Section 5

BUILDING DESIGN STANDARDS
Contents

Preface ................................................................................................................................................. 3

5.1 GENERAL STANDARDS .............................................................................................................. 6

5.2 SUBSTRUCTURE .......................................................................................................................... 16

5.3 SUPERSTRUCTURE ....................................................................................................................... 20

5.4 INTERNAL FINISHES ................................................................................................................... 32

5.5 ROOF-WATER, RUN-OFF and COLLECTION ........................................................................... 41

5.6 HEALTH AND SAFETY ............................................................................................................... 45

5.7 SECURITY ..................................................................................................................................... 50

5.8 THERMAL PERFORMANCE, VENTILATION, COOLING and HEATING................................. 53

5.9 ACOUSTIC PERFORMANCE ....................................................................................................... 62

5.10 ELECTRICAL POWER AND LIGHTING ................................................................................... 67

5.11 DATA, TELECOMMUNICATIONS and ALARMS .................................................................... 73

5.12 SERVICES ................................................................................................................................... 76

5.13 PLUMBING FIXTURES ............................................................................................................... 85

5.14 FIT-OUT, FURNITURE AND EQUIPMENT ............................................................................... 91
Preface

Design Standards for Department of Education and Training describes the specific standards for the design of new facilities and the redevelopment and maintenance of existing facilities for DET facilities.

Section 5 of this document describes the minimum quality standards and performance outcomes for buildings and provides:

- Planning and functional performance standards for the design of DET facilities.
- A base brief of reference information for the development of project facilities briefs.

DET facilities are required to comply with the National Construction Code including Building Code of Australia and relevant Australian Standards.

Other Policy, Standards and Procedures documents are referenced in this document where more detailed information is provided on particular aspects of facilities requirements.

5.1 General Standards
Contents

5.1 GENERAL STANDARDS ............................................................................................................. 6
5.1.1 Application and Regulation ............................................................................................. 6
5.1.2 Performance and Flexibility ............................................................................................. 6
5.1.3 Image .................................................................................................................................... 7
5.1.4 Construction and Protection ............................................................................................ 8
5.1.5 Sustainability ...................................................................................................................... 9
5.1.6 Access and Circulation ....................................................................................................... 11
5.1.7 Floor Area and Space Configurations ............................................................................ 12
5.1.8 Amenities .......................................................................................................................... 12
5.1.9 Modification and Demolition ............................................................................................ 13
5.1.10 Relocatable Buildings ..................................................................................................... 13
5.1.11 Food Preparation Areas .................................................................................................. 13
5.1 GENERAL STANDARDS

5.1.1 Application and Regulation

- Department of Education and Training Design Standards for DET Facilities form part of project documentation issued at tender for construction (including Minor Works, Maintenance and Design and Construct projects) in conjunction with specific project documentation such as schematic drawings and room data sheets.

- Section 5 of these DET Design Standards codifies the minimum standards to which building infrastructure shall be constructed.

- These design standards may be used as planning guidelines however the principal purpose is to establish minimum/mandatory quality standards for inclusion in tender/contract documentation.

- Quantitative standards are of a general nature with specific extent of work (number and location of elements, components, fixtures, etc.) defined in project specific briefs, schematic design drawings and room data sheets.

- Under Queensland Government Enterprise Architecture the application of documentation shall apply in the following order of precedence where a conflict arises:
  - Australian Government Legislation and Regulations including the National Construction Code (Building Code of Australia)
  - Queensland Government Legislation and Regulations
  - Queensland Government policy and Department of Education and Training policy
  - Approved project Schematic Drawings
  - Approved project Specification
  - Approved project Room Data Sheets
  - Design Standards for DET Facilities – (this document)
  - Relevant Australian Standard Codes
  - Relevant International Standard Codes
  - Manufacturers written recommendations

- The classification of school buildings under the National Construction Code - Building Code of Australia is generally under Class 9b. This including all school support buildings such as administration, staff, school halls, amenities, food service buildings etc. Other DET sectors e.g. Training and Early Childhood Education shall adopt the appropriate classification as determined.

5.1.2 Performance and Flexibility

- Buildings shall be functional, fit-for-purpose, comfortable, healthy, safe and environmentally sustainable to meet the intended use as outlined in the project brief.
Buildings shall be designed to respond positively to their environment including climatic, social, cultural and environmental conditions.

Buildings shall be designed to cater for their identified purpose yet be flexible and adaptable for changing uses both in the short and long term, taking into account the following:

- Structural systems shall allow clear span spaces with minimum internal columns or structural walls, to facilitate future refurbishment or remodelling as needs change in the future.

- Services such as power, data, water and drainage shall be wherever practicable, located on the perimeter of rooms in preference to in the centre to enable teachers and students to modify and customise learning spaces and to allow for future remodelling. Where power and data are required in the centre of a space, floor boxes shall be provided except where briefed otherwise.

- Built-in furniture and fixtures shall be wherever practicable, located on the perimeter of rooms.

5.1.3 Image

Image and Aesthetics

- The design aesthetic of school buildings shall incorporate a mix of innovation, functionality and cost effectiveness, to achieve a contemporary style tailored to each school taking into account the local landscape, site topography and the character of the local community.

- Where specifically briefed, specific buildings shall have enhanced visual image and identity. Additional documentation (elevations, 3D image etc.) of these buildings shall be provided for approval where required.

Scale

- The scale of buildings and fittings shall take into account the size of students, particularly in primary schools.

- A domestic scale is required for buildings for years Prep to year 3 to encourage a feeling of security and to assist the transition from home to school.

- High school buildings shall reflect a contemporary educational built environment that recognises and assists in the transition from school to tertiary education.

Colour Scheme - External

- External colour schemes shall be sympathetic to the surrounding environment/streetscape and be compatible with existing building colour schemes where applicable.

- Use colour to identify zones or individual buildings and to assist in identifying travel routes through the site.

Colour Scheme - Internal
Section 5.1. – General Standards
Building Design Standards for DET Facilities

- Internal colour schemes shall generally be light, neutral colours for large surfaces.
- Accent colours shall be used as approved after consultation with the client groups. Consultation will be needed to determine specific colour needs of students. Strong colours and patterns may be problematic for students with ASD.
- Colour schemes shall be used to assist in defining the identity of buildings and room functions and to assist in route/path finding.

**Colour for safety in Manual Arts Workshops**

- Use safety colours as set out in the Standard Industrial Safety Colours ASK 185.
- The interior walls and ceiling of Arc Welding Bays shall be painted non-reflective matt black.
- Safe work zones around machines where briefed shall be defined by yellow painted safety lines on the floor. *Refer 5.6.10 Health and Safety.*

**Colours for safety enhancement generally**

- In covered play areas, large structural columns shall have high luminance contrast colour for visual prominence when children are playing.
- The edging to all steps shall have a contrasting coloured nosing.

**Visual Transparency**

- Internal and external walls of all habitable rooms shall (except where specifically briefed otherwise) have glazed windows, view panels and door glazing to provide passive visual supervision and promote a visually transparent environment between spaces and to the external environment.
- To allow passive supervision of children while sitting on the floor, view panels in spaces for Years P to 3 shall have a sill height of between 400 to 800mm and a head height of minimum 1800mm.
- To allow passive supervision of children while sitting on chairs etc, view panels in spaces for Years 4 to 12 shall have sill height of 1000mm and a head height of minimum 1800mm.
- Where optional visual privacy is briefed as a requirement (such as for staff areas, offices, meeting and interview rooms) visual privacy shall be achieved by privacy blinds (Venetian or roller type screen/blinds) on the inside face of view panels and windows.
- Where external sunscreens are required to prevent sun penetration through windows, they shall be designed so as not to obstruct horizontal view by of more than 50% of the viewable window area, unless briefed otherwise.

5.1.4 **Construction and Protection**

- Construction and structural systems shall be appropriate for particular site location and site conditions and risks of natural events (e.g. topography, soil conditions, flood, storm...

- Where specifically briefed, nominated buildings shall be designed to function effectively during and immediately after natural hazard events and act as an emergency shelter for the community.

- The finished floor level of all habitable buildings, unless specifically briefed otherwise, shall be constructed to a minimum level of 500mm above Q100 flood level. Non-habitable buildings shall be constructed to a minimum level of 300mm above Q100 flood level.

- Construction and structural systems shall be suited to availability of local materials, construction techniques and available skills within local construction industry.

- Pest and vermin infiltration and infestation (i.e. birds, possums, termites, vermin and insects etc.) shall be prevented by approved physical or sealed chemical barriers (acceptable product Trithor or equal approved) especially for she type structures.

- School buildings shall be designed to resist wind loads in accordance with Building Code of Australia Part B Clause 1.2 Table 1.2A, Importance Level 3, unless specifically briefed otherwise.

### 5.1.5 Sustainability

**Sustainability**

- Buildings shall be designed to reflect departmental policy Earth Smart Environmental Sustainability Strategic Plan 2008-2012. Refer to Section 2 Ecologically Sustainable Development Standards, taking into account the following principles:
  - Passive Design principles
  - Energy Conservation
  - Water Efficiency and Water Quality
  - Indoor Environment Quality
  - Waste minimisation and Recycling
  - Sustainable Materials

- Materials shall wherever possible have low embodied energy, be recyclable and sourced from local manufacturers.

- Preference shall be given to products with environmental certification complying with ‘Green Tag’, Good Environmental Choice Australia (GECA) or equivalent system.


- Unless briefed otherwise, a Construction Management Plan compliant with the Department of Public Work’s Recycling Policy for Buildings and Civil Infrastructure shall incorporate a Recycling Management Plan for the management of construction waste.
Section 5.1. – General Standards
Building Design Standards for DET Facilities

- Unless briefed otherwise, the Construction Management Plan shall incorporate plans for drainage control, erosion control, sediment control and water quality outcomes consistent with the State Planning Policy for Healthy Waters.

**Life Cycle Durability**

- Building structure, fabric, materials, finishes, services and equipment shall be durable and have low maintenance life-cycle characteristics in accordance with a recognised Life Cycle Assessment (LCA) tool e.g. Green Tag LCARate or similar.

- The usable life cycle performance of building structure, fabric, services, materials, finishes and equipment shall have an indicative life span (years) as follows:
  - Building structure - 80 years.
  - Building fabric (roof, cladding, windows etc.) - 25 years
  - Building fit-out - 25 years.
  - Services infrastructure - 25 – 80 years dependant upon accessibility and type of elements.
  - Relocatable buildings (allowing for multiple relocations) - 25 years.
  - Sporting facilities - 50 years.
  - Plant and machinery - 25 years (depending on the item).

- Exposed galvanized steel elements subject to wear and tear by students (such as covered walkway columns) shall be left unpainted unless briefed otherwise.

- Handrails to external stairs, ramps and balustrades shall be a durable scratch resistant material (e.g. stainless steel) to resist wear and damage.

**Corrosion Protection**

- Atmospheric/ Exposure classification for concrete shall comply with Australian Standards AS3600 and AS/NZ 2312 as follows:
  - In contact with ground – A2.
  - Exterior above ground – B1.
  - Interior – A1.

- Atmospheric/ Exposure classification for structural steelwork shall comply with Australian Standards AS3600 and AS/NZ 2312 as follows:
  - Exterior (unlined external soffits and any area subject to condensation, contact with ground or rain water, or subject to crevice corrosion) – Moderate.
  - Interior – Mild.

- Base metal thickness of structural steel elements (excluding purlins and fascias) in an exterior environment – shall be a minimum of 3mm.

- Minimum corrosion protection to structural steelwork shall comply with Australian Standards AS 1627 and AS 4680 as follows:
  - Exterior environments – Hot dipped galvanised.
Section 5.1. – General Standards
Building Design Standards for DET Facilities

- Interior environment – IP1 General Purpose Prime.
- Interior environment (Subject to abrasive wear) – IP2 Special Purpose Primer.

- External structural components shall be hot dip galvanised in whole components following fabrication and bolted on site. On-site welding of hot dip galvanised, exposed structural components shall not be permitted except where specifically approved otherwise.

5.1.6 Access and Circulation

Accessibility


- The requirements of the Disability Discrimination Act shall be considered in relation to equitability of access. Advice from a consultant with expertise in DDA shall be provided to support any proposed solution.

- Lift access shall be provided where specifically briefed or required to comply with access provisions. Refer to Section 5.12.6 – Lift Services

- To support information access and enquiries by parents and the public, hearing augmentation systems shall be provided at reception counters in the Administration Block and Resource Centre and other areas where briefed. Acceptable product – Word-of-Mouth Sound - Shuttle or equal approved.

