ADOPTED BY REFERENCE
1. Schedule of referenced documents

The Standards and other documents listed in Table 1 are referred to in this Code. In order to reduce possible confusion/conflict, the Standards produced by the Standards Association of Australia or by the Standards Association of New Zealand as seen to be

specifically relevant, have been called up. However the Code users are free to use any suitable mix of Australian and New Zealand Standards provided care is taken to follow consistent technical principles and prevalent practices. Where the Standards from either Australia or New Zealand do not cover any specific area, the relevant Standards issued by the British Standards Institution or the American Society for Testing and Materials may be used.

TABLE 1 SCHEDULE OF REFERENCE DOCUMENTS		
NO	TITLE	Code Clause(s)
AS 1038	Methods for the analysis and testing of coal and coke	
Part 15	Fusibility of higher rank coal ash and coke and ash	Spec NCS4
AS/NZS 1170	Minimum design loads on structure (SAA Loading Code)	B1.2
Part 1	Dead and live loads and load combinations	
Part 2	Wind forces	
AS 1428	Design rules for access by the disabled	ND3.2, ND3.3
Part 1	Regulatory requirements	
AS 1530	Methods of fire tests on building materials components and structures	A1.1
Part 1	Combustibility test for materials	
Part 2	Test for flammability of materials	
Part 3	Test for early fire hazard properties of materials	Spec DCS2 Spec DCS2
Part 4	Fire-resistance tests on elements of building construction	Spec NCS4
AS 1657	Rules for fixed platforms, walkways, stairways and ladders	ND2.11, DF6.11.5
AS 1664	Rules for the use of aluminium in structures (SAA Aluminium Structures Code)	B1.3
AS 1720	Rules for the use of timber in structures (SAA Timber Engineering Code)	B1.3 Spec DCS1
AS/NZS 1860	Code practice for the installation of particleboard flooring	B1.3

TABLE 1 Continued		
SCHEDULE OF REFERENCE DOCUMENTS		
No.	Title	Code Clause(s)
AS 2159	Rules for the design and installation of piles (SAA Piling Code)	B1.3
AS 2327	Composite construction in structural Steel and concrete (SAA Composite Construction Code)	Spec DCS1,
AS 2870	Residential slabs and footings Construction	B1.3,DF1.9, NF1.9
AS/NZS 2904	Damp proof courses and flashings	DF1.8 NF1.8
AS/NZS 3000	SAA Wiring rules	DE1.1NE3.1.1
AS/NZS 3003	Electrical Installations – Patient Treatment areas of hospitals and medical, dental practices and dialyzing locations	
NZS 3109	Specification for concrete construction	B1.3
NZS 3124	Specification for concrete construction for minor works	B1.3
AS/NZS 3500	Plumbing and drainage Code	
Part 0	Glossary of terms	
Part 1	Water services	DF5.2,DF5.3, NF5.2,NF5.3
Part 2	Sanitary plumbing and sanitary drainage	DF6.2,NF6.2
Part 4	Heated water services	DF5.2,DF5.3, DF5.4, NF5.2, NF5.3, NF5.4
AS 3600	Concrete Structures	B1.3, Spec DCS1,
AS 3660	Termite Management	
Part 1	New Building Work	B1.3
AS3700	Masonry in building (SAA Masonry Code)	B1.3, Spec DCS1
AS 4100	Steel Structures	B1.3, Spec DCS1
AS/NZS 4200	Code of practice for pliable building membranes and underlays	DF1.5, NF1.5
Part 1	Materials	
Part 2	Installation Requirements	

NZS 4223	Code of practice for glazing in buildings	B1.3
NZS 4229	Code of practice for masonry buildings not requiring specific design	B1.3
NZS 4232	Performance criteria for fire resisting closures	Spec NCS3 NC3.6
NZS 4503	Hand operated fire fighting equipment	NE1.2
AS 4040 Part 2	Methods of Testing Sheet Roof and Wall Cladding Resistance to Wind Pressure for Non-Cyclone Regions	B1.3
AS 4046	Methods of Testing Roof Tiles	B1.3
AS/NZS 4256	Plastic Roof and Wall Cladding Materials	B1.3
AISC	Guidelines for assessment of fire resistance of structural steel members	Spec DCS1
AG 100 Series	Code for Gas Appliances	DG2.3 NG2.3

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ALL BUILDINGS

SECTION B

Structure

**Performance Requirements
Deemed-to-Satisfy Provisions**

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OBJECTIVES

A building must be designed and constructed to fulfil the following objectives:

- (a) prevent death and injury to people from structural failure
- (b) avoid distress to occupants as a result of deflection vibration degradation or other similar causes
- (c) avoid damage to neighbouring property
- (d) the building must satisfy the intended use

PERFORMANCE REQUIREMENTS

BP1 STRUCTURAL PROVISIONS

BP1.1 General Requirements

Buildings and their elements must be designed and constructed in order to prevent structural failure during the expected life of the building and to avoid unacceptable deflections and vibrations during the normal use of the building, resulting from -

- (a) combinations and frequency of all possible loads, dynamic responses and internal actions;
- (b) the properties of the materials used in the building; and
- (c) the foundation conditions.

BP1.2 Loads

The design and construction must take into account the loads resulting from the following acting either singly or in possible combinations-

- (a) self weight
- (b) imposed loads
- (c) temperature variations
- (d) earth pressure
- (e) wind
- (f) impact
- (g) explosion/implosion
- (h) fire
- (i) water and other liquids
- (j) fatigue resulting from fluctuating loads

DEEMED-TO- SATISFY PROVISIONS

B1 STRUCTURAL PROVISIONS

B1.1 General requirements

Materials, components and methods of construction used in a building or structure must be capable of sustaining an acceptable level of safety and serviceability when subjected to -

- (a) the most adverse combinations of loads (including combinations of loads that might result in a potential for progressive collapse); and
- (b) other actions, to which they may reasonably be subjected.

B1.2 Loads

The loading requirements of B1.1 are satisfied if the building or structure can resist loads determined in accordance with the following:

(a) Dead, live, and wind loads:

AS/NZS 1170 Minimum design loads on structures (known as SAA Loading Code)

Part 1 - Dead and live loads and load combinations

Part 2 - Wind loads

When using Part 2 of the Standard the following provisions apply:

A regional wind speed (V_R) of 40 m/s to all areas.

The Terrain Category in Kiribati is Category 2 such that the design wind speed is 38m/s up to a height of 5m. The maps of Australia and New Zealand in the Standard are to be disregarded.

(b) Other loads: The principles of structural mechanics

PERFORMANCE REQUIREMENTS

BP1.3 Design and Construction**BP1.3.1 General Requirements**

1) The design and construction must allow for-

- (a) the consequences of failure;
- (b) the quality of workmanship available;
- (c) Variations in materials properties and site characteristic; and
- (d) want of accuracy in the methods used to predict the structural performance of the building.

2) The following criteria must be satisfied -

- (a) during the designed life of the building the probability of experiencing unacceptable deflections or vibrations should be no more than 5%;
- (b) a risk of structural failure of no more than 0.1% within the designed life of the building;

BP1.3.2 Site Mixed Concrete and Grout

Materials be mixed in appropriate proportions in order to achieve design strength.

BP1.3.3 Corrosion protection of reinforcement and embedded steel

All steel reinforcement and other embedded steel must be suitably protected against corrosion.

DEEMED-TO- SATISFY PROVISIONS

B1.3 Design and Construction**B1.3.1 General Requirements**

The requirements for materials and forms of construction are satisfied if they comply with the following:

- (a) **Masonry** : AS 3700
- (b) Concrete construction (including reinforced and prestressed concrete): AS 3600
- (c) **Steel** construction-
 - (i) Steel structures: AS 4100.
 - (ii) Cold formed steel structures: AS 1538.
- (d) **Aluminium** construction: AS 1664.
- (e) **Timber** construction- Design of timber structures: AS 1720.
- (f) **Footings**: Footings for Class 1 buildings: AS 2870
- (g) **Piling**: AS 2159.
- (h) **Glass Installations**: NZS 4223.
- (i) **Protection from termites**: In areas subject to infestation by subterranean termites:
 - (i) Physical barriers: AS 3660.
 - (ii) Soil treatment: AS 3660.
- (j) **Roof construction**:
 - (i) Sheet Roof AS 4040
 - (ii) Tile Roof AS 4046
 - (iii) Plastic Roof AS/NZS 4256
 - (iv) Manufacturers recommendations.

All roofing must have some form of insulation.
- (k) **Particleboard structural flooring**: AS/NZS 1860.
- (l) **External wall cladding**: No structural damage when tested to TA 440 to withstand impact from a 4 kg piece of timber of nominal cross-section 100 mm x 50 mm striking end on at a velocity of 15 m/s.

1.3.2 Site mixed concrete and grout

When mixing concrete or grout at site the mix ratios corresponding to the required strength must be those given in table B1.6

All sand and aggregate used in the concrete mix must be washed.

PERFORMANCE REQUIREMENTS

BP1.3 Design and Construction Contd

BP1.3.3 Corrosion Protection of Reinforcement and Embedded Steel

All steel reinforcement and other embedded steel must be suitably protected against corrosion.

BP 2 Allowable number of storeys

Buildings will abide by storey restrictions appropriate to Kiribati geography and to planning requirements.

BP3 Site works

(a) site works as necessary must be carried out to ensure the stability of the building site during the expected life of the building;

(b) while carrying out site works any damage to existing structures or adjacent property must be avoided; and

(c) alterations to the ground water level resulting from site works must not be allowed to affect the stability of any building.

B4 Standard Structural Details

DEEMED-TO- SATISFY PROVISIONS

B1.3 Design and Construction Contd.

B1.3.3 Corrosion Protection of Reinforcement and Embedded Steel

All steel reinforcement and other embedded items of steel, whether used in concrete or masonry must be either:

- (a) epoxy coated;
- (b) hot dip galvanised;
- (c) Provided with a minimum 50mm of cover concrete in members above the ground and 75mm of cover concrete in a member in contact with the ground; or
- (d) otherwise protected against corrosion by a proven method.

When galvanising is used as an option the cement used must be free of calcium hydroxide.

A product called Sika Ferrogard ®901, is available for use with seawater and unwashed saline aggregate for making concrete of good quality and durability. Reinforcing bars do not easily corrode and destroy the concrete as would ordinarily be the case when using seawater and saline aggregates. The product is manufactured by Sika Australia Pty Ltd., 55 Elizabeth Street, Wetherill Park, NSW, 2164 Australia.

B2 Allowable number of storeys

For buildings in Class 1 buildings should the number of storeys exceed 2, or Classes 2 &3, should the number of storeys exceed 3, special application must be made to relevant Ministries of the Kiribati Government, for their approval.

Class 1A should be limited to 2 storeys.

Classes 2A & 3A should be no more than 1 storey.

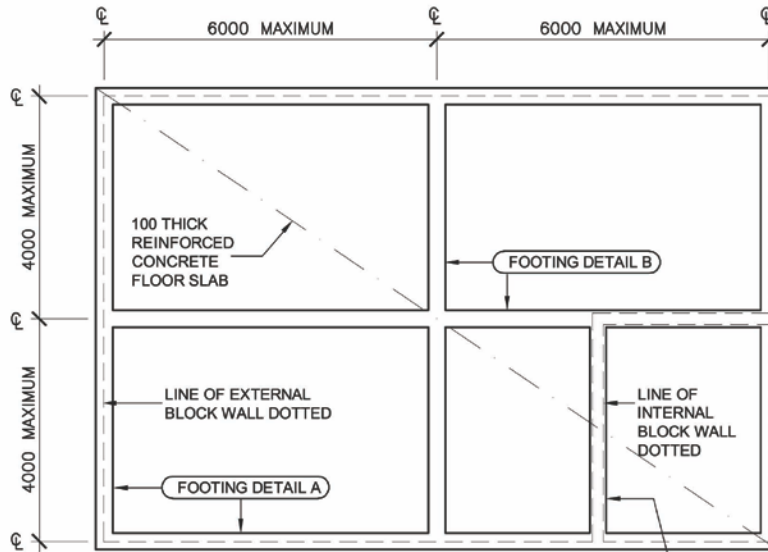
B3 Site works

Site specific design must be done.

B4 Standard Structural Details

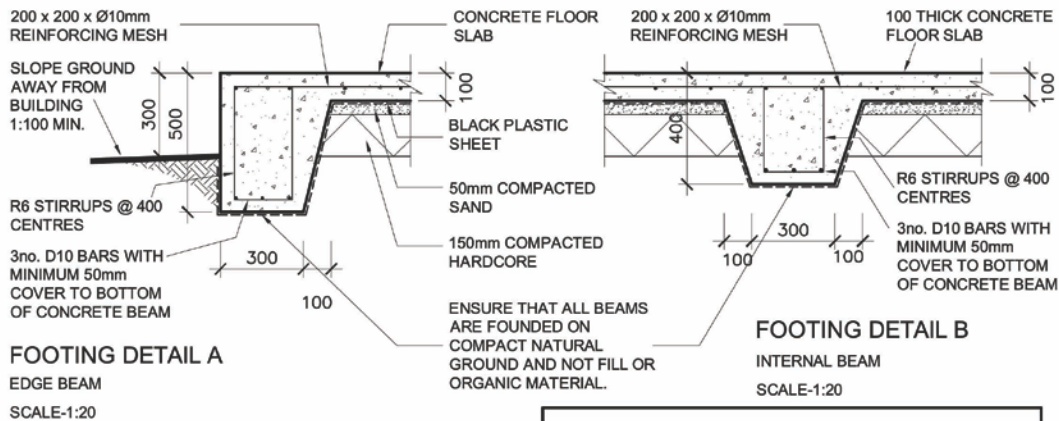
Single storey buildings of 3600 or less ceiling height may use the following approved structural details without the need for design or certification by a structural engineer.

- a) B4.1 Concrete slab on ground
- b) B4.2 Concrete strip footings for blockwork walls
- c) B4.3 & B4.4 Reinforced blockwork walls



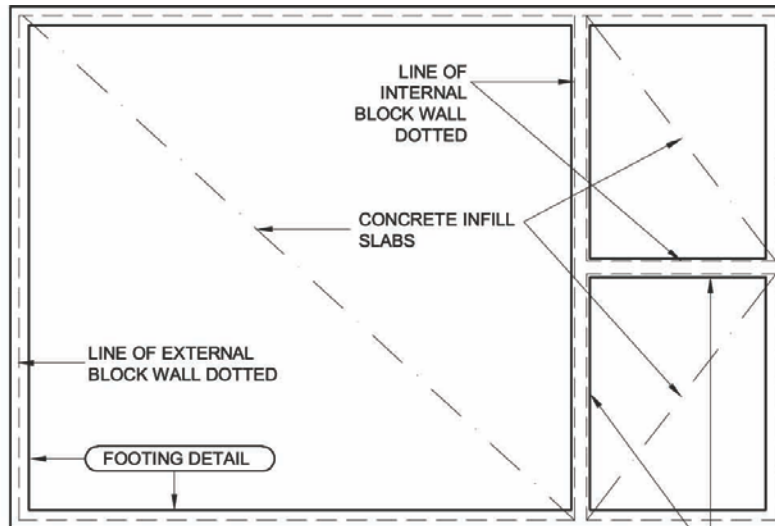
TYPICAL SLAB LAYOUT & FOOTING PLAN SCALE-1:100

FOOTING DETAIL B
PROVIDE INTERNAL BEAMS BELOW ALL LOADBEARING AND BLOCKWORK WALLS



NATIONAL BUILDING CODE OF KIRIBATI
STANDARD STRUCTURAL DETAIL
B4.1
CONCRETE SLAB ON GROUND
SCALE-1:100; 1:20

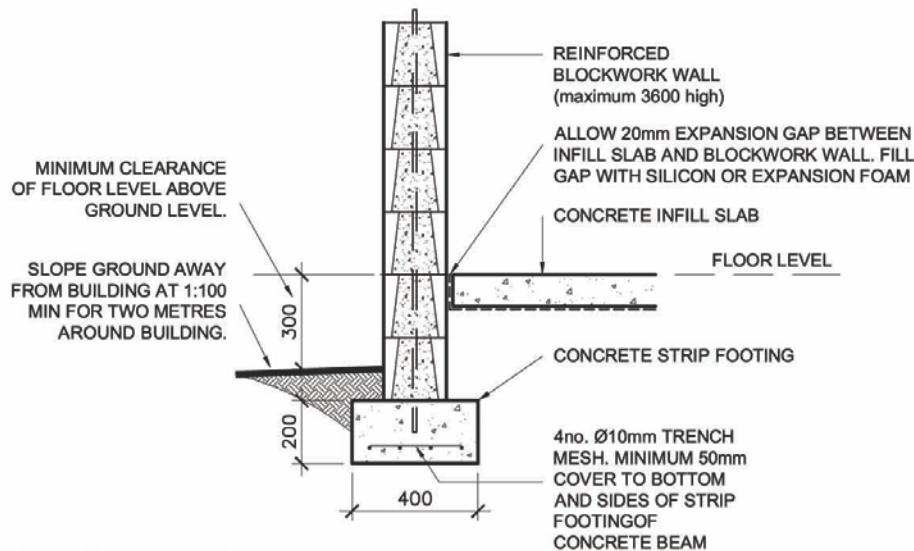
- FLOOR SLAB AND FOOTING NOTES**
- THESE DETAILS SHALL ONLY BE USED FOR SINGLE STOREY BUILDINGS
 - ALL REINFORCING SHALL HAVE 50mm CONCRETE COVER.
 - INTERNAL BEAMS (DETAIL B) SHALL BE FORMED UNDER ALL INTERNAL BLOCKWORK WALLS & AT 4.0 METRE MINIMUM CENTRES (REFER TO TYPICAL SLAB LAYOUT & FOOTING PLAN).
 - EDGE AND INTERNAL BEAMS MUST SIT ON NATURAL GROUND (SAND AND CORAL). WHERE FILL OR ORGANIC MATERIAL IS FOUND THIS MUST BE REMOVED TO THE LEVEL OF THE NATURAL GROUND.
 - ALL STEEL REINFORCING TO BE MINIMUM GRADE 300MPa
- CONCRETE MIX 0.75 : 1 : 2 : 3
WATER:CEMENT:SAND:20mm AGGREGATE
- LAY CONCRETE SLAB OVER BLACK PLASTIC SHEETING



TYPICAL STRIP FOOTING LAYOUT

SCALE-1:100

FOOTING DETAIL
PROVIDE INTERNAL STRIP FOOTINGS
BELOW ALL BLOCKWORK WALLS



STRIP FOOTING DETAIL

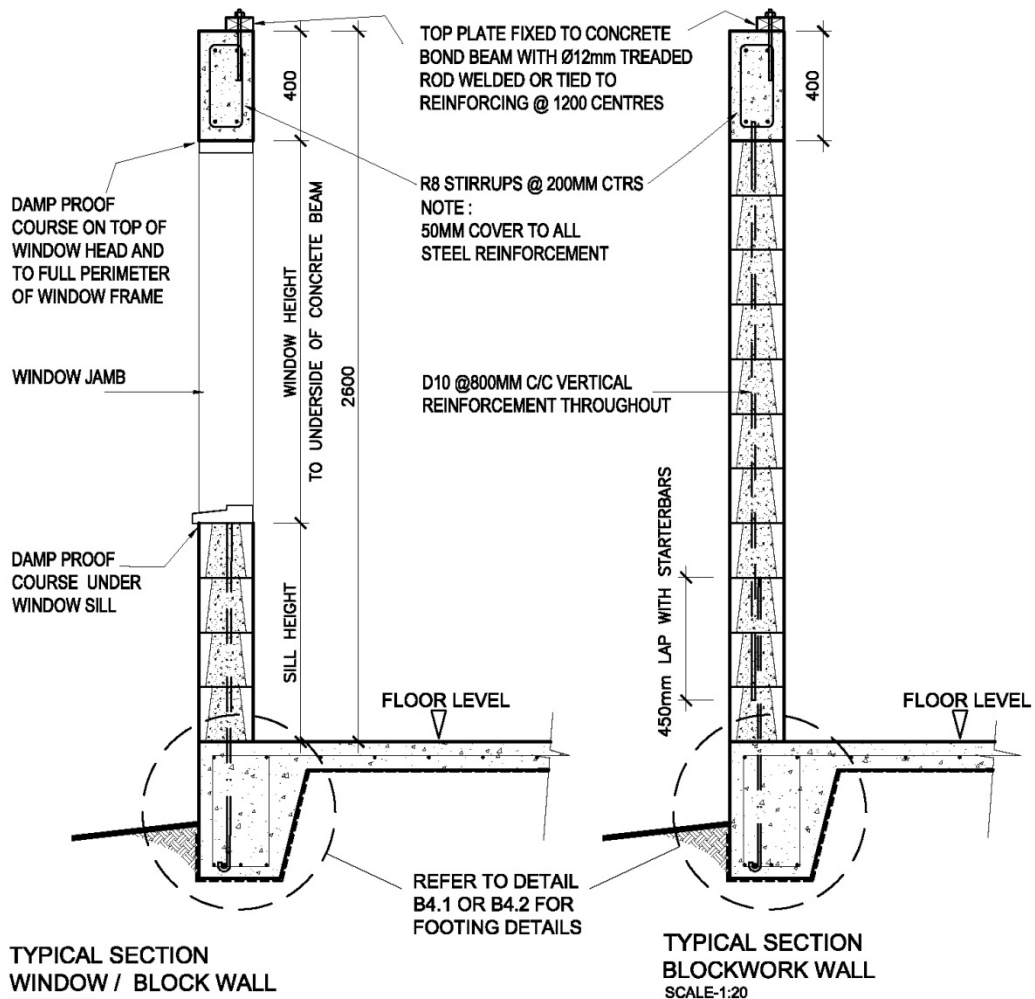
SECTION SCALE-1:20

NATIONAL BUILDING CODE OF KIRIBATI
STANDARD STRUCTURAL DETAIL
B4.2
CONCRETE STRIP FOOTINGS FOR
BLOCKWORK WALLS
SCALE-1:100; 1:20

CONCRETE STRIP FOOTING NOTES

1. THESE DETAILS SHALL ONLY BE USED FOR SINGLE STOREY BUILDINGS
2. ALL REINFORCING SHALL HAVE 50mm CONCRETE COVER.
3. STRIP FOOTINGS MUST SIT ON NATURAL GROUND (SAND AND CORAL). WHERE FILL OR ORGANIC MATERIAL IS FOUND THIS MUST BE REMOVED TO THE LEVEL OF THE NATURAL GROUND.
4. ALL STEEL REINFORCING TO BE MINIMUM GRADE 300MPa

CONCRETE MIX 0.75 : 1 : 2 : 3
 WATER:CEMENT:SAND:20mm AGGREGATE



TYPICAL SECTION WINDOW / BLOCK WALL
SCALE-1:20

TYPICAL SECTION BLOCKWORK WALL
SCALE-1:20

NATIONAL BUILDING CODE OF KIRIBATI
STANDARD STRUCTURAL DETAIL
B4.3
REINFORCED BLOCKWORK WALL
SECTION
SCALE-1:20

REINFORCED BLOCKWORK WALL NOTES

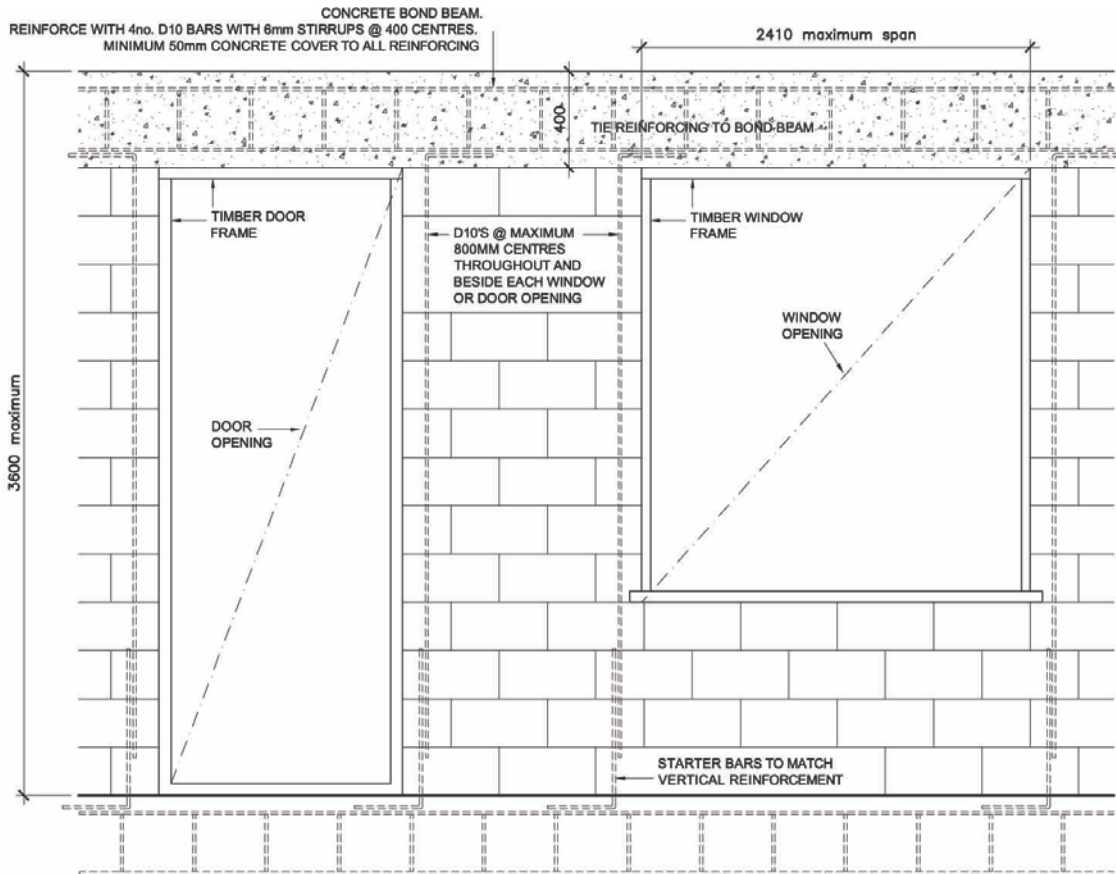
1. THESE DETAILS SHALL ONLY BE USED FOR SINGLE STOREY BUILDINGS
2. ALL REINFORCING SHALL HAVE 50mm CONCRETE COVER.
3. BACKFILL BLOCKWORK COMPLETELY WITH GROUT.
4. ALL STEEL REINFORCING TO BE MINIMUM GRADE 300MPa

CONCRETE BLOCKS 390x190x190 CONCRETE BLOCKS LAID IN STRETCHER BOND. 10mm FLUSH JOINTED MORTAR TO SPECIFICATION. RUN STRING LINE FOR ALL BLOCKWORK COURSES.

BACKFILL HOLLOW BLOCKS WITH GROUT TO SPECIFICATION.

MORTAR MIX 1 : 3
CEMENT:SAND

GROUT MIX 1 : 1 : 2 : 4
WATER:CEMENT:SAND:10mm AGGREGATE



TYPICAL BLOCKWORK WALL
ELEVATION SHOWING REINFORCING

SCALE-1:25

NATIONAL BUILDING CODE OF KIRIBATI
STANDARD STRUCTURAL DETAIL
B4.4
REINFORCED BLOCKWORK WALL
ELEVATION
SCALE-1:25

REINFORCED BLOCKWORK WALL NOTES

1. THESE DETAILS SHALL ONLY BE USED FOR SINGLE STOREY BUILDINGS
2. ALL REINFORCING SHALL HAVE 50mm CONCRETE COVER.
3. BACKFILL BLOCKWORK COMPLETELY WITH GROUT.
4. ALL STEEL REINFORCING TO BE MINIMUM GRADE 300MPa

CONCRETE BLOCKS 390x190x190 CONCRETE BLOCKS LAID IN STRETCHER BOND. 10mm FLUSH JOINTED MORTAR TO SPECIFICATION. RUN STRING LINE FOR ALL BLOCKWORK COURSES.

BACKFILL HOLLOW BLOCKS WITH GROUT TO SPECIFICATION.

MORTAR MIX 1 : 3
CEMENT:SAND

GROUT MIX 1 : 1 : 2 : 4
WATER:CEMENT:SAND:10mm AGGREGATE

TABLE B1 .6 MIX RATIOS FOR CEMENT AND GROUT				
COMPRESSIVE STRENGTH ^{N2}	MIX RATIOS BY VOLUME			
	WATER ^{N1}	CEMENT	SAND	COARSE AGGREGATE
10 MPa Concrete	0.9	1.0	3.2	3.0 of 20mm agg.
17.5 MPa Concrete	0.8	1.0	2.7	3.0 of 20mm agg.
20 MPa Concrete ^{N3}	0.7	1.0	2.3	2.7 of 20mm agg.
17.5 MPa Grout	1.0	1.0	2.0	4.0 of 10mm agg.

NB:

- N1. The quantity of water is the maximum allowable and must be reduced with increase in moisture content of sand or aggregate.
- N2. The compressive strength values in the table are INDICATIVE ONLY and depend on the quality of the materials used. All concrete requiring a specified strength, must be tested.
- N3. Class 1A, 2A and 3A buildings should always use the mix appropriate for 20 MPa concrete shown above.

**KIRIBATI
NATIONAL
BUILDING
CODE
2006**

DWELLINGS AND OUTBUILDINGS (CLASS 1 and 1A)

SECTION DC

FIRE RESISTANCE

Performance Requirements

Deemed-to-Satisfy Provisions

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DC1.1.2 Exception

DC1 .2 Common walls

Part

DC1 .3 Separating floors

DC1 .4 Sarking-type materials

Specification

Specification DCS1 - Fire-Resistance of Building Elements

Specification DCS2 - Early Fire Hazard Test for Assemblies

OBJECTIVES

A Class 1 and Class 1A building must be so designed and constructed that the following objectives are fulfilled:

- (a) it is protected from fire in any other building; and
- (b) materials used in the construction be such that if there is a fire in the building
 - (i) the spread of fire and the generation of smoke and toxic gases will be minimised;
 - (ii) stability will be maintained for a period at least sufficient for the occupants to escape and to ensure the safety of fire and
 - (iii) there will be little risk of collapse onto adjoining property.

PERFORMANCE REQUIREMENTS**DCP1 Fire Resistance and Stability****DCP1.1 External walls of Class 1 or 1A buildings**

External walls of class 1 buildings, located within 1 m of the allotment boundary or 2m from other buildings on the same allotment must -

- (a) remain stable and not allow the passage of destructive heat, flames, smoke or gases through them for an hour, in the event of a fire: and
- (b) not allow the passage of flames, smoke or gases through windows for an hour and such windows must not be openable.

DEEMED-TO- SATISFY PROVISIONS**DC1 Fire Resistance and Stability****DC1.1 External walls of Class 1 or 1A buildings**

Except as permitted by Clause DC1 .1.2 or DC1 .2, an external wall of a Class 1 building, and any openings in that wall, must be -

- (a) set back not less than 1 m from an allotment boundary other than the boundary adjoining a road alignment or other public space; and
- (b) not less than 2 m from another building on the same allotment.

DC1.1.1 Allowable encroachments

The distance from an allotment boundary or between buildings must be the shortest distance measured from the outermost point of the building or buildings concerned, except that-

- (a) fascia, gutters, down pipes, non-combustible eaves lining, and the like;
- (b) masonry chimney backs, flues, pipes, cooling appliances or other services;
- (c) light fittings, electricity or gas meters, aerials or antennae;
- (d) pergolas or sun blinds; and
- (e) unroofed terraces, landings, steps or ramps, not more than 1 m in height,

may encroach into that distance if the distance to the boundary or between the buildings is not reduced to less than 500 mm or the distance between the buildings is not reduced to less than 1 m.

DC1.1.2 Exceptions

Clause DC1 .1 does not apply to-

- (a) an external wall that previously complied with this Part and is reclad, if the recladding does not reduce the distance to the boundary or building by more than 150 mm; or
- (b) an open garage.

PERFORMANCE REQUIREMENTS

DCP1 Fire Resistance and Stability Contd.

DCP1.2 Common Walls

A common wall must if it separates a class 1 building from any other class, remain stable and prevent the passage of destructive heat, flames, smoke or gases for an hour, in the event of a fire.

DCP1.3 Separating floors

The underside of a floor separating 2 sole-occupancy units each being a separate domicile must not be combustible.

DCP1.4 Sarking-type materials

Any sarking-type material used in a class 1 building must have a flammability index of less than 5.

DEEMED-TO- SATISFY PROVISIONS

DC1 Fire Resistance and Stability Contd.

DC1.2 Common walls

A common wall must-

- (a) be of masonry or concrete, or be fully lined with fire- protective covering and extend to the underside of a non-combustible roof or not less than 450 mm above a roof with a combustible lining;
- (b) have a FRL (Determined in accordance with Specification DCS1) of not less than 60/60/60 if it separates Class 1 buildings on different allotments.

DC1.3 Separating floors

The underside of a floor separating sole-occupancy units, each being a separate domicile and located one above the other, must be lined with material with a FRL (Determined in accordance with Specification DCS1) of not less than 30/30/30.

DC1.4 Sarking-type materials

Any sarking-type material used in a Class 1 building must have a Flammability Index of not less than 5.

**SPECIFICATION – DCS1: FIRE
RESISTANCE OF BUILDING ELEMENTS**

1. Scope

This Specification sets out the procedure for determining the FRL of structural members and other building elements.

2. Rating

A building element has a FRL if -

- (a) it is listed in, and complies with Table 1 of this Specification;
- (b) it is identical with a prototype that has been submitted to the Standard Fire Test and the FRL achieved by the prototype is confirmed in a report from a Registered Testing Authority which -
 - (i) describes the method and condition of test and the form of construction of the tested prototype in full; and
 - (ii) certifies that the application of restraint to the prototype complied with the Standard Fire Test
- (c) it differs in only a minor degree from a prototype tested under (b) and the FRL attributed to the structural member is confirmed in a report from a Registered Testing Authority which -
 - (i) certifies that the structural member is capable of achieving the FRL despite the minor departures from the tested prototype; and
 - (ii) describes the materials, construction and conditions of restraint which are necessary to achieve the FRL;
- (d) it is designed to achieve the FRL in accordance with
 - (i) AS 4100, AS 2327 and AISC Guidelines for Assessment of Fire Resistance of Structural Steel Members if it is a steel or composite structure; or
 - (ii) AS 3600 if it is a concrete structure; or
 - (iii) AS 1720.4 if it is a solid or glued-laminated timber structure.
- (e) the FRL is determined by calculation based on the performance of a prototype in the Standard Fire Test and confirmed in a report in accordance with clause 3.

3. FRLs determined by calculation

If the FRL of a building element is determined by calculation based on a tested prototype –

- (a) the building element may vary from the prototype relation to
 - (i) length and height if it is a wall;
 - (ii) height if it is a column;
 - (iii) span if it is a floor, roof or beam;

- (iv) conditions of support; and
 - (v) to a minor degree, cross-section and components.
- (b) the report must demonstrate by calculation that the a building element would achieve the FRL if it is subjected to the regime of the Standard Fire Test in relation to-
 - (i) structural adequacy (including deflection);
 - (ii) integrity and
 - (iii) insulation; and
 - (c) the calculations must take into account -
 - (i) the temperature reached by the components of the prototype and their effects on strength and modulus of elasticity;
 - (ii) appropriate features of the building element such as support, restraint, cross-sectional profile, length, height, span, slenderness ratio, reinforcement, ratio of surface area to mass per unit length, and fire protection;
 - (iii) features of the prototype that influenced its performance in the Standard Fire Test although these features may not have been taken into account in the design for dead and live load;
 - (iv) features of the conditions of test, the manner of support and the position of the prototype during the test, that might not be reproduced in the building element if it is exposed to fire; and
 - (v) the design load of the building element in comparison with the tested prototype.

4. Interchangeable materials

- (a) Concrete and plaster - The FRL achieved with any material of Group A, B, C, D or E as an ingredient in concrete or plaster, applies equally when any other material of the same group is used in the same proportions:

Group A: Any portland cement materials or equipment; and

Group B: Any lime

Group C: Any dense sand.

Group D: Any dense calcareous aggregate, including any limestone or any calcareous gravel.

Group E: Any dense siliceous aggregate, including any basalt diorite, dolerite, granite, granodiorite or trachyte.

(b) Perlite and vermiculite - The FRL achieved with either gypsum perlite plaster or gypsum-vermiculite plaster applies equally for both plasters.

5. Columns covered with lightweight construction

(a) Protection against injury - If the fire-resisting covering of a steel column is lightweight construction -

(i) the covering must be protected by metal or other suitable material if the column is liable to damage from the movement of vehicles, materials or equipment; and

(ii) the voids must be filled solid with non-combustible material to a height of not less than 1.2m above the floor level to prevent indenting, if the covering is not in continuous contact with column; and

(b) Sealing at floor level - A plug of non-combustible material must seal all voids at each floor level, including voids between the column and its covering if-

(i) steel column extends through 2 or more storeys; and

(ii) the fire-resisting covering is not in continuous contact with the column.

TABLE 1 FRLS DEEMED TO BE ACHIEVED BY CERTAIN BUILDING ELEMENTS		
BUILDING ELEMENT	THICKNESS OF PRINCIPAL MATERIAL (MM)	ANNEXURE REFERENCE Clause No.
	60/60/60	
WALL		
Masonry -		
Concrete with material density in kg/m ³ of -		
- 1600 or more	80	1,2,3,4,5
- less than 1600	70	1,2,3,4,5
Gypsum-perlite or Gypsum-vermiculite plaster on metal lath and channel	50	1,7,9
HOT-ROLLED STEEL COLUMN		
(Including a fabricated column) exposed on no up to 4 sides:		
Fire protection of-		
Concrete - cast in-situ		
<i>load-bearing</i>	25	9,10
<i>non-bearing -</i>		
- unplastered	25	9,10
- plastered 13mm	25	1,7,9
Gypsum-perlite or Gypsum vermiculite plaster-		
-sprayed to contour	25	1,9
- sprayed on metal lath	20	1,7,9
Solid concrete masonry	50	1,2,3,8,9
HOT- ROLLED STEEL BEAM		
(Including an open-web joist, girder, truss, etc) exposed on up to all 4 sides:		
Fire protection of-		
Concrete - cast in -situ	25	9
Gypsum-perlite or Gypsum vermiculite plaster		
- sprayed to contour	25	1,9
- sprayed on metal lath	20	1,7,9

ANNEXURE TO TABLE 1**1. MORTAR, PLASTER AND PLASTER REINFORCEMENT****1.1 Mortar for Masonry**

Masonry units of concrete must be laid in cement mortar or composition mortar complying with the relevant provisions of AS 3700.

1.2 Gypsum-perlite and Gypsum-vermiculite Plaster

Gypsum-perlite or gypsum-vermiculite plaster must be applied -

- (a) in either one or 2 coats each in the proportions of 1m³ of perlite or vermiculite to 640 kg of gypsum if the required thickness of the plaster is not more than 25 mm; and
- (b) in 2 coats if the required thickness is more than 25 mm, the first in the proportion of 1m³ of perlite or vermiculite to 800 kg of gypsum and the second in the proportion of 1m³ perlite or vermiculite to 530 kg of gypsum.

1.3 Plaster of Cement and Sand or Cement, Lime and Sand

Plaster prescribed in Table 1 must consist of -

- (a) cement and sand or cement, lime and sand; and
- (b) may be finished with gypsum, gypsum-sand, gypsum-perlite or gypsum-vermiculite plaster or with lime putty.

1.4 Plaster Reinforcement

If plaster used as fire-protection on walls is more than 19 mm thick

- (a) it must be reinforced with expanded metal lathe that
 - (i) has a mass per unit area of not less than 1.84 kg/m
 - (ii) has not fewer than 98 meshes/m; and
 - (iii) is protected against corrosion by galvanising or other suitable method; or
- (b) 13mm x 13mm x 0.710 mm galvanised steel wire mesh; and

- (c) the reinforcement must be securely fixed at a distance from the face of the wall of not less than 1/3 of the total thickness of the plaster.

2. DIMENSIONS OF MASONRY

The thickness of concrete masonry is calculated as follows:

2.1 Solid Units

For masonry in which the amount of perforation or coring of the units does not exceed 25% by volume (based on the overall rectangular shape of the unit) the thickness of the wall must be calculated from the manufacturing dimensions of the units and the specified thickness of the joints between them as appropriate.

2.2 Hollow Units

For masonry in which the amount of perforation or coring of the units exceeds 25% by volume (based on the overall rectangular shape of the unit) the thickness of the wall must be calculated from the equipment thicknesses of the units and the specified thickness of the joints between them as appropriate.

2.3 Equivalent thickness

The equivalent thickness of a masonry unit is calculated by dividing the net volume by the area of one vertical face.

2.4 Cavity Walls

The thickness of a cavity wall is the sum of the thicknesses of the leaves determined in accordance with 2.1 and/or 2.2 as appropriate.

2.5 Cavity Walls of Different Materials

If the 2 leaves of a cavity wall are of units of different type, the thickness required is that listed for the less fire-resistant material (i.e. the greater thickness).

3. SLENDERNESS RATIO OF MASONRY**3.1 Maximum Value**

The slenderness ratio of a masonry wall must not exceed the appropriate value in Table 3.1.

3.2 Calculation

The slenderness ratio of a masonry wall is calculated in accordance with AS 3700. In the case of cavity walls it is calculated for each leaf separately. Each leaf must satisfy 3.1.

TABLE 3.1 MAXIMUM SLENDERNESS RATIOS FOR MASONRY WALLS	
TYPE OF UNIT	FRL
	60/60/60
Concrete in which the basalt content of the aggregate is less than 45% 45% or more	15
	20
Reinforced masonry - all types of unit designed for- axial forces and flexure- flexure-with super-imposed axial forces less than 5% of load capacity-	20
	30

4. PROTECTION TO MASONRY REINFORCEMENT

In a building element of reinforced masonry designed for fire-resistance, the distance from the surface of the element to the surface of the reinforcement must not be less than 30 mm for FRL 60/60/60.

5. INCREASE IN THICKNESS BY PLASTERING

5.1 General

The tabulated thicknesses are those of the principal material. They do not include the thickness of plaster which must be additional to the listed thickness of the material to which it is applied.

5.2 Walls

If a wall of concrete masonry is plastered on both sides to an equal thickness of the wall for the purposes of Table 1 (but not for the purposes of Table 3.1) may be increased by the following proportions of the thickness of the plaster on one side:

- For concrete masonry in which the aggregate is of a density in excess of 1800 kg/m³ : 100%
- For concrete masonry in which the aggregate is of a density between 1600 and 1800 kg/m³ : 85%
- For concrete masonry in which the aggregate is of a density less than 1600 kg/m³ : 75%

6. CONCRETE SLABS, BEAMS, WALLS AND COLUMNS

The requirements to meet specific values of FRL are those contained in AS 3600. However for simple structures the following procedures may be adopted.

6.1 Structural Adequacy Criterion

Table 6.1A gives the minimum dimensions for meeting specific levels of structural adequacy for

- | | |
|---|--|
| (a) Solid or hollow core plain slabs- | The clear cover to the longitudinal reinforcement or tendons. A slab is continuous if it is flexurally continuous along at least one edge under the imposed loads. |
| (b) Ribbed slabs with – ribs spaced at not more than 1200mm centre to centre | The minimum width of the rib and the clear cover to the reinforcement or tendons of the ribs. The slabs spanning the ribs may be treated as plain slabs as at (a). |
| (c) Beams The upper surface of the beams must be integral with a slab or protected by one - | The minimum width of web (rectangular or uniformly tapering cross-section) and the clear cover to the reinforcement or tendons. |

(d) Solid or hollow-core vertical walls-

The clear cover to the reinforcement or tendons. The effective thickness of the wall must be at least equal to that given in Table 6.3 for the RFL for the insulation criterion equal in period to the required structural adequacy criterion. In addition the slenderness ratio must not exceed the values given in Table 6.1B

(e) Columns which are -exposed on all sides to fire, built into or form part of a wall that does not have a fire separating function built in or form part of a wall that has a lower value of structural adequacy than required for the column; or protrude by a distance in excess of the value of the clear cover to longitudinal reinforcement.

The minimum cross-sectional dimension and the clear cover to the reinforcement

6.2 Integrity Criterion

This criterion is relevant only for slabs and walls and not for ribs, beams and columns. It is satisfied if the criteria structural adequacy and insulation are met for the period equal to that required for the integrity of the slab as appropriate.

6.3 Insulation Criterion

This criterion is also relevant only for slabs and walls. It is met by meeting the requirement for minimum effective thickness as given in Table 6.3. The effective thickness of solid slabs and walls is the actual thickness. The effective thickness of hollow core slabs and walls is the value of net cross-sectional area divided by the width of the cross section. With hollow core slabs and walls the thickness of the concrete between voids and between any part of a void and the nearest surface must be not less than 25mm or 20% of the effective thickness of the slab.

TABLE 6.1A		
FRL - REQUIREMENTS FOR STRUCTURAL ADEQUACY CRITERION		
BUILDING ELEMENT	FRL (Minutes)	
	30	60
Plain Slabs		
- simply supported one-way, clear cover (mm) to		
. Reinforcement	15	20
. Tendons	20	25
- simply supported one-way, clear cover (mm) to		
. Reinforcement	10	15
. Tendons	15	20

Plain slabs continuous one-way and two-way, clear cover (mm) to - Reinforcement - Tendons	 10 15	 10 15
Ribs of plain slabs min, width x clear cover (mm) (mm) - reinforcement - tendons - continuous one way and two-way ribbed slabs min, width x clear cover (mm) (mm) - reinforcement - tendons	 80x15 80x25 70x15 70x25	 110x25 110x35 75x20 75x30
Beams min, width of web (mm) x clear cover (mm) reinforcement or tendon simply supported - - reinforcement - tendons Continuous - - reinforcement - tendons	 75x20 75x25 75x20 75x25	 120x30 150x25 240x20 120x35 150x30 240x25 120x20 120x25
Vertical Walls clear cover in mm for - to reinforcement - to tendons Note:- Vertical walls must also satisfy requirements of Tables 6. 1B	 20 30	 20 30
Columns min. cross-sectional dimension x clear cover (mm) (mm) . to reinforcement	 150X10 240X15	 200X20 300x25

TABLE 6.1B

MAXIMUM ALLOWABLE SLENDERNESS RATIO FOR CONCRETE WALLS

Ratio of design axial force to the product of gross cross-sectional area and the characteristic compressive cylinder strength at 28 days	Corresponding maximum value of slenderness ratio (effective height/thickness)
0.0	35
0.005	20
0.03	15
0.10	10

Notes:

1. values in between can be interpolated.
2. design axial force = 1.1 dead load + 0.6 live load including impact
3. the characteristic compressive strength in MPa is generally expressed as the grade of the concrete.

TABLE 6.3

MINIMUM EFFECTIVE THICKNESS FOR INSULATION

FRL for <i>insulation</i> criterion minutes	Effective thickness (mm)
60	30
80	60

7. GYPSUM-PERLITE OR GYPSUM-VERMICULITE PLASTER ON METAL LATH

7.1 Walls

In walls fabricated of gypsum-perlite or gypsum-vermiculite plaster on metal lath and channel -

- (a) the lath must be securely wired to each side of 19 mm x 0.44 kg/m steel channels (used as studs) spaced at not more than 400 mm centres; and
- (b) the gypsum-perlite or gypsum-vermiculite plaster must be applied symmetrically to each exposed side of the lath.

7.2 Columns

For the fire protection of steel columns with gypsum-perlite or gypsum-vermiculite on metal lath -

- (a) the thickness of the plaster must be measured from the back of the lath;
- (b) the lath must be fixed at not more than 600 mm centres vertically to steel furring channels, and -
 - (i) if the plaster is to be 35mm thick or more - at least 12 mm clear of the column; or
 - (ii) if the plaster is to be less than 35mm thick, at least 6mm clear the column; or
- (c) the plaster may be applied to self furring lath with furring dimples to hold it not less than 10mm clear of the column.

7.3 Beams

For the fire protection of steel beams with gypsum-perlite or gypsum on metal lath -

- (a) the lath must be fixed at not more than 600 mm centres to steel furring channels and at least 20 mm clear of the steel;
- (b) the thickness of the plaster must be measured from the back of the lath

8. EXPOSURE OF COLUMNS AND BEAMS

8.1 Columns

A column incorporated in or in contact on one or more sides with a wall of solid masonry or concrete at least 100 mm thick may be considered to be exposed to fire on no more than 3 sides.

8.2 Beams

A beam, open-web joist, girder or truss in direct and continuous contact with a concrete slab or a hollow block floor or roof may be considered to be exposed to fire on no more than 3 sides.

9. REINFORCEMENT FOR COLUMN AND BEAM PROTECTION

9.1 Masonry

Concrete masonry for the protection of steel columns must have steel-wire or mesh reinforcement in every second course and lapped at the corners.

9.2 Structural Concrete

If a steel column or a steel beam is to be protected with structural concrete -

- (a) the concrete must be reinforced with steel-wire mesh or steel-wire binding placed about 20 mm from its outer surface; and
- (b) for concrete less than 50 mm thick, the steel wire must be -
 - (i) at least 3.15 mm in diameter; and

- (ii) spaced at not more than 100 mm vertically; or
- (c) for concrete not less than 50mm thick, the steel wire must be either -
 - (i) of a diameter and spacing in accordance with (b); or
 - (ii) at least 5mm in a diameter and spaced at not more than 150mm vertically

9.3 Gypsum-perlite or Gypsum-vermiculite Plaster Sprayed to contour

(a) If a steel column or steel beam is protected with either gypsum-perlite or gypsum-vermiculite plaster sprayed to contour and the construction falls within the limits of Table 9.3, the plaster must be reinforced with -

- (i) expanded metal lath complying with 1.4; or (b)
- (ii) galvanised steel mesh complying with 1.4.

(b) The reinforcement must be placed at a distance from the face of the plaster of at least 1/3 of the thickness of the plaster and must be securely fixed to the column or beam at intervals of not more than the relevant listing in Table 9.3.

(c) For the purposes of Table 9.3 -

- (i) "vertical" includes a surface at not more than 10° to the vertical;
- (ii) "horizontal" includes a surface at not more than 10° to the horizontal; and
- (iii) "underside" means the underside of any horizontal or non-vertical surface.

10.1 Measurement of Thickness

The thickness of the fire-protection to steel columns and steel beams (other than fire protection of gypsum-perlite gypsum-vermiculite plaster sprayed on metal lath or sprayed to contour) is to be measured from the face or edge of the steel, from the face of a splice plate or from the outer part of rivet or bolt, whichever is the closest to the outside of U fire-protective construction, except that-

- (a) if the thickness of the fire-protection is 40 mm or more, rivet heads may be disregarded;
- (b) if the thickness of the fire-protection is 50 mm or more -
 - (i) any part of a bolt (other than a high-tensile bolt) may be disregarded; and
 - (ii) a column splice plate within 900 mm of the floor may encroach upon the fire protection by up to a 1/4 of the thickness of the fire protection; and

(c) the flange of a column or beam may encroach by up to 12 mm upon the thickness of the fire protection at right angles to the web if

(i) the flange projects 65 mm or more from the web; and

(ii) the thickness of the edge of the flange (inclusive of any splice plate) is not more than 40 mm

TABLE 9.3 REINFORCEMENT OF GYPSUM-PERLITE OR GYPSUM-VERMICULITE PLASTER SPRAYED TO CONTOUR		
SURFACE TO BE PROTECTED	REINFORCEMENT REQUIRED IF SMALLER DIMENSION OF SURFACE EXCEEDS (mm)	MAX SPACING OF FIXINGS OF THE MESH TO SURFACE (mm)
Members with H or I cross section:		
Vertical-	300	450
Non-vertical	300	300
Underside-	300	300
Upperside of a horizontal surface-	Not required	
Members with other shapes:		
Vertical	Any size	450
Non vertical	Any size	300
Upperside of a horizontal surface	Not required	

SPECIFICATION - DCS2: EARLY FIRE HAZARD TEST FOR ASSEMBLIES**1. Scope**

This Specification sets out the procedures for determining the Early Fire Hazard Indices of components and assemblies. These tests classify building materials, their surface finishes and furnishings according to:

- (a) their tendencies to ignite;
- (b) their tendencies to spread flame;
- (c) the heat they develop once ignition has occurred;
- (d) their tendencies to produce smoke.

2. Form of test

Tests must be carried out in accordance with AS 1530.3 and AS 1530.4.

3. Test specimens

Test specimens must incorporate -

- (a) all types of joints; and
- (b) all types of perforations, recesses or the like for pipes, light switches or other fittings, which are proposed to be used for the member or assembly of members in the building.

4. Concession

Clause 3 does not apply to joints, perforations, recesses or the like that are larger than those in the proposed application and have already been tested in the particular form of construction concerned and found to comply with the conditions of test.

5. Smaller specimen permitted

A testing laboratory may carry out the test at pilot scale if a specimen (which must be not less than 900 mm) will adequately represent the proposed construction in the building, but the results of that test do not apply to construction larger than limits defined by the laboratory conducting the pilot examination.

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DWELLINGS AND OUTBUILDINGS (CLASS 1 and 1A)

SECTION DD

ACCESS AND EGRESS

**Performance Requirements
Deemed-to-Satisfy Provisions**

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DD1.1 Treads and Risers

DD1.2 Curved Stairs

DD 2 Balustrades

DD2.2 Parapets on flat roofs

DD 2.1 Balustrades

Part

DD 3 Exits

DD 3.1 Number of Exits

DD3.2 Ramps in exits

DD 3.3 Dimensions of Exits

OBJECTIVES

The building must have safe and adequate exits, including stairways, ramps and doors.

PERFORMANCE REQUIREMENTS

DDP 1 Stairs, Ramps and Passageways

a) Stairways, ramps, and passageways must be such as to provide safe passage for users of the building.

b) Stairways must provide safe and reasonably comfortable dimensions for goings and risers. In any case the pitch of the stairway must be maintained within limits of 23 degrees and 42 degrees

c) If any ramp is used the slope must not exceed 1:8.

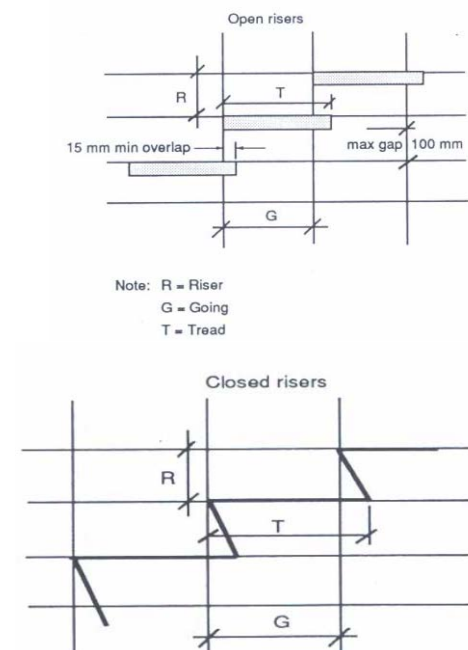
DEEMED-TO- SATISFY PROVISIONS

DDP 1 Stairs, Ramps and Passageways

DD1.1 Threads and Risers

- (a) A stairway must be suitable to provide safe passage in relation to the nature, volume and frequency of likely usage.
- (b) A stairway in any building satisfies (a) if it has:
 - I. Not more than 18 risers in each flight;
 - II. Going and riser dimensions in accordance with figure DD1.1 and table DD1.1 that are constant throughout each flight;
 - III. Risers which do not have openings that would allow a 100mm sphere to pass through between the treads; and
 - IV. The treads must not exceed the going by more than 20mm.

Figure DD1.1 Measurement of Riser Going and Tread.



PERFORMANCE REQUIREMENTS

DDP 1 Stairs, Ramps and Passageways Contd.

a) Stairways, ramps, and passageways must be such as to provide safe passage for users of the building.

b) Stairways must provide safe and reasonably comfortable dimensions for goings and risers. In any case the pitch of the stairway must be maintained within limits of 23 degrees and 42 degrees

c) If any ramp is used the slope must not exceed 1:8.

DEEMED-TO- SATISFY PROVISIONS

Table DD1.1 Riser dimensions (mm) to match Going

Pitch	GOING (MM)										
	230	240	250	260	270	280	290	300	310	320	330
42°											
41°	200										
40°	192	200									
39°	186	194	200								
38°	180	187	195	200							
37°	173	181	188	196	200						
36°	167	174	182	188	196	200					
35°	161	168	175	182	189	195	200				
34°	155	162	168	175	182	188	195	200			
33°	149	156	162	169	175	181	188	195	200		
32°		144	156	162	168	174	181	187	194	200	
31°			144	156	162	167	174	180	186	192	198
30°				150	156	161	167	173	179	185	190
29°					150	155	161	167	173	170	183
28°						150	155	160	165	170	175
27°							148	153	158	163	168
26°								146	151	156	161
25°										149	154
24°											147

Note: the actual riser dimension may be selected to suit the inter-landing height. However the value of the riser dimension must not be outside the maximum or minimum dimensions shown for each value going.

DD1.2 Curved stairs

Curved stairs must comply with relevant requirements of DD1.1.1 as well as the following:

- a) For the purpose of satisfying Table DD1.1 the going must be measured:
 - i. Along half way across the width of the stair where the clear width is less than 900 mm; and
 - ii. 300 mm from each side of the stair where the clear width is 900 mm or more.
- b) All steps must have the same uniform taper.
- c) The going at the narrow end of the steps must be not less than 75mm.

Windings are not permitted.

PERFORMANCE REQUIREMENTS

DDP2 Balustrades

Stairways, ramps, floors higher than 0.5m above the ground, balconies, and any roof to which people normally have access, must have bounding walls, balustrades or other barriers where necessary to protect users from the risk of falling.

DEEMED-TO- SATISFY PROVISIONS

DD 2.1 Balustrades

- a) A continuous balustrades must be provided along the side of any stairway or ramp, or any corridor, hallway, balcony, bridge, or the like, if -
 - I. It is not bounded by a wall; and
 - II. The change in the level is more than 1m.
- b) A balustrade must prevent, as far as practicable-
 - I. Children climbing over or through it;
 - II. Persons accidentally falling from the floor; and
 - III. Objects which might strike a person at a lower level accidentally falling from the surface.
- c) At balconies a balustrade satisfies (b) if
 - I. it has a height of not less than 930mm above the balcony floor;
 - II. the space between balusters or the width of any opening in the balustrade is not more than 100 mm except where the space between the rails or the height of the opening is not more than 100 mm;
 - III. all parts of the balustrade more than 150mm and less than 760 mm from the floor or nosings are vertical or otherwise do not provide a toe-hold; and
 - IV. it does not have any openings more than 100 mm wide within 150 mm of the floor
- d) In stairways and ramps (including access bridges and landings) a balustrade satisfies (b) if
 - I. it has a height of not less than 865 mm above the nosings of the stair treads and the floor of the landing, balcony, corridor, hallway, access bridge or the like;
 - II. the space between balusters or the width of any opening in the balustrade (including any openable window or panel) is not more than 100 mm except where the space between rails or the height of the opening is not more than 100 mm;
 - III. and all parts of the balustrade more than 150mm and less than 760 mm from the floor or nosings are vertical or otherwise do not provide a toe-hold.

PERFORMANCE REQUIREMENTS

DDP 2 Balustrades Contd.

Stairways, ramps, floors higher than 0.5m above the ground, balconies, and any roof to which people normally have access, must have bounding walls, balustrades or other barriers where necessary to protect users from the risk of falling.

DDP 3 Exits

A class 1 or 1A building must have provision for fast exit during any emergency.

DEEMED-TO- SATISFY PROVISIONS

DD 2.2 Parapets on flat roofs

Where a flat roof or other elevated place has regular access a parapet or balustrade of not less than 1 m height above the surface of the roof or elevated place must be provided. The width of any opening in the parapet or balustrade must not exceed 100 mm.

DD 3.1 Number of exits

Every Class 1 or 1A building must have two exits. At least one of these exits must provide an easy means of egress in case of any emergency without reducing security to the building. Such emergency exits may take the form of a trap door on an elevated floor or some such arrangement.

Windows and other such openings used as emergency exits must have a minimum clear dimension of 560 mm and a minimum clear area of opening of 0.6 m². The shutter must be capable of opening to 90 degree to the wall. The top of the window sill must be no more than 900 mm from the floor inside. The height of the windowsill from the ground or floor outside must not exceed 1800 mm.

DD 3.2 Ramp in exits

A ramp may be used in place of a stairway. The gradient of any such ramp must be no steeper than 1:8.

DD 3.3 Dimensions of exits

The clear minimum width of a stairway or ramp must be 760 mm. The unobstructed height throughout must be not less than 2 m.

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DWELLINGS AND OUTBUILDINGS (CLASS 1 and 1A)

SECTION DE

ELECTRICITY

**Performance Requirements
Deemed-to-Satisfy Provisions**

CONTENTS

PERFORMANCE REQUIREMENTS DEEMED-TO-SATISFY PROVISIONS

Part

DE1 Electrical Safety

DE1.1 General Requirement

DE1.2 Plug Sockets

Part

DE2 Amenity

OBJECTIVES

All electrical work associated with a Class 1 or 1A building must

- a) prevent electrocution, burns or fire;
- b) satisfy the reasonable expectations of the occupants by ensuring that it is adequate for their intended use, both current and anticipated.

PERFORMANCE REQUIREMENTS

DEP1 Electrical safety

The supply system must:

- (a) have suitable devices of adequate interruptive duty to automatically shut off the supply in the event of a fault or overload. Such devices must allow easy reinstatement of the supply after interruption.
- (b) have devices which are clearly identified and easily reached to isolate live parts from the incoming supply;
- (c) when the neutral of the supply is earthed, have socket outlet or plug – socket adapter construction which would ensure that the live, neutral and earth conductors of the plug;
- (d) be adequately protected against damage arising from the weather, water or excessive dampness mechanical loads and other such agents expected under normal conditions of use; and
- (e) ensure that the main switch is normally accessibly only to the occupants.

DEP2 Amenity

The supply system must have an adequate number of plug sockets of minimum 16 Amperes capacity to serve the reasonable anticipated needs of the occupants.

DEEMED-TO- SATISFY PROVISIONS

DE1 Electrical Safety

DE1.1 General Requirements

All electrical wiring and installation in or on any class 1 and 1A building must ensure safety from electric shock and fire. This requirement is satisfied if all electrical work associated with the buildings is done to comply with AS/NZS 3000 – electrical installations- buildings, structures and premises (known as the SAA Wiring Rules). The capacity of the system must allow for the long term anticipated requirements of the occupants.

All Electrical works are carried out by a suitably qualified person holding an Electricians License (issued by the Public Utilities Board).

DE1.2 Electrical Safety - Plug sockets

Plug sockets must:

- (a) have their individual switch
- (b) be located so that
 - (i) cords need not be taken across doorways;
 - (ii) trailing cords do not have cross circulation routes;
- (c) not be located behind door swings; and
- (d) in the kitchen be located 250mm above worktops at the back benches or on a return where it exits.

DE2 Amenity - Light Switches

The layout of light switches must follow the main night time circulation routes such as from the entrance hall to the living area to the bedrooms to the bathroom and toilet. Crossing any major space in the dark must be avoided. The switches must be located close to door openings.

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DWELLINGS AND OUTBUILDINGS (CLASS 1 and 1A)

SECTION DF

HEALTH AND AMENITY

**Performance Requirements
Deemed-to-Satisfy Provisions**

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- DF1.3 Drainage of land external to building
- DF1.4 Weather proofing of roofs and walls
- DF1.5 Pliable roof sarking
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Specification DFS1 Septic Tanks for Domestic Use

Specification DFS2 Rainwater Storage

OBJECTIVES

The design and construction of a Class 1 or 1A building must meet the following objectives.

- (a) Freedom from unhealthy and uncomfortable damp and wet conditions
- (b) Proper facilities for the preparation and cooking of food and the cleaning of utensils.
- (c) Adequate for personal washing and the washing of clothes;
- (d) Hygienic toilet facilities with adequate privacy and which will not be a nuisance to anyone;
- (e) Sufficient living space for privacy and comfort;
- (f) Adequate light and ventilation consistent with the requirements of healthy hygiene and comfort;

PERFORMANCE REQUIREMENTS

DFP 1 Damp and Waterproofing

Building must be so sited and suitable damp and waterproofing provided where necessary to prevent-

- (a) Moisture or damp affecting the stability of the building;
- (b) The creation of any unhealthy or dangerous condition;
- (c) Damage or defacement from moisture present at the completion of construction;
- (d) Causing undue damage to adjoining property; or
- (e) The accumulation of surface water against the building or beneath the floor.

Visible water must not be allowed to remain under or around for more than 1 hour after 17mm of rain.

DEEMED-TO- SATISFY PROVISIONS

DF1 DAMP AND WATERPROOFING

DF1.1 Floor levels and Site Drainage

Floor levels of all new buildings must be a minimum of 300mm above the natural ground level and, where possible, the ground around the building must slope away from the building at a minimum fall of 1 in 100 for two metres.

The construction of the site drainage system and the position and manner of discharge of a stormwater drain must not-

- a) result in the entry of water into any building or other allotments;
- b) affect the stability of any building; or
- c) create any unhealthy or dangerous condition within or around any building.

DF1.2 Building on land subject to dampness or flooding

One or more of the following measures must be carried out if it is warranted by the dampness of the building site or proneness to flooding:

- (a) The subsoil must be adequately drained.
- (b) The ground under the building must be regraded or filled and provided with outlets to prevent accumulation of water.
- (c) The surface of the ground under the building must be covered with a suitable damp-resisting material.
- (d) The top of the floor must be kept at not less than 300 mm above the known flood level at the site.

PERFORMANCE REQUIREMENTS

DFP 1 Damp and Waterproofing

Building must be so sited and suitable damp and waterproofing provided where necessary to prevent-

- (a) Moisture or damp affecting the stability of the building;
- (b) The creation of any unhealthy or dangerous condition;
- (c) Damage or defacement from moisture present at the completion of construction;
- (d) Causing undue damage to adjoining property; or
- (e) The accumulation of surface water against the building or beneath the floor.

Visible water must not be allowed to remain under or around for more than 1 hour after 17mm of rain.

DEEMED-TO- SATISFY PROVISIONS

DF1.3 Drainage of land external to building

A suitable system of drainage must be provided if paving, excavation or any other work on an allotment will cause undue interference with the existing drainage of rainwater falling on the allotment, whether the existing drainage is natural or otherwise.

DF1.4 Weatherproofing of roofs and walls

Roofs or external walls must be constructed to prevent rain or dampness penetrating to the inner parts of a building.

DF1.5 Pliable roof sarking

Pliable roof sarking type material used under roof or wall coverings must comply and be fixed in accordance with-

- (a) AS/NZS 4200; or
- (b) AS/NZS 4200

DF1.6 Water proofing of wet areas in buildings.

The following parts of a building must be impervious to water:

- (a) In any building – the floor surface or substrate in a shower enclosure, or within 1.5m measured horizontally from a point vertically below the shower fitting, if there is no enclosure.
- (b) The wall surface or substrate-
 - (i) Of a shower enclosure, or if the shower is not enclosed, within 1.5m and exposed to a shower fitting
 - (ii) Immediately adjacent or behind a bath, trough, basin, sink or similar fixture, to a height of 300mm above the fixture if it is within 75mm of the wall.
- (c) The junction between the floor and wall if the wall and the floor are required to be impervious to water.
- (d) The junction between the wall and the fixture if the wall is required to be impervious to water.

DF1.7 Damp proof and mortars

Moisture from the ground must be prevented from reaching-

- (a) the lowest floor timbers and the walls above the lowest floor Joists;
- (b) the walls above the damp-proof course; and
- (c) the underside of a suspended floor constructed of a material other than timber, and the supporting beams or girders.

PERFORMANCE REQUIREMENTS

DFP 1 Damp and Waterproofing

Building must be so sited and suitable damp and waterproofing provided where necessary to prevent-

- (a) Moisture or damp affecting the stability of the building;
- (b) The creation of any unhealthy or dangerous condition;
- (c) Damage or defacement from moisture present at the completion of construction;
- (d) Causing undue damage to adjoining property; or
- (e) The accumulation of surface water against the building or beneath the floor.

Visible water must not be allowed to remain under or around for more than 1 hour after 17mm of rain.

DFP2 Cooking and sanitary facilities

Adequate cooking, toilet and washing facilities must be provided for the occupants to allow reasonable comfort, hygiene and privacy.

DFP3 Room Sizes

The floor area plan dimensions and ceiling height of the rooms and other spaces must be adequate for living purposes.

DEEMED-TO- SATISFY PROVISIONS

DF1 .8 Acceptable damp-proof

A damp-proof course must consist of-

- (a) a material that compiles with AS/NZS 2904; or
- (b) suitable termite shields placed on piers; or
- (c) other suitable material.

DF1.9 Damp-proofing of floors on the ground

If a floor of a room is laid on the ground or on filling, moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by-

- (a) The insertion of a vapour barrier in accordance with AS 2870; or
- (b) Other suitable means.

DF2 Cooking and sanitary facilities

DF2.1 Facilities required

Cooking and sanitary facilities must be provided as shown in Table DF2.1

DF3 Room Sizes

DF3.1 Heights of rooms

Minimum height below the ceiling and any framing excluding minor projection such as cornices, are;

- (i) *habitable* room-average 2.4m and minimum of 2.1m; and
- (ii) bathroom, shower room, water closet, laundry, pantry, or the like – 2.4m.

DF3.2 Reduced height permissible

These heights may be reduced if the reduction does not unduly interfere with the proper functioning of the room.

DF3.3 Ceiling fans

Ceiling fans and other such appliances must be at a minimum vertical clearance of 2.1 m

PERFORMANCE REQUIREMENT

DFP4 Light and Ventilation

The standard of light and ventilation within a building must be adequate for the occupants, having regard to health hygiene and comfort.

DEEMED-TO- SATISFY PROVISIONS

DF4 Light and Ventilation

DF4.1 Provision of natural light

Natural lighting must be provided to all habitable rooms.

DF4.2 Methods and extent of natural lighting

Direct natural lighting must be provided by windows that-

(a) have an aggregate light transmitting area measured excluding framing members, glazing bars and other obstructions of not less than 10% of the floor area of the room;

(b) face-

(i) a court or other space open to the sky;
or

(ii) an open verandah, open carport, or the like;

(c) are not less than a horizontal distance of 1m from any boundary of an adjoining allotment that they face.