Egress

- All egress paths of travel and emergency lighting shall comply with statutory requirements.

- Entry doors to all classrooms shall open outwards to promote easy exit.

- Recess outswing doors into the classroom to avoid projecting into corridor circulation spaces.

- Sliding doors shall not be provided as the main entry in rooms required for accessibility under BCA and AS 1428.1.

Emergency Egress

- In rooms where potentially hazardous activities may occur (e.g. Science Labs, Food Kitchens, Catering Kitchens) and where briefed, provide a minimum of two (2) separate alternative paths of egress from the room in case of an emergency.

Other access/ egress issues
Section 5.1 – General Standards
Building Design Standards for DET Facilities

- All external doors shall have a minimum 900mm deep continuous wet weather cover (such as a veranda roof, covered link or awning) at a height to provide effective rain protection and for the length of the door opening plus a minimum of 1000mm each side.

- A suitable path of travel shall be provided for stretcher access to all first-aid/ casualty/ sick rooms from the nearest vehicular disabled parking bay including consideration of the width of doors, turning space, slope and cross fall of access pathways.

- In rooms where roller shutter doors are provided, an additional exit swing door shall be provided to ensure safe egress.

5.1.7 Floor Area and Space Configurations

- Refer to specific space/ room floor area allocations as defined in each project brief.

- For typical spatial allocations, functional relationships and room data for typical school models refer to Design Standards Section 7.

5.1.8 Amenities

- The number of sanitary fixtures for both students and staff shall be in accordance with statutory requirements (BCA 2010 Table 2.3 Sanitary Fixtures for Class 9b buildings) for the advised planned long term enrolment capacity of the whole school as indicated in the master plan.

- To ensure personal privacy and to minimise bullying, each student toilet cubicle shall have full height partitions between adjacent cubicles and full a height door (maximum 40mm gap under door and minimum door height 2040mm). The cubicle door shall be inward opening with lift off safety hinges and shall have an indicator latch that can be operated in an emergency from the outside.

- Each cubicle shall have impervious floor and wall finishes with sealed joints between wall and floor.

- Each cubicle shall have fixtures, fittings and services as briefed. Refer also to Section 5.12.2 Water Supply, Section 5.13 Sanitary Fixtures and Section 5.14 Fit-out, Furniture and Equipment.

- Each cubicle shall have natural ventilation and a dedicated light fitting (switched from a staff accessible room such as the cleaner’s store). Cubicles in single storey buildings shall have natural lighting via a ‘solartube’ or similar skylight which is vented to assist in natural ventilation.

- Separate male and female groups of cubicles shall be located adjacent to corresponding male and female hand washing areas that are screened to provide afterhours security and a degree of privacy yet enable passive supervision by staff from outside the block.

- Self-help toilet and shower cubicles for independent persons with a disability (PWD) shall comply with AS 1428.1 unless a standard of enhanced accessibility is legislated or specifically briefed.
• Assisted toilet and shower cubicles for persons with a disability requiring assistance (Assisted PWD) shall comply generally with AS 1428.1 but shall have circulation space each side of the toilet pan to enable assistance either manual or with a hoist.

• Student amenities in Prep to yr 1 shall take into consideration the height of young users when establishing the location and height of flush handles, wash basins and drinking fountains. Note: Standard height toilet pans shall be provided for all students from Prep to yr 12. Junior size pans shall only be provided where specifically briefed for Kindy aged children.

• Amenities hereto are generally not applicable for Early Childhood Centres or Training Facilities installations, unless specifically briefed.

5.1.9 Modification and Demolition

• Construction work involving disturbance, removal or demolition of any hazardous materials including asbestos, smoke alarms etc shall be in accordance with statutory requirements and DET and DPW policy. Refer to Section 5.6.6 Health and Safety-Hazardous Substances.

• Construction work involving demolition of existing buildings shall comply with Department of Public Works ‘Recycling Policy for Buildings and Civil Infrastructure’.

5.1.10 Relocatable Buildings

• Refer to DET standard arrangement for procurement of Relocatable Buildings.

• Unless briefed otherwise, relocatable classroom buildings shall have the equivalent standard of accessibility, water, drainage, power, data, electronic security, evacuation/lock-down alarm, to that provided in permanent buildings.

5.1.11 Food Preparation Areas

• Food preparation areas in Canteen/ Tuckshops and Catering Kitchens (for teaching catering and hospitality to students in years 10 to 12, including ASF Cert 3), shall comply with ‘Queensland Government - Design and Fit-out Guide for State Food Business’.

• Food Kitchens (for the teaching food studies to students in yrs 7 to 9 only) are exempt from the above requirements; however general design principles for food hygiene shall be adopted.
5.2 Substructure
## Contents

5.2  SUBSTRUCTURE .................................................................................................................. 16

5.2.1  Slab and Footings........................................................................................................ 16

5.2.2  Suspended Floors......................................................................................................... 16

5.2.3  Services......................................................................................................................... 17

5.2.4  Access to under Floor Areas........................................................................................ 17
5.2 SUBSTRUCTURE

5.2.1 Slab and Footings

- Generally single storey slab-on-ground construction shall be used where site conditions and briefed functional requirements allow such building platforms to be constructed economically. Access for persons with disabilities will be achieved more economically with single storey construction. Multi-storey and suspended floor construction may be appropriate where site constrains dictate.

- The design of the slab and footings shall take into account the following:
  - Stability of founding material and suitability of ground conditions
  - Estimation of any excavations in rock
  - Appropriate footing design for the nature of the building and the service function it is to perform
  - Suitability of excavated material for bulk fill
  - Minimise potential movement or settlement and susceptibility to damage of surrounding infrastructure
  - Site overland stormwater characteristics

- Where practicable, floor slabs and footings, including veranda slabs, shall be constructed with a single concrete pour to avoid joints.

- Provide physical termite protection at all penetrations and joints.

- Where slab edges are exposed provide continuous exposed edges of min 75mm high, for visual inspection for termite attack.

5.2.2 Suspended Floors

- Suspended slabs or raised substructures shall be used on the ground floor storey in the following situations:
  - Where geotechnical investigations recommend minimisation of ground disturbance such as excavations in rock
  - Where steep slope of the building zone cannot be formed economically into building platforms
  - In sensitive environmental areas where disturbance to natural ground is to be minimised
  - Where overland storm water flow or flood water risk is identified
Section 5.2. – Substructure
Building Design Standards for DET Facilities

- Ensure that areas under suspended slabs are stabilised and prevented from eroding.
- Surface drainage and falls shall be designed to ensure that water is diverted away from under slab areas.
- Tanking and seepage drainage shall be provided to retaining walls to prevent water penetration into lower or subfloor levels of buildings.

5.2.3 Services

- Allow for the following when determining sizes and location of underground services:
  - Future needs and capacity for expansion (e.g. – water pipes, electrical cabling, air-conditioning duct work, data cabling) where briefed
  - Serviceability and access for maintenance
  - Minimise the number of trenches required during construction
  - Where possible locate service runs in close proximity and in similar directions
  - Future building platform levels
  - Actual finished landscape levels
- Location of all underground services shall be documented in the form of as-built drawings.

5.2.4 Access to under Floor Areas

- All permanent and relocatable buildings and structures, where there is insufficient head height in accordance with legislative requirements (including verandas, decks, stairs and tank stands) shall be enclosed for service access only, by secure screening and lockable gates (e.g. battens or mesh screening). Gates shall open outwards.
- Under floor areas of buildings where briefed to be used for storage shall have the underside of floors treated for fire rating as required by building legislation.
5.3 Superstructure
### Contents

5.3 SUPERSTRUCTURE .............................................................................................................. 20

5.3.1 Building Structural System ......................................................................................... 20

5.3.2 Floors .......................................................................................................................... 21

5.3.3 Walls - External .......................................................................................................... 21

5.3.4 Walls - Internal ......................................................................................................... 22

5.3.5 Ceilings ....................................................................................................................... 23

5.3.6 Roof .......................................................................................................................... 24

5.3.7 Windows, Glazing and Sky-lighting ........................................................................... 25

5.3.8 Doors ......................................................................................................................... 26
5.3 SUPERSTRUCTURE

5.3.1 Building Structural System

- The design of the superstructure shall:
  - Reflect the building plan and sub-structure.
  - Locate structural loads (columns and bracing walls) on the external wall line unless otherwise approved, to allow maximum design flexibility in room layout and for future adaptability.
  - Enable roof cover to be constructed as soon as possible to reduce delays during wet construction periods.
  - Have no sharp elements (e.g. exposed flanges) on structural elements which are exposed to student circulation areas.

- All components shall be in accordance with applicable Australian Standards and the following structural criteria:
  - Floor live load – minimum 3 kPa.
  - Floor dead load not supporting masonry walls – minimum 1 kPa for demountable partitions and services.
  - Floor load for plant, lift, generator rooms, etc. – actual plant load or 5 kPa minimum.
  - Floor load for compactus storage areas – actual load or 7.5 kPa minimum.

- Comply with applicable Australian Standard including AS 1170.2 and the following wind loads:
  - Structural Importance Multiplier – 1.0.
  - Terrain Category – compatible with roughness of terrain for all approach directions, cyclone areas.
  - Internal Pressure Coefficient - minimum +0.2 – 0.3.
  - Internal walls and partitions shall resist all loads to which they might reasonably be subjected and the following:
    - Differential internal pressure co-efficient – minimum 0.25 kPa.
    - Partition walls not to deflect more than height /300 under a pressure of 0.25 kPa.

- Comply with applicable Australian Standards for earthquake loads and the following:
  - Masonry walls shall be anchored to the roof and floors which provide horizontal support – no unrestrained structural or non-structural masonry to be used.
  - All structural and non-structural components, plant and equipment shall be mechanically secured for all applied directions of force including upwards.
5.3.2 Floors

- Internal floors unless briefed otherwise, shall be structural concrete slab to the finished levels and fall as briefed.

- Concrete floors shall be in accordance with statutory requirements and relevant Australian Standards and shall have a Class A surface finish and a level tolerance of 3mm maximum deviation from a 3 metre straight edge in any direction, and have a moisture content suitable for application of floor finish as briefed.

- Provide falls in floors to floor wastes at minimum of 1:80 generally and 1:60 for PWD shower/toilets.

- External floors to verandas, covered walkways and paths shall have falls to direct surface water to the outside of the building and prevent ponding.

- Provide steps/ramps at doorways in accordance with statutory requirements and relevant Australian Standards.

- Provide appropriate set-downs for specialist flooring systems (e.g. sports and dance floors) where briefed.

- Recessed mat wells shall not be provided.

- Refer also to section 5.4 Internal Finishes

5.3.3 Walls - External

- Provide external wall cladding systems with the following characteristics:
  - Durable, graffiti resistant, easily cleaned, low maintenance and easily repaired if damaged.
  - Impact and abrasion/scuff resistant materials and finishes up to 1800mm above floor level.
  - Acoustic and thermal performance as per BCA or briefed,
  - Weatherproof.
  - Availability of materials and installation.

- Proposals for use of non-traditional and innovative wall solutions on each individual project shall be supported with proven evidence of suitability and cost effectiveness.

- Unpainted masonry (clay brick and coloured unpainted concrete block masonry) shall have an applied anti-graffiti finish treatment unless briefed otherwise.

- To minimise the locations for dust collection and bird roosting, external walls shall not have exposed horizontal ledges (other than window sills) wider than 30 mm.
5.3.4 Walls - Internal

General

- Refer also to Section 5.4.2. Internal Wall Finishes.
- Construction of internal walls and partitions shall be non-load bearing to enable removal and relocation for maximum flexibility of internal spaces.
- Wall sheeting of internal walls and partitions from floor level to 1800mm in all student accessible spaces shall be equal in impact/scuff resistance to 9mm fibre cement. Note: plasterboard is not acceptable due to ease of damage to surface.
- Wall sheeting in non-student accessible areas shall be equal in impact/scuff resistance to 6mm fibre cement.
- Corner protection shall be provided to external corners of walls.
- Construction of internal walls and partitions shall comply with acoustic performance as briefed.
- Framing size and spacing shall be in accordance with manufacturers’ recommendations for sheet lining fixing.
- Additional framing shall be provided where required to enable structural support for the fixing of joinery, fixtures and fittings.
- To prevent attack from corrosive kiln fumes, the walls of Art Kiln firing rooms shall be flush sheeted, fixed with stainless steel screws and all joints sealed.