DF4.3 Natural light borrowed from adjoining room

Natural lighting to a room may come through a glazed panel or opening from adjoining room (including an enclosed verandah) if-

(a) the glazed panel or opening has an area of not less than 10% of the floor area of the room to which it provides light.

(b) the adjoining room has window with an aggregate light transmitting area of not less than 100% of the combined floor areas of a room,

and the areas are specified in (a) and (b) may be reduced as appropriate if direct natural light is provided from another source.

DF4.4 Artificial Lighting

Artificial lighting must be provided to sanitary compartments, bathrooms, shower rooms, airlocks and laundries, if natural lighting of a standard equivalent to that required by DF4.2 is not available and the periods of occupation, or use of the room or space will create undue hazard to occupants seeking egress in an emergency.

PERFORMANCE REQUIREMENTS**DFP4 Light and Ventilation Continued**

The standard of light and ventilation within a building must be adequate for the occupants, having regard to health hygiene and comfort.

DEEMED-TO- SATISFY PROVISIONS**DF4.5 Ventilation of rooms**

A habitable room, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person of any purpose must be provided with free natural air movement complying with DF4.6. Where it is not practical to provide natural ventilation for any sanitary compartment, bathroom, shower or laundry, it is permissible to substitute natural ventilation with a mechanical ventilation of equal effectiveness

DF4.6 Natural ventilation

Required natural ventilation must be provided by permanent windows, openings, doors or other devices.

(a) with an aggregate opening or openable size which must be not less than the following percentages of the floor area of the room required to be ventilated.

- (i) 30% for habitable rooms; and
- (ii) 25% for all other rooms; and

(b) which open to-

- (i) a court, or a space open to the sky; or
- (ii) an open verandah, open carport, or the like

DF4.7 Ventilation borrowed from adjoining room

Natural ventilation to a room may come through a window opening, ventilating door or other device from an adjoining room (including an enclosed verandah) if -

(i) the room to be ventilated or from which ventilation is borrowed is not a sanitary compartment.

(ii) ventilation is not borrowed from one bedroom- to another or between a bedroom and the kitchen;

(iii) the window opening, door or other device has a ventilating area of not less than the required percentages of the floor area of the room to be ventilated; and

(iv) the adjoining room has a window, opening, door or other device with a ventilating area of not less than the required percentages of the combined floor areas of both rooms.

NOTE: The ventilating areas specified may be reduced as appropriate if direct natural ventilation is provided from another source.

DF4.8 Restriction on position of WCs and Urinals

A room containing a closet pan or urinal must not open directly into-

(a) a kitchen; or

(b) a room for storage or consumption of food, except if it is in a building containing only one habitable room.

PERFORMANCE REQUIREMENTS

DFP4 Light and Ventilation Continued

The standard of light and ventilation within a building must be adequate for the occupants, having regard to health hygiene and comfort.

DEEMED-TO- SATISFY PROVISIONS

DF4.9 Airlocks

If a room containing a closet pan or urinal is prohibited under DF4.8 from opening directly to another room-

- (i) access must be by an airlock, hallway or other room; or
- (ii) the room containing the closet pan or urinal must be provided with an exhaust fan.

DF4.10 Sub-floor ventilation

- (a) Suitable provision must be made to prevent undue deterioration of the lowest floor of a building because of dampness, other conditions on the allotment or the design of the building.
- (b) The following would satisfy the requirements of (a)
 - (i) where the timber is used, the floor framing must be suspended with an absolute minimum of 250mm and an average minimum of 400mm clearance from the ground underneath, to the floor and the immediate surrounds of the building. The average clearance must be determined as the average of the clearance at the corners of a 3m square grid covering the building plan. Sub-floor ventilation must be provided with ventilation openings totalling not less than the ground and the boundary of the floor. These openings are to be spaced as evenly as participate.
 - (ii) where other than timber is used the following must be provided-
 - sub-floor ventilation if the floor is suspended;
 - an impervious cover over the ground surface beneath the building; or
 - the floor members suitably treated.

PERFORMANCE REQUIREMENTS

DFP5 Water Supply and Plumbing

Plumbing for water must use materials which do not react with the water and thereby make it unsuitable for domestic use.

Suitable precautions must be taken to ensure that unsafe or unhygienic materials have no chance of entering the supply system.

The installation of hot water systems must not impair the safety of the users.

All concealed and difficult-to-access plumbing work must be suitably protected so that there is no likelihood of damage and leakage.

The plumbing must take into account the current and anticipated needs of the users and allow for the simultaneous use of the connected system by others.

Where rainwater from the roof run off is the source of supply, care must be exercised to ensure that there is no reasonable chance for the water to become contaminated.

DEEMED-TO- SATISFY PROVISIONS

DF5 Water Supply and Plumbing

DF5.1 General Requirements

The plumbing work for water supply must ensure-

- (a) the appropriateness of the materials and products used
- (b) the correct sizing of water services for the intended use;
- (c) the control of cross -connections and prevention of backflow
- (d) adequate care in the installation of the services;
- (e) suitable provision of main and subsidiary storage as required;
- (f) adequate connections to sanitary services without endangering health and hygiene;
- (g) that the installation of hot water systems provides safe and adequate service; and
- (h) all plumbing works be carried out by a suitably qualified tradesman, holding a Plumbing License (issued by Public Utilities Board).

DF 5.2 Means of Compliance

The requirement of DF5.1 are satisfied if all plumbing for water supply is carried out to the relevant provisions of-

- (a) AS/NZS 3500- Part 1 for Water services; and
- (b) AS/NZS 3500- Part 4 for Heated water services.

DF5.3 Pipes which are not easy to access

Particular attention drawn to the provisions in AS/NZS 3500 – Part 1 and 4 which prohibit the installation of pipes and fittings of certain materials in locations which are concealed or difficult to access. These include pipes made of ABS, galvanized steel, polybutylene and UPVC. Pipes and iron, cast iron polyethylene when used in concealed or difficult to access locations must follow the special precautions specified in AS/NZS 3500 – Parts 1- 4. These Standards are reviewed on a regular basis and it is the responsibility of plumber to comply with the current version.

PERFORMANCE REQUIREMENTS**DFP5 Water Supply and Plumbing
Continued**

Plumbing for water must use materials which do not react with the water and thereby make it unsuitable for domestic use.

Suitable precautions must be taken to ensure that unsafe or unhygienic materials have no chance of entering the supply system.

The installation of hot water systems must not impair the safety of the users.

All concealed and difficult-to-access plumbing work must be suitably protected so that there is no likelihood of damage and leakage.

The plumbing must take into account the current and anticipated needs of the users and allow for the simultaneous use of the connected system by others.

Where rainwater from the roof run off is the source of supply, care must be exercised to ensure that there is no reasonable chance for the water to become contaminated.

DEEMED-TO- SATISFY PROVISIONS**DF5.4 Access to domestic-type water heaters**

- (a) A household water heater which is installed in a building must-
 - (i) be supported on the construction sufficient to carry its full capacity weight and any possible wind or other loads;
 - (ii) be positioned to enable adequate access for operation, maintenance and removal; and
 - (iii) provide suitably for any overflow, especially if installed in a concealed location.
- (b) AS/NZS 3500 – Part 4 is relevant standard for the installation of a household water heater.

DF5.5 External water supply taps

External water supply taps may be installed for household or community water supply schemes. These should be:

- (a) constructed of materials with adequate strength and durability;
- (b) surrounded by a fence to exclude any domestic or wild animals;
- (c) no more than 200m from the intended user(s);
- (d) provided with a ball valve (or similar) for isolating the tap;
- (e) provided with a concrete (or similar) plinth below the tap which drains the water away from the tap; and
- (f) at least 400mm above the concrete plinth.

DF5.6 Rainwater storage

Rainwater storage and roof drainage should be provided at all permanent buildings with an impermeable roof surface, whether residential or non-residential. Guttering should be provided to collect water from 100% of the roof catchment.

Where rainwater is collected and stored, the storage and distribution must reasonably ensure that the water is not contaminated by unsafe or unsuitable materials. The capacity of the catchments and storage must be adequate to provide a continued supply of water during months of low rainfall.

The details given in specification DFS3 meet the requirements of this clause.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage

DFP 6.1 General

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6 Sanitary plumbing and drainage

DF6.1 General

DF6.1.1 Requirements

Sanitary plumbing and drainage must ensure-

- (a) the appropriateness of the product and materials used;
- (b) the correct sizing of drainage services for the intended use;
- (c) adequate care in the installation of the services including the provision of the appropriate grades;
- (d) All on-site sanitation systems must endeavour to have primary treatment as a minimum and secondary where practical, refer to section DFS1;
- (e) All latrines and septic tanks must be watertight in service where in the vicinity of the potable or brackish groundwater lens; and
- (f) the foul gases are not allowed to produce unhygienic conditions or any nuisance to anyone.

DF 6.1.2 Some common terms

Apart from the defined terms given in A 1.1 the following terms used in this Section are explained;

- (a) Nominal size (DN)

While converting to metric dimensions some manufacturers of pipes and fittings have used hard conversion whereas others have used soft conversion. For these and other reasons it is impractical to specify exact pipe and fitting dimensions. All Pipes and fittings in this Section are therefore specified by their nominal size. This is indicated by the letters "DN" followed by a number.

Since this number is only an approximation of the actual size, it is not subject to exact measurement and must not be used in calculations. The nominal size is thus on a numerical designation of the size which are designated by their outside diameter and other components by their thread size). It is just a convenient round number for reference purposes and is only loosely related to the manufacturing.

- (b) Trap

A trap is a device which retains a water seal for preventing the escape of sewer gases from sanitary plumbing. Figure DF6.2 shows two common types of fixture traps. There are also traps integral with gullies, water closet carts etc.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage continued

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF 6.1.2 Some common terms Contd.

(b, contd.)

The water seal can be broken by self-siphonage or induced siphonage as well as by positive pressure of the gases breaking through the seal. It is also possible for the seal to be dried out by prolonged non-use of the associated part of the system.

The best means at preventing the loss at the seal by siphonage or by positive pressure is to vent the trap to the outside air.

c) Fixture discharge pipe

This is the discharge pipe to which any single sanitary fixture is connected.

Figure DF6.1.2 Examples of fixture traps

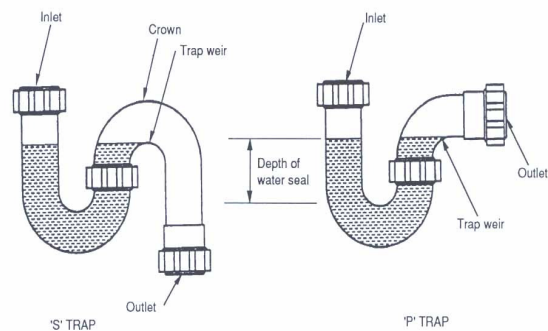


FIGURE DF6.1.2 EXAMPLES OF FIXTURE TRAPS

(d) Gullies

A gully is an assembly used for providing a water seal when handling the discharge from only waste fixtures and not any soil fixture. The water seal prevents the escape of foul gases into the building or into the atmosphere in the vicinity of the assembly.

It is a disconnected gully when it provides a separation through the water seal, between the discharge from waste fixtures and the rest of the sanitary system.

A floor waste gully is a disconnecter gully used inside a building with a floor grating or waste outlet fitting on a riser pipe. Discharge pipes from a waste fixture may also connect to a floor waste gully.

An overflow relief gully functions as a self-cleaning trap and is provided with a loosely fitted grating. This allows for the relief of any possible surcharge or overflow from the drain. The riser of the gully may have inlets for discharge from waste fixtures.

PERFORMANCE REQUIREMENTS**DFP6 Sanitary plumbing and drainage continued**

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS**DF6.2 Means of Compliance**

The requirements of DF6.1.1 are satisfied if all sanitary plumbing and drainage works are carried out to the relevant provisions of AS/NZS 3500 – Part 2- Sanitary plumbing and drainage, as well as this part of the code, including Specifications DFS1, DFS2 & DFS3 and in compliance with the National Sanitation Guidelines.

DF6.3 Fixture unit ratings

In the design of discharge pipes and drains the fixture unit ratings shown in the Table DF6.3 must be used. For the fixtures listed in the table the maximum unvented of the associated fixture discharge pipe must not exceed the distance given in Table 6.4. The length of the pipe is measured along the centre line from the weir of the trap the point of the connection to a graded discharge pipe, drain stack and other drainage trap.

DF6.4 Trapping Fixtures and appliances

DF6.4.1 The discharge from all sanitary fixtures and appliances must pass through traps before entering the drain, soil pipe or waste pipe. The fixture trap must retain a water seal of:

- (a) 50mm for traps of size DN50 or less
- (b) 75mm for traps of size greater than DN50

The traps must be located as close as possible to the fixture and not further than 600mm vertically from the fixture pairs and floor waste gullies.

DF6.4.2 The following fixtures may be connected in pairs to a single fixture trap

- (a) Wash basins
- (b) Sinks
- (c) Laundry
- (d) Showers

The fixture pairs must be connected so that the centre-to-centre distance between their outlets is more than 1.2m

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage continued

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.5 Fixture discharge pipes

DF6.5.1 Minimum grades

Discharge pipes must be laid to the minimum grades shown in Table DF6.5.1

Table DF6.5.1 Minimum grades of discharge pipes

Nominal size	Minimum grades
DN40	1 in 40
DN50	1 in 40
DN65	1 in 40
DN80	1 in 60
DN100	1 in 60

DF6.5.2 Connections

The connections of any fixture discharge pipe to a graded pipe of between two graded discharge pipes must be made as follows:

- (a) With a 45° or sweep junction fittings
- (b) Where the pipes are of different sizes
 - (i) the soffits of both must be in continuous alignment, and
 - (ii) where an unequal junction fitting is used, the soffit of the branch pipe must be at the same level or higher than the soffit of the pipe to which it connects; and
- (c) The level of the trap or floor waste gully weir must be 10 mm higher - than the soffit of the graded discharge pipe to which it connects;

DF6.6 Unvented branch drains

Where the risk of dangerous and unpleasant gases into occupied premises is minimal the venting of branch drains is not required. However, all of the limitations given in the following sub clause and illustrated in figure DF6.6 must be met in such cases. (For limitation of length of fixture discharge pipes, see DF6.4).

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage continued

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF 6.6.1 Limitations on Location or nature of connection

The connections of any unvented branch drain to a vented drain must be located at the ground floor level and the vented drain installed on grade below or above the ground and installed as specified by the manufacturer.

Meet the requirements of Table 6.4.

DF6.6.2 Limitations on size, length and bends

- (a) The size of any unvented branch drain must comply with limitations given in table DF6.6.2

Table DF 6.6.2 Size of unvented branch drains

Nominal size	Maximum sum of fixture unit loadings discharging into a branch drain
DN65	5 (but not from a water closet pan) or 10 from one floor waste gully
DN80	12 (no more than 1 water closet pan connected)
DN100	30 (no more than 2 water closet pan connected)

- (b) The length of unvented branch drain together with that of the fixture discharge pipe must not exceed-
- (i) 10m from the weir of the fixture trap.
- (c) maximum vertical drop from the crown of the trap to the top of the vented drain to which the unvented branch drain connects must not exceed-
- (i) 1.5m in the case of basins and bidets; and
 - (ii) 2.5m in the case of all other fixtures.
 - (iii) 2.0m for WC with 80mm waste
- (d) Where the fixture discharge pipe is the same size as the unvented branch drain to which it connects; the drain to the trap shall have a maximum of two vertical jump-ups, each not exceeding 2 m in height, and separated by not less than 300 mm of graded pipe.

Note: A bend of 45 degree or less is not considered to be a bend for the purposes of this clause.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.7 Venting

In order to prevent the escape of dangerous and unpleasant gases into occupied premises and to ensure that water seals in traps are not destroyed by siphonage, adequate venting must be provided for all fixture discharge pipes and drains except as allowed by DF6.6.

DF6.7.1 Trap vents (Stack Systems)

The minimum size of trap vent must be related to the nominal size of the fixture traps as follows:

Size of fixture trap	Size of trap vent
DN30 or DN40	DN30
DN50 or DN100	DN40

Every trap vent must be extended upward at least 50mm above the flood level rim of the fixture. This may be accomplished in one of the following ways:

- (a) As a vertical vent to the open air, the outlet of which is no closer than 600mm from any opening to the building;
- (b) On an ascending grade of at least 1:80 and then:
 - (i) as a vertical vent to the open air; or
 - (ii) to a connection with a vertical or branch vent.
- (c) Take the vent above the flood level rim of the fixture then loop it down either vertically or on a downward grade of 1:80 and connect to a vertical branch vent.

Trap vents must be located no closer than 75mm and no farther than 1500mm from the crown of the trap.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.7.2 Drain vents

(a) General

Vents in *drains* must be provided-

- (i) at the upstream end of any *drain*;
- (ii) at the upstream end of any branch *drain* to which a fixture trap or floor waste gully is connected and if the distance from the weir of the trap to the vented *drain* exceeds 10m;
- (iii) at the upstream of any DNN100 branch *drain* to which 3 or more water closet pans are connected; and
- (iv) at the upstream end of any DN80 branch *drain* to which no more than 2 water closet pans are connected.

(b) Location

The upstream vent of any *drain* must be connected-

- (i) at or close to the end of the *drain*; or
- (ii) at the vent extension of a stack located at or near the upstream end of the *drain*.

In either case it is permissible to have unvented length of *drain* upstream of the vent connecting the unvented length complies with DF6.6.

(c) Size of vents

The minimum size of an upstream vent of any *drain* is DN50. Subject to this, the vent must be sized by the ratings given in table D6.7.2.

Table D6.7.2 Size and rating of drain vents

Fixing units discharging into drain	Vent rating	Vent sizes
1 to 10 (incl)	0.5	DN40
10 (excl) to 30 (incl)	1	DN50
30 (excl) to 175 (incl)	2	DN65
175 (excl) to 400 (incl)	3	DN80

When two or more vents are directly connected to the *drain* these can take the place of a single vent provided the sum of their ratings is not less than the rating *required* for venting the *drain*.

PERFORMANCE REQUIREMENTS

**DFP6 Sanitary plumbing and drainage
Contd.**

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.7.3 Termination of vents (See Fig. 6.7.3 - 1)

- (a) Vent pipes from waste fixtures discharging into disconnector gullies and from gullies located within buildings must be vented independently and not be interconnected to any other system vent. Such vents must terminate in the open air;
 - (i) at a height of at least 50mm above the overflow level of the associated fixture;
 - (ii) at least 600 mm from any opening to the building which is within a horizontal distance of 3m from the vent; and
 - (iii) not less than 150mm above its point of penetration through any roof covering.
- (b) Vents other than in (a) must terminate in the open air:
 - (i) not less than 600mm above any opening into any building which is within a horizontal distance of 3m from the vent;
 - (ii) not less than 150mm above its point of penetration through any roof covering;
 - (iii) not less than 3m above any trafficable roof deck which is within a horizontal distance of 3m from the vent;
 - (iv) not less than 2m above or 600mm below any chimney or similar opening within a horizontal distance of 3m from the vent;
 - (v) not less than 5m from any air intake; and
 - (vi) not less than 600mm above any eave, coping or parapet which is within a horizontal distance of 600mm from the vent.

DF6.8 Design of pipes and drains**DF6.8.1 Sizing of discharge pipes**

Discharge pipes must not be less than the size of the fixture traps to which they are connected. The size must be determined from Table DF6.3 and take into consideration:

- (i) the sum of the *fixture unit* rating of all fixtures connected to the pipe;
- (ii) the proposed pipe gradient; and
- (iii) the maximum *fixture unit* loadings given in Table DF6.8.1.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.8.1 Sizing of discharge pipes, Contd.

Table DF6.8.1 Maximum fixture unit loadings for graded discharge pipes

Grade	Nominal pipe size (mm)				
	40	50	65	80	100
1 in 20	6	15	51	65	376
1 in 30	5	10	29	39	248
1 in 40	4	8	21	27	182
1 in 50	x	x	x	20	142
1 in 60	x	x	x	16	115

Note

- (i) x indicates that the combination of pipe size and gradient is not permitted.
- (ii) Not more than 2wc pans are to be connected to any 80mm pipe.

DF6.8.2 Sizing of drains

The size of a vented *drain* must be determined by taking into account the total number of *fixture units* (obtained from Table DF6.3) discharging into the drain.

(a) Normal grades

The minimum normal grade of *drains* must be as given in Table DF6.8.2A

DF6.8.2A Minimum gradient of Drains

Nominal size (mm)	Minimum grade
65	1 in 40
80	1 in 60
100	1 in 60
125	1 in 80
125	1 in 100

(b) Maximum *fixture unit* loadings for vented *drains*.

The *fixture unit* loadings for vented *drains* must not exceed the values given in Table DF6.8.2B for the size and grade of the *drain* shown.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

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DEEMED-TO- SATISFY PROVISIONS

DF6.8.2 Sizing of drains, Contd.

Table DF6.8.2B Maximum fixture unit loadings for vented drains

Grade	Nominal pipe size (mm)			
	80	100	125	150
1 in 20	215	515	1450	2920
1 in 30	140	345	1040	2200
1 in 40	100	255	815	1790
1 in 50	76	205	665	1510
1 in 60	61	185	560	1310
1 in 70	50	140	485	1180
1 in 80	42	120	425	1040
1 in 90	x	x	380	935
1 in 100	x	x	340	855
1 in 120	x	x	x	725
1 in 150	x	x	x	595

Note

x indicates that the combination of nominal size and gradient is not permitted.

(c) Reduced grades

Where the minimum grades given in Table DF6.8.2A are not achievable *drains* may be laid at the reduced grades given in Table 6.8.2C. In such a case the minimum *fixture unit* loadings given in the Table must be connected in advance of the top end of the reduced grade. Where even these reduced grades cannot be achieved provision must be made for regular and automatic flushing of the *drain*.

Table 6.8.2C Minimum fixture unit loadings for reduced grade drains

Reduced Grade	Nominal pipe size (mm)			
	80	100	125	150
	Minimum <i>Fixture unit</i> loading			
1 in 70	9	10	See Table DF6.8.2A	
1 in 80	10	18	"	"
1 in 90	x	x	27	"
1 in 100	x	x	38	"
1 in 120	x	x	x	75
1 in 150	x	x	x	160

Note

x means that the grade is not permitted unless special automatic flushing arrangements are made.

(d) a *drain* must not be oversized for the purpose of using a lower gradient than the minimum gradient given in Table DF6.8.2A. The size of a *drain* must not reduce in the direction of flow.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.8.3 cover over drains

- (a) *Drains* must be protected against mechanical damage and deformation resulting from the loads over them. Adequate cover must be provided to comply with Table 6.8.3 unless exempted under (b).

Table DF6.8.3 Minimum depth of cover over drains

Location	Minimum cover top of pipe socket to ground surface (mm)	
	Pipes of cast iron or ductile iron	Pipes or other material
Hosehold driveways	300	500
Other locations where no vehicular loadings are expected	nil	300

- (b) Where it is not practical to provide the minimum cover to Table DF6.8.3 *drains* must be covered by a sandy overlay of at least 50mm and provided with-

- (i) 100mm reinforced concrete for heavy vehicular loads
- (ii) 75mm thick concrete paving where light vehicular traffic may be expected; and
- (iii) 50mm thick concrete paving at other location where vehicular traffic is not expected.

The paving must be symmetric to the *drain* alignment and must have a minimum width equal to the depth of the base of the drain from the top of the paving plus 300mm.

DF6.8.4 Drains close to buildings

- (a) *Drains* under buildings

Where it cannot be reasonably avoided *drains* may be laid below ground under building in which case-

- (i) inspection openings must be provided to both ends of the *drain* adjacent to the building; and
- (ii) a minimum of 25 mm of sandy overlay provided over the pipe and below a reinforced concrete floor slab; or
- (iii) the *drain* must be protected from damage.

- (b) proximity of buildings

- (i) where the *drain* is to be laid parallel to a footing the excavation for it must clear a line at 30° from the extremity of the footing (see Figure 6.8.4). If the excavation is more than 1.5m deep or if the sides are not stable, special precautions such as benching, battering or timbering should be taken before any work is done in the excavation.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

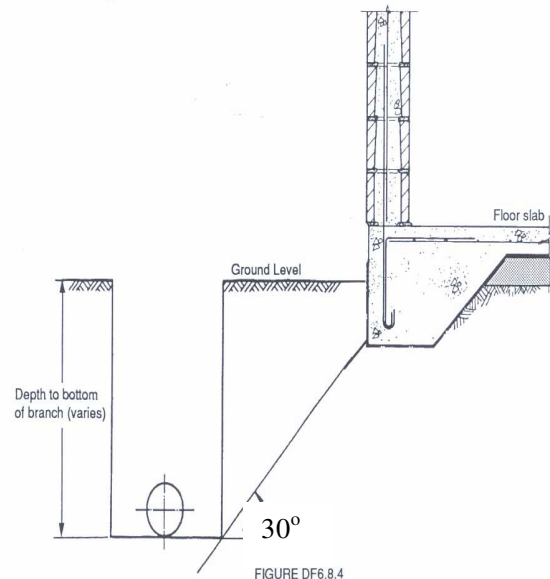
The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

Where connection to the public sewer system is not carried out, septic tanks of adequate capacity must be supplied. No other means of sewage treatment and disposal is permitted without formal approval and must be in compliance with the National Sanitation Guidelines. All systems not connected to the public sewer system shall meet the specifications detailed in the National Sanitation Guidelines.

DEEMED-TO- SATISFY PROVISIONS

DF6.8.4 Drains close to buildings Contd.

Figure 6.8.4



- (ii) where a *drain* crosses a strip footing, the angle of the crossing must be not less than 30° and the top of the *drain* must clear the bottom footing by not less than 50mm.
- (c) building over drains, where it is not practical to divert *drains* in order to avoid erecting buildings over them-
 - (i) the restrictions listed in (a) and (b) must be observed; and
 - (ii) other appropriate engineering precautions taken against damage.

DF6.9 Gully Traps other than floor waste gullies

Gully traps may be used;

- (a) as overflow relief gullies to provide in the event of sewer surcharge; or
- (b) to provide disconnection between waste discharges and the remainder of the sewerage installation (disconnecter gullies).

DF6.9.1 General

- (a) A disconnecter gully must be installed such that-
 - (i) it is supported on a minimum 100 mm thickness of concrete of 17 MPa grade; and

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

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DEEMED-TO- SATISFY PROVISIONS

DF6.9.1 General Contd.

- (ii) it is protected at a floor level by concrete surround of minimum width and depth of 75mm.
- (b) The following discharges must not be allowed into a gully:
 - (i) from any *soil fixture*; and
 - (ii) any rain water drainage from the roof or ground.
- (c) The gully must have its water seal maintained from a *waste fixture* or floor waste gully. The maximum length of unvented waste pipe discharging into the gully must be 3.5m from basins or bidets, 10m from all other wastes gullies and fixtures with DN50 or smaller pipes, and 10m from floor waste gullies and fixtures with DN65 or larger pipes.

DF6.9.2 Overflow relief gullies

At least one of the overflow relief gully must be installed in a drain which is connected to a public sewer.

(a) Size

The size of the overflow relief gully is related to the size of the *main drain*. For a size of main *drain* of DN80 the gully must be also DN80. For main *drains* of DN100 to 150 size, the gully must also be DN100.

(b) Location

An overflow relief gully must be located within the property, external to the building, as far as practicable from the downstream end of the *drain* and so that the top of the gully is accessible and positioned where any overflow can be easily noticed.

(c) Height

A minimum height of 150mm must be kept between the top of the overflow gully riser and the lowest fixture connected to the *drain*. The point of measurement on fixtures is given in Table DF6.9.2.

Table DF6.9.2. Point of measurement of fixtures for height above the overflow level of gully

Fixture	Point of reference
<i>Soil fixture</i> with integral trap	Level of water seals
Floor waste gully or shower outlet	Top surface level of grate
Other fixtures	Top surface level of fixture outlet

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

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The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

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DEEMED-TO- SATISFY PROVISIONS

DF6.9.3 Disconnecter gully traps

Where installed within a building these must:

- (a) have the gully riser extended to floor level and be sealed with an airtight removable cover; and
- (b) a DN50 vent pipe branch from the riser at an upward grade of not less than 1 in 80 and terminate with a grating at an external wall of the building above a likely flood level. Alternatively the vent pipe can terminate as in DF6.7.3 (a). No other fixture or appliance must be connected to the vent pipe.

DF6.10 Floor waste gullies

Floor waste gullies are functionally similar to fixture water traps. Shower outlets may be used as floor waste gullies. Any waste fixture may be connected to a floor waste gully. No trap is required other than for discharge outlets from basins. For other than basins the maximum length of the untrapped waste pipe must not exceed 1.2m. If any of the fixtures is trapped, the maximum length of waste pipe is allowed to be up to 2.5m. However, the maximum distance cannot be extended by venting. With the exception of allowed fixture pairs, each fixture must connect individually with the gully at a grade of not less than 1 in 40.

DF6.10.1 Size

The outlet size of a floor waste gully trap is based on the total *fixture units* of the fixtures and appliance discharging into it. The outlet size must be:

- (a) DN50 for a total *fixture unit* rating of 3 units or less; and
- (b) DN65 to DN100 for a total *fixture unit* rating of 10 or less.

A DN50 outlet and DN50 riser may be used if the sole function of the gully is to dispose of water spillage and wash down water. All other gullies must have a minimum riser size of DN80 at floor level. A floor waste gully must have an accessible, removable grate.

DF6.10.2 Height of gully riser

The minimum height of the gully riser from the top of the water seal to the floor surface must comply with table DF6.10.2. The maximum height must not exceed 600mm.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

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The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

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DEEMED-TO- SATISFY PROVISIONS

DF6.10.2. Minimum height of floor waste gully risers

MINIMUM HEIGHT OF FLOOR WASTE GULLY RISERS

Waste fixtures connected to gully riser	Size of gully riser	Minimum height mm (water seal to floor level)	
		88%	45° entry
All permitted waste fixtures including maximum one bath	80	200	150
	100	150	100

4.6.7.8 Discharges from tundishes

DF6.10.3 Maintenance of Water Seal

At least one *waste fixture* must be connected to any floor waste gully in order to maintain the water seal. For this reason the minimum depth of water seal must be 65mm or the values in DF6.4.1, whichever is more.

DF6.11 Inspection openings

DF6.1.1 General

Inspection openings comprise:

- (a) inspection branches or square *junctions*; or
- (b) inspection chambers.

DF6.11.2 Location

Inspection openings must be provided:

- (a) outside the building on each branch connecting one or more water closet pans and within 2.5m of the building;
- (b) at intervals of not more than 30m;
- (c) downstream and upstream ends of any section of *drain* that passes under a building;
- (d) where any section of *drain* is connected to an existing *drain*;
- (e) at the connection to the public *sewer*; and
- (f) at any other location as required by the Public Utilities Board.

Appropriate locations are illustrated in Figure DF6.11.2.

DF6.11.3 Line Maintenance

Any blockages from the first Inspection Opening to the building are the responsibility of the building owner to service. Any blockages from the first Inspection Opening downstream are the responsibility of the Public Utilities Board to remedy

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

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DEEMED-TO- SATISFY PROVISIONS

DF6.11.4 Size

- (a) the size of inspection branches or square junctions must be:
 - (i) the same size as the *drain* for drains up to DN150; and
 - (ii) not less than DN150 for larger *drains*.
- (b) The dimensions of inspection chambers must comply with Table DF6.11.3

DF6.11.3 Size of inspection chambers

Depth to floor of Chamber	Minimum internal measurements (mm)		
	Rectangular Length	Width	Circular Diameter
Less than 600	600	450	600
600 to 900	900	600	900
More than 900	1200	750	1050

DF6.11.5 Access for inspection branches and square junctions

- (a) Where required

An inspection chamber is *required* where an inspection branch of square junction:

- (i) cannot accommodate all the convergent *drains*; or
- (ii) will not permit proper inspection or the clearing of obstructions.

- (b) conduits and channels

The conduits in inspection chambers may be open channels of the size and shape equal to the associated *drains*. The floor in inspection chambers must slope at a grade of between 1 in 10 and 1 in 15 towards the channel. Any formed junction must have a centre line radius of not less than 300mm. A fall of at least 30cmm must be provided in the invert of any channel that curves through 45° or more.

DF6.11.6 construction of inspection chambers

- (a) Where *required*

An inspection chamber is *required* where an inspection branch or square junction;

- (i) cannot accommodate all the convergent *drains*; or
- (ii) will not permit proper inspection or the clearing of obstructions.

PERFORMANCE REQUIREMENTS

DFP6 Sanitary plumbing and drainage Contd.

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DEEMED-TO- SATISFY PROVISIONS

DF6.11.6 construction of inspection chambers Contd.

(b) Conduits and channels

The conduits in inspection chambers may be open channels of size and shape equal to the associated *drains*. The floor in inspection chambers must slope at a grade of between 1 in 10 and 1 in 15 towards the channel. Any formed junction must have a centre line radius of not less than 300mm. A fall of at least 30mm must be provided in the invert of any channel that curves through 45° or more.

(c) Access opening

A circular or rectangular access opening of 530mm minimum dimension and fitted with a removable water tight cover must be provided at surface level. The cover must have been designed and installed to take any likely load on it. Where the size of the inspection chamber is larger than the size of the access opening, the top section of the chamber may be suitably tapered. Where this is done the full dimensions of the chamber must be maintained for a height from the chamber floor of at least 1.5 m, and the depth of the narrower shaft at the top not exceed 350 mm. The minimum dimension of the shaft except at the opening must be 600 mm.

(d) Access ladder

Where the depth of the chamber exceeds 1.2 m rungs or rung ladders must be provided to AS 1657.

(e) Materials of construction

Inspection chambers must have their base and walls of a minimum thickness of 150 mm and constructed of

- (i) base - concrete; and
- (ii) walls - concrete or fully grouted concrete block masonry.

The concrete must be of 20 MPa grade. The walls and base must be suitably reinforced if required. The channels may be formed of half sections of pipes and fittings. Any access rungs or ladder must be of galvanised steel. The cover and any frame to seal it must be of reinforced concrete or cast iron with safe lifting devices.

The walls and base of any inspection chamber must be cement rendered to a smooth finish. The render may contain a suitable waterproofing agent to ensure a waterproof finish. Where there is any likelihood of seepage of sub-soil water into the manhole the external surfaces of the wall must be plastered to a waterproof finish or a suitable waterproofing agent added to the concrete in the walls and base.

PERFORMANCE REQUIREMENTS**DFP6 Sanitary plumbing and drainage
Contd.**

This section should be read in conjunction with the Kiribati National Sanitation Guidelines.

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

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DEEMED-TO- SATISFY PROVISIONS

(f) Inserts;

The contact area between pipes or fittings and the walls formed around them, as well as holes broken into or formed in the walls of inspection chambers for insertion of pipes or fittings must be made water tight by -

- (i) the application of a suitable bonding agent around the pipes;
- (ii) caulking the annular space between the wall and the pipe or fitting with a stiff mix of one part cement and 2 parts sand;
- (iii) sealing with an epoxy based or other suitable sealant; or
- (iv) a combination of these methods.

DF6.11.7 Junctions

Drains shall be joined at grade to each other by means of a 45° junction and shall comply with the following (Figure 6.11.7):

- (a) Double 45° junctions and double sweep junctions shall not be used.
- (b) Where a junction is used to make the connection of a branch drain to a main drain of the same size, the entry level of the branch drain may be on grade.
- (c) Where unequal junctions are used, the invert of the branch drain shall be 10mm higher than the soffit of the drain to which it connects.

DF6.11.8 Junctions installed other than on grade

Drains installed other than on grade shall be joined by means of a sweep or 45° junction if, where a sweep junction is used, the invert of the branch drain is at least 10mm higher than the soffit of the main drain (see Figure 6.11.8).

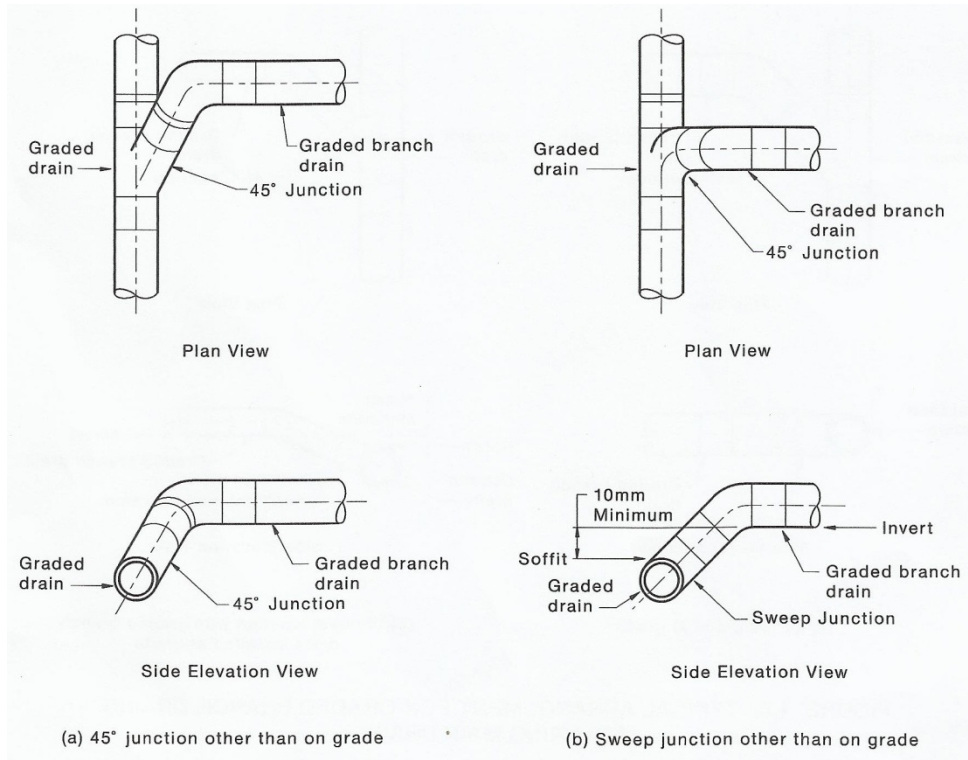


Figure 6.11.7 Typical arrangement for branch drains entering main drain other than on grade

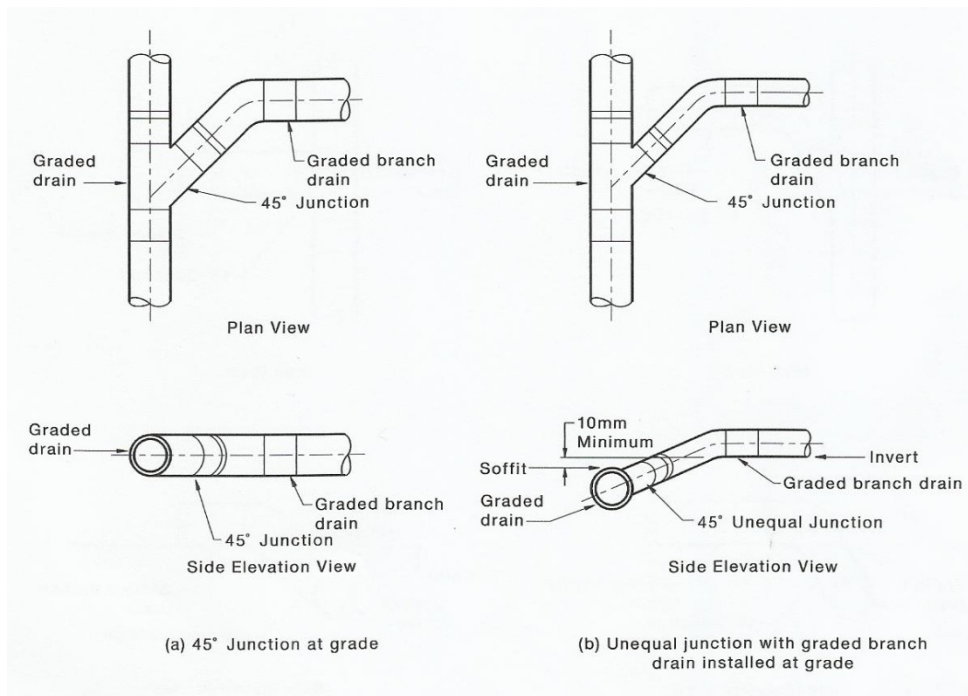


Figure 6.11.8 Typical arrangement for graded branch drains entering main drain

PERFORMANCE REQUIREMENTS

DFP7 Roof drainage

Where impermeable roofing is present in the building design, the rainwater draining from the whole roof area must be collected.

Any roof drainage system provided must be capable of handling the reasonably expected peak intensities of rainfall.

DEEMED-TO- SATISFY PROVISIONS

DF7.1 Design of roof gutters

- (a) Roof gutters where provided must be sized using the information given in Table DF7.1.

Notes:

(1) The roof catchment area is the area of the roof drained by one downpipe. It is taken as the area of the roof from ridge to gutter between two adjacent downpipes.

(2) Values can be interpolated for catchment areas falling between the given figures.

(3) The gutter sizes do not include any allowance for freeboard. A freeboard of 25 mm for eaves gutters and 35mm for box gutters must be added to the cross-sections derived from the table DF7.1. No freeboard allowance need be added to valley gutters.

- (b) Internal box gutters are not encouraged and should be avoided where possible.

- (c) Gutters must have a minimum slope of:

1 in 400 for eaves gutters

1 in 150 for internal box gutters

These slopes must be increased where there is any material risk of clogging of the gutters and downpipes with leaves and other such matter.

- (d) Gutters should be fixed and supported to manufacturer's specifications, or every 0.5m, with the appropriate gutter supports/clips.

- (e) All gutters must be installed and falls tested prior to installation of roof sheeting. Falls must be tested by filling gutters with water and ensuring that water fully drains to downpipes.

- (f) High fronted eave gutters are preferred as they reduce 'splash losses' from the water collection system.

Note:

With high fronted eaves with fascia boards there could be overflow from the back of the gutter into the building if the downpipes or gutters are blocked. One method of preventing such overflow is by providing drainage slots along the front of the gutter at a level lower than the back edge. Another method would be to provide sumps and weirs at the ends of the gutter or where the downpipes take off. The risk of overflow into the building from any internal box gutter can be reduced by providing sumps and weirs at the ends of the gutter.

- (g) Gutter outlets should be provided to connect gutters to downpipes.

PERFORMANCE REQUIREMENTS

DFP7 Roof drainage

Where impermeable roofing is present in the building design, the rainwater draining from the whole roof area must be collected.

Any roof drainage system provided must be capable of handling the reasonably expected peak intensities of rainfall.

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DEEMED-TO- SATISFY PROVISIONS

DF7.2 Design of downpipes

The minimum area of cross-section of a downpipe must be at least half the area of cross-section of the gutter it serves.

DF7.3 Materials for gutters or rainwater pipes and joints

The materials used should be of adequate strength and durability and:

- (i) all gutter joints should remain water tight under working conditions;
- (ii) gutters and rainwater pipes should be firmly supported without restricting thermal movement;
- (iii) where different metals are used, they should be separated by non-metallic material to prevent electrolytic corrosion; direct metal contact between galvanised iron (or Zincalume[®]), stainless steel, copper, monel or lead compounds must be avoided; and
- (iv) split PVC pipes should not be used as a substitute for specifically designed eaves gutters.

DF7.3 Materials for gutters or rainwater pipes and joints Contd.

Rainwater storage tanks of appropriate size and construction must be provided to store run off from guttering system.

The details given in specification (DFS2.5) meet the requirements of this clause

Table DF7.1 Gutter sizes

	Roof catchment area (m ²)			
	10	20	50	100
Type of gutter	Required cross sectional area of gutter (mm ²)			
Eaves gutter	1400	2500	5180	9100
Internal Box valley or gutter	2800	5000	10360	18200

TABLES AND DIAGRAMS

TABLE DF2.1 PROVISION OF COOKING AND SANITARY FACILITIES

MINIMUM FACILITIES REQUIRED	
In all cases	a) facilities for the preparation and cooking of food, and for the cleaning of utensils.
Where there is piped water supply to the kitchen and abolition areas	(b) a kitchen sink in a kitchen. (c) a shower or other adequate personal washing facilities. (d) clothes washing facilities. (e) a closet pan and facilities for washing hands.
Where there is piped water supply only to the tap in the kitchen or up to a stand pipe in the vicinity of the building or where there is no piped water supply	(f) a paved raised platform with a paved area and a drain around it. (g) a suitable privy as per Specification DF2.1
<p>Note:</p> <p>(i) If any of these facilities are detached from the main building, they must be set aside for the exclusive use of the occupants of the building.</p> <p>(ii) Where the layout allows it, facilities in (c), (d), (e) can be in the same room.</p>	

TABLE DF 6.3 FIXTURE UNIT RATINGS

Fixture	Min. size of trap outlet and fixture discharge pipe DN	Fixture unit rating
Basin	40	1
Bath	40	4
Floor waste gully — without fixture with fixture	50	0 as per fixture rating
Laundry trough	40 or 50	5
Shower	40 or 50	2
Sink	50	3
Water Closet Pan	80 / 100	4
Clothes Washing Machine	40	5*
Dish Washing Machine		3*

* Where a dishwashing machine is connected to a sink trap, only the sink fixture unit rating is considered. Where a clothes-washing machine is connected to a trough trap, only the trough fixture unit rating is considered.

TABLE DF 6.4 Maximum Length (m) of fixture discharge pipe without venting

APPENDIX D							
MAXIMUM LENGTH (m) OF FIXTURE DISCHARGE PIPE WITHOUT VENTING							
(Normative)							
Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
AUTOPSY TABLE—shall discharge through a flushing floor waste gully							
Untrapped DN 50 waste to flushing floor waste gully	1.2	NP	NP	NP	NP	NP	NP
Untrapped DN 50 waste to minimum DN 65 flushing floor waste gully	NP	NP	10.0	10.0	2.5	NP	NP
BAIN-MARIE and WATER BOILER							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 Trap and waste	2.5	6.0	NP	NP	NP	NP	NP
DN 40 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	NP	NP
BASIN							
DN 40 trap and waste	2.5	3.5	NP	NP	2.5	2.5	2.5
DN 32 outlet DN 40 trap and waste	2.5	3.5	NP	NP	NP	2.5	2.5
DN 32 trap and DN 40 waste (NZ only)	NP	3.5	NP	NP	NP	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	10.0	2.5	2.5
DN 32 outlet DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	10.0	2.5	2.5

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
BATH							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40/50 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 50 trap and waste (NZ only)	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40/50 trap and DN 65 waste	NP	10.0	10.0	10.0	NP	NP	NP
BEDPAN and WASHER/STERILIZER							
DN 80 trap and waste	NP	NP	10.0	10.0	2.5	NP	NP
DN 100 trap and waste	NP	NP	10.0	10.0	6.0	NP	NP
BIDETTE/BIDET							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	2.5	3.5	NP	NP	2.5	2.5	2.5
DN 32 outlet DN 40 trap and waste	2.5	3.5	NP	NP	2.5	2.5	2.5
DN 32 trap and DN 40 waste (NZ only)	NP	3.5	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 32 outlet DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
DENTAL UNITS							
Cuspidors DN 25 or DN 40 untrapped waste							
To sealed trap no smaller than DN 40	NP	6.0	NP	NP	NP	NP	NP
Evacuators (trapped tundish)	2.5	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	1.2	6.0	NP	10.0	2.5	2.5	2.5
DN 25, DN 32 and DN 40 trap and waste (NZ only)	2.5	3.5	NP	NP	NP	NP	NP
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
DRINKING FOUNTAINS and BUBBLERS							
DN 40 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 25 and DN 32 trap and waste (NZ only)	2.5	3.5	NP	NP	NP	NP	NP
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
DISPOSAL UNITS							
Domestic food waste							
DN 40 trap and waste (NZ only)	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and waste (Australia)	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and waste (NZ only)	NP	10.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
Commercial food waste							
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
Sanitary napkin							
DN 50 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	NP	NP
DISCONNECTOR GULLY TRAPS							
DN 100 outlet	NP	NP	10.0	10.0	6.0	NP	NP
FLOOR WASTE GULLY TRAPS							
DN 50 outlet	NP	6.0	NP	NP	2.5	2.5	2.5
DN 65/80 outlet	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 100 outlet	NP	10.0	10.0	10.0	6.0	6.0	6.0
SHOWERS 80/100 mm grates							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40/50 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40/50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
2-3 showers to graded channel with							
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
4-6 showers to graded channel with							
DN 65 trap and waste	NP	10.0	10.0	10.0	2.5	NP	NP

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
SINKS							
Kitchen							
Untrapped DN 40 waste	NP	NP	NP	NP	NP	NP	NP
DN 40 trap and waste (NZ only)	NP	6.0	NP	NP	2.5	2.5	2.5
DN 50 trap and waste	NP	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste (NZ only)	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
Bar (domestic)							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
Bar (commercial)							
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 50 trap and waste	2.5	6.0	NP	10.0	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
(Cleaner's)							
Untrapped DN 40 waste (NZ only)	1.2	NP	NP	NP	NP	NP	NP
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste (NZ only)	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 50 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste (NZ only)	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
Pot or utility							
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
Laboratory							
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
SLOP HOPPER							
DN 100 trap and waste	NP	NP	10.0	10.0	6.0	NP	NP
SWIMMING POOLS							
Limits determined by network utility operator (see Note 6)							
DN 40 waste	NP	Unlimited	NP	NP	NP	NP	NP
TROUGHES							
Ablution							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	2.5	6.0	NP	NP	2.5	NP	NP
DN 50 trap and waste	2.5	6.0	NP	NP	2.5	NP	NP
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
Laundry							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 50 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
URINALS							
Wall hung							
DN 40 trap and waste	NP	NP	NP	NP	2.5	2.5	2.5
DN 50 trap and waste	NP	NP	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	2.5	2.5
Slab (see Note 9)							
Up to 5 m in length minimum DN 65 trap and waste (see Note 7)	NP	NP	10.0	10.0	2.5	NP	NP
Waterless Urinals (see Clause 11.24.2.3)							
DN 40 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	NP	10.0	10.0	2.5	2.5	2.5
WASHING MACHINES							
(Domestic clothes) hose connecting to:							
Untrapped DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 50 trap and waste	2.5	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
Commercial clothes laundrette							
Untrapped DN 50 waste	NP	NP	NP	NP	NP	NP	NP
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
Industrial laundry							
To graded channel and 225 mm silt trap with DN 100 outlet	NP	10.0	NP	NP	NP	NP	NP
(Domestic dishwasher) waste outlet hose connecting to riser of kitchen sink trap—							
Above the water seal of a DN 50 trap and waste	NP	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and waste	NP	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	2.5	2.5
Commercial dishwasher (see Note 6)	NP	10.0	NP	NP	NP	NP	NP
Glass							
Untrapped DN 50 waste	1.2	NP	NP	NP	NP	NP	NP
DN 50 trap and waste	2.5	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
COMBINATION PAN ROOM SINK							
DN 100 outlet	NP	NP	10.0	10.0	6.0	NP	NP

(continued)

Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
POTATO PEELER—shall discharge through a peel trap							
DN 50 trap and waste	NP	6.0	NP	NP	2.5	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
RANGES OF FIXTURES (see Note 6)							
5 × basins DN 40 traps and wastes connected to a DN 50 common discharge pipe	NP	NP	NP	NP	NP	4.5	4.5
5 × water closets DN 100 outlets connected to a DN 100 common discharge pipe	NP	NP	NP	10.0	NP	10.0	10.0
5 × wall-hung urinals DN 50 traps connected to a DN 65 common discharge pipe	NP	NP	NP	10.0	NP	10.0	10.0
REFRIGERATED CABINETS and STERILIZERS							
Untrapped minimum DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
Minimum DN 40 Trap and waste	2.5	6.0	NP	NP	2.5	NP	NP
DN 40 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
STERILIZERS							
Untrapped minimum DN 40 waste	1.2	NP	NP	NP	NP	NP	NP
Minimum DN 40 trap and waste	2.5	6.0	NP	NP	2.5	NP	NP
DN 40 trap and DN 65 waste	NP	0.0	10.0	10.0	2.5	NP	NP

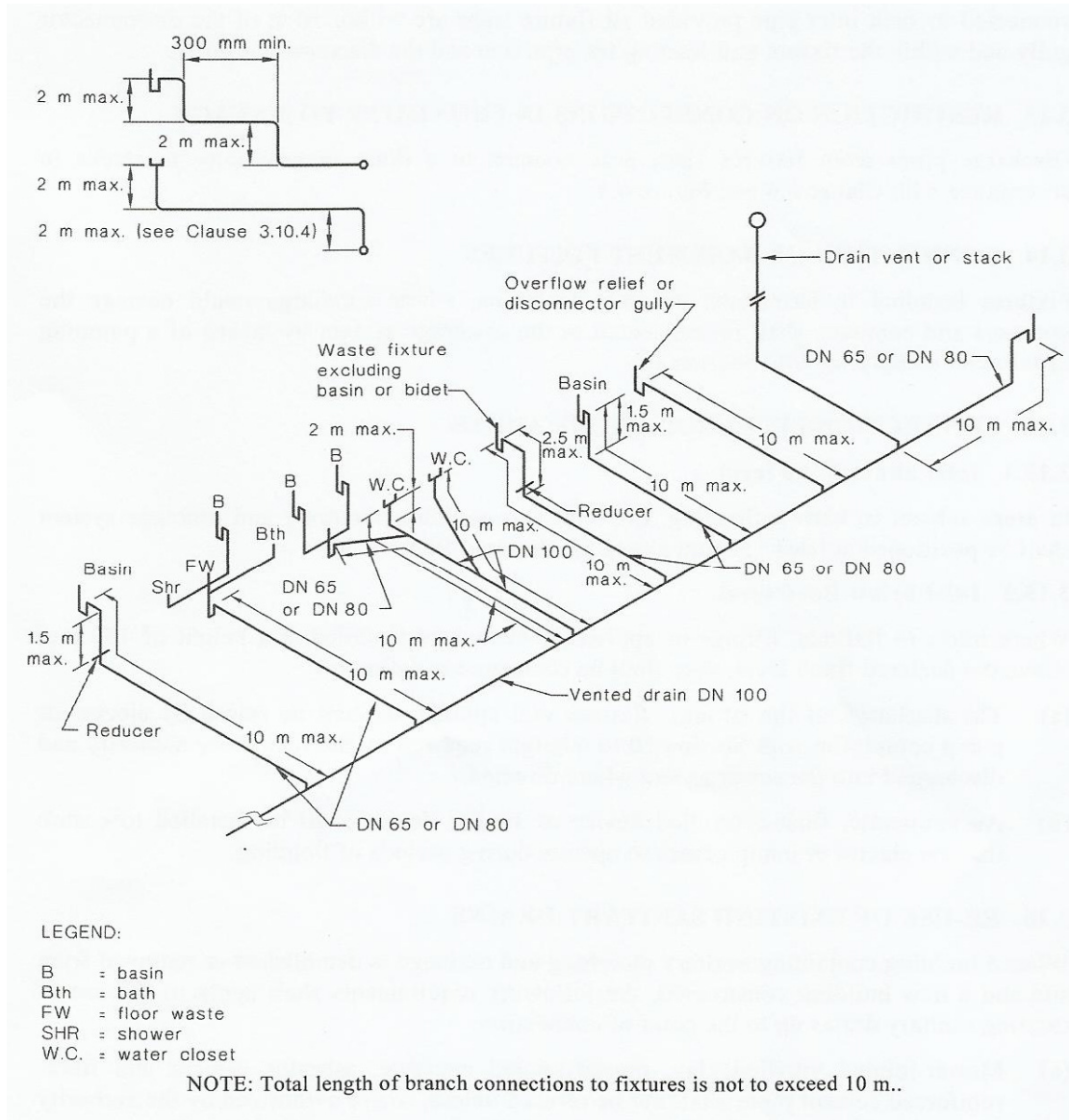
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Fixture	Floor waste gully	Disconnector gully	Vented drain	Reduced velocity aerated stack system	Fully vented (modified)	Single stack	Single stack (modified)
	Ref. Clause 4.6.7.3 Figure 4.2 Table 4.4 (see Notes 3 & 5)	Ref. Clause 4.6 Table 4.1	Ref. Clause 3.10 Figure 3.6 Table 3.6	Ref. Clause 9A.6	Ref. Clause 7.5.7.5.4 Clause 7.5.7.5.5 Figure 7.11	Ref. Clause 8.2 Figure 8.1 Table 8.2	Ref. Clause 8.2.3 Figure 8.2 Table 8.2
TUNDISHES (minor discharge)							
Untrapped DN 25 to DN 50 waste	10.0	NP	NP	NP	NP	NP	NP
DN 40 trap and waste	10.0	6.0	NP	NP	2.5	2.5	2.5
DN 40 trap and DN 65 waste	10.0	10.0	10.0	10.0	2.5	2.5	2.5
WATER CLOSET PAN							
DN 100 outlet	NP	NP	10.0	10.0	6.0	6.0	6.0
WOK BURNERS							
(Approx. 1 fixture unit per burner) (see Note 6)							
Minimum DN 50 trap and waste	NP	6.0	NP	NP	NP	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP
COMBINATION OVENS & STEAMERS							
(see Notes 6 and 8)							
DN 50 trap and waste	NP	6.0	NP	NP	NP	NP	NP
DN 50 trap and DN 65 waste	NP	10.0	10.0	10.0	2.5	NP	NP

NOTES:

- 1 NP = not permitted.
- 2 For the topmost fixture to fully vented modified stacks, see Clause 7.5.1.2.
- 3 Wastepipes to floor waste gullies shall not be extended by venting.
- 4 'Minor discharge', approximately a minimum of 1 L per day and not more than 20 L per day.
- 5 For submerged-inlet floor waste gullies the requirements are specified in Table 4.4.
- 6 For connections of fixtures in range, see Clause 8.5.10.
- 7 Over 5 m of urinal wall additional outlets required.
- 8 Discharge through a DN 100 tundish or installed to manufacturer's instructions.
- 9 See Clause 8.4.2, Item (a) for connection of slab type urinals to single stacks.

Figure DF 6.6 Typical Connections of Ground-Floor Fixtures to Unvented Branch Drains



- B = Basin
- DV = Drain vent
- FW = Floor waste gully
- IC = Inspection chamber
- IO = Inspection opening
- IS = Inspection shaft
- ORG = Overflow relief gully
- Tr = Trough

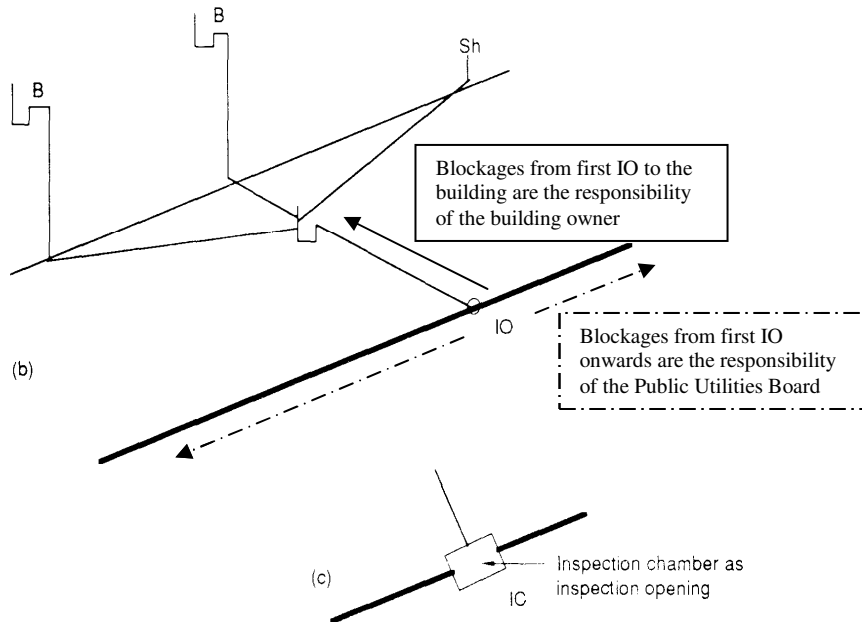


FIGURE DF6.11.2 LOCATION OF INSPECTION OPENINGS

Figure 6.11.2 Typical provision of inspection openings

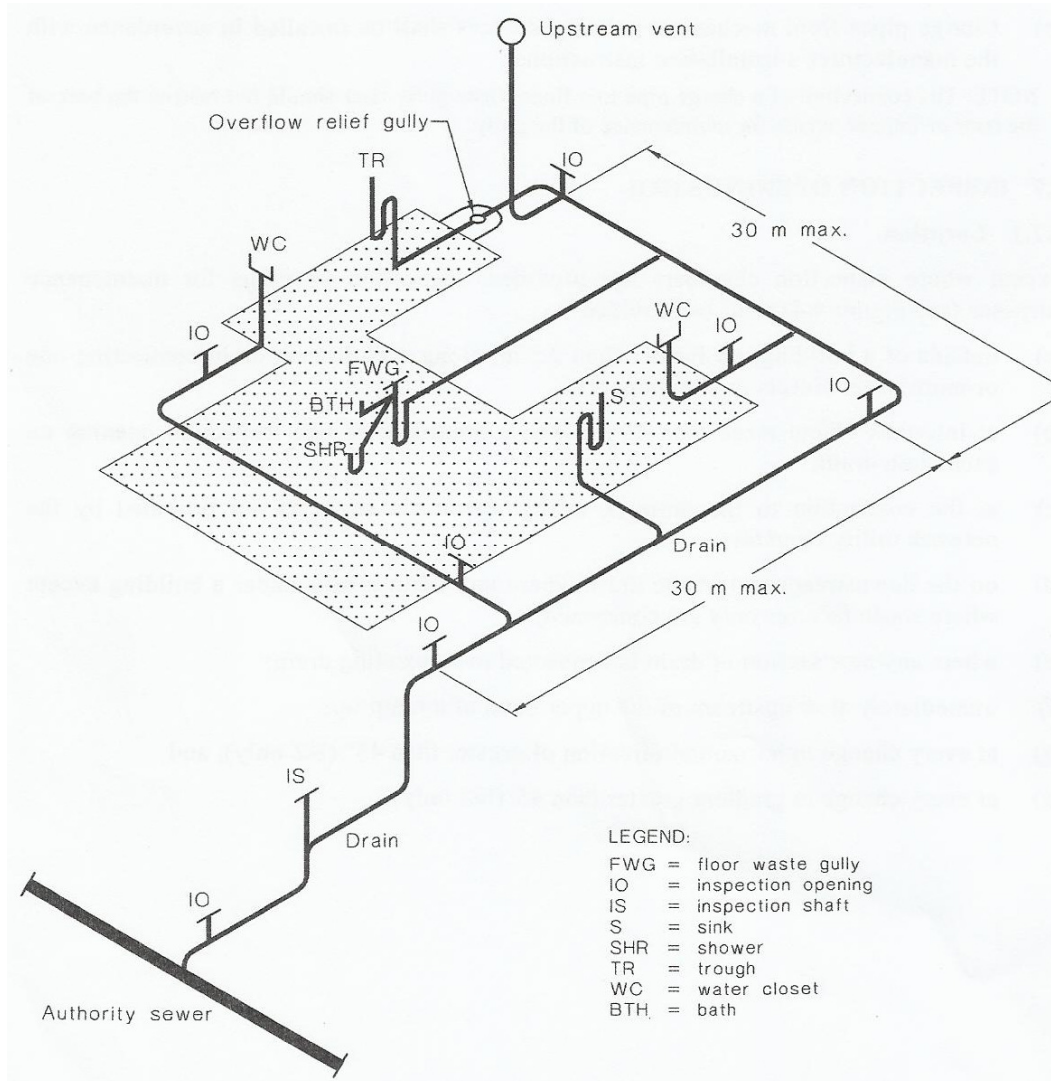
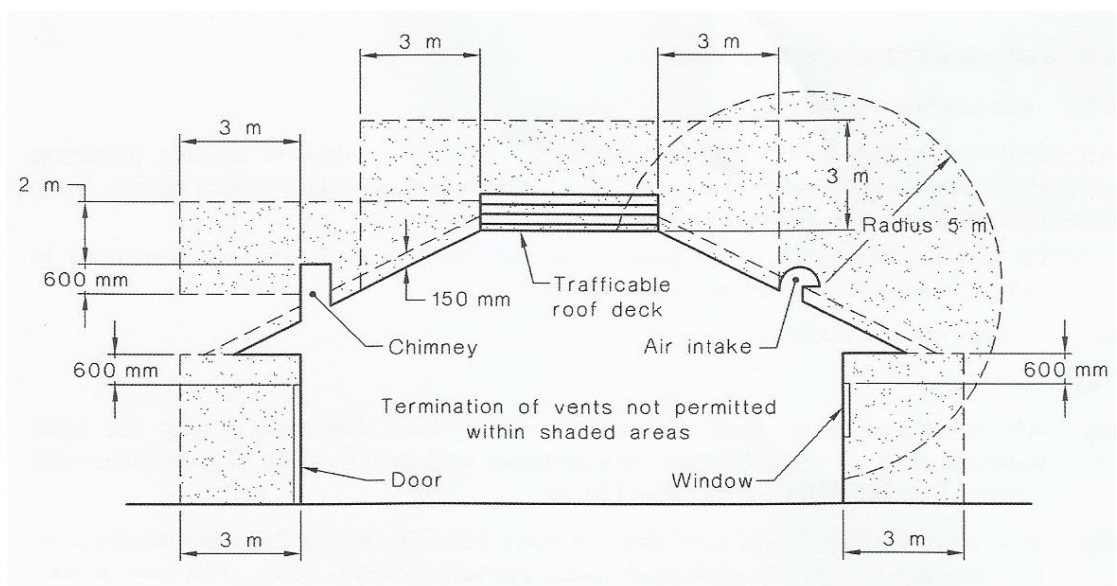


Figure 6.7.3 – 1 Termination of Vents



DFS1: SEPTIC TANKS FOR DOMESTIC USE

Additional details for on-site sanitation systems are provided in the National Sanitation Guidelines. All on-site systems should be design in accordance with the National Guidelines and require approval by MPWU prior to installation.

1 Function of a septic tank

The basic function of a household septic tank is to receive normal liquid household wastes and to condition them for such a time, and in such a manner, that the clarified effluent may be percolated efficiently into the subsoil, where it is absorbed and evaporated. In order to perform this basic function, all septic tanks must fulfil the following requirements:

(a) Remove solids

A septic tank must have a primary or liquefying chamber of such shape and size that the rate of flow of all sewage is so reduced that at least the larger solids sink to the bottom and are retained and the clarified effluent is discharged. The inlet and outlet pipes of this primary chamber must be so shaped and located that the scum which forms on the surface of the sewage is not disturbed. The capacity of the tank is usually kept equal to the inflow during 24 hours to allow a day's retention.

(b) Promote bacterial action

To ensure that the solids and liquids in the tank will decompose it is necessary that the tank be designed so that either

- (i) a variety of bacteria - anaerobic bacteria - which thrive in the absence of free oxygen are present; or
- (ii) a variety of bacteria - aerobic bacteria - which thrive with access to air, is also present.

A tank that is designed to achieve the purpose defined in (i) is a single-treatment septic tank, and a tank that is designed to achieve the purpose defined in (ii) is a double-treatment septic tank. A double-treatment tank is generally more expensive. Therefore details of only single-treatment tanks with or without aerobic filters will be included in this Specification.

(c) Store sludge

A fine silt-like sludge accumulates at the base of the primary tank. It follows that the primary tank must be of sufficient size to store sludge for a considerable period; otherwise, if the tank is not cleaned out at frequent intervals, the sludge will eventually be scoured from the tank and clog the outlet drain, the absorption trench or soil and an aerobic filter where provided.

2 Location

Septic tanks and other connected works such as absorption trenches must be located at a sufficient distance to prevent contamination of potable water sources and nuisance. Figure 2 shows typical layouts with the minimum separation distances marked on them. It will be seen that a minimum distance of 15 m is required between absorption trenches and wells.

3 Construction

3.1 Septic tanks may be of pre-formed plastic, reinforced concrete or of reinforced block masonry walls over a reinforced concrete base. Tanks of precast concrete construction may be made from rectangular slabs which are assembled on the site, or be of cylindrical construction, either as a single cylinder open at the top, or a stack of short, open-ended cylinders. There are also prefabricated septic tanks made of fibreglass.

3.2 Whatever form of construction or materials are used for the sides and bottoms of septic tanks the resulting work must be impervious to water. For tanks of rectangular section, it is important that all internal angles be well rounded, so as to minimize shrinkage cracking. Leakage at the corners of tanks of precast concrete construction made from rectangular slabs, or at the joints of precast tanks made from a number of open-ended cylinders, must be detected and corrected in advance.

3.3 Every septic tank of block masonry or concrete construction must be covered with reinforced concrete slabs and removable manhole covers fitted over every compartment. The manholes are used when it is necessary to pump out or otherwise clean the tanks. Inspection openings are also required over the inlet and outlet square junctions. The aerobic filter where provided must be filled with hard, impervious and durable stone, coral or gravel. These must be graded from 60 mm to 75 mm.

Details DFS2.1, 2.2, 2.3 & 2.4 give details of the construction and dimensions required of built-in-situ septic tanks.

4 Grease traps

4.1 The satisfactory disposal of the discharge from kitchen waste fixtures is frequently difficult because it is charged with grease which cannot be satisfactorily dealt with in a septic tank. This difficulty may be overcome by a grease trap located near the kitchen through which all discharge from the kitchen must pass before entering the drain to the septic tank. For satisfactory working of the trap it is necessary that both laundry and roof waters, and liquid and powder detergents, be excluded from it. A grease trap constructed as shown in DFS2.4 has been found effective in arresting grease.

Alternatively, a smaller precast concrete or pre-formed plastic grease trap may be used. The capacity of the grease trap below the level of the invert of the outlet must be not less than the total capacity of the sinks and dishwashers served. The cover over the trap should be removed to allow the cleaning of the trap.

Grease traps must be provided to all sinks and floor wastes in commercial kitchens and other catering operations. They are not mandatory but advisable for kitchen sinks in domestic situations.

The capacity of the grease trap below the level of the invert of the outlet must be not less than the total capacity of the sinks and dishwashers served. The cover over the trap should be removable to facilitate the cleaning of the trap.