Toilet Partitions

- The design, configuration and extent of toilet partitions shall be in accordance with Section 5.1.8. Amenities.
- Toilet partitions shall be a proprietary system with dividing walls, front panels and doors constructed of minimum 10 mm compact laminate with a scratch resistant, textured, graffiti resistant finish on both faces and shall have a random patterned colour (no plain colours) that hides marks.
- Panels shall be joined with clear anodised aluminium channels.
- All fixings shall be vandal resistant, stainless steel, concealed fixings.
- Cubicle doors shall be mounted on 3 lift off gravity safety hinges with 90 degree hold open and fixed with bolt through type, tamper proof fixings.
- Cubicle doors shall have suitable rebated or profiled overlapping jamb edges at junction with frontal panels to provide a visual privacy.
5.3.5 Ceilings

- Minimum height of ceiling in habitable rooms shall be 2700mm (to allow for ceiling fans mounted at minimum 2400mm) and sloping/raked ceilings shall be minimum 2400mm high at lowest point.

- A raised height ceiling with clerestory and/or skylights shall be provided to allow greater volume and to achieve natural lighting and ventilation as follows:
  - where necessary to meet the requirements of 5.8.3 Natural Ventilation and 5.8.9 Natural Lighting
  - in single storey buildings in rooms of 100 sq m or greater.

- Minimum thermal insulation properties (in combination with roof insulation) shall be as briefed. Refer also to 5.8 Thermal Performance

- Ceiling systems shall have minimum acoustic absorption and transmission properties as briefed. Refer also to Section 5.9 Acoustic Performance.

- In food areas such as Canteens, Catering Kitchens, dining rooms and food stores, ceiling systems shall be sealed against dust and vermin and shall comply with ‘Queensland Government - Design and Fit-out Guide for State Food Business’ including flush mounted light fittings.

- All rooms shall be provided with access to the ceiling space to allow access to existing services and installation of additional services in the future.

- Ceiling in rooms smaller than 20 sq m, unless briefed otherwise, shall be fixed flush sheeted.

- Ceilings in rooms larger than 20 sq m, unless briefed otherwise, shall be suspended grid type ceiling with inset tiles and lighting (to provide access to ceiling space for services).

- Suspended grid and tile ceiling systems shall have the following minimum requirements unless briefed otherwise:
  - Proprietary manufactured
  - 30 year warranty against visible sagging, warping and corrosion
  - 1200 x 600 x 19mm thick tiles
  - RH99 sag resistance
  - Textured finish with scrub-able, scratch and soil resistant anti-mould surface
  - 0.90 light reflectance
  - Acoustic absorption minimum NRC 0.70
  - Square lay-in 24 mm grid
  - Minimum 60% recycled content
  - Acceptable product – Armstrong Ultima or equal approved

- Air-conditioned rooms shall have air inlet/outlet registers that are compatible with the ceiling grid.
• To assist in achieving sound isolation between rooms as briefed, acoustic ceiling baffles shall be provided each side of wall partitions.

• To prevent attack from corrosive kiln fumes, the ceiling of Art Kiln firing rooms shall be flush sheeted, fixed with stainless steel screws and all joints sealed.

5.3.6 Roof

• Refer also to Section 5.5 – Roof water run-off and Collection

• To achieve rain noise damping and assist thermal insulation of roofs over fully enclosed spaces, soffits, verandas and large open covered areas, blanket insulation of min R2.5 and with a vapour barrier shall be provided directly under the roof sheeting. Refer Section 5.8 Thermal Performance

• Unless specifically briefed otherwise, roofs over fully enclosed spaces, shall have a minimum slope of 10 degrees and over unenclosed spaces (e.g. covered play areas, covered walkways, verandas, outdoor learning areas etc) shall have a minimum slope of 3 degrees.

• All susceptible openings into the roof space shall be provided with bird proofing.

• Framing under open roofed areas and covered links shall be flush against the underside of roof sheeting to prevent nesting and roosting of birds.

• Roof and veranda eaves shall have a minimum clearance of 2400mm from ground to reduce unauthorised roof access and vandalism.

• Roof eaves overhang shall be a minimum of 900mm wide unless briefed otherwise.

• The extent and location of roof eaves overhang and veranda shall be assessed for contribution to sun shading of windows. A combination of both overhang and external sunscreens shall be used to achieve the required sun exclusion. Refer also to Section 5.8.2 Shading.

• Roof system shall be pre-finished metal profiled sheeting, screw fixed to roof framing, unless briefed otherwise. Other roof systems (such as metal sheeted, rigid foam sandwich panels such as Ritek) shall only be used where specifically briefed or specified.

• Unless briefed otherwise roof sheeting shall comply with the following minimum requirements:
  - Material is to be minimum 0.48 mm base metal thickness, finish complying with AS/NZS 2728: type 4 and AS 1397-2007, G550, AZ150. Acceptable product - Colorbond ‘Coolmax’ or equal approved.
  - Coatings shall be appropriate for corrosive atmospheric conditions and location (e.g. within 2 km of sea coastline use). Acceptable product - ‘Colorbond Ultra’ or equal approved.
  - Sheets shall be full length sheets with no end laps.
- All materials, finish, flashings and fixings shall be protection from the effects of galvanic corrosion.
- Bird proofing shall be provided to all sheeting edges/ends.

5.3.7 Windows, Glazing and Sky-lighting

- Window systems shall comply with relevant Australian Standards including AS1288 Glass in Buildings (and amendments).

- Safety glass shall be provided in all identified risk situations in accordance with AS 1288 Glass in Buildings (and amendments).

- Window systems shall be proprietary aluminium systems of commercial quality, clear anodised finished unless briefed otherwise.

- The window system shall incorporate associated proprietary fixings, flashings, seals and hardware.

- Window systems shall be designed to meet the wind loading and impact resistance levels to suit the relevant location.

- Window systems shall achieve acoustic transmission rating for each room as briefed. Refer also to Section 5.9 Acoustic Performance.

- Window systems shall achieve physical security rating as briefed. Refer also to Section 5.7 Security Design Requirements.

- All window glass shall be aluminium section edge framed unless briefed otherwise.

- To achieve views and passive visual connection/supervision, provide view panels in walls between rooms and in doors as briefed.

- To achieve natural ventilation as briefed, the extent of open-able windows (together with doors and open-able clerestory/skilights) as a % of floor area, shall be as briefed. Refer to 5.8.3 Natural Ventilation.

- To achieve natural lighting, the extent of windows and skylights (clerestory windows or solar tube type skylights) as a % of floor area, shall be as briefed. Refer to Section 5.8.9 Natural Lighting.

- The standard window configuration in external walls of habitable rooms, unless briefed otherwise, shall extend from sill height 1000 mm above floor level, up to 2400 high with a transom at 2100 high (door head height).

- High level louvres at 2400mm or more above internal floor level (such as clerestory windows) shall be mechanically operated in banks via electric actuators with variable control switching.

- Double hung windows shall only be provided where specifically briefed and shall have fail-safe spring balances and locking mechanisms.
• Casement or hopper windows shall only be provided where specifically briefed and shall be located so as not to open into trafficable areas.

• School buildings located close to noise sources (main roads, railway lines etc) shall where specifically briefed have double glazing or thicker glass to achieve acoustic requirements.

• Tinted glazing shall be provided only where specifically briefed to achieve glare reduction and shall comply with relevant Australian Standards.

• Security screening where briefed shall be as required by Section 5.7 Security. Acceptable products - ‘Crimsafe’ high tensile stainless steel mesh with screw clamps or ‘Clearshield’ stainless steel perforated sheet or approved equal.

• Insect screens where briefed to open-able window panels (and doors) shall be woven SS mesh or perforated SS sheet screens as above.

• In rooms located on two-storey levels and above, open-able windows that constitute a fall hazard shall be protected with a barrier screen of woven Stainless Steel (SS) mesh or perforated SS sheet as above, unless briefed otherwise.

5.3.8 Doors

General

• Door width (to achieve clear width), door location and side clearance shall comply with building legislation for egress and access and with relevant Australian Standards including AS 1428.1.

• Main external doors to all classrooms/learning spaces and shall be single leaf nom 920mm wide outward opening unless briefed otherwise. Other doors shall be nom 820mm wide unless briefed otherwise.

• Main entry doors where briefed (e.g. to significant buildings, Administration, Performance buildings), shall be double leaf, commercial quality, fully glazed, aluminium framed with appropriate hardware and door closers.

• Fully glazed doors and view panels in doors shall comply with relevant Australian Standards including AS1288 Glass in Buildings (and amendments).

• Security screening where briefed shall be as required by Section 5.7 Security. Acceptable products - ‘Crimsafe’ high tensile stainless steel mesh with screw clamps or ‘Clearshield’ stainless steel perforated sheet or approved equal.

• Door systems being constructed in buildings in cyclone regions shall comply with relevant wind code loading for the area.

Door Construction

Version 2.0 Date: 29 July 2011
Doors shall be capable of withstanding heavy and constant usage by students and sufficiently robust to provide physical security to the level briefed.

External doors shall be weatherproof construction with weather seals.

External doors shall be solid core except where briefed otherwise.

Internal doors generally shall be cell core except where briefed to meet high acoustic requirements.

Impact and scuff panels/plates for protection from wheelchair damage, shall be provided to doors in all PWD accessible toilets.

**Gates**

To ensure adequate ventilation and supervision by staff, gates to student amenities foyer and washbasin areas and other secure courtyards shall be 50% perforated metal sheet screening or similar to adjacent wall screening.

Locks to gates shall comply with escape provisions of Building Code of Australia and shall be open-able from the inside at all times. Provide a 600mm radius anti-tamper panel around the latch handle to prevent external access to the handle through the mesh when the gate is locked.

Gates shall be provided with appropriate latch or bolt to allow holding and locking in the fully open position.

**Toilet Doors**

To ensure visual privacy and effective ventilation, doors to student individual toilet cubicles shall be full height 2040 mm high and with a maximum of 40mm gap at the floor and have a ventilation panel above the door up to 2400mm high.

Cubicle doors shall be inward opening with lift off hinges and shall have a privacy indicator latch that can be opened from the outside in an emergency.

**Roller Doors/ Shutters**

Roller shutters or doors to large stores, field stores, canteen servery areas etc. shall be interlocking slat type constructed to give maximum strength.

Roller shutters shall have a reinforced bottom rail and have internal barrel bolts both sides for padlocking.

Roller shutters larger than 3600W x 2400H shall be chain operated. Electric motorised roller doors shall be provided only where specifically briefed.

Roller shutters to tractor storage areas shall have a minimum clear opening height of 2400 to allow clearance for the tractor anti-roll cage.

**Special Doors**
The door set for Category ‘A’ Security Store Room where briefed shall be a minimum of 1 hour fire rating and comply with relevant Australian Standards. Refer also to Section 5.7 Security.

Operable and Concertina Doors

Operable folding panel walls and concertina doors where briefed shall have the following qualities:

- Minimum rating of Rw 33 between classrooms including associated jamb seals, floor seals and head tracks to reduce noise transmission. Refer also to Section 5.9: Acoustic Performance
- Commercial quality construction, durable, low maintenance, with quality fixings, mechanisms and latches. Acceptable product – Hufcor Series 5000 or equal approved.
- Provide barrel bolt floor fixings at the bottom of each pair of panels to control flexing due to differential air pressure between rooms.
- Incorporate into the door panels where briefed, view panels, whiteboards, mirrors, pin-boards and penholders.
- Operable folding panel doors unless briefed otherwise shall be made up of separate pairs of panels hinged together to allow any combination of pairs of panels to be used.
- Operable walls where compliant access between rooms is required shall have one swing door end panel with access compliant lever handle.

Door Frames

- Door frames shall be steel or aluminium unless briefed otherwise.
- Door frames shall suit door location, door type and window system if applicable.
- Provide door closers to restrain door swings in areas that could cause a danger to students.

Door Locks

- Refer also to Section 5.7 - Security.
- Lockable doors, unless specifically briefed otherwise, shall be fitted with commercial quality, 6 pin cylinder mortise locks with deadlatch conforming to AS 4145.2 - level D3 durability and level S2 security. Acceptable product – ‘Lockwood 3572 Vestibule Lock’ or equal approved.
- Lockable doors, unless specifically briefed otherwise, shall have the external handle key lockable from the outside.
- The external handle shall be lockable from the inside by a snib.
- The internal handle shall allow opening from the inside at all times
Keying system shall be a Grand Master Key (GMK) Restricted Key System and registered with an approved master locksmith. *Acceptable product* – ‘Lockwood Generation 6 system’ or equal approved.