4.2 If grease traps are not regularly cleared of the accumulated grease it would give rise to the blocking of drains, unsightly overflow through the sides of the cover slab of the trap and unpleasant odour.

6 Absorption trenches

Refer to DFS2.1 for the required lengths or absorption trenches.

Absorption trenches should not be installed where the level of the water lens is less than 600mm below the natural ground level. Refer to the National Sanitation Guidelines for options where these conditions occur.

6.1 Typical dimensions for an absorption trench are approximately, width 450 mm and minimum depth of 400 mm. The trenches are packed with 75 mm size coral to a height of 150 mm, over which a line of perforated pipes is laid along the centre of the trench, commencing about 300 mm from the beginning of the trench and thereafter running the full length of the trench. The drain pipe conveying the effluent to the trench extends into the trench and butts against the first perforated pipe.

6.2 The joints between the pipes in the trench must not be sealed. The pipes should be surrounded and covered with 75 mm broken hard stone or hard coral to within a few millimetres from the top of the trench, over which should be placed a protective covering of old iron; bag, bark or the like, before covering the trench with sand.

6.4 The absorption trench should be constructed along the general contour of the ground. It must be so positioned that the prepared ground level at the trench is lower than the invert of the outlet pipe from the septic tank so as to prevent the effluent back-flooding into the septic tank.

Typical absorption trenches are shown in Detail DFS2.1 and 2.2.

6.5 Moisture-seeking shrubs or other vegetation planted in the vicinity of the trench will assist in the absorption of the effluent, but care should be taken in selecting the shrubs so that their roots are not likely to interfere with the efficiency of the trench. Roof water, and as far as possible surface and ground water, must be excluded from absorption trenches, so as to maintain their efficiency

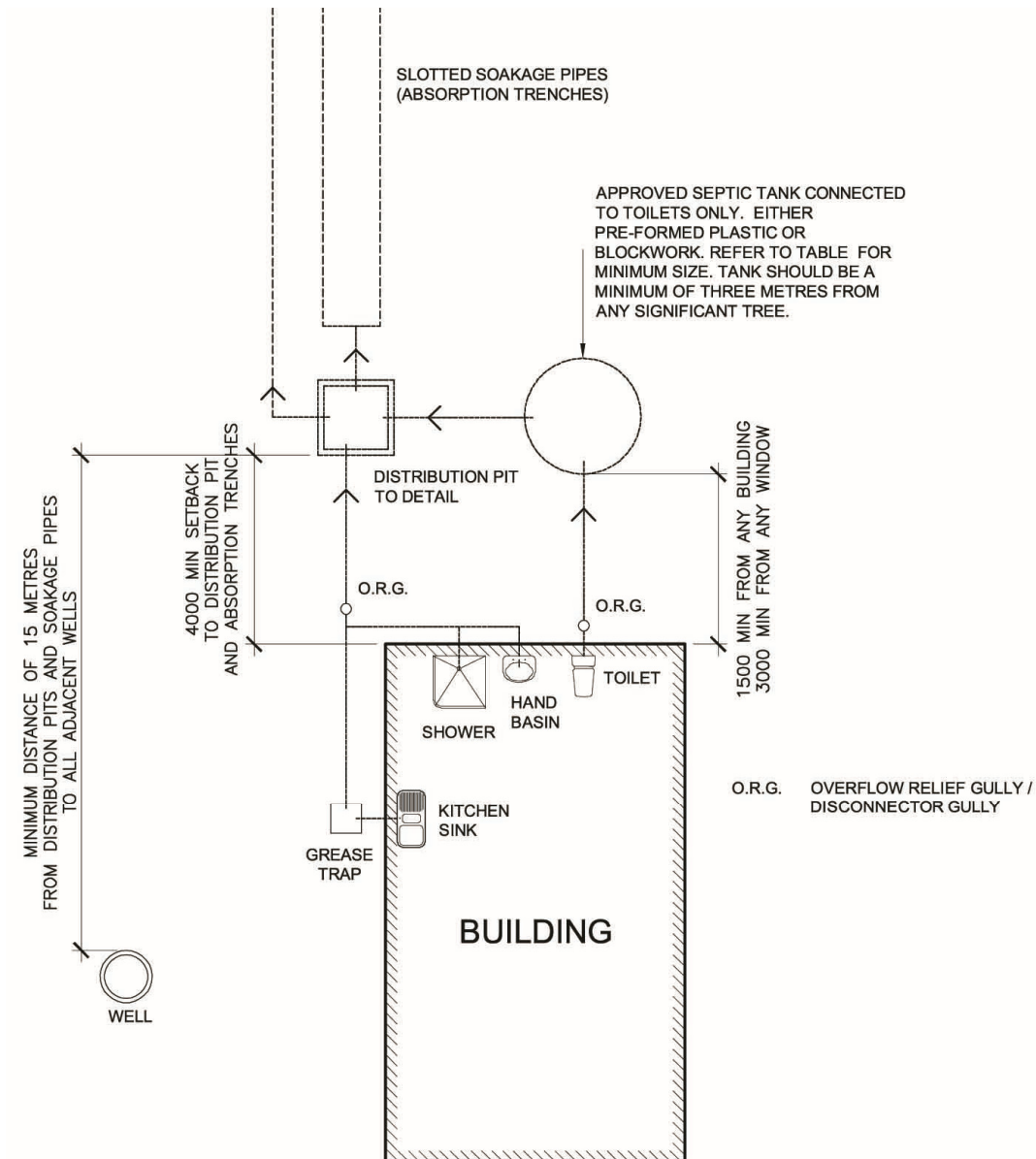
7 Special circumstances

In some areas where there are many septic tanks, a drainage system can be made available to take the effluent away from each septic tank, either by gravity or by pumping, to an absorption area, public sewerage, or treatment ponds.

If such a system is available then it is mandatory for the septic systems to connect to this.

8 Vents

A vent is required in order to allow ventilation through the septic tank and drainage system. Vents are usually of PVC capable of withstanding ultra violet radiation, and are normally taken off at the head of the house drain farthest away from the septic tank. At various stages in the operation of a septic tank, offensive odours may be given off. The height and location of the vent outlet must be a minimum of 150mm above its point of penetration through any roof covering and 600mm above the top of any opening situated within a radius of 3 m from the vent.



NOTE:
 KITCHEN SINK WASTES FROM COMMERCIAL KITCHENS OR CATERING OPERATORS MUST PASS THROUGH AN APPROVED GREASE TRAP PRIOR TO BEING DISCHARGED INTO THE DISTRIBUTION PIT.
 GREASE PITS ARE NOT COMPULSORY FOR HOUSES.

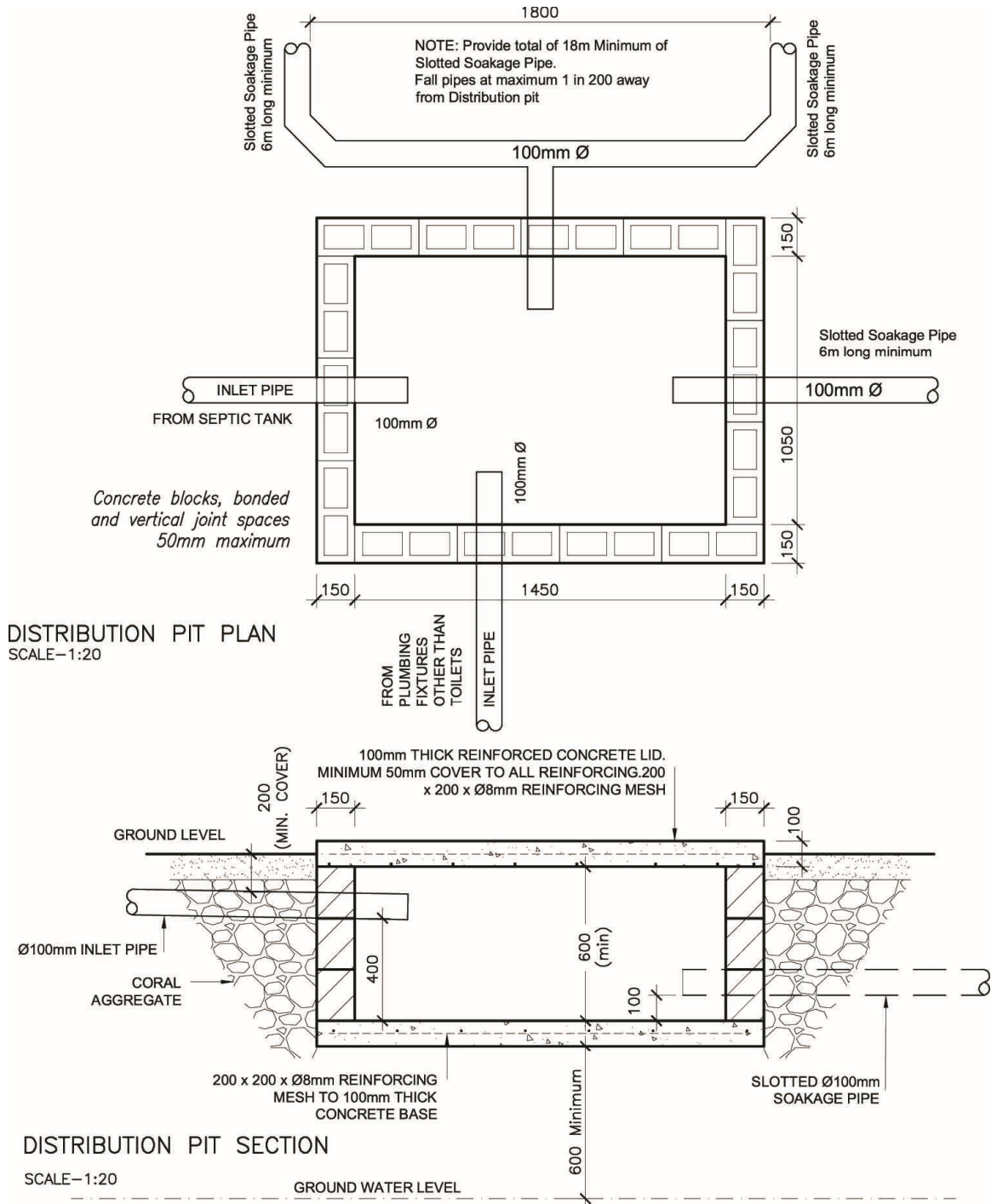
REFER TO DFS2.2 FOR APPROVED DISTRIBUTION PIT DETAILS.
 REFER TO DFS2.3 FOR APPROVED SEPTIC TANK DETAILS.
 REFER TO DFS2.4 FOR APPROVED GREASE TRAP DETAILS.

NATIONAL BUILDING CODE OF KIRIBATI
 STANDARD DETAIL
DFS2.1
 SEPTIC TANK LAYOUT & SETBACK PLAN
 SCALE-1:100

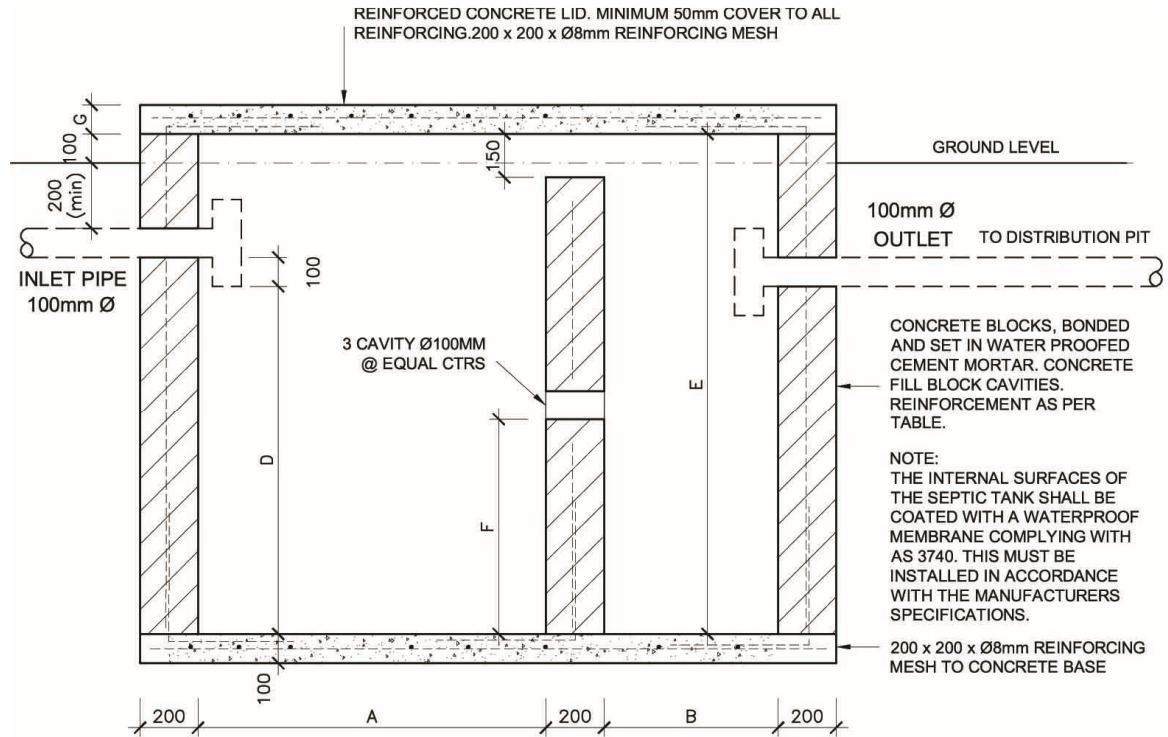
SEPTIC TANK & ABSORPTION TRENCH SIZES

USAGE No. of people	TANK VOLUME kL (cubic metres)	TRENCHES length in metres
6	1.0	18
8	1.5	18
10	2.0	18
20	3.3	30
40	5.3	45
100	13.5	100

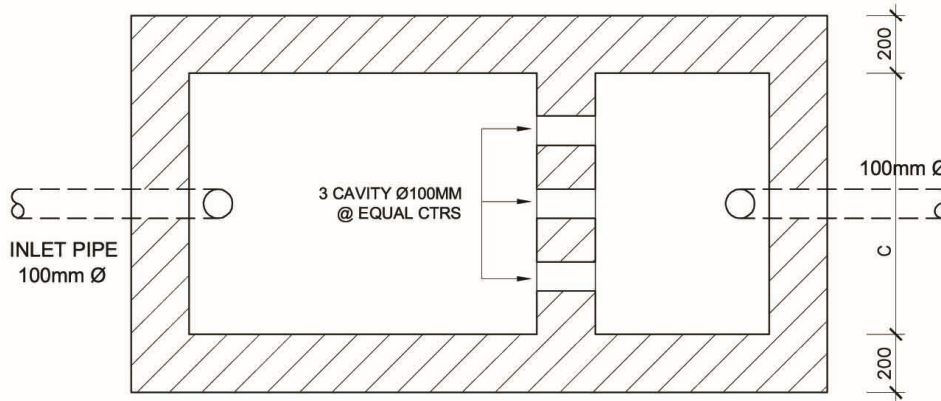
SEPTIC TANKS MAY BE CONSTRUCTED FROM EITHER PRE-FORMED PLASTIC, REINFORCED CONCRETE OR REINFORCED CONCRETE BLOCKWORK



NATIONAL BUILDING CODE OF KIRIBATI
STANDARD DETAIL
DFS2.2
DISTRIBUTION PIT
SCALE-1:20



SECTION



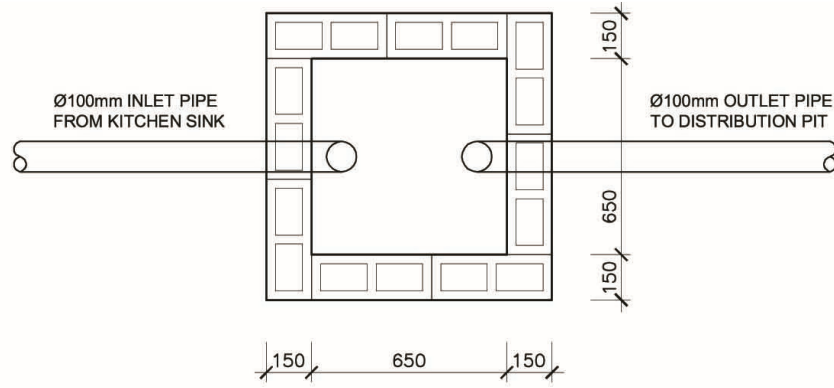
PLAN

SEPTIC TANK SIZING TABLE

NO. OF USERS	DIMENSIONS IN MM							VOLUME kL (m ³)	REINFORCEMENT	
	A	B	C	D	E	F	G		Vertical Bars	Horiz. Bars
10	1200	0600	0900	1200	1675	740	100	2.04	D12 @ 400	D12 @ 600
15	1370	0760	0900	1200	1675	740	100	2.38	D12 @ 400	D12 @ 600
25	1675	0900	1065	1370	1830	835	100	3.74	D16 @ 600	D12 @ 600
40	2130	1065	1200	1370	1830	825	100	5.35	D16 @ 600	D12 @ 600
60	2430	1200	1370	1370	1830	825	150	6.94	D16 @ 600	D12 @ 600
75	2590	1370	1525	1525	1980	900	150	9.21	D16 @ 400	D16 @ 600
100	3150	1525	1830	1525	1980	900	150	13.59	D16 @ 400	D16 @ 600
150	3660	1830	2730	1525	1980	900	150	17.84	D16 @ 400	D16 @ 600
200	3810	2730	2430	1525	1980	900	150	21.52	D16 @ 400	D16 @ 600

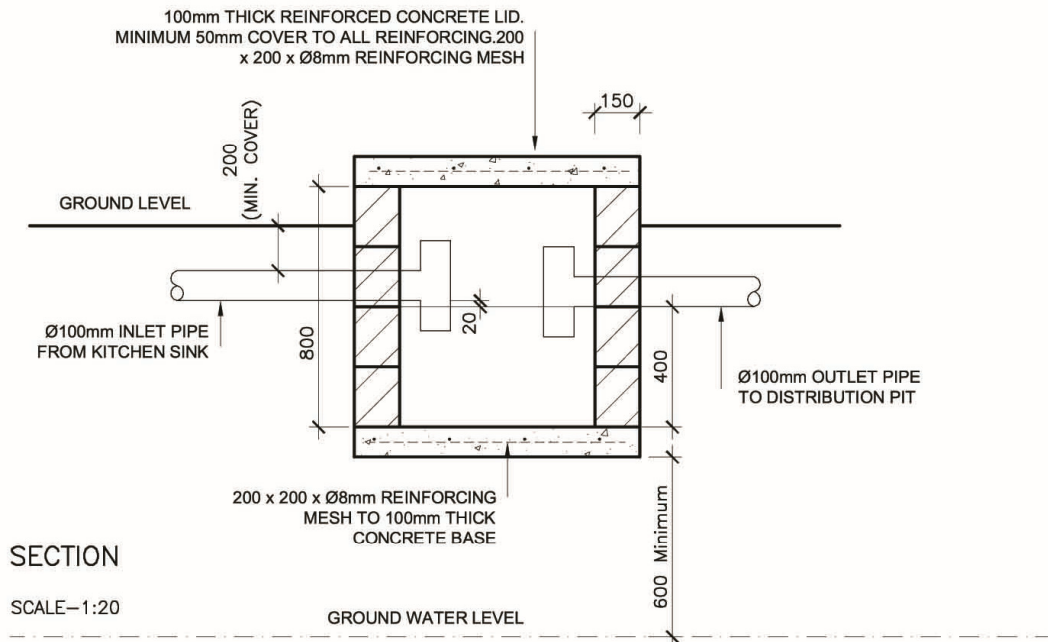
NATIONAL BUILDING CODE OF KIRIBATI
STANDARD DETAIL
DFS2.3
REINFORCED CONCRETE SEPTIC TANK
SCALE-1:20

SIZES ARE BASED ON SEPTIC TANK BEING ONLY CONNECTED TO THE TOILET
SIZES AND REINFORCING CAN BE USED FOR EITHER REINFORCED CONCRETE OR REINFORCED CONCRETE BLOCKWORK



BLOCKWORK GREASE TRAP PLAN

SCALE-1:20



SECTION

SCALE-1:20

NATIONAL BUILDING CODE OF KIRIBATI
STANDARD DETAIL

DFS2.4

GREASE TRAP

SCALE-1:20

SPEC DFS2 - RAINWATER STORAGE

DFS2.1 Determining minimum required rainwater storage volume

The amount of storage required depends on:

- (a) the average annual rainfall and its variability through the year;
- (b) the area of the roof which is guttered and connected to the tank;
- (c) the daily per capita consumption of water;
- (d) the number of users of the stored rainwater; and
- (e) the desired reliability of the supply.

By fixing all of the above variables, the minimum required storage for a particular building can be determined:

- (i) Variable (a) is fixed for any location, and can be determined from the rainfall record (or a nearby record).
- (ii) Variable (b) is fixed because, as stated in DFP7, the whole roof catchment must be used in rainwater collection, therefore variable (b) equals the area of the (proposed) roof.
- (iii) To provide a minimum storage requirement, variable (c) is set at 5 Litres/person/day for a household rainwater collection and supply system, and 2 Litres/person/day for a communal building without permanent residents (such as a school, maneaba, or a government building).

Note:

These have been set as such to provide practical statutory minimum requirements for rainwater storage volumes. Where specific conditions are to be met (*i.e.* where rainwater is the only available safe water source in a community – for example, on Banaba - or where rainwater is used for more than just drinking and cooking – for example, at a hospital) a site specific analysis using an appropriate method shall be required, and defensible estimates of reliability, per capita consumption, and the number of users must be used.

- (iv) A defensible estimate of the number of users must be made (this may require some research with respect to communal buildings).
- (v) To provide a minimum storage requirement, the reliability is set so that the system fails no more than 1 month in 10 years.

The design charts (DFS2.5-A to DFS2.5H) for the Island groups of Kiribati are provided to determine the minimum required rainwater storage volume for any particular building.

The designer/constructor must first estimate the number of users (point iv above) and use the appropriate design chart, depending on the location (i), and the proposed use of the building (iii – household or communal) to determine the minimum required storage, from the roof area (ii). The design charts are based on assumptions of points (iii) and (v) above.

DFS2.2 Tank material

Tanks must be designed specifically by the manufacturer for storing potable water.

Many materials are available. Where plastic, materials must be UV stabilised.

If the inside of tanks is coated, the coating must be compatible with potable water. The inside of the tank must not be painted with any ordinary paint.

DFS2.3 Erection of rainwater tanks and required fittings

It is best to erect rainwater tanks in a shady location (particularly if translucent or plastic) but away from falling leaves.

Rainwater tanks must be located on a suitable horizontal surface. Appropriate consideration needs to be given to the adequacy of the structure supporting the rainwater tank.

The inlet and overflow of rainwater tanks must be fitted with mosquito proof, non-degradable screens to ensure rainwater tank water quality and ventilation.

A removable inspection lid must be provided to allow access to undertake rainwater tank maintenance.

Rainwater tanks must be fitted with overflow pipes for the disposal of excess rainwater inflow. The overflow pipes fitted to tanks must be adequate to prevent uncontrolled overflow. Overflow pipes should not terminate near the rainwater tank support structure. Ideally, overflows should be routed to specifically designed soakaways or nearby wells.

As far as possible, pollutants such as organic matter and accumulated dust should be prevented from entering the system. As such, consideration should be given to 'first flush diverters', downpipe 'rain heads', or gutter screens.

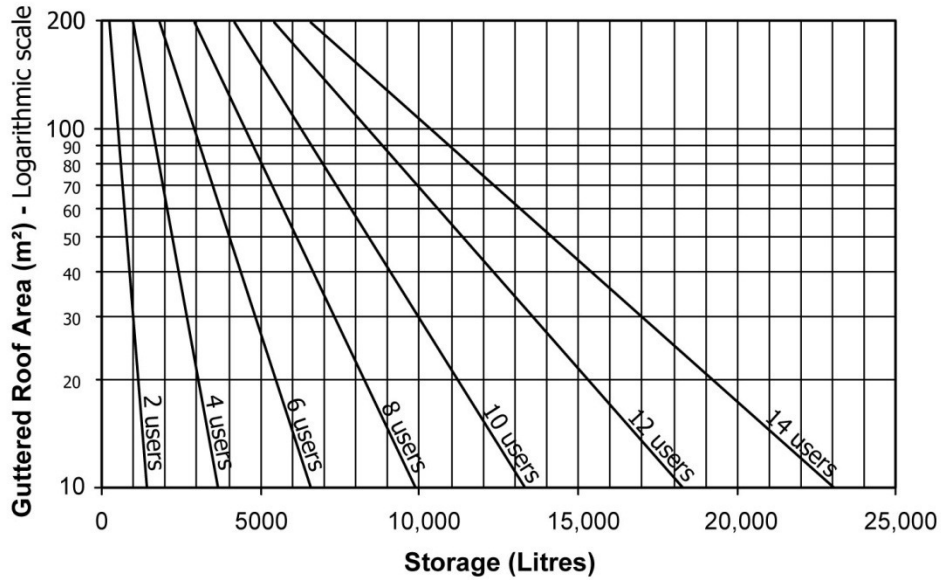
DFS2.4 Effect of roofing material and the environment

Rainwater in general is very pure and hence many metals dissolve in it much faster than in land based water. For instance if any lead is used in the roof for flashing or in the form of lead-based paint, the rainwater would leach the lead into the storage tank. If this happened the water would not be potable. The nature of the materials used in the roof must be ascertained and their safety confirmed before a decision is taken to use the run-off from the roof. In general galvanised iron sheets, zinc-aluminium coated sheets and a number of other products are safe.

DFS2.5 Design charts

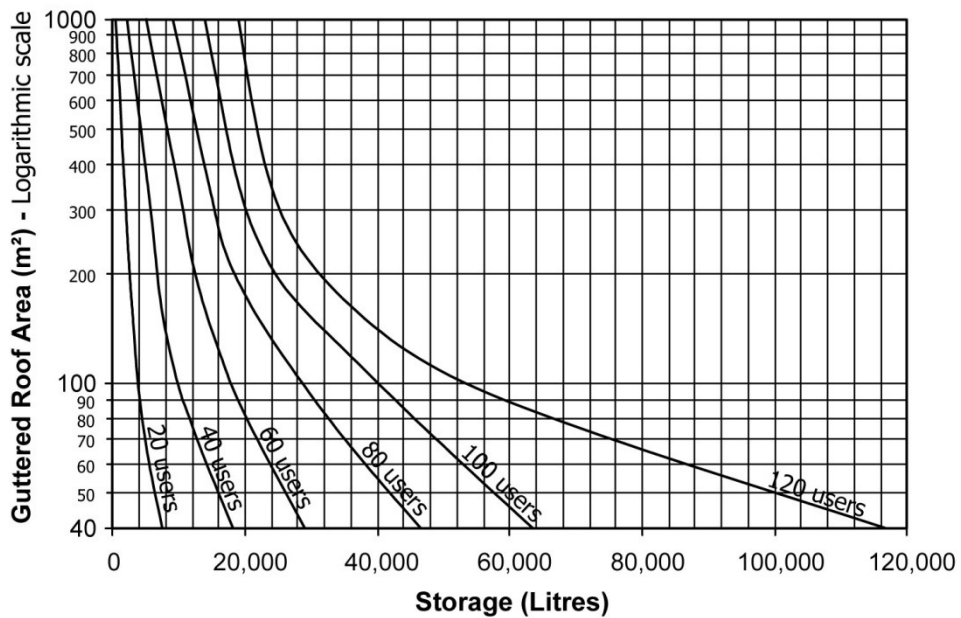
DFS2.5A

Required household storage, Tarawa and Northern Gilbert Islands



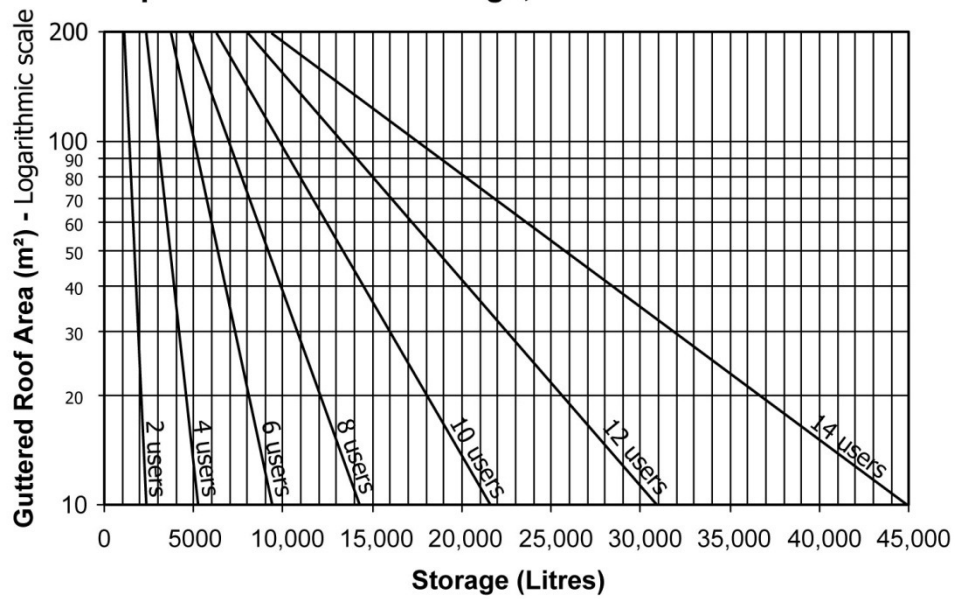
DFS2.5B

Required communal storage, Tarawa and Northern Gilbert Islands



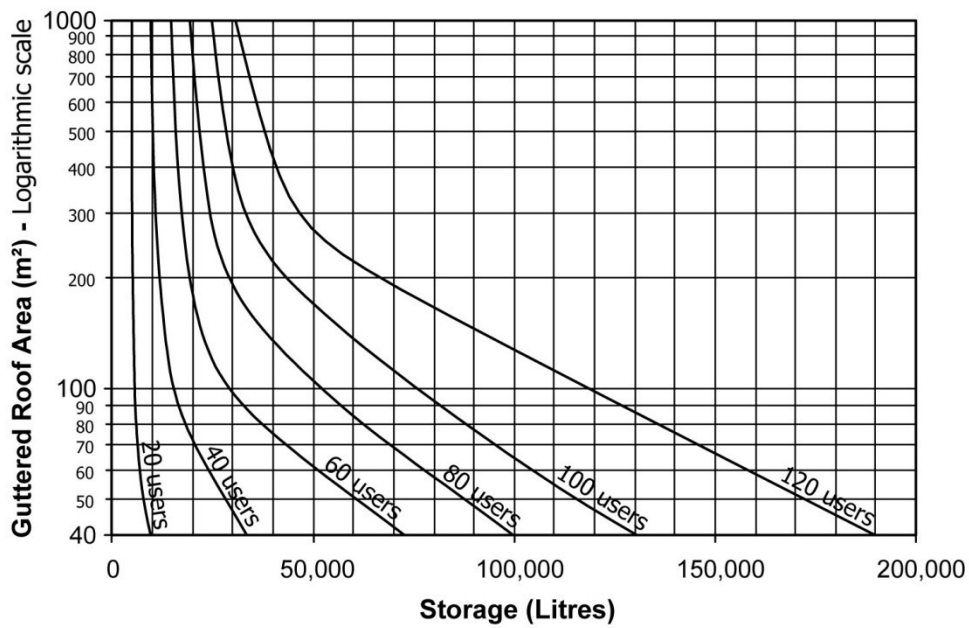
DFS2.5C

Required household storage, Southern Gilbert Islands



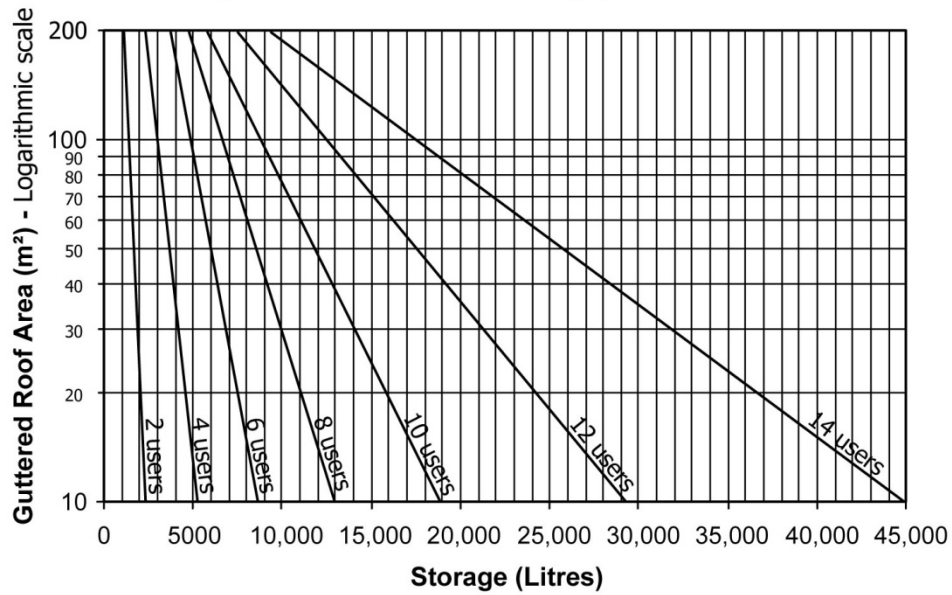
DFS2.5D

Required communal storage, Southern Gilbert Islands



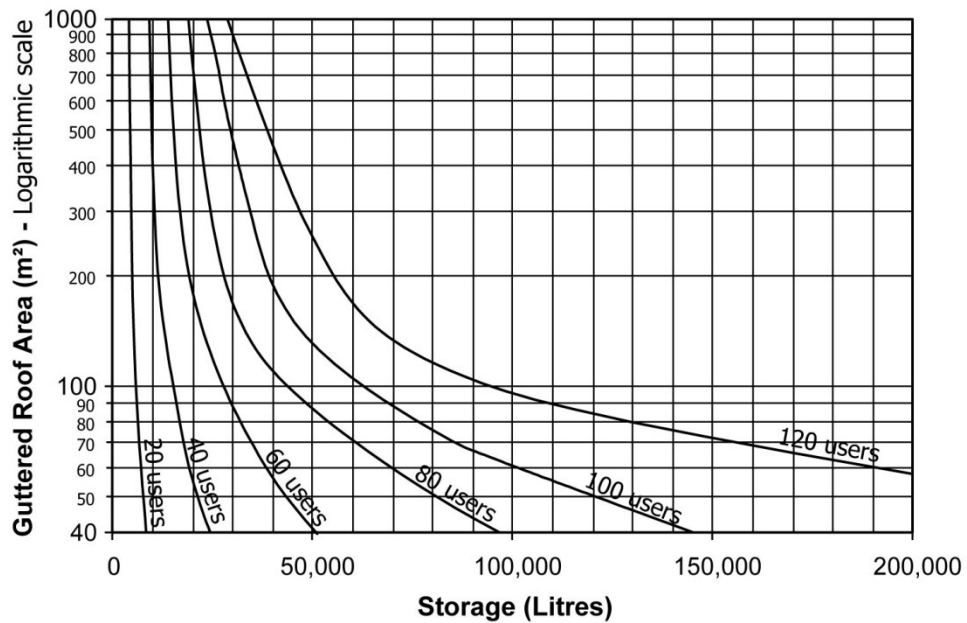
DFS2.5E

Required household storage, Phoenix Islands



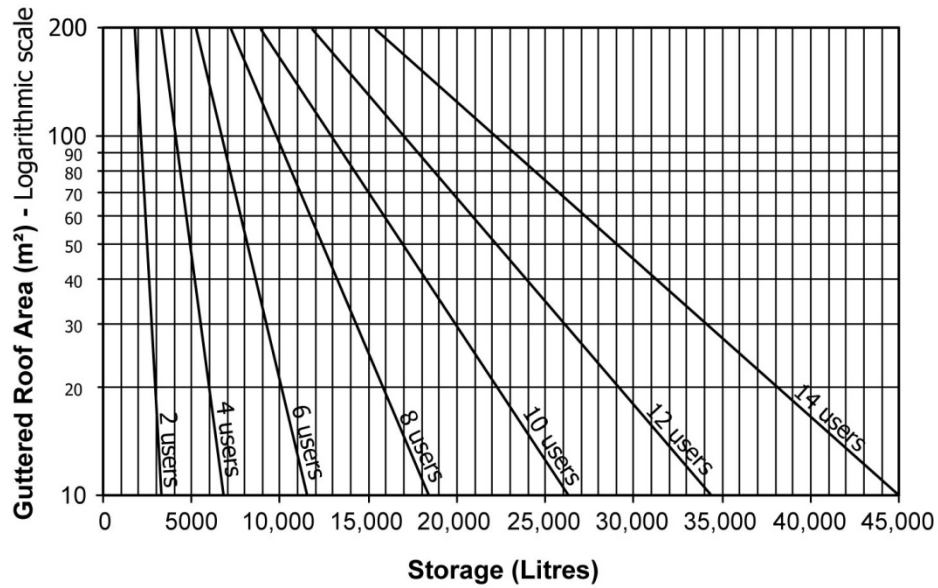
DFS2.5F

Required communal storage, Phoenix Islands



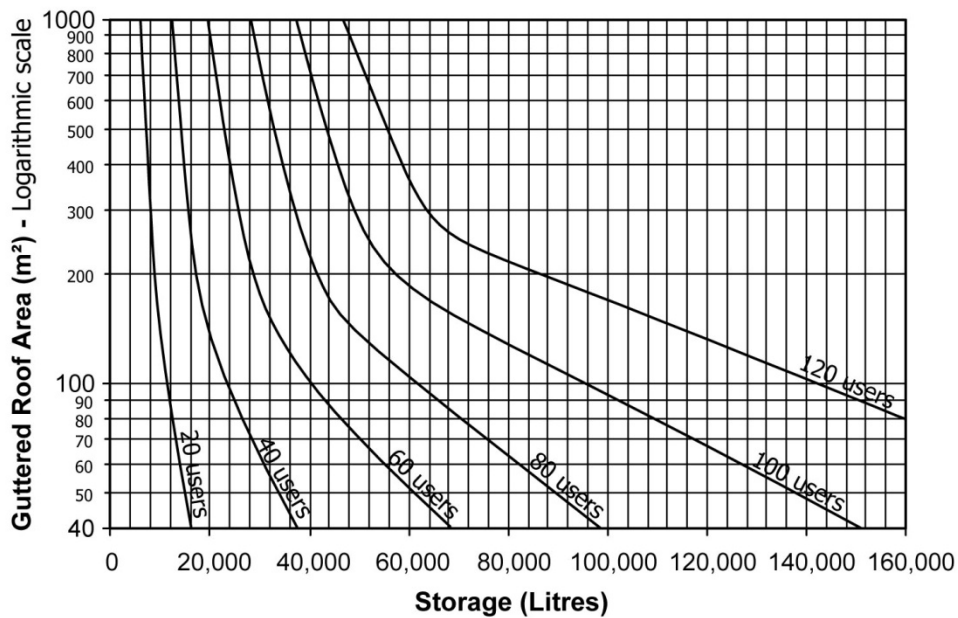
DFS2.5G

Required household storage, Line Islands



DFS2.5H

Required communal storage, Line Islands



**KIRIBATI
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DWELLINGS AND OUTBUILDINGS (CLASS 1 AND 1A)

SECTION DG

ANCILLARY PROVISIONS

**Performance Requirements
Deemed-to-Satisfy Provisions**

CONTENTS

PERMANENCE REQUIREMENTS DEEMED-TO SATISFY PROVISIONS

Part

DG1 Minor Structures and Components

DG1.1 Access to domestic-type water
heaters

DG1.2 Aesthetics

DG1.3 Poultry and other domestic animal
houses

Part

DG2 Gas Appliances, Fireplaces, Chimneys and Flues

DG2.1 General requirements

DG2.2 Open fireplaces deemed-to-
satisfy

DG2.3 Gas Appliances

OBJECTIVES

To regulate the design and construction of ancillary provisions in relation to Class1 and 1A Buildings, promoting health and safety.

PERFORMANCE REQUIREMENTS

DGP1 MINOR STRUCTURES AND COMPONENTS

DGP1.1 Domestic-type water heaters

Household water heaters must be adequately supported, drained, and accessible.

DGP1.2 Aesthetics

Any minor structure such as fencing, awnings and the like must be suited to the general surroundings as well as the occupancy of the building and the neighbourhood

DGP1.3 Poultry and other Domestic Animal Houses

Accommodation for animals and poultry must not lead to insanitary conditions for the occupier or neighbours and the public.

DEEMED-TO- SATISFY PROVISIONS

DGP1 MINOR STRUCTURES AND COMPONENTS

DG1 .1 Domestic-type water heaters

- (a) A household water heater which is installed in a building must –
 - (i) be supported on construction sufficient to carry its full capacity weight and any possible wind or earthquake loads;
 - (ii) be positioned to enable adequate access for operation, maintenance and removal; and
 - (iii) provide suitably for any overflow, especially if installed in a concealed location.
- (b) AS 1529 is the relevant standard for the installation of a household water heater.

DG1 .2 Aesthetics

Any fencing or free standing wall must be suited to the occupancy of the building within.

It must not detract from the general aesthetic appearance of the surroundings. If any barbed wire or other such is used it must be at a height of not less than 2 m above the finished level of any existing or intended adjacent footpath.

DG1.3 Poultry and other Domestic Animal Houses

A building used for keeping domestic birds or animals must be not less than:

- (a) 20m from any other building or source of potable water and from any boundary adjoining a public road or other public space; or
- (b) if the distances above are not achievable, provision should be made to ensure that neighbours are not affected by noise or odour, and adequate drainage should be supplied to an outlet location to comply with the restrictions of (a).

The floor of the building must be constructed of suitable material. Suitable arrangements must be made for the collection and disposal of animal wastes, so that they do not create a nuisance or encourage the breeding of flies and other pests.

PERFORMANCE REQUIREMENTS

DGP2 Gas Appliances, Fireplaces, Chimneys and Flues

Gas Appliances, Fireplaces, chimneys and flues must be adequately constructed or separated to prevent-

- (a) ignition of nearby parts of the building; or
- (b) escape or discharge of smoke to the inside of the building or to adjacent windows, inlets, or the like.

Pressure vessels located in a building are to be installed in a manner which will provide adequate safety for occupants.

When located in a building, a pressure vessel must be installed to avoid, during reasonable foreseeable condition, the likelihood of:

- (a) leakage from the vessel which could cause damage to the building; and
- (b) rupture or other mechanical damage of the vessel which could cause damage to the building or injury to occupants

DEEMED-TO- SATISFY PROVISIONS

DGP2 Gas Appliances, Fireplaces, Chimneys and Flues

DG2.1 General requirements

A chimney or flue must be constructed-

- (a) to withstand the temperatures likely to be generated by the appliance to which it is connected;
- (b) so that the temperature of the exposed faces will not exceed a level that would cause damage to nearby parts of the building;
- (c) so that hot products of combustion will not-
 - (i) escape through the walls of the chimney or flue; or
 - (ii) discharge in a position that will cause fire to spread to nearby combustible materials or allow smoke to penetrate through nearby windows, ventilation inlets, or the like;
- (d) in such a manner as to prevent rainwater penetrating to any part of the interior of the building;
- (e) such that its termination is not less than;
 - (i) 600 mm above any point of penetration of or contact with the roof; and
 - (ii) 900 mm above any opening or openable part in any building, within 3 m horizontal distance of the chimney or flue; and
- (f) so that it is accessible for cleaning.

DG2.2 Open fireplaces deemed-to-satisfy

An open fireplace, or solid-fuel burning appliance in which the fuel-burning compartment is not enclosed, satisfies DG2.1 if it has-

- (a) a hearth constructed of stone, concrete, masonry or similar non-combustible material so that-
 - (i) it extends not less than 300 mm beyond the front of the fireplace opening and not less than 150 mm beyond each side of that opening;
 - (ii) it extends beyond the limits of the fireplace or appliance not less than 300 mm if the fireplace or appliance is free-standing from any wall of the room;

PERFORMANCE REQUIREMENTS

DGP2 Gas Appliances, Fireplaces, Chimneys and Flues Contd.

Gas Appliances, Fireplaces, chimneys and flues must be adequately constructed or separated to prevent-

- (a) ignition of nearby parts of the building; or
- (b) escape or discharge of smoke to the inside of the building or to adjacent windows, inlets, or the like.

Pressure vessels located in a building are to be installed in a manner which will provide adequate safety for occupants.

When located in a building, a pressure vessel must be installed to avoid, during reasonable foreseeable condition, the likelihood of:

- (a) leakage from the vessel which could cause damage to the building; and
- (b) rupture or other mechanical damage of the vessel which could cause damage to the building or injury to occupants

DEEMED-TO- SATISFY PROVISIONS

DG2.2 Open fireplaces deemed-to-satisfy Contd.

- (iii) its upper surface does not slope away from the grate or appliance; and
 - (iv) combustible material situated below the hearth (but not below that part required to extend beyond the fireplace opening or the limits of the fireplace) is not less than 155 mm from the upper surface of the hearth;
- (b) walls forming the sides and back of the fireplace up to not less than 300 mm above the underside of the arch or lintel which -
- (i) are constructed in 2 separate leaves of solid masonry not less than 180 mm thick, excluding any cavity; and
 - (ii) do not consist of concrete block masonry in the construction of the inner leaf;
- (c) walls of the chimney above the level referred to in (b) -
- (i) constructed of masonry units with a net volume, excluding cored and similar holes, not less than 75% of their gross volume, measured on the overall rectangular shape of the units, and with an actual thickness of not less than 90 mm; and
 - (ii) lined internally to a thickness of not less than 12 mm with rendering consisting of 1 part cement, 3 parts lime, and 10 parts sand by volume, or other suitable material; and
- (d) suitable damp-proof courses or flashing to maintain weatherproofing.

DG2.3 Gas Appliances

Gas appliances are to be installed according to AG100.

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PUBLIC BUILDINGS AND GROUP DWELLINGS (CLASS 2, 2A AND 3, 3A)

SECTION NC

FIRE RESISTANCE

**Performance Requirements
Deemed-to-Satisfy Provisions**

CONTENTS

PERFORMANCE REQUIREMENTS DEEMED-TO-SATISFY PROVISIONS

Part

NC1 Fire Resistance and Stability

- NC1.1 Type of construction required
- NC 1.2 Calculation of rise in storeys
- NC1.3 Lightweight construction
- NC1.4 Early Fire Hazard indices

NC2 Compartmentation and Separation

- NC2.1 Application
- NC2.2 General floor area limitations
- NC2.3 Health care buildings
- NC2.3 Separation by fire walls
- NC2.4 Separation of classification in the same storey
- NC2.5 Separation of classification in different storeys
- NC2.6 Separation of classifications in different storeys
- NC2.7 Electrical substations

NC3 Protection of Openings

- NC3.1 Application of Part
- NC3.2 Openings in external walls

Part

- NC3.3 Separation of openings in different fire compartments
- NC3.4 Doorways in firewalls
- NC3.5 protection of doorways in horizontal exits
- NC3.6 Opening in exits
- NC3.7 Services in exits
- NC3.8 Bounding constructions Class 2 and 3 buildings
- NC3.9 Openings for service installations
- NC3.10 Installation deemed to satisfy

Specifications

Specification NCS1:

Fire-resisting construction

Specification NCS2:

Early Fire Hazard Indices

Specification NCS3:

Fire doors, smoke doors, fire windows and shutters

Specification NCS4:

Penetration of Walls, Floors and Ceilings by services

OBJECTIVES

The design and construction of building must fulfil the following objectives -

Fire Resistance and Stability

- (a) A building must be constructed so that it is protected from fire in any other building.
- (b) Materials used in the construction must be such that if there is a fire in the building -
 - (i) the spread of fire and the generation of smoke and toxic gases will be minimised;
 - (ii) stability will be maintained for a period at least sufficient for the occupants to escape and to ensure the safety of fire-fighters; and
 - (iii) there will be little risk of collapse onto adjoining property.

Compartmentalisation and Separation

Buildings must be constructed to localise the effects of fire to the areas of origin. Adequate levels of passive fire protection must be provided so that sufficient time is available for the users and others to escape from the effects of fire and as an alternative, to allow the users to stay safely within unaffected compartments for the duration reasonably required to put out the fire by active means.

Protection of Openings

Openings must be protected and service penetrations must be fire-stopped to maintain separation and compartmentalisation.

PERFORMANCE REQUIREMENTS

NCP1 Fire Resistance and Stability

In order to maintain the *structural adequacy* and stability of any building for a sufficient time for the safety of the users, those who fight fires and others, the following must be ensured -

- (a) the load bearing elements must have the FRL (Determined in accordance with Specification DCS1) appropriate to
 - i. their function in the building and;
 - ii. the expected fire load density and;
 - iii. the fire risk and;
 - iv. the height of the building and;
 - v. its location with reference to the availability of external fire fighting resources and;
 - vi. the fire control measures available within the building.
- (b) the FRL of structural elements must be at least equal to the other elements to which they provide support; and
- (c) the collapse of elements with a lower FRL must not result in the collapse of elements with a higher FRL.

DEEMED-TO- SATISFY PROVISIONS

NC1 Fire Resistance and Stability

NC1.1 Type of construction required

- (a) The minimum level of *fire-resisting construction* must be that given in Specification NCS1.

NC1.2 Calculation of rise in storeys

In a building of Class 2 or 3, a storey that has an average height of more than 6m is counted as:

- a) One storey if it is the only storey above the ground; or
- b) 2 storeys in any other case

NC1.3 Lightweight construction

Lightweight construction must be of such material and such construction that it is not easily damaged by the ordinary use of the building.

NC1.4 Early Fire Hazard Indices

The Early Fire Hazard Indices of materials and assemblies inside Class 2 and 3 buildings must comply with Specification NCS2.

PERFORMANCE REQUIREMENTS

NCP2 Compartmentalisation and Separation

The size of fire compartment must also be consistent with the fire severity of the fire load density it contains and the likely spread of fire between it and any other compartment, storey or building.

Building compartment size and separating construction must be such that the potential size of a fire and the spread of fire and smoke are limited in order to -

- (a) protect the occupants of one part of the building from the effects of fire elsewhere in the building.
- (b) control the spread of fire or smoke to adjoining buildings; and
- (c) facilitate access to the building by fire-fighters.

DEEMED-TO- SATISFY PROVISIONS

NC2 Compartmentalisation and Separation

NC2.1 Application

This Part applies to all Class 2, 2A, 3 and 3A buildings.

NC2.2 General floor area limitations

- (a) Subject to NC2.3 the size of any *fire compartment* in a building must not exceed the relevant maximum floor area and volume set out in Table NC2.2.
- (b) A part of a building which contains only water tanks or similar service units is not counted in the floor area or volume of a fire compartment if it is situated at the top of the building.

Table NC 2.2 Maximum size of fire Compartments

	Max floor area	Max volume
Class 2 & 2A	500m ²	2000m ³
Class 3 & 3A	1000m ²	4000m ³

NC2.3 Health care buildings

A health care building must be divided into *fire compartments* with a *floor area* of not more than 500m² and further subdivided with walls of minimum FRL of 30/30/30 into floor areas of not more than 250m². *Fire compartments* must be separated from the remainder of the building by *fire walls* with a FRL of not less than 60/60/60.

NC2.4 Separation by fire walls

A part of a building separated from the remainder of the building by a *fire wall* is treated as a separate building if:

- (a) the *fire wall*:
 - (i) extends through all the *storeys* and spaces in the nature of the *storeys* that are common to that part and any adjoining part of the building;
 - (ii) is carried through to the underside of the roof covering; and
 - (iii) has the relevant FRL prescribed by the specification NCS1 for each of the adjoining parts; and if these are different, the greater FRL;
- (b) any opening in a *fire wall* comply with Part NC3;

PERFORMANCE REQUIREMENTS

NCP2 Compartmentalisation and Separation

The size of fire compartment must also be consistent with the fire severity of the fire load density it contains and the likely spread of fire between it and any other compartment, *storey* or building.

Building compartment size and separating construction must be such that the potential size of a fire and the spread of fire and smoke are limited in order to -

- (a) protect the occupants of one part of the building from the effects of fire elsewhere in the building.
- (b) control the spread of fire or smoke to adjoining buildings; and
- (c) facilitate access to the building by fire-fighters.

DEEMED-TO- SATISFY PROVISIONS

NC2.4 Separation by fire walls Contd.

- (c) timber purlins or other combustible material do not pass through or cross the *fire wall* and;
- (d) where the roof of one of the adjoining parts is lower than the roof of the other part the design of the building must restrict the spread of fire from the lower part to the higher part.

NC2.5 Separation of classifications in the same storey

If a building has parts of different classifications located alongside one another in the same *storey*:

- a) Each building element in that *storey* must have the higher FRL prescribed in Specification NCS1 for that element for the classification concerned; or
- b) The parts must be separated in that storey by a *fire wall* with whichever is the greater of the higher FRL prescribed in Specification NCS1 for the classification concerned.

NC2.6 Separation of classifications in different storeys

If one of the adjoining parts is of Class 2 and if parts of different classification are suited one above the other in adjoining *storeys* they must be separated as follows:

The underside of the floor (including the sides and underside of any floor beams) must have a *fire protective covering*.

NC2.7 Electricity substations

If an electricity substation is situated within a building-

- (a) it must be separated from any other part of the building by construction having a FRL of not less than 60/60/60;
- (b) doors, windows and any other openings on external wall need not have a FRL if such openings are no closer to a *fire source feature* or *exit* than 3m. Any other doorway including those opening to any other part of the building must be protected with *self closing* -/60/30 fire doors;
- (c) electricity supply cables between a main and the substation, and between the substation and the main switchboard, must be enclosed or otherwise protected by construction having a FRL of not less than 60/60/60; and
- (d) any openings, fans or grilles for natural or mechanical ventilation must be located only on an external wall unless protected with an *automatic* -/60/30 fire shutter.

PERFORMANCE REQUIREMENTS

NCP 3 Protection of Openings

Openings of any nature in the envelope surrounding fire compartments must be so protected that they do not allow the passage of dangerous amounts of heat, flames, smoke and gases in the event of a fire within or outside the compartment and for a period sufficient to -

- (a) allow the safe evacuation of all affected people; and
- (b) allow fire fighters to fight the fire.

The sufficiency of the duration allowed must take into account the nature of occupancy of the building as well as the proximity of other buildings and their occupancy.

DEEMED-TO- SATISFY PROVISIONS

NC3 Protection of Openings

NC3.1 Application of this Part

- (a) This Part does not apply to:
 - (i) control joints, weep holes, and the like, in masonry construction, and joints between pre-cast concrete panels, if they are not larger than necessary for the purpose; or
 - (ii) *non-combustible* ventilators for sub-floor or cavity ventilation, if each does not exceed 45×10^3 mm in face area and is spaced not less than 2m from any other ventilator in the same wall
- (b) This Part applies to openings in building elements required to be fire-resisting, including doorways, windows (including any associated fanlight or infill panel) and other fixed or openable glazed areas that does not have the required FRL.

NC3.2 Openings in external walls

- (a) Openings in an external wall must be not less distant than 1.5 m from any *fire source feature*.
- (b) Where openings require protection such as fire doors, fire windows etc. these must comply with Specification NCS3.

NC3.3 Separation of openings in different fire compartments

The distance between openings in external walls in compartments separated by a fire wall must not be less than that set out in Table NC3.3.

Table NC 3.3 Distance between openings in different compartments.

Angle	Between walls	Min. distance between openings
From	0° to 45°	5m
more than	45° to 90°	4m
more than	90° to 135°	3m
more than	135° to 180°	2m

NC3.4 Doorways in fire walls

The aggregate width of openings for doorways in a fire wall which are not part of a *horizontal exit* must not exceed 1/2 of the length of the *fire wall*, and each doorway must be protected by a single fire door or a non-metallic fire shutter, which:

- (i) has a FRL of not less than that required by Specification NCS1 for the *fire wall*, and;
- (ii) is *self-closing* or *automatic* if the *automatic* closing device is designed to operate if there is smoke in the part of the building on either side of the *fire wall*.

PERFORMANCE REQUIREMENTS

NCP3 Protection of Openings Contd.

Openings of any nature in the envelope surrounding fire compartments must be so protected that they do not allow the passage of dangerous amounts of heat, flames, smoke and gases in the event of a fire within or outside the compartment and for a period sufficient to -

- (a) allow the safe evacuation of all affected people; and
- (b) allow fire fighters to fight the fire.

The sufficiency of the duration allowed must take into account the nature of occupancy of the building as well as the proximity of other buildings and their occupancy.

DEEMED-TO- SATISFY PROVISIONS

NC3.5 Protection of doorways in horizontal exits

A doorway that is part of a *horizontal exit* must be protected by a single fire door which has a FRL of not less than that required by Specification NCS1 for the *fire wall*.

NC3.6 Openings in exits

(a) A doorway that does not open to a road or *open space* must be protected by a *self-closing* or *automatic -/60/30* fire door if it opens to a stairway, passageway or ramp.

(b) A window must not be located in an *external wall* of a stairway, passageway or ramp if it is within 6m of, and exposed to -

- (i) a fire-source feature; or
- (ii) another window or other opening in a wall of the same building, unless they both serve the same fire-isolated enclosure.

NC3.7 Services in exits

Exits must not have any services other than-

- (a) electrical wiring associated with a lighting system serving the exit, or
- (b) water supply pipes for fire services and domestic use.

NC3.8 Bounding construction: Class 2, 2A 3, and 3A buildings

- (a) A doorway in a Class 2 or 3 building must be protected if it provides access from a sole- occupancy unit to:
 - (i) a *public corridor*, public hallway, or the like;
 - (ii) a room not within a *sole-occupancy unit*;
 - (iii) the landing of an internal stairway that serves as a required *exit*; or
 - (iv) another *sole occupancy unit*
- (b) Protection for a doorway must be at least a *self-closing*, tight fitting, solid core door, not less than 35 mm thick.
- (c) Other openings in internal walls which are required to have a FRL to inhibit the lateral spread of fire must not reduce the fire-resisting performance of the wall.

NC3.9 Openings for service installations

An electrical, electronic, plumbing, mechanical ventilation or air-conditioning, or other service that penetrates a building element (other than an external wall or roof) that is required to have a FRL or a resistance to the incipient spread of fire, must be installed so that the fire-resisting performance of the building element is not impaired.

PERFORMANCE REQUIREMENTS

NCP3 Protection of Openings Contd.

Openings of any nature in the envelope surrounding fire compartments must be so protected that they do not allow the passage of dangerous amounts of heat, flames, smoke and gases in the event of a fire within or outside the compartment and for a period sufficient to -

- (a) allow the safe evacuation of all affected people; and
- (b) allow fire fighters to fight the fire.

The sufficiency of the duration allowed must take into account the nature of occupancy of the building as well as the proximity of other buildings and their occupancy.

DEEMED-TO- SATISFY PROVISIONS

NC3.10 Installation deemed-to-satisfy

Installation satisfies NC3.9 if -

- (a) the method and materials used are identical with a prototype assembly of the service and building element which has achieved the *required* FRL or *resistance to the incipient spread of fire*;
- (b) it complies with (a) except for the *insulation* criterion relating to the service when:
 - i. the service is farther than 100mm from *any combustible* material; and
 - ii. it is not located in a *required exit*
- (c) the service is a metal pipe installed in accordance with Specification NCS4 and it penetrates a wall, floor or ceiling, but not a ceiling required to have a resistance to the incipient spread of fire;
- (d) the service is sanitary plumbing installed in accordance with Specification NCS4 and it -
 - (i) is of metal or UPVC pipe; and
 - (ii) is in sanitary compartments which are separated from other parts of the building by walls with the FRL required by Specification NCS1 for a stair shaft in the building and a self-closing - /60/30 fire door;
- (e) the service is a wire or cable, or a cluster of wires or cables installed in accordance with Specification NCS4 and it penetrates a wall, floor or ceiling, but not a ceiling required to have a resistance to the incipient spread of fire;
- (f) the service is an electrical switch, outlet, or the like, and it is installed in accordance with Specification NCS4.

NCS1: FIRE-RESISTING CONSTRUCTION

1. Scope

This specification contains requirements for the *fire-resisting* construction of building elements.

2. GENERAL REQUIREMENTS

2.1 Exposure to fire-source features

(a) a part of the building element is exposed to a *fire source feature* if there is no obstruction to any horizontal line between that part and the *fire-source feature* or a vertical projection of the feature projection of the feature. Where another part of the building obstructs any such horizontal line, the part under construction will still be considered exposed if the obstruction has:

- (i) A FRL of not less than 30/-/-; or
- (ii) is transparent or translucent

(b) If various distances apply for different parts of a building element:

- (i) the entire element must have the FRL applicable to that part having the least distance between itself and the relevant *fire source feature*, or
- (ii) each part of the element must have the FRL applicable according to its individual distance from the relevant *fire source feature*,

but this provision does not override or permit any exemption from Clause 2.2.

2.2 Fire protection for a support of another part

A part of a building that gives direct vertical or lateral support to another part required to have a FRL, must have a FRL in respect of a *structural adequacy* not less than the greater of:

- (a) that *required* for the part it supports; or
- (b) that *required* for the part itself,

and be *non combustible* if the part supports is *required* to be *non combustible*.

2.3 Lintels

A lintel must have a FRL *required* for the part of the building in which it is situated. It need not have the FRL if it does not contribute to the support of a fire door, fire window or fire shutter, and:

- (a) it spans an opening in
 - (i) a wall of a building containing only one storey;
 - (ii) a non-load bearing wall of a Class 2 or 3 building; or

(b) it spans an opening in masonry which is not more than 150 mm thick and -

- (i) not more than 3 m wide if the masonry is non load bearing, or
- (ii) not more than 1.8 m wide if the masonry is load bearing and part of one of the leaves of a cavity wall.

2.4 Attachments not to impair fire-resistance

(a) A combustible material may be used as a finish or lining to a wall or roof, or in a sign, sunscreen or blind, awning, or other attachment to a building element which has the required FRL if :

- (i) the material is exempt under Clause 5 of the specification NC2 or complies with the Early Fire Hazard Indices prescribed in Clause 2 of the same specification.
- (ii) it is not located near or directly above a *required exit* so as to make the *exit* unusable in a fire; and
- (iii) it does not otherwise constitute an undue risk of fire spread via the façade of the building.

(b) the attachment of a facing or finish, or the installation of ducting or any other service, to a part of a building *required* to have a FRL must not impair the *required* FRL of that part.

2.5 General concessions

(a) Steel columns - Except in a fire wall or common wall, a steel column need not have a FRL in a building that contains only one storey.

(b) Timber Columns - In a building that contains only one storey, a timber column may be used in a building provided:

- (i) in a fire wall or common wall the column has the required FRL
- (ii) in all other cases the column has a FRL of not less than 30/-/-

(c) Structures on roofs – a *non combustible* structure situated on a roof need not comply with the other provisions of this Specification if it only contains one or more of the following:

- (i) hot water or other tanks
- (ii) other service units that are *non combustible* and do not contain *combustible* fluids.

3. TYPE OF FIRE RESISTING CONSTRUCTION

3.1 Fire resistance of building elements

In a building *required* to be of fire resisting construction:

(a) a building element listed in Table 3 and any beam or column incorporated in it must have a FRL not less than that listed in the Table for that particular Class of building concerned;

(b) an *external wall* that is required by Table 3 to have a FRL may be considered to have a FRL if the outer part of the wall has the required FRL;

(c) a *fire wall* or an internal wall bounding a *sole occupancy unit* or separating adjoining units, if it is of lightweight construction, must comply with Specification NC1.3.

(d) In a Class 2 or 3 building an *internal wall* which is *required* by table 3 to have a FRL must extend:

(i) to the underside of the floor next above if that floor has a FRL of at least 30/30/30 or a fire *protective coating* on the underside of the floor:

(ii) to the underside of a ceiling having a *resistance* to the incipient spread of fire to the space above itself of not less than 60 minutes; or

(iii) to the underside of the roof covering if it is *non-combustible* or 450 mm above the adjoining roof covering if it is *combustible* and must not be crossed by timber purlins or other *combustible* material,

- unless the walls bounds a *sole occupancy unit* in the topmost (or only) *storey* and there is only one unit in that *storey*, and

(e) all *external walls* and *fire walls* within 1.5m of the boundary adjoining a public road or stream or other open water channel, must be extended to not less than 450mm above the adjoining roof line to form a parapet.

TABLE NC 3 FIRE RESISTANCE LEVEL OF BUILDING ELEMENTS

Insulation	FRL (in minutes)	
	Structural Adequacy/Integrity/	
Building Element	Class of Building	
	2	3
External wall or other external building element excluding a roof where the distance from any <i>fire source feature</i> to which it is exposed is-		
less than 1.5m	60/-/-	60/60/60
External column not incorporated in a <i>external wall</i> where the distance from any <i>fires source feature</i> to which it is exposed is-		
less than 1.5m	60/-/-	60/60/60
Common walls and fire walls-	60/60/60	60/60/60
Internal walls-	30/30/30	30/30/30
Floors-	30/30/30	30/30/30

NCS2: EARLY FIRE HAZARD INDICES

1. Scope

This Specification sets out requirements in relation to the Early Fire Hazard Indices of materials, linings and finishes inside buildings.

2. Class 2 and 3 buildings:

General requirements

Except where superseded by clause 3 or 4, any material or component used in a building must -

- (a) in the case of a *sarking-type* material, have a Flammability index not more than 5;
- (b) in the case of other materials, have -
 - (i) a Spread-of-Flame index not more than 9;
 - (ii) a *Smoke Developed Index* of not more than 8 if the *Spread of Flame Index* is more than 5;
- (c) be completely covered on all faces by concrete or masonry not less than 50mm thick; or
- (d) in the case of a composite members or assembly be constructed so that when assembled as proposed in a building-
 - (i) any material which does not comply with (a) or (b) is protected on all sides and edges from exposure to the air;
 - (ii) the member or assembly when tested in accordance with Specification A2.4 has a *Smoke Developed Index* and a *spread of flame Index* not exceeding those prescribed in (b); and
 - (iii) the member or assembly retains the protection in position so it prevents ignition of the material and continues to screen it from access to free air for a period of not less than 10 minutes.

3 Acceptable materials

A material complies with Clause 2 if it is-

- (a) plaster, cement render, concrete terrazzo, ceramic tile or the like, or
- (b) a *fire protective covering*

4 Fire retardant coatings

When paint or fire retardant coatings are used in order to make a substrate comply with a required Spread of Flame Index, Smoke Developed Index or Flammability Index this fact must be clearly marked on an easily visible label or labels and permanently fixed to the building elements so that the coating will not be scrapped off or otherwise made ineffective, without recoating to preserve the fire retardant properties. If any coatings used will retain the *required* fire retardant properties for a limited period, it must be replaced before the expiry of

such period so that the *required* properties are not diminished.

5 Exempted building parts and materials

The requirement in this specification for a *Spread of Flame Index*, *Smoke Developed Index* or *Flammability Index* do not apply to-

- (a) timber framed windows;
- (b) solid timber handrails or skirtings;
- (c) timber faced solid core or fire doors;
- (d) electrical switches, outlets, cover plates or the like
- (e) materials used for-
 - (i) roof covering or membranes or roof insulating material applied in continuous contact with a substrate;
 - (ii) adhesives, or
 - (iii) damp proof courses, flashings, caulking, sealing, ground moisture barriers or the like;
- (f) paint, varnish, lacquer or similar finish, other than nitro cellulose lacquer;
- (g) a clear or translucent roofing of glass fibre reinforced polyester if-
 - (i) the roof in which it is installed forms part of a building in fire resisting construction;
 - (ii) the material used as part of the roof covering;
 - (iii) it is not prohibited by any other clause of this Code;
 - (iv) it is not closed than 1.5 m from another roof light of the same type
 - (v) each roof lights is not more than 20% of the roof surface; or
- (h) any other material which does not significantly increase the hazard of fire.

NCS3: FIRE, SMOKE DOORS, FIRE WINDOWS AND SHUTTERS

1 Scope

This Specification sets out requirements for the construction of fire doors, smoke doors, fire windows and fire shutters.

2 Fire doors

A required fire door must comply with NZS 4232 except that

- (a) it may be fully glazed or incorporate glazing if the tested prototype was similarly glazed;
- (b) the radiation level at a distance of 365mm from the face of the glazing must not exceed 10 kW/m during the period corresponding to that for *integrity* in the required FRL;
- (c) the rise in average temperature on the side of the tested prototype remote from the furnace must not exceed 140°C (except in any glazed part) during the first 30 minutes of the fire test.

3 Smoke doors

A required smoke door-

- (a) may have one or 2 door leaves;
- (b) must swing -
 - (i) in the direction of egress; or
 - (ii) in both directions if the path of travel to exits in either direction;
- (c) must be self-closing and may be fitted with an automatic release device; and
- (d) must be constructed of-
 - (i) solid core at least 35mm thick, glazed panels in a timber frame at least 35mm thick or a metal frame with a mid rail or suitable crash bar, or
 - (ii) PVC or other suitable material,

and if necessary be fitted with smoke seals.

4 Fire Shutters

A required fire shutter must be a shutter that-

- (a) is identical with a tested prototype that has achieved the *required* FRL;
- (b) is installed in the same manner and in an opening that is not larger than the tested prototype; and
- (c) does not have a rise in average temperature on the side remote from the furnace of more than 140°C during the first 30 minutes of the test.

5 Fire Windows

A required fire window must be-

- (a) identical in construction with a prototype that has achieved the *required* FRL; and
- (b) installed in the same manner and in an opening that is not larger than the tested prototype.

NCS4 - PENETRATION OF WALLS, FLOORS AND CEILINGS BY SERVICES

1 Scope

This Specification prescribes materials and methods of installation for services that penetrate walls, floors and ceilings required to have a FRL.

2. Application

- (a) This Specification applies to installations permitted under this Code as alternatives to systems that have been demonstrated by tests to fulfill the requirements of NCS4.
- (b) This Specification does not apply to installation in ceilings *required* to have a *resistance to the incipient spread of fire* or the installation of piping that contains or is intended to contain a flammable liquid or gas.