The keying plan for the entire school shall provide Grand Master Key, Master Key, Keyed-Alike and Keye-to-Differ functionality as briefed with all keys stamped with appropriate alpha/ numeric coding.

Special lock set for Category ‘A’ Security Store Room where briefed shall be a 4 point proprietary security lock. *Acceptable product* – Rivers 4 point lock set or equal approved.

**Door Furniture and Fittings**

Door lock handles shall be lever handle, brushed stainless steel finish. *Acceptable product* – ‘Lockwood 202 Series Stainless Steel’ furniture with ‘Lever 90 handles’ or equal approved.

Provide door stops to all internal and external doors. Door stops shall be vandal resistant and located so as not to create a trip hazard in trafficable areas.

Provide vandal resistant door hold back devices to all external doors.

Provide a minimum of 3 heavy duty fixed pin SS hinges to suit weight and size of door to prevent sagging.

Where doors are required to open 180 degrees provide wide throw or extended hinges.

Provide barrel bolts to the top and bottom of the secondary leaf of double leaf doors.

Provide ‘D’ handles to sliding doors.

Doors in rooms that are briefed to require air circulation (e.g. electrical cupboards and stores, data cupboards, air conditioned areas etc.) shall have heavy duty and securely fixed metal louvre grilles.

On external two leaf doors provide an external striker/ latch cover plate. *Acceptable product* – ‘Boyd plate’ or equal approved.

Electronic card key access system shall be provided only where specifically briefed.
5.4 Internal Finishes
Contents

5.4 INTERNAL FINISHES ..........................................................................................32
  5.4.1 Flooring ........................................................................................................32
  5.4.2 Internal Wall Finishes ................................................................................37
  5.4.3 Ceiling Finishes ..........................................................................................38
  5.4.4 Paint Finishes .............................................................................................38
5.4 INTERNAL FINISHES

5.4.1 Flooring

- Floor coverings shall comply with relevant Australian Standards, be commercial grade, easily cleaned and be able to withstand very high levels of wear and occasional inappropriate use.
- Floor coverings shall have slip resistance to suit the usage of the space in accordance with AS/NZS 4586 and Appendix A.
- Floor coverings shall have colours and pattern to minimise the visual impact of stains and marks.
- Where briefed, floor coverings shall have additional cushioning underlay for tactile comfort.
- Junction between different floor finishes and at exposed edges shall have stainless steel junction strip. At doorways the junction strip shall be located directly under the door when closed.
- The following sections provide the minimum standard acceptable for floor finish types as briefed:

Carpet Tiles

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Tufted loop pile, direct stick tile</td>
</tr>
<tr>
<td>Construction</td>
<td>100% solution dyed/ yarn dyed nylon, bonded to woven 100% synthetic backing, interlocking crossover stitch (to prevent zippering/ unravelling)</td>
</tr>
<tr>
<td>ACCS Rating</td>
<td>CEHDS (Commercial/ contract Extra Heavy Duty plus Stairs)</td>
</tr>
<tr>
<td>Thickness &amp; weight</td>
<td>Nominal pile thickness – 3 to 4mm</td>
</tr>
<tr>
<td></td>
<td>Nominal total thickness - 6 to 8mm</td>
</tr>
<tr>
<td></td>
<td>Minimum pile mass - 612g/m² (18oz)</td>
</tr>
<tr>
<td>Tile dimensions</td>
<td>Nominal 450 to 600mm square</td>
</tr>
<tr>
<td>Machine Gauge</td>
<td>1/10 – 1/12</td>
</tr>
<tr>
<td>Backing ISO/PAS 17984</td>
<td>Dimensional stability of less than 0.2%</td>
</tr>
<tr>
<td>Warranty</td>
<td>Minimum 15 Years Commercial wear, No Zipper/ Edge unravel, No de-lamination, Colourfast, Anti-shock</td>
</tr>
<tr>
<td>Pattern</td>
<td>Colours should be of darker range, with disruptive patterning or lines to disguise marking</td>
</tr>
<tr>
<td>ESD Green Accreditation</td>
<td>Green Building Council V1compliant</td>
</tr>
<tr>
<td></td>
<td>ESC level 4 – maximum points</td>
</tr>
<tr>
<td></td>
<td>Comply with ISO9001 &amp; 14001</td>
</tr>
<tr>
<td>Indoor Air Quality</td>
<td>Low VOC emission to comply with Green Building Council Green Star – Education Tool -Table IEQ 8.3</td>
</tr>
<tr>
<td>Recycled Content</td>
<td>Minimum 40% total recyclable content by total weight</td>
</tr>
<tr>
<td>Fire Rating - AS/ISO 9239-1 2003</td>
<td>Critical Radiant Flux – greater than 4.5 kW/m²</td>
</tr>
<tr>
<td></td>
<td>Smoke Development Rate – less than 500% x min</td>
</tr>
<tr>
<td>Anti-Static</td>
<td>Comply with AATCC 134 less than 3.5Kv at 21º and</td>
</tr>
</tbody>
</table>
Section 5.4. – Internal Finishes
Building Design Standards for DET Facilities

<table>
<thead>
<tr>
<th></th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Interlocking tufted level loop pile, direct stick</td>
</tr>
<tr>
<td>Construction</td>
<td>100% solution/ yarn dyed nylon, bonded to woven 100% synthetic backing, interlocking crossover stitch (to prevent zippering/ unravelling)</td>
</tr>
<tr>
<td>ACCS Rating</td>
<td>CEHDS (Commercial/ contract Extra Heavy Duty plus Stairs)</td>
</tr>
<tr>
<td>Thickness &amp; weight</td>
<td>Pile height – 4 to 5mm Minimum pile mass – 748 g/m² (22oz)</td>
</tr>
<tr>
<td>Gauge</td>
<td>1/10 to 1/12</td>
</tr>
<tr>
<td>Width</td>
<td>Nominal - 3660 mm</td>
</tr>
<tr>
<td>Primary Backing</td>
<td>110g/m² minimum woven synthetic</td>
</tr>
<tr>
<td>Secondary Backing</td>
<td>90 g/m³ minimum “ACTION BACK” 6 pic minimum</td>
</tr>
<tr>
<td>Bonding</td>
<td>Dual latex</td>
</tr>
<tr>
<td>Bond Strength</td>
<td>40 N minimum</td>
</tr>
<tr>
<td>Tuft Withdrawal Force</td>
<td>30 N minimum</td>
</tr>
</tbody>
</table>
| Warranty                  | Minimum 10 Years Commercial wear, No Zipper/Edge ravel, No de-lamination, Colourfast, Anti-shock  

Carpet - Broadloom

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuft withdrawal force AS 2111.15</td>
<td>Greater than 20 newtons</td>
</tr>
<tr>
<td>Extractable matter AS 2001.3.4</td>
<td>Less than 1.5%</td>
</tr>
<tr>
<td>Installation</td>
<td>Comply with AS/ANZS 2455.1 &amp;.2</td>
</tr>
<tr>
<td>Acceptable products equal to:</td>
<td>Ontera</td>
</tr>
<tr>
<td></td>
<td>-Quad-X - 19 oz</td>
</tr>
<tr>
<td></td>
<td>-Ultra Naturals - 21 oz</td>
</tr>
<tr>
<td></td>
<td>-Ultra Highlights - 21 oz</td>
</tr>
<tr>
<td></td>
<td>-Ultra Directions - 24 oz</td>
</tr>
<tr>
<td></td>
<td>Godfrey Hirst</td>
</tr>
<tr>
<td></td>
<td>-Base Line, Base Affect, Curriculum, Landscape - 20oz.</td>
</tr>
<tr>
<td></td>
<td>-Physics, Neutron, Doctrine, Designer Jet Range - 22oz.</td>
</tr>
<tr>
<td></td>
<td>InterfaceFLOR</td>
</tr>
<tr>
<td></td>
<td>-Outlook &amp; Outlook Colours - 18 oz</td>
</tr>
<tr>
<td></td>
<td>-EntropyRE – 18 oz</td>
</tr>
<tr>
<td></td>
<td>-Cubic - 19 oz</td>
</tr>
<tr>
<td></td>
<td>Shaw Contract Group</td>
</tr>
<tr>
<td></td>
<td>-Speak Your Language Collection – 18 oz</td>
</tr>
<tr>
<td></td>
<td>-Urban Reflections Collections - 19 oz</td>
</tr>
<tr>
<td></td>
<td>-No Rules Collection - 18 to 20 oz</td>
</tr>
<tr>
<td></td>
<td>-Peto Intrinsic Tarmac - 22 oz</td>
</tr>
</tbody>
</table>

Version 2.0   Date:  29 July 2011
### Sheet Vinyl Flooring

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Fully flexible heavy public/commercial use quality</td>
</tr>
<tr>
<td>Surface finish</td>
<td>A surface treatment to give a ‘low maintenance’ finish, not requiring sealers or polish for the life of the sheet with written guarantee to this effect</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Limited to damp mopping, neutral cleaners, machine cleaning and dry buffing</td>
</tr>
<tr>
<td>Construction Type</td>
<td>Either homogeneous consolidated vinyl with non-directional pattern or heterogeneous multi-layered vinyl sheet with vinyl chips in transparent wear layer bonded to moisture proof backing</td>
</tr>
<tr>
<td>Warranty</td>
<td>Minimum - 10 years including ‘low maintenance’ finish</td>
</tr>
<tr>
<td>Thickness</td>
<td>Minimum thickness - 2mm</td>
</tr>
<tr>
<td>Joints</td>
<td>All joints shall be heat or chemically welded to</td>
</tr>
</tbody>
</table>
Section 5.4. – Internal Finishes
Building Design Standards for DET Facilities

| Flexibility | Ability to form sheeting into a continuous surface from floor to walls with a 25mm radius coving with suitable fillet backing |
| Adhesive | Adhesive suitable for wet areas and have low VOC emission |
| Colour | Mid to darker colours and disruptive patterns to disguise marks (not charcoal or black) |
| Slip resistance | Vinyl floors where briefed and scheduled below shall comply with AS/ NZS 4586 and be one of the following types: |

**Type A - General use vinyl** (e.g. Resource Prep Rooms, Store Rooms etc)
- Appendix A Wet Pendulum – Y
- Appendix D Oil-wet ramp R9

**Type B - Non-slip vinyl** (e.g. Science Labs, Art Studios, Practical learning Areas etc)
- Appendix A Wet Pendulum – X
- Appendix C Wet/ barefoot ramp – B
- Appendix D Oil-wet ramp R10

**Type C – Barefoot/ Wet-area Vinyl** (e.g. Canteen Prep and Serving Areas, HE Food & Catering Kitchens, Staff Amenities, Shower Rooms, PWD shower/ toilets)
- Appendix A Wet Pendulum – X
- Appendix C Wet/ barefoot ramp – B
- Appendix D Oil-wet ramp R10

Type | Acceptable Products (or equal approved)
--- | ---
**Type A - General Use Vinyl**
- **Polyflor**
  - Prestige PUR
  - Mystique PUR
  - Classic Mystique PUR
  - Design FX
  - Forest FX
- **Tarkett**
  - IQ Range
  - Premium Range
  - Accent
  - Century
- **Armstrong**
  - Bravo
  - Accolade Plus
  - Contract Interior/Translations

**Type B - Non-slip Vinyl**
- **Forbo**
  - Smaragd Emerald
  - Accord
### Special Flooring

**Industrial Technology (Manual Arts) workshops and Student Amenities**

- Non-slip epoxy flooring shall be self-levelling, low VOC emission, with slip resistance in accordance with AS /NZS 4586 Appendix D - Oil Wet Ramp R10.