3 Metal pipes

- (a) a metal pipe that is not normally filled with liquid must not penetrate a wall, floor or ceiling within 100mm of any *combustible* material unless wrapped or fire stopped to satisfy the requirements of Clause 7 and must be constructed of:
 - (i) Copper alloy or stainless steel with a wall thickness of at least 1mm; or
 - (ii) cast iron steel (other than stainless steel) with a wall thickness of at least 2mm.
- (b) an opening for a metal pipe must-
 - (i) be neatly formed, cut or drilled;
 - (ii) be no closer than 200mm to any other service penetration; and
 - (iii) accommodate only one pipe.
- (c) A metal pipe must be wrapped but must not be lagged or enclosed in thermal insulation over the length of penetration of a wall, floor or ceiling unless the lagging or thermal insulation fulfils the requirements in clause 7.
- (d) the gap between a metal pipe and the wall, floor or ceiling it penetrates must be fire stopped in accordance with clause 7.

5. Wires and cables

If a wire of cable or cluster of cables penetrates a floor, wall or ceiling-

- (a) the opening must be neatly formed, cut or drilled and no closer than 50mm to any other service opening; and
- (b) the opening must be no larger in cross sectional area than-
 - (i) 2000 mm² if only a single cable is accommodated and the gap between

the cable and wall, floor or ceiling is no wider than 15mm; or

- (ii) 500mm² in any other case; and
- (b) the gap between the service and wall, floor or ceiling must be fire stopped in accordance with clause 7.

6 Electrical switches and outlets

If an electrical switch, outlet or socket or the like is accommodated in an opening or recess in a wall, floor or ceiling-

- (a) the opening or recess must not-
 - (i) be located opposite any point within 300mm horizontally nor 600mm vertically of any opening or recess on the opposite side of the wall; nor
 - (ii) extend beyond half the thickness of the wall; and
- (b) the gap between the service and the wall, floor or ceiling must be fire stopped in accordance with clause 7.

7 Fire stopping

(a) **Material:** The material used for fire stopping of service penetrations must be concrete, high temperature mineral fibre, high temperature ceramic fibre or other material that does not allow flow at a temperature below 1120°C when tested in accordance with AS 1038. And must have-

- (i) demonstrated in a system tested in accordance with NC3.10(a) of this Code that it does not impair the fire resisting performance of the building element in which it is installed; or
- (ii) demonstrated in a test in accordance with (e) that it does not impair the fire resisting performance of the test slab

(b) **Installation:** Fire stopping material must be packed into the gap between the service and wall, floor or ceiling in a manner and compressed to the same degree as adopted for testing under 7(a)(i) or (ii).

(c) **Hollow construction:** If a pipe penetrated a hollow wall (such as a stud wall, a cavity wall or a wall of hollow block work) or a hollow floor/ceiling system, the cavity must be so framed and packed with fire stopping material that the material is-

- (i) installed in accordance with 7(b) to a thickness of 25mm all round the service for the full length of the penetration; and

- (ii) restrained, independently of the service, from moving or parting from the surfaces of the service and of the wall, floor or ceiling.
- (d) **Recesses:** If an electrical switch, socket, outlet or the like is accommodated in a recess in a hollow wall or hollow floor/ceiling system-
- (i) the cavity immediately behind the service must be framed and packed with fire stopping material in accordance with 7(c); or
 - (ii) the back and sides of the service must be protected with refractory lining board identical with and the same thickness as that in which the service is being installed.
- (e) **Test:** the test to demonstrate compliance of a fire stopping material with this specification must be conducted as follows:
- (i) The test specimen must comprise a concrete slab not less than 1m square and not more than 100mm thick, and appropriately reinforced if necessary for structural adequacy during manufacturer, transport and testing.
 - (ii) The slab must have a hole 50mm in diameter through the centre and the hole must be packed with the fire stopping material.
 - (iii) The slab must be conditioned in accordance with AS 1530.4.
 - (iii) Two thermocouples complying with AS 1530.4 must be attached to the upper surface of the packing each about 5mm from its centre.
 - (v) The slab must be tested on flat generally in accordance with Section 10 of AS 1530.4 and must achieve a fire resistance of 60/60/60 or better.

**KIRIBATI
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PUBLIC BUILDINGS AND GROUP DWELLINGS (CLASS 2, 2A AND 3, 3A)

SECTION ND

ACCESS AND EGRESS

**Performance Requirements
Deemed-to-Satisfy Provisions**

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OBJECTIVES

A building must be so designed and constructed that the following objectives are fulfilled.

Provision for Escape

There must be adequate means of escape in case of fire or other emergency from all parts of the building to a place of safety.

Construction of Exits

(a) Stairways, ramps and passageways must be such as to provide safe passage for the users of the building.

(b) Stairway, ramps, floors higher than 0.5m above the ground, balconies, and any roof to which people normally have access, must have bounding walls, balustrades or other barriers where necessary to protect users from the risk of falling-

(c) Vehicle ramps and any floors to which vehicles have access must have kerbs or other barriers where necessary to provide protection to pedestrians and to the structure of the building.

Access for People with Disabilities

Reasonable provision must be made in the design of a building, having regard to its use and location, to facilitate access and circulation by people with disabilities.

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

DEEMED-TO- SATISFY PROVISIONS

ND1 Provision for Escape

ND1.1 Applications

This Part applies to all buildings except the internal parts of a sole-occupancy unit in a Class 2 building.

ND1.2 Number of exits required

- (a) **All buildings** – Every building must have at least one required exit.
- (b) **Health –care buildings** – In addition to any horizontal exit, and subject to (c) not less than 2 exits must be provided from any storey which includes a ward area.
- (c) **Exits from divided wards:** In a health – care building, at least one exit must be provided from every portion of a storey which has been divided in accordance with NC2.3.

ND1.3 Exits travel distances

- (a) **Class 2 or 2A buildings:**
 - (i) The entrance doorway of any sole-occupancy unit must be more than 6m from an exit or from at point at which travel in different directions to 2 exits is available; and

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

DEEMED-TO- SATISFY PROVISIONS

ND1.3 Exits travel distances Contd.

(a) Class 2 or 2A buildings Contd.:

- (ii) no point on the floor of a room which is not in a sole-occupancy unit must be more than 20m from an exit or from a point at which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40m from the starting point.

(b) Class 3 or 3A buildings:

Subject to (c):

- (i) No point on a floor must be more than 20m from an exit, or from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40m from the starting point

(c) Health-care buildings: in a ward area in a health-care building –

- (i) No point on the floor must be more than 12m from a point from which travel in different directions to 2 of the required exits is available; and
- (ii) the maximum distance to one of those exits must not be more than 30m from the starting point.

ND1.4 Distance between alternative exits

Exits that are required as alternative means of egress must be –

- (a) distributed as uniformly as practicable within or around the storey served;
- (b) not less than 9m apart; and
- (c) not more than 45m apart in a Class 2 building or a storey containing a ward area in a health-care building.

ND1.5 Dimensions of exits

In a required exit or path of travel to an exit -

- (a) for Class 2 and 3 Buildings the unobstructed height throughout must be not less than 2m;
- (b) for Class 2A and 3A Buildings, the unobstructed height throughout must be not less than 0.8m
- (c) if the storey pertains to a Class 2 or 2A building or accommodates not more than 100 persons, the unobstructed width except for doorways must be -
 - (i) not less than 1m; or
 - (ii) 2m in a passageway from a ward area;

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

DEEMED-TO- SATISFY PROVISIONS

ND1.5 Dimensions of exits Contd.

- (d) if the storey accommodates more than 100 persons the aggregate width, except for doorways must be not less than –
 - (i) 1m plus 250mm for each (50) persons (or part) in excess of 100; or
 - (ii) 2m in a passageway from ward area in health care buildings;
- (e) the clear openings of a doorway must be not less than-
 - (i) in ward areas – 1.6 m wide or 1.25m if it is a horizontal exit;
 - (ii) in areas used by students in a school – 870mm wide;
 - (iii) the width of exit required by (b) or (c), minus 250mm; or
 - (iv) in any other case except where it opens to a sanitary compartment or bathroom – 760mm wide; and
- (f) the required width of exit must not diminish in the direction of travel or open space.

ND1.6 External stairways

An external stairway may serve as a required exit if the stairway (including any connecting bridges) is of non-combustible construction throughout. If any part of such a stairway connecting more than 2 storeys is exposed to, and less than 4m from a window, doorway or the like in an external wall, the stairway must be fully shielded in the affected area from such window or doorway by non-combustible construction with a FRL of not less than 60/60/60.

ND1.7 Travel by stairways or ramps

- (a) Stairway serving as a required exit must provide a continuous means of travel by its own flights of stairs and landings from every storey served to the level at which egress to a road or open space is provided.
- (b) In a Class 2 or 2A building, the distance between the doorway of a room or sole-occupancy unit and the point to egress to a road or open space by way of any required stairway or ramp must not exceed 30m.
- (c) In a Class 3 or 3A building, the distance from any point on a floor and a point of egress to a road or open space by way of a required stairway or ramp must not exceed 80 m.

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

DEEMED-TO- SATISFY PROVISIONS

ND1.7 Travel by stairways or ramps Contd.

- (d) In a Class 2, 2A, 3 or 3A building, a required stairway or ramp must discharge at a point not more than-
 - (i) 15m from a doorway providing egress to a road or open space or from a passageway leading to a road or open space; or
 - (ii) 30m from one of 2 such doorways or passageways if travel to each of them from the stairway or ramp is in opposite or approximately opposite directions
- (e) if 2 or more exits are required and are provided by means of internal stairways or ramps, each exit must provide separate egress to a road or open space

ND1.8 Discharge from exits

- (a) An exits must not be blocked at the point of discharge and where necessary, suitable barriers must be provided to prevent vehicles from blocking the exit,
- (b) If a required exit leads to an open space, the path of travel to the road must have an unobstructed width throughout of not less than-
 - (i) the minimum width of the required exit, or
 - (ii) 1m;
 whichever is the greater.

ND1.9 Horizontal exits

Horizontal exits must -

- (a) not be counted as a required exit, when between sole-occupancy units; or
- (b) not comprise more than 50% of the number of required exits from any part of a storey which has been divided by a fire wall; and
- (c) have a clear area on each side of the fire wall to accommodate the total number of persons (calculated under ND1.10) from both parts of the storey, of not less than –
 - (i) 2.5m² per patient in a health-care building and
 - (ii) 0.5m² per person in any other case.

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

DEEMED-TO- SATISFY PROVISIONS

ND1.10 Number of persons accommodated

The number of persons accommodated in a storey, or room must be determined with consideration to the purpose for which it is used and the layout of the floor area by –

- (a) calculating the sum of the numbers obtained by dividing the floor area of each part of the storey by the number of square metres per person listed in Table ND1.10 according to the use of the part, excluding spaces set aside for-
 - (i) stairs, ramps, corridors, hallways, lobbies and the like;
 - (ii) service ducts and the like, sanitary compartments or other ancillary used;
- (b) reference to the seating capacity in an assembly building or room; or
- (c) any other suitable means of assessing its capacity.

ND 1.11 Measurement of distances

The nearest part of an exit means in the case of-

- (a) A stairway, passageway, ramp, the nearest part or the doorway providing access to them.
- (b) A doorway opening to a road or open space, the nearest part of that doorway.
- (c) A horizontal exit, the nearest part of the doorway.

ND1.12 Method of measurement

The following rules apply:

- (a) In the case of a room that is not a sole-occupancy unit in a class 2 or 2A building, the distance includes the straight-line measurement from any point on the floor of the room to the nearest part of a doorway leading from it, together with the distance from that part of the doorway to the single required exit or point from which travel in different directions to 2 exits is available.
- (b) Subject to (d) and (f), the distance from the doorway of a room or sole-occupancy unit in a Class 2 building is measured in a straight line to the nearest part of the required single exit or point from which travel in different direction to 2 required exits is available.
- (c) Subject to (d) and (f), the distance between exits is measured in a straight line between the nearest part of those exits.

PERFORMANCE REQUIREMENTS

NDP1 Provision for Escape

The design and construction of buildings must allow all occupants in any or all fire compartments to get to-

- (a) any one of more than one exit within 2.5 minutes; or
- (b) a single exit within 1 minute.

NDP2 Construction of Exits

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND1.12 Method of measurement Contd.

- (d) Only the shortest distance is taken along a corridor, hallway, external balcony or other path of travel that curves or changes direction.
- (e) If more than one corridor, hallway, or other similarly defined internal path of travel connects required exits, the measurement is along the path of travel through the point at which travel in different directions to those exits is available.
- (f) If a wall (including a demountable internal wall) that does not bound-
 - (i) a room; or
 - (ii) a corridor, hallway or the like, causes a change of direction in proceeding to a *required exit*, the distance is measured along the path of travel past the wall.
- (g) if permanent fixed seating is provided, the distance is measured along the path of travel between the rows of seats

ND2 Construction of Exits

ND2.1 Application of Part

Except for ND2.6 and nd2.9, this Part does not apply to the Internal part of a sole-occupancy unit in a Class 2 building.

ND2.2 Stairway and ramps

Required stairs and ramps (including landings and any supporting structural members) must be constructed only of-

- (a) reinforced or prestressed concrete;
- (b) steel in no part less than 6mm thick; or
- (c) timber that-
 - (i) has a finished thickness of not less than 400mm;
 - (ii) has an average density of not less than 800kg/m³ at a moisture content of 12%;and
 - (iii)has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits continued

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND2.3 installations in exits and paths of travel

- (a) Gas or other fuel services must not be installed in a required exit.
- (b) Service or equipment must not be installed in a required exit or in any corridor, hallway, lobby or the like leading to a required exit if it comprises –
 - (i) electricity meters, distribution boards or ducts
 - (ii) central telecommunications distribution boards or equipment; or
 - (iii) electrical motors or other motors serving equipment in the building;

ND2.4 Width of stairways

- (a) The required width of a stairway must –
 - (i) be measured clear of all obstruction such as handrails, projecting parts of balustrades, columns, beams, and the like; and
 - ii) extend without interruption, except for ceiling cornices, to a height not less than 2m vertically above a line along the nosings of the treads or the floor of the landing
- (b) A required stairway that exceeds 2m in width is counted as having a width of only 2m unless it is divided by a balustrade or handrail continuous between landings and each division is less than 2m wide.

ND2.5 Ramps

ND2.5.1 Pedestrian ramps

- (a) A ramp may be a substitute for a stairway if the construction enclosing the ramp and the width and ceiling height comply with the requirements for a stairway.
- (b) A ramp serving as a required exit must have a gradient of not more than-
 - (i) 1:12 in are used by patients in a health- care building; or
 - (ii) 1:14 if required by Part ND3;
 - (iii) 1:10 if subject to wetting ; or
 - (iv) 1.8 in any other case.
- (c) The floor surface of a ramp must have a non-slip finish.

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits continued

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND2.5.2 Service ramps

Service ramps must not be steeper than 1:3. Where they are steeper than 1:8 cleats must be provided at the spacing shown in Table ND2.52. Two examples are shown in figure ND2.52.

TABLE ND2.52		
SPACING OF CLEATS FOR SERVICE RAMPS		
Ramp slope not more than:	CLEATS SPACING (mm)	
	Goods carried	No Goods Carried
1:6	360	460
1:5	330	430
1:4	300	400
1:3	280	380

ND2.6 Treads and risers

ND2.6.1 Straight flights

- (a) A stairway must be suitable to provide safe passage in relation to the nature, volume and frequency of likely usage.
- (b) A stairway in any building (including a sole-occupancy unit in a Class 2 building) satisfies (a) if it has-
 - (i) subject to (v), not more than 18 or less than 2 risers in each flight;
 - (ii) going and riser dimensions in accordance with Figure ND2.6.1 and Table ND2.6.1 that are constant throughout each flight;
 - (iii) risers which do not have any openings that would allow a 100mm sphere to pass through between the treads;
 - (iv) treads which have a non-slip finish or a suitable non-strip near the edge of the nosings;
 - (v) in a health-care building where the difference in level is not more than 600mm a ramp must be provided instead of steps;
 - (vi) a cross fall of between 1:100 and 1:50 where the stairway is subject to wetting; and
 - (vii) treads not exceed the goings by more than 300mm.

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits continued

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND2.6.2 Curved stairs

Curved stairs must comply with the relevant requirements of ND2.6.1 as well as the following:

- (a) For the purposes of satisfying Table ND2.6.1 the going must be measured:
 - (i) along half way across the width of the stair where the clear width is less than 900mm; and
 - (ii) 300mm from each side of the stair where the clear width is 900mm or more.
- (b) All steps must have the same uniform taper.
- (c) The going at the narrow end of the steps must be not less than 75 mm.
- (d) Winders are not permitted.

ND2.7 Landings

In a stairway -

- (a) Landings having a maximum slope of 1:50 may be used in any building to limit the number of risers in each flight and each landing must-
 - (i) be not less than 750mm long measured 500mm from the inside edge of the landing; and
 - (ii) have a non-slip finish throughout or a suitable non-skid strip near the edge of the landing where it leads to a flight of stairs below; and
- (b) In a health-care building-
 - (i) the area of any landing must be sufficient to move a stretcher, 2 m long and 600 mm wide, at an incline not more than the slope of the stairs, with at least one end of the stretcher on the landing while changing direction between flights; or
 - (ii) the stair must have a change of direction of 180, and the landing a clear width of not less than 1.6m and a clear length of not less than 2.7m.

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits continued

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND2.8 Thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless-

- (a) in patient-care areas in a health-care building, the door sill is not more than 25mm above the finished surface of the ground, balcony or the like to which the doorway opens;
- (b) in other cases –
 - (i) the doorway opens to a road, open space or external balcony; and
 - (ii) the door sill not more than 190mm above the finished surface of the ground, balcony, or the like, to which the doorway opens.

ND2.9 Balustrades

- (a) In a Class 2 or 3 building a continuous balustrade must be provided along the side of any stairway or ramp, or any corridor hallway, balcony, bridge or the like, if –
 - (i) it is not bounded by a wall; and
 - (ii) the change in level is more than 1m,
- (b) A balustrade required by (a) must prevent, as far as practicable-
 - (i) children climbing over or through it;
 - (ii) persons accidentally falling from the floor; and
 - (iii) objects which might strike a person at a lower level accidentally falling from the floor surface.
- (c) At balconies a balustrade satisfies (b) if –
 - (i) it has a height of not less than 930mm above the balcony floor;
 - (ii) the space between balusters or the width of any opening in the balustrade is not more than 100mm except where the space between rails or the height of the opening is not more than 100mm;
 - (iii) all parts of the balustrade more than 150mm and less than 760mm from the floor or nosings are vertical or otherwise do not provide a toe-hold; and
- (d) In stairways and ramps (including access bridges and landings) a balustrade satisfies (b) if-
 - (i) it has a height of not less than 865mm above the nosings of the stair treads and the floor of the landing, balcony, corridor, hallway, access bridge or the like;

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits Contd

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them

DEEMED-TO- SATISFY PROVISIONS

ND2.10 Handrails

- (a) suitable handrails must be provided where necessary to assist and provide stability to persons using a ramp or stairway.
- (b) Handrails satisfy (a) if they are-
 - (i) located along at least one side of the ramp or flight of stairs;
 - (ii) not more than 2 m apart in the case of intermediate handrails;
 - (iii) fixed at a height of not less than 700 mm above the nosings of stair treads in a building that is used as a primary school;
 - (iv) in any other case fixed at a height of not less than 865mm above the nosings of stair treads and the floor surface of the ramp, landing, or the like; and
 - (v) continuous between stair flight landings and have no obstruction on or above them that will tend to break a hand-hold.

ND2.11 Fixed platforms, walkways and ladders

Fixed platforms, walkways, non-required stairways

Handrails, balustrades and ladders must comply with **AS 1657** in a workshop factory or warehouse.

ND2.12 Doorways and doors

A doorway serving as a required exit, forming part of a required exit, or in a patient-care of a health-care Building-

- (a) must not be fitted with a revolving door,
- (b) must not be fitted with a roller shutter or tilt-up door unless-
 - (i) it serves a shop, factory or warehouse building or part with a floor not more than 200m²;
 - (ii) the doorway is the only required exit from the building or part; and
 - (iii) it is held in the open position while the building or part is lawfully occupied;

PERFORMANCE REQUIREMENTS

NDP2 Construction of Exits Contd

The design and construction of exits must allow for the following optimum conditions during evacuation in any emergency –

- (a) a density in the exit of 2.0 persons/m² of exit floor area;
- (b) a speed of movement along the slope of the exit of 0.5m/s; and
- (c) an average flow of 1.18 persons per second per metre effective width of exit.

In the case of occupancies such as health-care buildings where evacuation needs the assistance of others and/or of equipment, additional consideration must be given to the design of exits.

The pitch of any stairway or slope of a ramp must not be unsafe or uncomfortable

The size of opening in any bounding wall, balustrade or the like must be such as to prevent very young mobile children from going through them and injuring themselves. These must also be designed to discourage young children under 5 years of age from gaining any foothold and climbing over them.

NDP3 Access for People with Disabilities

People with disabilities must have the facility to gain reasonable access to buildings so that they are not at any material disadvantage when compared with others.

DEEMED-TO- SATISFY PROVISIONS

ND2.13 Swinging doors

A swinging door in a required exit or forming a required exit –

- (a) must not encroach-
 - (i) at any part of its swing by more than 500mm on the required width of a required stairway passageway or ramp, including the landings and
 - (ii) when fully open, by more than 100mm on the required width of the required exit, and

the measurement of encroachment each case is to include door handles or other furniture or attachments to the door;
- b) must swing in the direction of egress unless-
 - (i) it serves a building or part with a floor area not more than 200m², it is the only required exit from the building or part and it is fitted with a device for holding it in the open position; or
 - (ii) it serves a sanitary compartment or airlock (in which case it may swing in either direction); and
- (c) must not otherwise impede the path or direction of egress.

ND3 Access for People with Disabilities

ND3.1 Application of Part

This Part applies to all Class 2 and 3 buildings.

ND3.2 Access to buildings

Access for people with disabilities must be provided to buildings as setout in Table ND3.2 by means of a continuous path of travel in accordance with AS 1428.1.

- (a) from the boundary of the allotment;
- (b) from any carpark space on the allotment (whether within or outside the building) -
 - (i) that is set aside for people with disabilities using the building; or
 - (ii) if there are no carpark spaces set aside for them, from any carpark area that serves the building; and
- (c) from any other building on the allotment to which access for people with disabilities is required.

PERFORMANCE REQUIREMENTS

NDP3 Access for People with Disabilities Contd.

People with disabilities must have the facility to gain reasonable access to buildings so that they are not at any material disadvantage when compared with others.

DEEMED-TO- SATISFY PROVISIONS

ND3.3 Parts of buildings to be accessible

(a) Access for people with disabilities must be provided

- (i) from the doorway at the entrance floor providing access to any sanitary compartment required for the use of people with disabilities; and
- (ii) to areas normally used by the occupants, excluding any plantroom, commercial kitchen, cleaners' store room, maintenance accessway, rigging loft, or the like.

(b) A path of travel providing required access must not include a stairway, turnstile, revolving door, escalator or other impediment which would prevent a person in a wheelchair using it.

(c) Access, finishes and fittings, including passageways, ramps, step or kerb ramps, passenger lifts, signs, doorways and other parts of the building required by this Part must comply at least with the provisions of AS 1428.1.

TABLES AND DIAGRAMS

TABLE ND1.10

AREA PER PERSON ACCORDING TO USE

TYPE OF USE	m ² per person
Art gallery, exhibition area, museum.. .. .	4
Bar cafe, church, dining room	1
Boardroom	2
Boarding House	15
Computer room for main frame and mini computers	25
Court room - judicial area	10
- public seating	1
Dance floor	0.5
Dormitory -	8
Early childhood centre	6
Factory - (a) machine shop, fitting shop, or like place for Cutting, grading, finishing or fitting of metals or glass, except in the fabrication of structural steelwork or manufacture of vehicles or bulky products	5
(b) areas used for fabrication and processing other than those in (a)	50
(c) a space in which the layout and natural use of fixed plant or equipment determine the number of persons which will occupy the space during working hours	Area per person determined by the use of the equipment.
Garage - public	30
Gymnasium	3
Hospital ward area	10
Hospital, hotel, motel, guesthouse	15
Indoor sports stadium - arena	10
Kiosk	1
Kitchen, laundry (other than domestic) and laboratory	10
Library - reading space	2
- storage space	30
Office, including one for typewriting or document copying or with desk-top computers	1
Plant Room for - ventilation, electrical or other service units	30
- boilers or power plant	50
Reading Room	2
Restaurant	1
School - common staff room	2
- individual staff room	10
- general classroom	2
- only as for others	
- multi-purpose hall	1
- trade and practical area : primary	4
secondary	As for workshop

TABLE ND1.10 Continued

AREA PER PERSON ACORDING TO USE

Shop	-	space for sale of goods	-						
	(a)	at a level entered direct from the open air or any lower	..	..	..	..	..	..	3
	(b)	all other levels	..	..	..	..	..	..	5
Showroom	-	display	..	..	..	..	..	..	5
Skating rink, based on rink area			..	..	..	..	..	..	1.5
Spectator stand, audience viewing area:									
	-	bench seating	..	..	..	..	..	..	450mm\person
	-	fixed seating	..	..	..	..	..	..	number of seats
		- seating not fixed	..	..	..	..	..	..	1
	-	standing viewing area	..	..	..	..	..	..	0.3
Storage space			..	..	..	..	..	..	30
Swimming pool, based on pool area			..	..	..	..	..	..	1.5
Switch room, transformer room			..	..	..	..	..	..	30
Telephone exchange – private			..	..	..	..	..	..	40
Theatre dressing room			..	..	..	..	..	..	As for factory

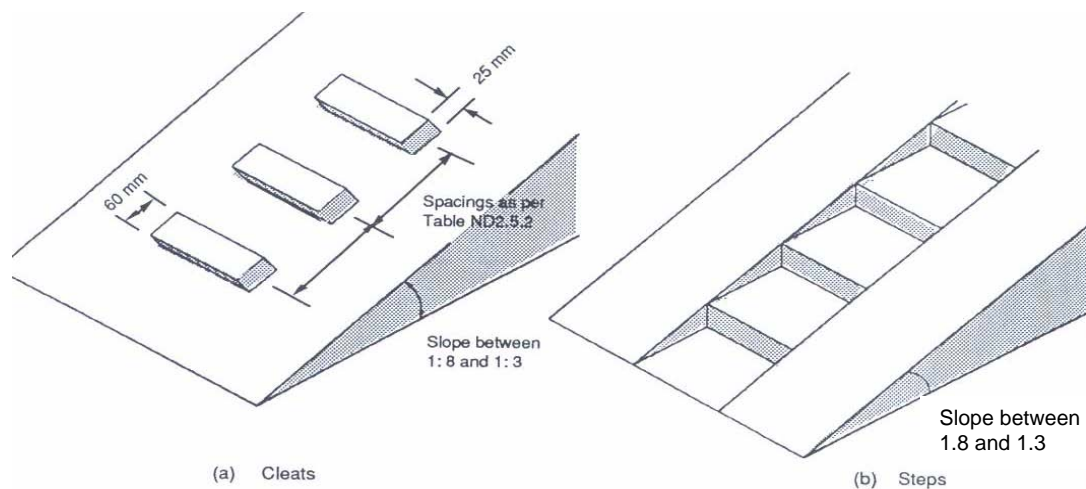


FIGURE ND2.5.2 EXAMPLES OF SERVICE RAMPS WITH CLEATS

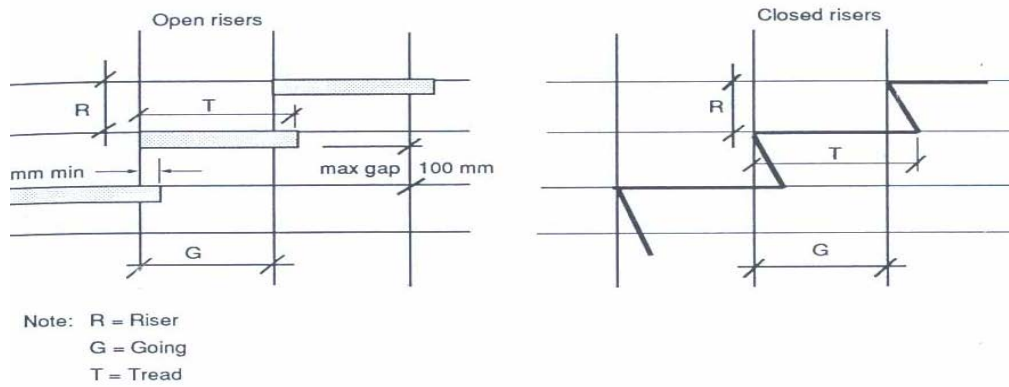


FIGURE ND2.6.1 MEASUREMENT OF RISER GOING AND TREAD

TABLE ND 2.6.1 RISER DIMENSIONS (MM) TO MATCH GOING									
		GOING(MM)							
PITCH	250	260	270	280	290	300	310	320	330
37	188								
36	182	188							
35	175	182	189						
34	168	175	182	188					
33	162	169	175	181	188				
32	156	162	168	174	181	187			
31	150	156	162	167	174	180	186		
30		150	156	161	167	173	179	185	
29			150	155	161	167	173	179	183
28				150	155	160	165	170	175
27					148	153	158	163	168
26						146	151	156	161
25								149	154
24									147

Notes:

- Actual riser dimension may be selected to suit the inter landing height. However the value of the riser dimensions must not be outside the maximum or minimum dimensions shown for each value of going.
- The dimensions shown within the outlined box are preferred because they are less strenuous for individuals on crutches or with minor disabilities.

TABLE ND3.2

REQUIREMENTS FOR ACCESS FOR PEOPLE WITH DISABILITIES

CLASS OF BUILDING	ACCESS REQUIREMENTS
Class 2	To and within -
<p>(a) If the building contains;</p> <ul style="list-style-type: none"> ➤ more than 10 units up to 49 units ➤ more than 49 units <p>(b) If accommodation is provided for more than 10 persons other than in <i>sole-occupancy</i> units -</p> <ul style="list-style-type: none"> ➤ up to 49 beds ➤ more than 49 units <p>(c) Common areas of buildings that are required to be accessible</p>	<p>one <i>sole occupancy unit</i>.</p> <p>2 <i>sole occupancy units</i>.</p> <p>2 beds.</p> <p>4 beds.</p> <p>the entrance floor and to all public areas on that floor</p>
<p>Class 3</p>	<p>To and within the entrance floor if its floor area is more than 500 m²</p> <p>To and within any floor if irrespective of <i>floor area</i>, the floor is not more than 190 mm at the point of entrance above or below the adjacent finished ground level; and</p> <p>within any other floor to which vertical access by way of a ramp, step or kerb ramp is provided.</p>
<p>Health-care building.. .. .</p>	<p>To and within all areas normally accessible to the public, patients or staff.</p>
<p>Note: The calculation of floor area and the number of persons accommodated are in accordance with ND1.10.</p> <p>For the purposes of this Table, a double bed counts as 1 bed.</p>	

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PUBLIC BUILDINGS AND GROUP DWELLINGS (CLASS 2, 2A AND 3, 3A)

SECTION NE

SERVICES AND EQUIPMENT

**Performance Requirements
Deemed-to-Satisfy Provisions**

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NE3 Electrical Work

NE3.1 Safety

NE3.2 Amenity

OBJECTIVES

A building must be so designed and constructed that the following objectives are fulfilled:

Fire Fighting Equipment

Having regard to the size and use of the building, adequate In-built and external fire protection services must be provided

To

- (a) restrict fire growth to the compartment of origin;*
- (b) prevent fire spread to adjoining building allotments;*
- (c) facilitate the fighting of fire to minimize damage to the building and its contents.*

Smoke Control

Ventilation and air-conditioning systems installed in a building must –

- (a) provide suitable air for the health and safety of the occupants; and*
- (b) incorporate reasonable measures to minimize the spread of smoke in the event of fire to escape from the building, to other compartments and to enable access for fighting the fire.*

Electrical Work

All electrical work must;

- a) prevent electrocution, burns or fire;*
- b) satisfy the reasonable expectations of the occupants by ensuring that it is adequate for their intended use, both current and anticipated.*

PERFORMANCE REQUIREMENTS

NEP1 Fire Fighting Equipment

Active Fire Fighting

In determining the type and extent of active fire fighting systems that must be provided for a building the following must be taken into account -

- (a) the class of occupancy;
- (b) proximity to fire-source features;
- (c) size of fire compartments
- (d) effective height;
- (e) the technical resources available and locally to satisfactorily install and regularly test and maintain the active fire fighting systems

Fire and smoke alarms

Reliable detection and warning systems must be installed for automatic operation in the event of a fire or generation of unacceptable levels of smoke.

DEEMED-TO- SATISFY PROVISIONS

NE1 Fire Fighting Equipment

NE1.1 Application of Part

This Part applies to Class 2, 2A, 3 & 3A buildings

NE1.2 Portable fire extinguishers

Portable fire extinguishers containing an extinguishing agent suitable for the risk being protected must be installed in accordance with NZS 4503.

NE1.3 Provision for special hazards

Suitable additional provision must be made if special problems of fighting fire could arise because of-

- (a) the nature or quantity of materials stored, displayed or used in a building or on the allotment; or
- (b) the location of the building in relation to a water supply for fire fighting purposes

PERFORMANCE REQUIREMENTS**NEP2 Smoke Control**

Building must have a sufficient number of windows or other openings or ventilating arrangements to quickly disperse any smoke generated in a fire. In the case of buildings used as theatres, public halls or the like, the audience seating area and egress routes must be protected against fire and smoke spreading from any fire occurring on the stage, in back stage, in back stage areas or in a rigging loft.

NEP3 Electrical safety

The supply system must:

(a) have suitable devices of adequate interruptive duty to automatically shut off the supply in the event of a fault or overload. Such devices must allow easy reinstatement of the supply after interruption.

(b) have devices which are clearly identified and easily reached to isolate live parts from the incoming supply;

(c) when the neutral of the supply is earthed, have socket outlet or plug – socket adapter construction which would ensure that the live, neutral and earth conductors of the plug;

(d) be adequately protected against damage arising from the weather, water or excessive dampness mechanical loads and other such agents expected under normal conditions of use; and

(e) ensure that the main switch is normally accessibly only to the occupants.

DEEMED-TO- SATISFY PROVISIONS**NE2 Smoke Control****NE2.1 Natural smoke venting**

Windows, doors, panels, or the like, provided to control the movement of smoke must be as evenly distributed as practicable and be readily openable.

NE2.2 Smoke venting in theatres and stages

The design of smoke control systems for theatres, stages and public halls must fulfil up-to-date and relevant fire engineering principles and practices.

NE3 Electrical Safety**NE3.1 General Requirements**

All electrical wiring and installation in or on any Class 2, 2A, 3 and 3A building must ensure safety from electric shock or fire. This requirement is satisfied if all electrical work associated with the building is done to comply with AS/NZS 3000 -Electrical installations- building, structures and premises (known as the SAA Writing Rules) and AS/NZS 3003 for health buildings. The capacity of the system must allow for the long term anticipated requirements of the occupants.

All Electrical works are carried out by a suitably qualified person holding an Electricians License (issued by the Public Utilities Board).

NE3.2 Plug and power sockets

Plug and power sockets must:

(a) have their individual switch;

(b) be located so that ;

(i) cords and cables need not be taken across doorways;

(ii) trailing cords and cables do not have to circulation routes

(c) not be located behind door-swings; and

(d) in the kitchen in Class 2 or 2A buildings be located 250 mm above worktops at the back of benches or on a return wall where it exists.

NE3.3 Meter and distribution board

The meter must be located in a position from which it can easily be read. If the main switches and circuit breakers/fuses are not located with the meter they must be located at a height of not less than 1.8m from the floor where they can found easily in the dark.

PERFORMANCE REQUIREMENTS

NEP4 Amenity

The supply system must have an adequate number of plug sockets of minimum 16 Amperes capacity to serve the reasonable anticipated needs of the occupants.

DEEMED-TO- SATISFY PROVISIONS

NE4 AMENITY

NE4.1 Light switch layout

(a) the layout of light switches in Class 2 buildings must follow the main night time circulation routes such as from the entrance hall to the living area to the bed-rooms to the bathroom and toilet. Crossing any major space in the dark must be avoided. The switches must be located close to door openings.

(b) All stairs must have two-way switching at the top and the bottom.

TABLES AND DIAGRAMS

TABLE NE1.2 PORTABLE FIRE EXTINGUISHERS SELECTION CHART

TYPE OF EXTINGUISHER		WATER	FOAM	DRY CHEMICAL	CARBON DIOXIDE
Class and type of fire		CONTENTS OF EXTINGUISHER			
		Electrically Conductive		Electrically Non-Conductive	
A	Ordinary combustibles (wood,paper,etc)	✓ YES MOST SUITABLE	✓ YES	✓ YES	✓ YES
B	Flammable liquids	x NO	✓ YES SPECIAL FOAM REQUIRED FOR ALCHOL-TYPE FIRE	✓ YES	✓ YES
C	Flammable	x NO	x NO	✓ YES	✓ YES
D	gases combustibles metals	x NO	x NO	x NO	x NO
	(E.) Fire involving live electrical equipment	x NO	x NO	✓ YES	✓ YES

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SECTION NF

HEALTH AND AMENITY

Performance Requirements

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- NF6.6 Small treatment plants

NF7 Roof Drainage

OBJECTIVES

A building must be designed and constructed to meet the following objectives -

Damp and Weatherproofing

Suitable drainage, damp and weatherproofing must be provided where necessary to prevent :

- (a) moisture or damp affecting the stability of the building;
- (b) the creation of any unhealthy or dangerous condition; or
- (c) causing damage to adjoining property.

Cooking and Sanitary Facilities

Adequate toilet and washing facilities must be provided for the occupants of a building, having regard to its use and size. In residential buildings other than those meant for transient occupants suitable facilities must also be available for the preparation and cooking of food, the cleaning of utensils and the laundering of clothes

Room Sizes

The floor area, plan dimensions and ceiling heights of rooms and other spaces within a building must be adequate for their use or purpose.

Light and Ventilation

The standard of light and ventilation within a building must be adequate for the occupants, having regard to the use or purpose of the building.

Water Supply Plumbing

An appropriate safe and hygienic system of plumbing for the supply of water for domestic needs must be provided.

Sanitary Plumbing

An appropriate system of drainage for the hygienic waterborne conveyance of waste water must be provided.

Roof Drainage

Where a roof drainage system is provided, it must give reasonable protection against the overflow of rainwater into the building.

PERFORMANCE REQUIREMENTS

NFP1 Damp and waterproofing

Water and damp conditions must not be allowed to-

- (a) affect the stability of buildings;
- (b) create ill health or discomfort for the occupants;
- (c) damage or deface buildings as a result of moisture present at the completion of construction;
- (d) cause damage to adjacent property; or
- (e) pond surface water against buildings or beneath the floor.

DEEMED-TO- SATISFY PROVISIONS

NF1 Damp and Waterproofing

DF1.1 Floor levels and Site Drainage

Floor levels of all new buildings must be a minimum of 300mm above the natural ground level and, where possible, the ground around the building must slope away from the building at a minimum fall of 1 in 100 for two metres.

The construction of the site drainage system and the position and manner of discharge of a stormwater drain must not-

- a) result in the entry of water into any building or other allotments;
- b) affect the stability of any building; or
- c) create any unhealthy or dangerous condition within or around any building.

PERFORMANCE REQUIREMENTS

NFP1 Damp and waterproofing Contd.

Water and damp conditions must not be allowed to-

- (a) affect the stability of buildings;
- (b) create ill health or discomfort for the occupants;
- (c) damage or deface buildings as a result of moisture present at the completion of construction;
- (d) cause damage to adjacent property; or
- (e) pond surface water against buildings or beneath the floor.

DEEMED-TO- SATISFY PROVISIONS

NF1 .2 Building on land subject to dampness or flooding

One or all of the following measures must be carried out if it is warranted by the dampness of the building site or proneness to flooding:

- (a) The subsoil must be adequately drained.
- (b) The ground under the building must be regraded or filled and provided with outlets to prevent accumulation of water.
- (c) The surface of the ground under the building must be covered with a suitable damp-resisting material.
- (d) The top of the floor must be kept at not less than 300 mm above the known flood level at the site.

NF1.3 Drainage of land external to building

A suitable system of drainage must be provided if paving, excavation or any other work on an allotment will cause undue interference with the existing drainage of rainwater falling on the allotment whether the existing drainage is natural or otherwise.

NF1 .4 Weatherproofing of roofs and walls

Roofs and external walls must be constructed to prevent rain or dampness penetrating to the inner parts of a building, unless it is a workshop or open shed and in the particular case there is no necessity for compliance.

NF1.5 Pliable roof sarking

Pliable roof *sarking-type material* used under roof or wall coverings must comply and be fixed in accordance with-

- (a) AS/NZS 1736; or
- (b) AS/NZS 1903 and AS1904

NF1.6 Water proofing of wet areas in buildings

The following parts of a building must be impervious to water:

- (a) In any building - the floor surface or substrate in a shower enclosure, or within 1.5 m measured horizontally from a point vertically below the shower fitting, if there is no enclosure;
- (b) In a Class 2 or 3 building - the floor surface or substrate in a bathroom or shower room, slop sink compartment, laundry or sanitary compartment which is used in common by the occupants.

PERFORMANCE REQUIREMENTS

NFP1 Damp and waterproofing Contd.

Water and damp conditions must not be allowed to-

- (a) affect the stability of buildings;
- (b) create ill health or discomfort for the occupants;
- (c) damage or deface buildings as a result of moisture present at the completion of construction;
- (d) cause damage to adjacent property; or
- (e) pond surface water against buildings or beneath the floor.

DEEMED-TO- SATISFY PROVISIONS

NF1.6 Water proofing of wet areas in buildings Contd.

- (c) The wall surface or substrate
 - (i) of a shower enclosure, or if the shower is not enclosed, within 1.5 m and exposed to a shower fitting, to a height of 1.8 m above the floor;
 - (ii) immediately adjacent or behind a bath, trough, basin, sink, or similar fixture, to a height of 300 mm above the fixture if it is within 75 mm of the wall.
- (d) The junction between the floor and wall if the wall and floor are required to be impervious to water.
- (e) The junction between the wall and fixture if the wall is required to be impervious to water.

NF1 .7 Damp-proof courses

Except in a building that is exempt from weather proofing under NF1.4, moisture from the ground must be prevented from reaching-

- (a) the lowest floor timbers and the walls above the lowest floor joists;
- (b) the walls above the damp-proof course: and
- (c) the underside of a suspended floor constructed material other than timber, and the supporting beams or girders.

NF1.8 Acceptable damp-proof course

A damp-proof course must consist of

- (a) a material that complies with AS/NZS 2904;
- (b) suitable termite shields placed on piers;
- (c) other suitable material

NF1.9 Damp-proofing of floors on the ground

If a floor of a room is laid on the ground or on filling-

- (a) moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by-
 - (i) the insertion of a vapour barrier in accordance with AS 2870; or
 - (ii) other suitable means; and
- (b) damp-proofing need not be provided if the building is exempt from weatherproofing under NF1.4.

PERFORMANCE REQUIREMENTS

NFP2 Cooking and sanitary facilities

NFP2.1

Washing and clothes laundering facilities provided in residential buildings must be consistent with the size and occupancy of the building.

The number of toilet and washing facilities provided must be consistent with the size and class of occupancy.

NFP2.2

Any cooking facility provided must not spread smoke which may affect health or create a nuisance to the occupants or neighbours.

NFP2.3

The standard of toilet and washing facilities provided must, in any building, not create a nuisance or lead to ill health to the occupants or neighbours.

NFP2.4

Smoke extraction units from kitchens and other process operations in class 3 buildings must ensure that the progressive build-up of soot grease and the like does not lead to a fire or unhealthy conditions.

DEEMED-TO- SATISFY PROVISIONS

NF2 Cooking and sanitary facilities

NF2.1.1 Facilities for Class 2&2A buildings

Sanitary and other facilities for Class 2&2A buildings, must be provided in accordance with Table NF2.1.

TABLE NF2.1 PROVISION OF SANITARY AND OTHER FACILITIES
CLASS OF MINIMUM FACILITIES REQUIRED BUILDING
<p>Class 2 Facilities for residents-</p> <p>For each 10 residents for whom private facilities are not provided-</p> <p>(a) a shower; and</p> <p>(b) a closet pan and washbasin</p> <p>If situated outside the building, these facilities must be conveniently accessible.</p>

NF2.1.2 Calculation of number of occupants and fixtures

(a) The number of persons accommodated must be calculated according to Table ND1.10 if it cannot be more accurately determined by other means.

(b) Unless the premises are predominantly used by one sex or numbers of male and female users are known, sanitary facilities must be provided equally for both sexes.

In addition where the nature of employment of an employee is such that a shower is highly desirable at the end of the work (e.g. cooks and kitchen hands), showers must be provided for each 10 such male or female employee in any one shift.

NF2.1.3 Facilities in Class 3&3A Buildings

Sanitary facilities must be provided in Class 3&3A buildings in accordance with Table NF2.3

NF2.1.4 Construction of sanitary compartments

Partitions - Other than in any early childhood centre, sanitary compartments must have doors and partitions which must separate adjacent compartments and extend-

(a) from floor level to the ceiling in the case of a unisex facility; or

(b) to a height of not less than 1500mm above the floor if primary school children are the principal users, or 1800 mm above the floor in all other cases.

PERFORMANCE REQUIREMENTS

NFP2 Cooking and sanitary facilities Contd.

NFP2.1

Washing and clothes laundering facilities provided in residential buildings must be consistent with the size and occupancy of the building.

The number of toilet and washing facilities provided must be consistent with the size and class of occupancy.

NFP2.2

Any cooking facility provided must not spread smoke which may affect health or create a nuisance to the occupants or neighbours.

NFP2.3

The standard of toilet and washing facilities provided must, in any building, not create a nuisance or lead to ill health to the occupants or neighbours.

NFP2.4

Smoke extraction units from kitchens and other process operations in class 3 buildings must ensure that the progressive build-up of soot grease and the like does not lead to a fire or unhealthy conditions.

NFP3 Room sizes

The size and disposition of rooms in a building must be consistent with the requirements of health and hygiene.

DEEMED-TO- SATISFY PROVISIONS

NF2.1.5 Interpretation: Urinals and washbasins

- (a) A urinal may be either
 - (i) an individual stall or wall hung urinal;
 - (ii) each 600 mm length of a continuous urinal trough; or
 - (iii) a closet pan used in place of a urinal.
- (b) A washbasin may be either
 - (i) an individual basin; or
 - (ii) a part of a hand wash trough served by a single water tap.

NF2.1.6 Facilities for people with disabilities

Sanitary facilities must be provided in accordance with Table NF2.6 in every Class 2 and 3 building that is required - Part ND3 to be accessible to people with disabilities.

NF2.2-NF2.4 –No Deemed to Satisfy.

NF3 – Room sizes and Heights

NF3.1 Minimum Heights

Minimum heights below the ceiling and any framing excluding minor projections such as cornices, are:

- (a) Class 2 buildings-
 - (i) habitable room – 2.4 m;
 - (ii) laundry or the like - 2.1m.
 - (iii) Corridor or passageway - 2.1m.
- (b) Subject to (c) and (d) Class 3 buildings-
 - (i) office, shop, warehouse or factory space –2.4m;
 - (ii) corridor or passageway – 2.1m
- (c) Health-care building-
 - (i) ward area – 2.4m;
 - (ii) operating theatre or delivery room – 3.0 m;
 - (iii) treatment room, clinic, waiting room, passageway, corridor, or the like –2.4m.
- (d) Ancillary and other spaces -
 - (i) bathroom, shower room, water closet, toilet room, airlock, tea preparation room, pantry, store room, garage, carparking area, or the like, in any building – 2.1m;

PERFORMANCE REQUIREMENTS

NFP3 Room sizes Contd.

The size and disposition of rooms in a building must be consistent with the requirements of health and hygiene.

NFP4 Light and ventilation

Where air handling systems are provided in a building there must be adequate provision for natural ventilation to cater for any prolonged failure of the system.

DEEMED-TO- SATISFY PROVISIONS

NF3.2 Reduced height permissible

These heights may be reduced if the reduction does not unduly interfere with the proper functioning of the room in

- (a) attic rooms
- (b) rooms with a sloping ceil or projection below ceiling line; or
- (c) other rooms or spaces.

NF3.3 Ceiling fans

Ceiling fans and other such appliances must be at a minimum clearance of 2.1 m.

NF4 – Light and Ventilation

NF4.1 Provision of natural light

Natural lighting must be provided in:

- (a) Class 2& 2A buildings - to all bedrooms and dormitories.
- (b) Health-care building - to all rooms used for sleeping purposes.
- (c) School buildings -to all general purpose classrooms in primary or secondary schools and all playrooms or the like for the use of children in an early childhood centre.

NF4.2 Methods and extent of natural lighting

Direct natural lighting must be provided by windows that-

- (a) have an aggregate light transmitting area measured excluding framing members, glazing bars or other obstructions of not less than 10% of the floor area of the room;
- (b) face
 - (i) a court or other space open to the sky; or
 - (ii) an open verandah, open carport, or the like;
- (c) are not less than a horizontal distance from any adjoining allotment, or a wall of the same building or another building on the allotment that they face, that is the greater of
 - (i) in a Class 2 or health-care buildings - 1 m; and
 - (ii) in a ward area or other room used for sleeping purposes in a health-care building- 3m.

PERFORMANCE REQUIREMENTS

NFP4 Light and ventilation Contd.

Where air handling systems are provided in a building there must be adequate provision for natural ventilation to cater for any prolonged failure of the system.

DEEMED-TO- SATISFY PROVISIONS

NF4.3 Natural light borrowed from adjoining room

Natural lighting to a sole-occupancy unit of a Class 2 building may come through a glazed panel or opening from an adjoining room (including an enclosed verandah) if-

- (a) in the building both rooms are within the same sole occupancy unit or the enclosed verandah is on common property;
- (b) the glazed panel or opening has an area of not less than 10% of the floor area of the room to which it provides light; and
- (c) the adjoining room has windows with aggregate light transmitting area of not less than 10% of the combined floor areas of both rooms.

The areas specified in (b) and (c) may be reduced as appropriate if direct natural light is provided from another source.

NF4.4 Artificial lighting

Artificial lighting must be provided

- (a) in required stairways and ramps by means of separate electrical wiring circuits from the main switchboard for the exclusive use of the stairway or ramp; and
- (b) if natural lighting of a standard equivalent to that required by NF4.2 is not available and the periods of occupation, or use of the room or space will create undue hazard to occupants seeking egress in an emergency, in
 - Class 2 and 3 buildings - to all rooms that are frequently occupied and all corridors, lobbies, internal stairways, other circulation spaces and paths of egress.

NF4.5 Ventilation of rooms

- (a) A habitable room, office, shop, factory, workroom, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person for any purpose must have adequate flow-through or cross-ventilation and air quality, including sufficient air-changes and fresh air quantities.
- (b) Provision of either-
 - (i) natural ventilation complying with NF4.6; or
 - (ii) a mechanical ventilation or air conditioning system with provision for reasonable natural ventilation in case of a lengthy failure of the mechanical system satisfies (a)

Where it is not practical to provide any natural ventilation or a sanitary compartment, bathroom, shower or laundry (other than commercial), it is permissible to have only a mechanical ventilation system with the same effect as otherwise required for natural ventilation.

PERFORMANCE REQUIREMENTS

NFP4 Light and ventilation Contd.

Where air handling systems are provided in a building there must be adequate provision for natural ventilation to cater for any prolonged failure of the system.

DEEMED-TO- SATISFY PROVISIONS

NF4.6 Natural ventilation

Required natural movement of air must be provided by permanent windows openings, doors or other devices which can be opened -

- (a) with an aggregated opening or openable size not less than 15% of the floor area of the room required to be ventilated; and
- (b) opens to-
 - (i) a court, or space open to the sky; or
 - (ii) an open verandah, open carport, or the like.

NF4.7 Ventilation borrowed from adjoining room

Natural ventilation to a room may come through a window, opening, ventilating door or other device from an adjoining room (including an enclosed verandah) if both rooms are within the same sole-occupancy unit or the enclosed verandah is common property, and-

- (a) in a sole-occupancy unit of a Class 2 building-
 - (i) the room to be ventilated is not a sanitary compartment;
 - (ii) the window, opening, door or other device has a ventilating area of not less than 15% of the floor area of the room to be ventilated; and
 - (iii) the adjoining room has a window, opening, door or other device with a ventilating area of not less than 15% of the combined floor areas of both rooms; and
- (b) in a Class 3 building
 - (i) the window, opening, door or other device has a ventilating area of not less than 15% of the floor area of the room to be ventilated; and
 - (ii) the adjoining room has a window, opening, door or other device with a ventilating area of not less than 15% of the combined floor areas of both rooms; and
- (c) the ventilating areas specified in (a) and (b) may be reduced as appropriate if direct natural ventilation is provided from another source.

NF4.8 Restriction on position of WCs and urinals

A room containing a closet pan or urinal must not open directly into-

- (a) a kitchen or pantry;
- (b) a public dining room or restaurant;
- (c) a dormitory in a Class 2 building;
- (d) a room used for public assembly; or
- (e) a workplace normally occupied by more than one person

PERFORMANCE REQUIREMENTS

NFP4 Light and ventilation Contd.

Where air handling systems are provided in a building there must be adequate provision for natural ventilation to cater for any prolonged failure of the system.

DEEMED-TO- SATISFY PROVISIONS

NF4.9 Airlocks

If the room containing the closet pan or urinal is prohibited under NF4.8 from opening directly to another room-

- (a) in a sole-occupancy unit in a Class 2 building -
- (i) access must be by an airlock, hallway or other room ; or
 - (ii) the room containing the closet pan or urinal must be provided with mechanical exhaust ventilation and the doorway to the room adequate screened from view.
- (b) in a Class 3 building (which is not an early childhood centre, or primary school) –
- (i) access must be by an airlock, hallway or other room with a floor area of not less than 1.1m² and fitted with self-closing doors at all access doorways; or
 - (ii) the room containing the closet pan or urinal must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.

NF4.10 Sub-floor ventilation

- (a) Suitable provision must be made to prevent undue deterioration of the lowest floor of a building because of dampness, other conditions on the allotment or the design of the building.
- (b) The following would satisfy the requirements of (a)-
- (i) where timber is used, the floor framing must be suspended with a minimum 400 mm clearance from the ground underneath to the floor and all around. Sub-floor ventilation must be provided with ventilation openings totalling not less than 3% of the peripheral vertical area between the ground and the boundary of the floor. These openings are to be spaced as uniformly as practicable.
 - (ii) where other than timber is used
 - subfloor ventilation should be provided if the floor is suspended;
 - an impervious cover provided over the ground surface beneath the building; or
 - the floor members suitably treated.

PERFORMANCE REQUIREMENTS

NFP5 Water supply plumbing

NFP5.1 General requirements

The plumbing must take into account the current and anticipated needs of the user and allow for the simultaneous use of the connected system by others.

Plumbing for potable water supply must use materials which do not react with the water and thereby make it unsuitable. Suitable precautions must be taken to ensure that unsafe or unhygienic materials have no chance of entering the supply system.

NFP5.2 Pipes which are not easy to access

All concealed and difficult-to-access plumbing work must be suitably protected so that there is no likelihood of damage and leakage.

NFP5.3 Access to domestic-type water heaters

The installation of hot water systems must not impair the safety of the users.

DEEMED-TO- SATISFY PROVISIONS

NF5 Water Supply Plumbing

NF5.1.1 General requirements

The plumbing work for water supply must ensure -

- (a) the appropriateness of the materials and products used;
- (b) the correct sizing of water services for the intended use;
- (c) the control of cross-connections and prevention of backflow;
- (d) adequate care in the installation of the services;
- (e) suitable provision of main and subsidiary storage as required;
- (f) adequate connections to sanitary services without endangering health and hygiene; and
- (g) the installation of hot water systems to provide safe and adequate service.
- (h) all plumbing works be carried out by a suitably qualified tradesman, holding a Plumbing License (issued by Public Utilities Board).

NF5.1.2 Means of compliance-

- (a) AS/NZS 3500 - Part I for cold water service; and
- (b) AS/NZS 3500 - Part 4 for hot water service.

NF5.2 Pipes which are not easy to access

Particular attention is drawn to the provisions in AS/NZS 3500 - Parts 1 and 4, which prohibit the installation of pipes and fittings of certain materials in locations that are concealed or difficult to access. These include pipes made of ABS, galvanized steel, polybutylene and UPVC. Pipes and fittings made of copper, copper alloy, stainless steel, ductile iron, cast iron and polyethylene when used in concealed or precautions specified in AS/NZS 3500 – Parts 1 and 4.

NF5.3 Access to domestic-type water heaters

- (a) A household water heater which is installed in a building must-
 - (i) be supported on construction sufficient to carry its full capacity weight and any possible wind or earthquake loads;
 - (ii) be positioned to enable adequate access for operation, maintenance and removal; and
 - (iii) provide suitably for any overflow, especially if installed in a concealed location.
- (b) AS/NZS 3500 – Part 4 is the relevant standard for the installation of a household water heater.

PERFORMANCE REQUIREMENTS**NFP6 Sanitary plumbing and drainage**

Sanitary plumbing must be laid to self-cleansing grades consistent with their discharge loading, unless other suitable arrangements are made to ensure that the system is kept free of the accretion of sewage and other waste matter.

The size of drains and the layout of their connections must reasonably ensure the current and anticipated needs of the users.

The connections to sanitary installations must ensure that foul gases are not allowed to produce unhygienic conditions nor create any nuisance to anyone and are suitably vented.

DEEMED-TO- SATISFY PROVISIONS**NF6 Sanitary Plumbing and Drainage****NF6.1 General requirements**

- (a) the appropriateness of the products and materials used;
- (b) the correct sizing of drainage services for the intended use
- (c) adequate care in the installation of the services including the provision of appropriate grades; and
- (d) that foul gases are not allowed to produce unhygienic conditions or any nuisance to anyone.

NF6.2 Means of compliance

The requirements of NF6.1 are satisfied if all sanitary plumbing and drainage works are carried out to the relevant provisions of AS/NZS 3500 - Part 2- Sanitary plumbing and sanitary drainage.

Where appropriate, these requirements may also be met by complying with the provisions of Part DF6.

NF6.3 Certain floors to be drained

In a Class 2 building the floor of each bathroom and laundry, in a sole-occupancy unit which is located at other than the lowest level must be graded to permit drainage to a floor waste gully.

NF6.4 Grease trap

Where the nature of the occupancy is such that the waste water contains grease, fats or oils to levels unacceptable to the Authority having jurisdiction, a suitable grease trap must be installed. The accumulated grease and oils must be removed at the intervals sufficient to prevent their escape into the disposal system. After removal the grease and oils must be suitably disposed of.

NF6.5 Trade wastes

Any trade waste unacceptable to the Authority having jurisdiction must be pre-treated before it enters the disposal system.

NF6.6 Small treatment plants

Where there is no public sewerage and treatment system available one of the following methods may be used for the treatment of sewerage:

- (a) Package treatment plants.
- (b) Septic tanks.
- (c) Any other suitable method.

The detail given in Annexure 2 to Specification DFS2 may be used for the preliminary design of the main elements of a septic tank system if such a system is considered.

PERFORMANCE REQUIREMENTS

NFP7 Roof drainage

Any roof drainage system provided must be capable of handling the reasonably expected peak intensities of rainfall.

DEEMED-TO- SATISFY PROVISIONS

NF7 Roof drainage

Roof drainage where provided must comply with requirements of Part DF7.

TABLES AND DIAGRAMS

TABLE NF2.3 SANITARY AND OTHER FACILITIES										
Class of Building	User	Max Number Served by-								
		Closet Fixture (s)			Urinals			Washbasin		
		1	2	Each Extra	1	2	Each Extra	1	2	Each Extra
All Class 3	Employees									
	Males	20	40	20	25	50	50	60	120	60
	Females	15	30	15	-	-	-	60	120	60
Restaurants, cafes, bars, public halls, function rooms and for out patients in health-care buildings	Patrons-									
	Males	50	200	250	50	200	100	50	200	250
	Females	30	70	80	-	-	-	50	200	250
Health-care buildings (other than for out patients)	Patients-									
	Males	-	16	8	-	-	-	16	32	16
	Females	-	16	8	-	-	-	16	32	16
Other facilities - One shower for each 8, or part, patients or inmates										
Schools	Students and staff									
	Males	30	70	70	30	70	35	60	140	140
	Females	20	40	30	-	-	-	60	140	140
Sporting Venues, theatres, cinemas, or the like and churches, chapels or the like	Participants at sporting venues, theatres or the like									
	Males	20	40	20	10	20	10	20	40	20
	Females	15	30	15	-	-	-	20	40	20
Other facilities: One shower for each 10 or part, participants										
	Spectators or patrons									
	Males	250	500	500	100	200	100	250	500	500
	Females	75	250	250	-	-	-	250	500	500

TABLE NF2.6 SANITARY FACILITIES FOR PEOPLE WITH DISABILITIES																									
CLASS OF BUILDING	MINIMUM FACILITY FOR USE BY PEOPLE WITH DISABILITIES																								
<p>Class 2- In every sole- occupancy unit to which access for people with disabilities is required-</p> <p>(a) One closet pan and washbasin; and</p> <p>(b) One shower.</p>																									
<p>Class 3 building with floor area more than 1000 m² and</p> <p>Class 2 if accommodation is other than in sole- occupancy units, or other parts of the building are required to be accessible-</p> <p>NUMBER OF PERSONS FOR WHOM TOTAL FACILITIES NORMALLY REQUIRED</p> <p>Closet pans-</p> <table border="0"> <tr> <td>1 – 100</td> <td>..</td> <td>..</td> <td>..</td> <td>(a)</td> <td>one unisex facility; or</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>(b)</td> <td>one closet pan and washbasin for each sex</td> </tr> <tr> <td>More than 100</td> <td>..</td> <td>..</td> <td></td> <td>(c)</td> <td>2 unisex facilities; or</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>(b)</td> <td>one closet pan and washbasin for each sex and one unisex facility.</td> </tr> </table> <p>In all cases, facilities for females must include adequate means for the disposal of sanitary towels.</p> <p>Baths or showers one shower or shower-bath for each 10 or part thereof Normally required, but not less than one for use by both sexes.</p>		1 – 100	(a)	one unisex facility; or					(b)	one closet pan and washbasin for each sex	More than 100		(c)	2 unisex facilities; or					(b)	one closet pan and washbasin for each sex and one unisex facility.
1 – 100	(a)	one unisex facility; or																				
				(b)	one closet pan and washbasin for each sex																				
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**KIRIBATI
NATIONAL
BUILDING
CODE
2006**

PUBLIC BUILDINGS AND GROUP DWELLINGS (CLASS 2,2A & 3,3A)

SECTION NG

ANCILLARY PROVISIONS

Performance Requirements

Deemed-to-Satisfy Provisions

CONTENTS

DEEMED-TO-SATISFY PROVISIONS PERFORMANCE REQUIREMENTS

Part

Part

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OBJECTIVES

This Section contains more specific requirements for particular parts of buildings or structures.

PERFORMANCE REQUIREMENTS

NGP1 Minor Structures and Components

NGP1.1 Refrigerated chambers, strong rooms and vaults

Refrigerated, cooling chambers, strong rooms and vaults or the like, which are capable of entry by a person must have adequate safety measures to facilitate escape and for alerting persons outside the chambers or vault in the event of an emergency.

NGP1.2 Domestic type water heaters

Household water heaters must be adequately supported and drained, and accessible.

NGP1.3 Safety at elevated places

Elevated places with regular access such as flat roofs must have adequate protection to prevent anyone from falling.

DEEMED-TO- SATISFY PROVISIONS

NG1 MINOR STRUCTURES AND COMPONENTS

NG1.1 Refrigerated chambers, strong rooms and vaults

- (a) A refrigerated or cooling chamber which is of sufficient size for a person to enter must;
 - (i) have a door which is in an opening with a clear width of not less than 600 mm and a clear height of not less than 1.5 m; and
 - (ii) at all times, be able to be opened from inside without a key.
- (b) A strong room or a vault in a building must have
 - (i) internal lighting controllable only from within the room; and
 - (ii) a pilot light located outside the room but controllable only by the switch for the internal
- (c) A refrigerated or cooling chamber, strong room or vault must have a suitable alarm device located outside but controllable only from within the chamber, room or vault.

NG1 .2 Access to domestic-type water heaters

- (a) A household water heater which is installed in a building must
 - (i) be supported on construction sufficient to carry its full capacity weight and any possible wind or other loads;
 - (ii) be positioned to enable adequate access for operation, maintenance and removal; and
 - (iii) provide for any overflow, especially if installed in a concealed location.
- (b) Installation of a household water heater in accordance with AS 1529 satisfies (a).

NG1.3 Parapets on flat roofs

Where a flat roof or other elevated place has regular access, a parapet or balustrade of not less than 1 m height above the surface of the roof or elevated place must be provided. The smallest dimension of any opening in the parapet or balustrade must not exceed 100mm.

PERFORMANCE REQUIREMENTS

NGP1 Minor Structures and Components Contd.

NGP1.4 Use of airspace over public places

Any use of airspace over public places such as footpaths and roads must be limited to ensure that normal public use of such places is not obstructed.

NGP1.5 Fences

Any fencing or free-standing wall must be suited to the occupancy of the building within

DEEMED-TO- SATISFY PROVISIONS

NG1.4.1 Projections over public places

Buildings must not project beyond the allotment boundary. Architectural features such as eaves, cornices, docks, lamps, ventilating equipment, trade signs, hoardings, flag poles, bay or oriel windows and such like as well as a platform or balcony to provide additional means of egress from an existing building, may however project over public footpaths or roads with the following minimum clearances-

- (a) 3300 mm above existing or intended finished level of footpaths; and
- (b) the outer extremity of the feature must be setback 500 mm from the existing or intended kerb.

Any drainage from such architectural features (including drainage from air-conditioning and other ventilating equipment) must be suitably taken down to a drain with downpipes which must also satisfy the required clearances.

NG1 .4.2 Moveable Awnings or sunshades over public places

Any moveable awnings or sunshades must be firmly fixed so that they do not create any danger, obstruction or inconvenience to pedestrians. They must provide the following minimum clearances if they project over public places:

- (a) 2300 mm above the finished levels of the footpath;
- (b) their outer extremity must be set back 500 mm from the kerb.

NG1.5 Fences

If any barbed wire or other such is used it must be at a height of not less than 2 m above the finished level of any existing or intended adjacent footpath.

PERFORMANCE REQUIREMENTS

NGP2 Gas Appliances, Fireplaces, Chimneys and Flues

Gas Appliances, fireplaces, chimneys and flues must be adequately constructed or separated to prevent:

- i. Ignition of nearby parts of the building; or
- ii. escape or discharge of smoke to the inside of the building or adjacent windows, ventilation inlets or the like.

Pressure vessels located in a building are to be installed in a manner which will provide adequate safety for occupants.

When located in a building, a pressure vessel must be installed to avoid, during reasonable foreseeable condition, the likelihood of:

- (a) leakage from the vessel which could cause damage to the building; and
- (b) rupture or other mechanical damage of the vessel which could cause damage to the building or injury to occupants.

DEEMED-TO- SATISFY PROVISIONS

NG2 Gas Appliances, Fireplaces, Chimneys and Flues

NG2.1 General Requirements

A chimney or flue must be constructed;

- a) to withstand the temperatures likely to be generated
- b) so that the temperature of the exposed faces will not exceed a level that would cause damage to nearby parts of the building;
- c) so that hot products of combustion will not
 - (i) escape through the walls of the chimney or flue; or
 - (ii) discharge in a position that will cause fire to spread to nearby combustible materials or allow smoke to penetrate through nearby windows, ventilation inlets or the like;
- (d) in such a manner as to prevent rainwater penetrating to any part of the interior of the building;
- (e) such that its termination is not less than:
 - (i) 600 mm above any point of penetration of or contact with the roof; and
 - (ii) 900 mm above any opening or openable part in any building, within 3 m horizontal distance of the chimney or flue; and
- (f) so that it is accessible for cleaning.

NG2.2 Gas Appliances and open fireplaces deemed-to-satisfy

Gas appliances are to be installed according to AG100.

An open fireplace, or solid-fuel burning appliance in which the fuel-burning compartment is not enclosed, satisfied NG2.1 if it has-

- (a) a hearth constructed of stone, concrete, masonry or similar non-combustible material so that
 - (i) it extends not less than 300 mm beyond the front of the fireplace opening and not less than 150 mm beyond each side of that opening.
 - (ii) it extends beyond the limits of the fireplace or appliance not less than 300 mm if the fireplace or appliance is free-standing from any wall of the room;
 - (iii) its upper surface does not slope away from the grate or appliance, and combustible material situated below the hearth (but not below that part required to extend beyond the fireplace opening or the limits of the fireplace) is not less than 155 mm from the upper surface of the hearth;

PERFORMANCE REQUIREMENTS

NGP2 Gas Appliances, Fireplaces, Chimneys and Flues

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- (a) leakage from the vessel which could cause damage to the building; and
- (b) rupture or other mechanical damage of the vessel which could cause damage to the building or injury to occupants.

DEEMED-TO- SATISFY PROVISIONS

NG2.2 Gas Appliances and open fireplaces deemed-to-satisfy Contd.

- (b) walls forming the sides and back of the fireplace up to not less than 300 mm above the underside of the arch or lintel which:
 - (i) are constructed in 2 separate leaves of solid masonry not less than 180 mm thick, excluding any cavity; and
 - (ii) do not consist of concrete block masonry in the construction of the inner leaf;
- (c) walls of the chimney above the level referred to in (b)-
 - (i) constructed of masonry units with a net volume, excluding cored and similar holes, not less than 75% of their gross volume, measured on the overall rectangular shape of the units, and with an actual thickness of not less than 90 mm; and
 - (ii) lined internally to a thickness of not less than 12 mm with rendering consisting of 1 part cement, 3 parts lime, and 10 parts sand by volume, or other suitable material; and
- (d) suitable damp-proof courses or flashings to maintain weatherproofing.

NG2.3 Incinerator rooms

- (a) if an incinerator is installed in a building any hopper giving access to a charging chute must be
 - (i) non-combustible;
 - (ii) gastight when closed;
 - (iii) designed to return to the closed position after use;
 - (iv) not attached to a chute that connects directly to a flue unless the hopper is located in the open air; and
 - (v) not located in a *required* exit
- (b) If an incinerator is in a separate room, that room must be separated from other parts of the building by construction with an FRL of not less than 60/60/60.