**Dance, Drama, Halls & Indoor Sports Courts**

- Timber ‘area-elastic’ flooring shall be prefinished 'no-sand' in accordance with manufacturers specifications and with a minimum 5 year manufacturer’s warranty for the installed floor. *Acceptable products equal to:*
  
  - ‘Aura/ Haro Helsinki 15’
  
  - ‘ASF Horner PR 2’

<table>
<thead>
<tr>
<th>Type C – Barefoot/ Wet Area Vinyl</th>
<th>Polyflor</th>
<th>Tarkett</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Polyflor Hydro</td>
<td>- Eminent Safe -T</td>
<td></td>
</tr>
<tr>
<td>- Tarkett</td>
<td>- Safetred</td>
<td></td>
</tr>
<tr>
<td>Altro</td>
<td>- VM 20</td>
<td></td>
</tr>
<tr>
<td>Forbo</td>
<td>- Contrax</td>
<td></td>
</tr>
<tr>
<td>Gerflor</td>
<td>- Surestep PUR</td>
<td></td>
</tr>
<tr>
<td>- Tarasafe Ultra</td>
<td>- Tarasafe Style</td>
<td></td>
</tr>
<tr>
<td>- Uni</td>
<td>- Uni</td>
<td></td>
</tr>
<tr>
<td>Armstrong</td>
<td>- Accolade Safeguard</td>
<td></td>
</tr>
<tr>
<td>Response Ind</td>
<td>- Canopus</td>
<td></td>
</tr>
<tr>
<td>- Canopus Plus</td>
<td>- Canopus Plus</td>
<td></td>
</tr>
</tbody>
</table>

- Eternal Stone
- Nera Contract Pixel
- Armstrong
- Accolade Safe Plus
- Possibilities
- Spectrum
- Assurance
- LG Floors
- Durable Vinyl
- Response Ind
- Garnet
- Spica
- Polyflor
- Polysafe Vogue Ultra PUR
- Polysafe Corona PUR

- Eternal Stone
- Nera Contract Pixel
- Armstrong
- Accolade Safe Plus
- Possibilities
- Spectrum
- Assurance
- LG Floors
- Durable Vinyl
- Response Ind
- Garnet
- Spica
- Polyflor
- Polysafe Vogue Ultra PUR
- Polysafe Corona PUR

- Eternal Stone
- Nera Contract Pixel
- Armstrong
- Accolade Safe Plus
- Possibilities
- Spectrum
- Assurance
- LG Floors
- Durable Vinyl
- Response Ind
- Garnet
- Spica
- Polyflor
- Polysafe Vogue Ultra PUR
- Polysafe Corona PUR

Version 2.0  Date: 29 July 2011
• Note: Timber flooring used in schools located in high rainfall and high humidity regions of the state shall be designed and finished to resist damage from moisture and have a minimum 5 year manufacturer’s warranty for the installed floor and have the same performance and maintenance requirements as the above acceptable products.

• Synthetic “point-elastic” flooring shall be in accordance with manufacturers specifications. Acceptable product equal to:

  ‘Aura Pulastic 2000’

**Flooring for Special Education Spaces**


**Flooring for Covered Areas, Covered Walkways and External Paths**

• Non-slip concrete shall have ‘light broomed’ surface finish to achieve slip resistance rating in accordance with AS /NZS 4586 Appendix D - Oil Wet Ramp R10.

**Skirtings**

• Skirtings shall be provided to all walls unless briefed otherwise.

• Skirting shall generally be minimum 10mm thick proprietary pre-finished MDF, 100 mm high, dark colour with tapered edges.

• In wet areas where an impervious sealed joint between the floor and the wall is required, flooring shall be coved up walls and kickboards with impervious joints at corners. Refer also to 5.4.2 below.

• In food preparation areas, flooring shall be coved up walls and kickboards with impervious joints at corners, to comply with ‘Queensland Government - Design and Fit-out Guide for State Food Business’.

**5.4.2 Internal Wall Finishes**

• Paint finish shall comply with relevant Australian Standards. Refer to 5.4.4 below.

• Wall finish in wet areas and shower areas shall be an impervious, easily cleaned sheet material (e.g. smooth vinyl or sheet laminate) up to minimum 2100mm above floor level, fully sealed or heat welded to floor vinyl sheeting with coved backing to corners.

• Walls in food preparation areas shall be finished to comply with ‘Queensland Government - Design and Fit-out Guide for State Food Business’.

• Where specifically briefed (such as in Performing Arts auditoriums), provide acoustic absorption wall surfaces to achieve the briefed absorption level. Refer to Section 5.9 Acoustic Performance.

• Chair rub rail shall be provided to walls in waiting areas where briefed, from 700 to 900 mm above floor level.
• External corners to all internal walls shall be provided with a replaceable corner protection angle from floor skirting to 1800 mm in all student accessible spaces.

5.4.3 Ceiling Finishes

• Flush ceilings shall be painted matt white in colour to ensure adequate light reflection unless briefed otherwise.

• Ceiling tiles shall be pre-finished matt white colour unless briefed otherwise.

• Ceiling grid shall be white powder coated finish matt white colour.

5.4.4 Paint Finishes

• Paint finishes shall comply with Australian Paint Approval Scheme (APAS) and with relevant Australian Standards (AS/NZS 2311 and AS/NZS 3730), shall be ultra-low VOC emission and shall be washable/scrubable.
5.5 Roof-Water, Run-Off and Collection
Contents

5.5 ROOF-WATER, RUN-OFF and COLLECTION.................................................................41

5.5.1 Gutters..................................................................................................................41

5.5.2 Down-pipes & Sumps ..........................................................................................41
5.5 ROOF-WATER, RUN-OFF and COLLECTION

5.5.1 Gutters

- Eaves gutters shall be provided to all roofs unless specifically briefed otherwise.
- Gutters shall be designed for rainfall and storm events of Average Recurrence Interval (ARI) 20 year, in accordance with all relevant Australian Standards.
- Overflow relief shall be provided at the front of the gutter to prevent overflow at the back of the gutter. High front square gutters with overflow slots are not acceptable due to clogging of slots and subsequent overflow at the back.
- Box gutters shall not be installed over fully enclosed spaces. Box gutters elsewhere shall be avoided unless specifically approved otherwise.
- Gutters shall be securely fixed at minimum 2400mm above ground level.
- Gutters shall be located above 2400mm above ground level in trafficable areas. Where specifically approved to be fitted below 2400mm, they shall have fixings of a standard in excess of normal manufacturer’s requirements to withstand swinging on by students.
- Where the location, type and height of trees indicate that there is likelihood that leaves may clog gutters provide leaf guards to all gutters. Leaf guards shall be removable for gutter cleaning.

5.5.2 Down-pipes & Sumps

- Downpipes shall be minimum 150mm internal diameter and designed (sufficient number, spacing and size) for rainfall and storm events of Average Recurrence Interval (ARI) 20 year, in accordance with all relevant Australian Standards.
- Suitable droppers and spreaders shall be provided where downpipes from high roofs discharge onto lower level roofs.
- All downpipes below 2100mm shall be robust, heavy duty and constructed of material strong enough to withstand abuse (e.g. fibre reinforced concrete, hot dipped galvanised CHS steel (Note: UPVC is not acceptable).
- All joints, fixings and brackets shall have adequate strength to resist damage by students and shall be free of sharp protrusions and edges.
- Where the location, type and height of trees indicate that there is likelihood that leaves may clog gutters provide leaf guards to the top of all downpipes and sumps.
- The base of each downpipe shall be separated from the stormwater drainage via a minimum of 25mm gap between the pipe end and the grated inlet to prevent back-up and to provide an access opening sufficient to remove the grate for cleaning and unblocking.
Section 5.5. – Roof-Water, Run-Off and Collection
Building Design Standards for DET Facilities

- All downpipes shall discharge cleanly into grated stormwater inlets, without spilling on to paths or walkways.

5.5.3 Storage Tanks

- On-site rainwater collection and storage shall be provided for toilet flushing in accordance with Qld Development Code section MP 4.3 – Alternative Water Sources.

- Water tanks for storage of overland flow for use for sports field irrigation, shall have capacity nominated in the brief.

- Above ground tanks shall be a suitable colour, suitably located and where required, screened to reduce visual intrusion on neighbouring properties.

- Below ground tanks shall be located away from future building zones, and have loading capacity to ensure that tank structure can withstand vehicular traffic.

- Where roof water is collected for human consumption, roof surfaces shall be of a suitable and safe material and with a ‘first flush’ device fitted to the inlet of tanks to enable initial rainfall to flush roof surface.

- Tank intakes shall be screened with fine stainless steel wire mesh against entry of foliage, insects and vermin. Screen intakes shall be designed to effectively shed leaf debris so as not to hold material in the intake that could breed insects and allow eggs and larvae to penetrate the screen and enter the tank.

- Intakes shall be securely fixed with vandal resistant fixings, to prevent unauthorised access.

- Overflow outlets shall be piped to the stormwater system via downpipes complying with Section 5.5.2 above.
Section 5.6. – Health and Safety
Building Design Standards for DET Facilities

5.6 Health and Safety
# Contents

5.6 HEALTH AND SAFETY .................................................................................................................. 45  
  5.6.1 General .................................................................................................................................... 45  
  5.6.2 Circulation and Access ........................................................................................................... 45  
  5.6.3 Projections, Protrusions, Pinch and Entrapment Hazards ...................................................... 46  
  5.6.4 Floor Slip Hazards .................................................................................................................. 46  
  5.6.5 Stairs and Ramps ..................................................................................................................... 46  
  5.6.6 Hazardous Substances ........................................................................................................... 46  
  5.6.7 Hygiene .................................................................................................................................... 47  
  5.6.8 Ventilation ............................................................................................................................... 48  
  5.6.9 Eye Wash and Safety Showers ................................................................................................. 48  
  5.6.10 Machinery Safety .................................................................................................................. 48  
  5.6.11 Electrical Safety ..................................................................................................................... 48  
  5.6.12 Gas Safety ............................................................................................................................. 49  
  5.6.13 Roof Access and Fall Safety ................................................................................................ 49
5.6 HEALTH AND SAFETY

5.6.1 General

- Design and construction of school buildings shall comply with relevant Australian Standards and legislative requirements including the Workplace Health and Safety Act. Refer also to DET procedure HLS-PR-016.

- Designers of buildings and facilities have an obligation to ensure the design of the structure does not affect the workplace health and safety of persons during construction, after completion and in use for the purpose for which it was designed. This includes an obligation owed to people working in a completed building and those who repair or maintain it.

5.6.2 Circulation and Access

- Egress paths of travel shall be in accordance with statutory requirements.

- Access clearance distances between walls, fixed joinery, fixed benches, fixtures etc. shall be as follows in accordance with AS 2982.
  - User access one side with no through traffic – 1000 mm clear
  - User access one side with through traffic – 1200 mm clear
  - User access on two sides with no through traffic – 1400 mm clear
  - User access on two side with through traffic – 1800 mm clear
  - No user access, through traffic at cross aisles – 1500 mm clear

- Junctions between different floor surfaces shall be flush to prevent trip hazards. Where a difference in levels is unavoidable it shall comply with relevant Australian Standards and be delineated by a change in the colour or texture.

- Columns, fittings etc. shall not protrude into run-off areas adjacent to sports courts. Removable posts for goals and net supports shall be padded in accordance with manufacturers’ recommendations.

- To minimise the number of columns that students need to avoid, covered walkways shall have minimum 4800mm spacing between support columns (along length of walkway) except where briefed otherwise.

- Columns located at intersections between covered walkways shall be set back minimum 1200mm from walkway corners.

- Intersections between covered walkways and uncovered paths shall have a truncated infill to minimise erosion when pedestrians cut the corners.

- Overhead structures, fittings, windows (hopper or casement windows) shall not intrude into pedestrian paths of travel or trafficable areas.
5.6.3 Projections, Protrusions, Pinch and Entrapment Hazards

- Exposed corners, edges, protrusions, fixtures, brackets etc. shall have rounded shape with no sharp edges and shall not intrude into pedestrian paths of travel or trafficable areas.

- Sheet metal fixtures (such as flashings, benches, sinks, basins and troughs) shall be free of sharp edges and corners that could cause injury.

- Holes, openings or slots (e.g. drainage gratings, grille screens, balustrades, fences, open steps etc.) shall not constitute an entrapment hazard for feet, hands, fingers and head.

- Drain covers, grates, manhole covers etc. shall be securely fixed to prevent opening by students.

- Areas with low head height, (such as under floor and roof spaces) shall be secured to prevent access by students, yet allow authorised access for maintenance. Refer also to Section 5.2.4 Substructure.

5.6.4 Floor Slip Hazards

- All non-carpeted floors and ramps (vinyl, concrete, epoxy etc.) shall have a slip resistant finish with the rating as briefed. Refer also to Section 5.4 Internal Finishes.

5.6.5 Stairs and Ramps

- Step dimensions shall comply with statutory requirements. In addition ‘riser’ height shall be maximum 175mm and ‘going’ shall be a minimum 270mm.

- All stair treads shall have contrasting coloured, non-slip nosing edge strips.

- Balustrades and handrails to all ramps and stairs shall comply with statutory requirements and relevant Australian Standards.

- Floor tactile indicators and handrail tactile buttons to all stairs shall be in accordance with statutory requirements.

5.6.6 Hazardous Substances

- Any construction work that involves any excavation of ground material or any demolition or disturbance of existing buildings, shall assume that asbestos containing materials may be present and shall comply with relevant legislation and DET policy ‘FCM – 003”
Any materials or finished product (such as fixed joinery or loose furniture) that contains formaldehyde-based compounds, including glues in reconstructed wood based material (particle board, MDF, pin board, cork board etc.) shall comply with emissions class ‘E0’ (E-zero) in accordance with AS/ANZS 1859.1 and 2.

Materials and products (including paints) shall be low or zero VOC emission unless approved otherwise. Any material that emits VOCs shall complete off-gassing to a safe level prior to occupation.

Timber treated with copper-chrome-arsenate (CCA) preservative is not permitted in schools.

Air conditioning systems with water cooled condenser type plants are not to be used due to the risk of Legionnaire’s Disease.

Storage facilities for hazardous substances shall comply with relevant Australian Standards in particular AS/NZ 2243.10 and AS 1940.

The Science Chemicals Store for storage of science chemicals shall be secure, exhaust ventilated (Refer Section 5.8.5 Mechanical Ventilation) and fire rated.

Separate cabinets for storage of hazardous science chemicals shall comply with relevant Australian Standards as follows:

- corrosive substances (class 8), max 100 litre capacity
- flammable liquids (class 3), max 100 litre capacity
- oxidising substances (class 5.1), max 50 litre capacity

The oxidising substance cabinet shall be located in the science preparation room at least 3m away from flammables and corrosives storage cabinets (not located in the chemical store).

Flammables and corrosives cabinets shall be located within the Science Chemical Store with a minimum of 300mm space between and shall not be located one above the other.

Additional flammable liquids cabinets for storage of flammable liquids used for building maintenance such as paints, aerosols, solvents, glues and lubricants, etc. shall comply with relevant Australian Standards as follows:

- flammable substances (class 3), max 250 litre capacity

A self-contained store for storage of tractor and mower fuel shall be a separate building detached from other school buildings.

All cleaner’s cupboards/stores shall be fitted with locks.

**5.6.7 Hygiene**

- Hand washing facilities located in food preparation and serving areas shall have adjustable hot and cold water mixer and be capable of hands-free operation (knee or foot operated).

5.6.8 Ventilation

- Natural ventilation systems refer to Section 5.8.3.

- Mechanical extraction to science fume cupboards, finishing and fibreglass alcoves, spray paint booths, chemical stores, kiln enclosures and any other areas where noxious fumes may be generated shall be in accordance with AS 1668.2. Refer also to Section 5.8.5.

5.6.9 Eye Wash and Safety Showers

- Eye/face wash and hand-held shower or overhead drench facilities shall comply with AS 3500. Refer also to Section 5.13 Sanitary Fixtures.

- The waste from each eye/face wash or shower facility shall be connected directly into the sewer drain via a waste trap. Refer also to Section 5.12.3.

- Floor surface drainage with falls to a floor waste shall be provided under each eye/face wash or shower facility (or fall to an external area for fixtures located in the Grounds Store).

- Water supply to each eye wash/shower facility shall be potable cold water.

- Cold water supply pipes shall not be located in a ceiling space or be exposed to direct sunlight which could result in uncontrolled high water temperature.

5.6.10 Machinery Safety

- Equipment and fittings shall be located in a manner that ensures safe use and adequate circulation.

- Safe operation areas around each machine in Industrial Technology Workshops shall be delineated on the floor by yellow safety line markings, 50mm wide.

- Floor safety lines shall be located generally 700mm out from working face & 300mm from non-working face or as determined by the DET Workplace Health and Safety Officer in conjunction with the school staff.

- Windows near machinery that may produce high speed projectiles shall have suitable safety glass to withstand impact.

5.6.11 Electrical Safety

- Refer also to Section 5.10 Electrical Power.
5.6.12 Gas Safety

- Refer also to Section 5.12.4 Gas Services.
- Emergency shut-off buttons and gas leakage detection sensor devices shall be provided in all rooms with gas appliances and/or gas turrets (such as Science Labs, Science Prep Rooms, Food and Catering Kitchens, Canteen Preparation Areas).
- Gas cook-tops shall have flame-failure cut-out systems.
- Control knobs shall be designed to be tamper proof e.g. fixed to the spindle with allen key grub screws.
- Cook-tops shall have fully sealed hobs, fixed and sealed into the bench top to prevent gas leaking into any under bench components.
- Domestic gas stoves which have gas ovens and gas grillers shall not be provided. Only commercial type gas stoves/ovens are permitted.

5.6.13 Roof Access and Fall Safety

- Safe work and fall-prevention systems incorporating roof anchor points and ladder access points shall be provided to all roofs except where specifically briefed otherwise, in accordance with statutory requirements and relevant Australian Standards in particular AS 2626.
5.7 SECURITY

Refer to:

*DET Security Design Requirements*

Prepared by School Security Program

Asset Management Unit
5.8 Thermal Performance, Ventilation, Cooling, Heating and Natural Lighting
Section 5.8. – Thermal Performance, Ventilation, Cooling, Heating and Natural Lighting
Building Design Standards for DET Facilities

Contents

5.8 THERMAL PERFORMANCE, VENTILATION, COOLING and HEATING ..............53
5.8.1 Thermal Insulation ........................................................................53
5.8.2 Shade ..............................................................................................53
5.8.3 Natural Ventilation .........................................................................54
5.8.3 Ceiling and Wall Fans .................................................................54
5.8.5 Mechanical Exhaust Ventilation ......................................................55
5.8.6 Wood Dust/Waste Capture and Extraction .......................................57
5.8.7 Air Conditioning and Evaporative Cooling .......................................57
5.8.8 Heating .........................................................................................58
5.8.9 Natural Lighting .............................................................................59
5.8 THERMAL PERFORMANCE, VENTILATION, COOLING and HEATING

5.8.1 Thermal Insulation

- Thermal insulation shall be provided to walls, ceilings, roofs and floor in accordance with statutory requirements (BCA Section J) and relevant Australian Standards.

- Higher levels of thermal insulation shall be provided where briefed to ensure internal comfort conditions are achieved when optimal building design solutions are not feasible due to specific site constraints.

- Foil/blanket insulation (reflective foil vapour barrier on the underside of the blanket) shall be provided directly under roof sheeting to all ceiled spaces to provide a primary thermal barrier, to minimise condensation and to dampen rain noise.

- Design of buildings to utilise ‘thermal mass’ shall only be considered as an option in the designated DET ‘Cold’ and ‘Very Cold’ Zones.

5.8.2 Shade

- To minimise solar heat gain into buildings, direct sun penetration shall be excluded from entering windows and skylights in:
  
  - All Learning spaces
    o From 1st February to 30th November – exclude sun between 9am and 3pm

  - All Staff, Administration and Library spaces
    o From 1st February to 30 May and from 1st August to 30th November – exclude sun between 8am and 5pm
    o From 1st June to 31st July – exclude sun between 9am and 4pm.

- Sun exclusion shall be achieved either by eaves overhangs or external sun-shading devices (horizontal, vertical or angled).

- External sun-shading devices shall be designed to effectively exclude direct sun while maintaining a minimum area of 50% clear view horizontally between 1000 to 1800 mm above floor level. **Acceptable product - equal to ‘Hi-Lite’ anodised aluminium grating type screens (with dimensions and spacing of louver bars to achieve the required sun angle exclusion).**

- To prevent collision hazard, external sunscreens that project below 2100 mm clear height above ground level, shall be protected with barriers or framing.
Section 5.8. – Thermal Performance, Ventilation, Cooling, Heating and Natural Lighting
Building Design Standards for DET Facilities

5.8.3 Natural Ventilation

- To promote natural cross ventilation, habitable rooms designed for use by more than 15 occupants shall have external windows/doors/skylights with a minimum open-able area of 10% of floor area.

- If open-able area of 10% of floor area cannot be achieved practically through windows and doors, airflow shall be assisted by mechanical ventilation systems.

- All other habitable rooms (i.e. rooms with fewer than 15 occupants) shall have open-able ventilation at a minimum of 5% of floor area.

- Open-able windows and doors shall be located, wherever possible, on opposite sides of a room (or open-able windows on one side with high level open-able clerestory or skylights on the opposite side of the room).

- Non-habitable rooms such as store rooms, cleaner’s cupboards and data rooms shall have natural ventilation via fixed grilled vents.

- Automatic or timed controlled opening of high level windows/vents (for afterhours/night time cooling) shall only be provided where specifically briefed. Vent openings shall be screened to prevent entry of insects or animals that would set off after-hours electronic security.

5.8.3 Ceiling and Wall Fans

- All habitable rooms unless briefed otherwise shall have ceiling or wall fans to assist in air movement.

- Ceiling fans shall have the following minimum requirements:-
  - 1400mm diameter, 120 watt motor, statically and dynamically balanced, minimum four (4) blades, all metal construction with aluminium blades, corrosion resistant finish, white colour unless briefed otherwise, 3 year warranty.
  - Each fan shall be controlled by minimum three (3) speed settings or a variable speed control, with tamper proof controls and fan “run” lights on controllers (remote controllers are not to be provided).
  - All fan controllers for the fans in each room shall be located together mounted adjacent to light switches.

- Ceiling fans shall be mounted from ceilings with a minimum ceiling height of 2700mm and fan blades at minimum of 2400mm above floor level and clear of lights, display wires and other fixtures.

- Rooms with ceiling heights less than 2700mm shall have oscillating wall fans mounted on walls at 2100mm minimum height.
5.8.5 Mechanical Exhaust Ventilation

**General Requirements for Learning Spaces (Classrooms, Studios, Workshops, Laboratories etc)**

- Mechanical exhaust ventilation systems shall be provided to habitable rooms designed for use by more than 15 occupants only where the area of open-able windows/doors does not achieve 10% of floor area, unless briefed otherwise.

- Mechanical exhaust ventilation systems shall be designed to achieve indoor air quality via air changes in accordance with statutory requirements and relevant Australian Standards (AS 1668.2 - 1991 Appendix A) Note: BCA refers to the 1991 edition, not the later 2002 edition.

- In addition mechanical exhaust ventilation systems shall comply with ‘Schools Standard Air-conditioning Specification (Section 3 Sub-section 2.5 - Mechanical Ventilation)’. Refer to: [http://oneportal.deta.qld.gov.au/Services/Facilities/Forschools/CapitalWorksPlanning/Pages/Airconditioning.aspx](http://oneportal.deta.qld.gov.au/Services/Facilities/Forschools/CapitalWorksPlanning/Pages/Airconditioning.aspx)

- Mechanical exhaust ventilation systems shall be installed by installers specifically recommended by the mechanical system equipment manufacturer/supplier.

- Systems shall exhaust rising hot air at ceiling level and draw in fresh cooler air at low level through windows or vents.

- Rooms utilising mechanical exhaust ventilation shall also utilise ceiling or wall fans as specified in Section 5.8.4.

**Performing Arts and Presentation Auditorium**

- Mechanical exhaust ventilation systems shall be designed to be suitable for the total occupancy of the space during performances or presentations in accordance with relevant Australian Standards (AS 1668.2 -2002).

**Canteen Preparation and Commercial Kitchen areas**

- Provide where briefed, commercial exhaust extraction hood over cooking appliances in accordance with relevant Australian Standards (AS 1668.2 -2002)

- The exhaust hood system shall have the following minimum requirements:
  - Stainless steel hood sized to cover cooking equipment with min 150mm overhang.
  - Internal perimeter gutters with threaded cap drain points.
  - Vapour proof fluorescent luminare to provide 320 lux at work surface switched separate from room lighting.
  - Removable/ washable grease filters with integral frame handles, sufficient to maintain design air quantity.
  - Fans control switch with 3 speeds, located adjacent to hood complete with LED run indicator.
Where commercial cooking appliances are located back-to-back in the centre of a kitchen, each side shall have separate exhaust hood systems.

**Art Kiln Rooms**

- Mechanical exhaust ventilation systems for kilns shall comply with:
  - “Mechanical Services for School Art Kiln Extraction Systems” – Basset Consulting Engineers – July 2004
  - Kiln manufactures recommendations.
  - Refer also to Section 5.14 2 Fixed equipment – Art Kilns.

**Science Chemical Store Room**

- Mechanical exhaust ventilation systems for science chemical store room shall comply with the following minimum requirements:
  - Both high and low level exhaust grilles within the store room (to draw both light and heavier than air fumes).
  - Fans designed to achieve 40 air changes per hour.
  - Discharge above roof through a weatherproof stack.
  - Door or wall air inlet grilles to provide relief fresh air.
  - Corrosion resistant fan unit, fittings and ductwork.
  - 2 speed fan controller to allow for (a) continuous low speed exhaust or (b) short periods of high speed for purging of fumes prior to staff entering the room.

**Science Fume Cupboards, Spray Painting Room, Fibreglass Resin Fume Alcove**

- Each fume cupboard, spray booth and fume alcove shall have a fixed ducted exhaust system and shall:
  - Comply with relevant Australian Standards
  - Maintain required face velocity through the access opening.
  - Maintain adequate make up of exhaust air quantities.
  - Supply air system shall not to interfere with airflow patterns.
  - Fan on/off and speed controller located outside and adjacent to the canopy.

**Science Preparation and Arc Welding Fume Snorkels**

- Articulated snorkel type fume exhaust units to each electric arc-welding booth shall comply with relevant Australian Standards. Acceptable product – ‘Nederman Arm Original 3m’ or equal approved.

- Articulated snorkel type fume exhaust units over science prep benches shall comply with relevant Australian Standards. Acceptable product – ‘Extech Equip’ – CZ 09004-10 with wall bracket, or equal approved.
5.8.6 Wood Dust/ Waste Capture and Extraction

- Wood waste and wood dust extraction system shall be a ‘cyclone’ type system complete with inlet cones at each machine, ductwork, exhaust fan and motor, cyclone separator unit, final filter damper system, waste storage system. Acceptable product – Gregory’s Machinery Cyclone Dust Extraction system, or equal approved.

- Wood waste and wood dust extraction systems shall be sized to suit the number and type of woodwork machinery and be capable of being expanded to accommodate future equipment shown on plans.

- Automatic gate-dampening system shall be provided in the duct at each machine.

- Cyclone unit shall be housed in an acoustically treated enclosure to control noise levels. Refer also to Section 5.9 Acoustics.

- The enclosure shall allow access for removal and replacement of bulk waste and dust collection bins and filters.

- Air capture velocity at each woodwork machine gate shall not be less than 21 metres/second.

- Ductwork prior to final filters shall be internally insulated to assist in attenuating noise.

- Prior to handover, the cyclone system shall be fully operational, including commissioning and testing by the manufacturer, training of staff, operation and maintenance manuals handover.

- Cassette type recirculating dust filtration units shall be provided in each workshop that generated wood dust.

5.8.7 Air Conditioning and Evaporative Cooling

**General**

- Where schools are located in the DET Cooling Zones, the thermal performance of school buildings shall be designed using passive cooling design principles, to operate for the majority of the cooler parts of the school year without artificial cooling and for the hottest part of the year be capable of operating efficiently with artificial cooling.


- Split systems shall be used with a single external condenser unit per building, connected to multiple indoor units for reasons of lower energy consumption, ease of maintenance and aesthetic reasons, unless approved otherwise.

- Condenser units shall be located externally in vandal proof enclosures and at a level not below indoor floor level (500mm above Q100 level), clear of pedestrian circulation.
Refrigerated Air-conditioning - DET Air-conditioning Zone

- Refrigerated air conditioning systems shall be provided to all buildings in schools located within the “Schools Air-conditioning Zone” as shown on the DET zoning maps. Within each building, air-conditioning shall only be provided to habitable rooms (storage areas toilets and services are not included).

Refrigerated Air-conditioning - Specialist areas within all cooling zones

- Air-conditioning shall be provided to the following specialist spaces located in all cooling zones:
  - Music Practice rooms.
  - Canteen and Tuckshop Preparation areas.
  - Special Education facilities.
  - Audio-visual Recording Studios and Editing Annexes that require doors and windows to be kept closed to achieve suitable acoustic conditions.
  - Main data network/telecommunications room for the whole school (24 hour/ 7 day operation).
  - Performing Arts auditorium spaces where mechanical ventilation systems are not cost effective.

Evaporative Cooling or Air Conditioning - Western Cooling Zone

- Evaporative cooling (or refrigerated air conditioning) systems shall be provided to all buildings in schools located within the “Western Cooling Zone” as shown on the DET zoning maps. Within each building, evaporative cooling shall only be provided to habitable rooms (storage areas toilets and services are not included).

- Evaporative cooling systems shall comply with the following minimum requirements:
  - Minimum 40 air changes of room volume per hour.
  - Suitable water supply (water treatment may be required in some hard water areas).
  - Automatic water sump bleed and dump valve operation to flush out concentrated salts, piped to nearest stormwater down pipe or to holding tanks or irrigation system.
  - All components including duct insulation and support frame shall be corrosion resistant and suitable for operation in a moist environment.
  - Preferably located at ground level, clear of pedestrian circulation, above flood level, mounted on support frame bolted to concrete plinth with supply air ducted to rooms.
  - Noise levels from cooling systems shall comply with relevant Australian Standards.
  - Variable or multiple fan speed controller and On/Off pump controller.

5.8.8 Heating

- Heating shall be provided to all buildings in schools located within the portion of the state designated “Cold Zone” and the “Very Cold Zone” as shown on the DET zoning maps. Within each building, heating shall only be provided to habitable rooms (storage areas toilets and services are not included).
Provide heating to Special Education facilities located in all zones, where briefed.

Heating units shall be reverse cycle (heating/cooling) air-conditioning unless specifically briefed otherwise.

Reverse cycle air-conditioning shall comply with *Schools Standard Air-conditioning Specification Version 2*. Refer to:


### 5.8.9 Natural Lighting

- Refer also to *Section 5.3.7 Windows, Glazing and Sky-lighting*

- To achieve reasonable natural light, windows and/or skylights shall be provided to all habitable rooms and the glazed area shall be minimum 10% of floor area of the room.

- Areas of a habitable room greater than 6m from a window shall have additional natural lighting via clerestory windows or skylights.

- Skylights design, location and spacing shall achieve illuminance without solar heat gain. *Acceptable products – Solatube 750 DS or Vento - Sunpipe or equal approved*
5.9 Acoustic Performance
Contents

5.9 ACOUSTIC PERFORMANCE...............................................................................................62
  5.9.1 Planning for acoustic control......................................................................................62
  5.9.2 Acoustic Isolation........................................................................................................62
  5.9.3 Acoustic Absorption....................................................................................................63
5.9 ACOUSTIC PERFORMANCE

5.9.1 Planning for acoustic control

- Factors affecting acoustic performance that need to be considered include:
  - Site location in relation to noise sources e.g. roads, aircraft, railways, industry etc., in accordance with AS 2021, AS 2107, AS 3671.
  - Relationship between noise producing buildings within the site e.g. music, sport centre, workshops.
  - Relationship between noise producing activities and spaces within buildings.
  - Activity and equipment noise within spaces e.g. music, playground activities in covered area, machinery noise in workshop.
  - Impact and vibration noise from foot traffic and machinery from rooms above in multi-level buildings.
  - Impact noise from rain and hail on roof sheeting.
  - Impact noise, vibration and resonances in light weight metal framed structures from student movement and foot traffic.
  - Sound travel paths through openings, joints or gaps between walls, floors and ceilings and open-able joints in operable walls, doors and view panels.
  - Sound travel between rooms over the partitions via the ceiling space (where the ceiling is acoustically transparent and where partitions do not extend full height).
  - Noise reflection and reverberation within internal spaces larger than 100sqm and in large roofed covered areas.
  - Noise from mechanical ventilation fans and air-conditioning fans.
  - Where noise reduction cannot be achieved by distance from the noise source, appropriate noise reduction strategies such as double glazing, noise barriers etc. shall be provided.

5.9.2 Acoustic Isolation

- Unwanted airborne noise can travel into a room from external sources and from adjacent rooms through walls, windows, ceiling, and doors and through gaps and joints between them. In addition impact noise can travel through the building structure.

- Acoustic isolation achieved by each barrier is the measure of reduction of sound and is defined as a weighted sound reduction index (Rw) in accordance with AS/NZS ISO 717.1.

- The following acoustic isolation performance categories shall be applied to each room where briefed. Each category defines the minimum sound isolation levels (Rw) that shall be achieved.
Very High Isolation (Category VH)
- Rw 50 – from adjoining rooms (including walls, ceiling, doors and view panels including joints and seals).
- Rw 35 – from adjoining internal circulation corridors and from external areas including roof rain noise.

High Isolation: (Category H)
- Rw 42 – from adjoining rooms (including walls, ceiling, doors and view panels including joints and seals)
- Rw 30 – from adjoining internal circulation corridors and from external areas including roof rain noise.

Moderate Isolation: (Category M)
- Rw 35 – from adjoining rooms (including walls, ceiling, doors and view panels including joints and seals)
- Rw 25 – from adjoining internal circulation corridors and from external areas including roof rain noise.

5.9.3 Acoustic Absorption
- Sound absorption properties within a room are based on the design, ambient sound levels and reverberation times shown for educational buildings in Table 1 of AS 2107 (2000).
- The acoustic absorption within a room is achieved by a combination of the absorption properties of all internal surfaces (floor, ceiling, walls, furniture and people). Acoustic absorption is defined in terms of Noise Reduction Coefficient (NRC) measured over a range of sound frequencies from 250 to 2000Hz in accordance with AS 1045, AS 2107 and AS/ NZS 1935.1.
- Where specifically briefed, teaching spaces for students with special hearing needs, learning difficulties and students with English as a second language, shall have reverberation times lower than the nominated minimum level and shall have sound-field augmentation systems.
- Learning spaces larger than 100sqm where projection of voice and music is critical, (such as open plan learning spaces, presentation/ performance auditorium), shall be subject to specialist advice from an acoustic consultant and may require sound augmentation (PA) systems.
- In very large spaces such as sports halls a maximum reverberation time shall be 1.5 seconds.
- External covered play areas shall have roof noise damping and acoustic absorption ceilings to achieve absorption category as briefed.
- The following acoustic absorption categories shall be applied within each room as briefed. Each category defines minimum sound absorption levels (NRC) that shall be achieved.
Section 5.9 – Acoustic Performance
Building Design Standards for DET Facilities

High Absorption: (Category H)
- To achieve an ambient sound level range of 35 to 40 dB(A) and a reverberation time of maximum 0.4 seconds
  - ceiling - minimum NRC 0.7  Acceptable product – Armstrong Ultima or approved equal
  - floor - carpet minimum NRC 0.5
  - walls - absorptive pin boards/ panels minimum NRC 0.3 to 0.5 where wall space allows

Moderate Absorption: (Category M)
- To achieve an ambient sound level of 40 to 45 dB(A) and a reverberation time of maximum 0.6 seconds.
  
  **Rooms with carpeted floors**
  - floor - carpet minimum NRC 0.5
  - ceiling - minimum NRC 0.5
  - walls – no absorption required

  **Rooms with vinyl, epoxy or concrete floors**
  - floor - non sound absorbing
  - ceiling - minimum NRC 0.7.  Acceptable product – Armstrong Ultima or approved equal.
  - Note - Ceilings in Food Preparation Areas – NRC 0.7 washable hygienic finish.  
    Acceptable product - ECOphon Hygiene Foodtec AC3 or equal approved.

Low Absorption: (Category L)
- To achieve an ambient sound level of 45 to 50 dB(A) and a reverberation time of maximum 0.8 seconds.

  **Rooms and Covered Areas with vinyl, epoxy or concrete floors**
  - floor - non sound absorbing
  - ceiling - minimum NRC 0.5
5.10 Electrical Power and Lighting
## Contents

5.10  ELECTRICAL POWER AND LIGHTING .................................................................67  
5.10.1 General ...........................................................................................................67  
5.10.2 Main and Distribution Switchboards ............................................................67  
5.10.3 Conduits, Pits, Mains and Wiring .................................................................68  
5.10.4 Power Outlets and Switches .........................................................................69  
5.10.5 Isolation and Emergency shut-off switches ..................................................69  
5.10.6 Earthing, Overload and Residual Current Device Protection .......................70  
5.10.7 Lighting: General ..........................................................................................70  
5.10.8 Special Lighting ............................................................................................71  
5.10.9 Access Lighting .............................................................................................71  
5.10.10 Emergency Lighting .....................................................................................72  
5.10.11 Solar Photovoltaic and Energy Saving Systems ..........................................72
5.10 ELECTRICAL POWER AND LIGHTING

5.10.1 General

- Main Switchboard (MSB) shall be located as central as possible to electrical loads served, to minimise consumer mains cable length, to allow access for maintenance without undue disruption to school operations and for easy access for meter reading.

- To minimise exposure of building occupants to electromagnetic fields, main switchboards and building distribution switchboards shall not be located in close proximity to occupied areas.

- Materials and components shall comply with statutory requirements and relevant Australian Standards.

- Unless specifically briefed otherwise, all switchboards and electrical appliances (including air-conditioning condensers) shall be located a minimum level of 500mm above Q100 flood level.

5.10.2 Main and Distribution Switchboards

- Externally located MSB shall be housed in a weather proof cabinet either freestanding or preferably located against a blank building wall, mounted on concrete plinth.

- MSB shall have minimum 25% spare capacity in ratings of main incoming busbar and main switch/isolator and 25% spare capacity for extra sub-circuits and circuit breakers, after allowing for future buildings and allowance for future air-conditioning capacity.

- Front panels on external MSBs shall be either fixed so that they cannot be undone from front or require a specialised tool. Fixings shall be vandal proof and access doors shall be lockable with Lowe & Fletcher 92268 lock or equal.

- Equipment and conductors shall have short circuit rating, not less than the maximum prospective symmetrical RMS short circuit current values on the incoming terminals at the operational voltage and to withstand fault currents for a minimum of 1 second.

- Protection to be IP42 for internal installations and at least IP54W for external or plant room installations.

- Undertake a risk assessment to AS1768 to determine the need for lightning protection measures. Where risk index is 12 or greater, provide a lightning protection system.

- Ensure continuity of conductors and suitability of connection where structural elements are used to provide lightning protection.

- Commercial grade lightning surge arrester shall be provided on General Supply Tariff section of the main switchboard with visual indication where it has failed.
• Lightning surge protection shall be provided on all distribution switchboards (excepting those in amenities and sheds) on each phase and neutral, with indication where it is no longer functioning.

• A distribution switchboard shall be provided in each block, with smaller type switchboards for amenities blocks and external stores/sheds.

• Distribution switchboards shall have circuit breakers for at least a three phase fault current rating of 6KA with spare capacity of 50% and allowance for likely high fault currents when site is fully developed.

• Circuit protection devices and residual current device (RCD) protection shall be provided within distribution board for protection of all socket power outlets and lighting outlets. Refer to Section 5.10.5.

5.10.3 Conduits, Pits, Mains and Wiring

• Sizing of conduits shall allow for future cabling as indicated in the school master plan.

• Underground conduits between pits and containing mains or sub-mains shall be minimum 100mm diameter. Minimum size of other underground conduits shall be 50mm diameter.

• Maximum distance between pits shall be 50 metres and pits shall be provided at all changes in direction.

• Pit systems shall be drained to stormwater system or to adequate grave soakage pits.

• Buried entries to conduits shall be sealed with pliable non-setting waterproof compound.

• Sub-mains cables to switchboards in all individual blocks shall be sized to have 50% spare capacity.

• All permanently connected equipment shall be wired via an isolator.

• All cables shall be double insulated and sheathed.

• Copper conductors shall be multi-strand not less than 1.5mm² for lighting and 2.5mm² for power final sub circuits.

• Cables shall be sized to carry intended electrical load taking into account maximum demand, installation methods, short circuit capacity and voltage drop.

• Where surface mounted conduits are specifically approved, they shall be fully supported by fixing to solid structure. Across any air gaps wider than 100mm, provide additional rectangular zinc annealed steel channel supporting structure. Surface run conduits must not be able to be easily grabbed and pulled down by students.

• Where specifically approved, cables rising up external walls or covered links from underground pipes shall be protected from 300mm below ground level to 3000mm above ground level with minimum 1.6mm thick galvanised steel duct or pipe, painted to match the surrounds.
5.10.4 Power Outlets and Switches

- Single phase outlets shall be provided in the number, quantity and location as briefed.

- Provide power outlets for the security system, expander panels, telephone system, telecommunications system, future installation of air conditioning systems etc. as briefed.

- GPOs shall be either single or double outlet, have a rocker operated switch with 3-pin plug base with flat earth pin, and incorporate a safety shutter over the active pin suitable for use by two or three pin plugs.

- External power outlets shall be weatherproof rated to IP56 and lockable in the ‘OFF’ position.

- Wall mounted GPOs shall be located 500mm above floor level unless briefed otherwise.

- Power outlets located to serve PWD adjustable height benches shall be mounted at 1000mm high within reach of a seated person.

- Power outlets that serve the centre of a room shall be located, unless briefed otherwise, in approved recessed floor boxes (together with data outlets). Refer DET Network Infrastructure procedures and Standards

- Unless briefed otherwise, power outlets located on walls above fixed benches shall be located to have the top edge of the face plate at 1000mm above floor level (to ensure the bottom edge of the face plate is clear of a 900mm high bench surface).

- Power outlets shall be separated a minimum of 600mm distance from any water outlet, the edge of a sink/ tub or a gas outlet.

- A maximum of six 10 amp double socket power outlets shall be wired per circuit.

- In Tuckshop/ Canteen food preparation areas, each double power outlet shall be on a separate circuit.

- In Home Economics, food and catering kitchens, a maximum of two double power outlets shall be on a separate circuit (This is to allow for use of an electric frying pan by each student).

- Switch plates for all power outlets and switches shall be vandal/ tamper resistant and not have any removable surround or cover.

- Three phase outlets shall be surface or semi-recess mounted and incorporate rotating switch mechanism, 5 pin plug base, spring loaded flap and screw neck to plug base.

5.10.5 Isolation and Emergency shut-off switches

- Provide an isolating switch for each permanently connected machine or appliance, unless briefed otherwise.
The isolation switch shall be rated at not less than the circuit protective device, mounted adjacent to each item of equipment, flush mounted for internal installations and weatherproof IP56 for external installations.

Where briefed, isolation switches shall be key lockable in the ‘OFF’ position.

Emergency power shut-off buttons shall be located generally close to the main entry doorway or near the teacher demonstration area but not next to entry doorways where they can be easily bumped and tampered with.

A reset switch for the emergency power shut-off circuit shall be located in the nearest staff accessible only room to enable staff to reset the power supply without having to access a switchboard.

5.10.6 Earthing, Overload and Residual Current Device Protection

Protection to all power and lighting circuits shall be provided using combined overload/ RCD circuit breakers.

The combined overload/ RCD circuit breakers shall be highly resistant to transients to minimise nuisance tripping.

MEN underground earthing system shall be provided so that there is only a bond between neutral and earth to occur within site main switchboard.

Main earthing conductor shall be bonded to electrode/s at or close to the main switchboard.

Each sub main shall have an earth conductor run with it.

Additional earthing electrode at each sub-switchboard shall be provided to ensure that surge protection devices in ‘remote’ blocks have good local connection to earth.

Note: Under no circumstances are the neutral and earth bars to be bonded together in the sub-switchboards. This is to prevent neutral current flowing via metal-framed covered links.

5.10.7 Lighting: General

Minimum artificial illuminance levels for each room shall be in accordance with AS1680.2.3.

Maximum illuminance levels in each room shall be no more than 25% above the levels recommended in AS1680.2.3 for 95% of the nominated floor area.

Unless briefed otherwise, lighting shall be fluorescent tube type lighting system with high efficiency reflectors, prismatic diffusers.

In suspended grid ceilings light fittings shall be recessed into ceiling grid. Rooms without a grid ceiling shall have surface mounted or suspended mounting (see below).
5.10. Electrical Power and Lighting

Building Design Standards for DET Facilities

- Fluorescent tube lamps shall comply with the Minimum Energy Performance Standard contained in AS4782 and shall be “high efficiency” T5 tri-phosphor tubes unless briefed otherwise. The tubes shall have a rated life of at least 20,000 hours.

- Fluorescent lighting shall incorporate low loss, high frequency electronic ballasts (EEI A1 or A2), capable of dimming. Refer also to Section 2 – Ecologically Sustainable Development Requirements.

- In food areas provide recessed fluorescent fittings in accordance with ‘Queensland Government - Design and Fit-out Guide for State Food Business’.

- In rooms with ceilings higher than 2700mm provide suspended light fitting hung on adjustable SS wire hangers. Cabling to suspended fittings shall be white in colour and clipped to wires with colour matched clips at max 600mm centres.

- Lights mounted on the wall adjacent to mirrors in Dressing/Make-up rooms shall have protective covers over lights to prevent unsafe practice of hanging clothes over lights.

- Minimum clear height of ceiling mounted light fittings shall be 2300mm in habitable rooms.

- Banks of lights shall be switched to allow zoning to suit room use and promote energy saving taking into account location of natural light from windows and skylights.

- Switches shall be located near the most commonly used entry door on the handle side jamb of door at 1100mm above finished floor level.

5.10.8 Special Lighting

- Enhanced or local task lighting where briefed (for specific tasks such as entry foyers, over reception counters in administration and resource centre) shall be recessed reflector down-lights with compact fluorescent bulbs unless briefed otherwise.

- In plant rooms provide industrial type switches rated to IP56.

- Provide 2-way switching at both doors in large rooms with more than one door.

- Light fittings and switches in Kiln Rooms, Spray Painting Rooms and Science Chemical Store Rooms, and as briefed, shall be suitable for explosive environments, rated to IP66 and IECEx certification.

5.10.9 Access Lighting

- Provide access lighting to verandas, stairs, covered access ways and paths to staff and visitors car parks to comply with relevant Australian Standards.

- Access light fittings shall be vandal resistant, waterproof and insect proof.

- Access lighting from major pedestrian entry gate to entry to main Administration block shall be pole-mounted and located along main paths and roadways to achieve light levels recommended in AS1158.

- All external lighting shall have a light source efficacy of at least 50 lumens/watt.
To assist in energy savings, access lighting shall have timer controlled switching and photo-electric sensor switching configured in series, with manual over-ride switch in parallel.

## 5.10.10 Emergency Lighting

- Provide emergency lighting and emergency exit lights in accordance with statutory requirements and relevant Australian Standards.
- Emergency light fittings shall have LED type lighting and have heavy duty and vandal resistant covers and fixings. Acceptable product ‘Clevertronics’ or equal approved.
- Provide a central testing system for emergency and exit lighting.

## 5.10.11 Solar Photovoltaic and Energy Saving Systems

- Refer to Section 2 - DET Ecologically Sustainable Development (ESD).
- Where briefed, a photovoltaic solar electricity feed-in system shall be provided, equivalent to 2 kW generation capacity with associated solar data monitoring system. Solar photovoltaic systems shall comply with the Department of Education and Training Solar Photovoltaic Specification. The solar data monitoring system shall be supplied by iWeb under the terms of DET-100499 to allow integration with the data display website eq.solarschools.net.
- ‘Smart meters’ shall be provided on the main switch board for monitoring energy use.
- If the school utilises more than one electricity supply point, at least 65% of a school’s energy consumption shall be metered through one or more smart meters.
- Where briefed, timers/ sensor control system shall be provided to achieve energy savings.
- Where briefed, automatic dimming with daylight sensors on lighting circuits shall be provided adjacent to windows to achieve energy savings.
5.11 DATA, TELECOMMUNICATIONS and ALARMS

Refer to:

DET – Network Infrastructure Procedures and Standards (DNIPS)

Prepared by

Information and Technologies Unit
5.12 Services
Contents

5.12 SERVICES .............................................................................................................................................76
  5.12.1 Hydraulic Services - General ...........................................................................................................76
  5.12.2 Water Supply ....................................................................................................................................76
  5.12.3 Sewer Drainage and Sanitary Plumbing .............................................................................................78
  5.12.4 Mechanical Services .........................................................................................................................79
  5.12.5 Fire Services .....................................................................................................................................82
  5.12.6 Lift Services .....................................................................................................................................82
5.12 SERVICES

5.12.1 Hydraulic Services - General

- Hydraulic services (Sewer and Stormwater Drainage and Water Services) shall comply with relevant Australian Standards and shall be designed for the following:
  - Type of function and usage pattern for each building
  - Flexibility for adaptation and extensions in the future
  - Access for maintenance and inspection
  - Ground and site conditions
  - Trade waste facilities
  - Life expectancy of 30-50 years dependent upon accessibility and type of component

5.12.2 Water Supply

General

- Provide potable and non-potable water supply and services, as briefed, to points of usage including fittings, fixtures and connection points in accordance with all relevant Australian Standards and statutory requirements.

- Hot and cold supply shall comply with all relevant Australian Standards, for velocity up to 3 m/s and static pressure of between 350 and 500 kPa.

- Provide water saving fittings to all outlets to meet WELS rating as briefed. Refer also to 5.13 Sanitary Fixtures.

- Alternative water sources (i.e. rainwater) shall be provided for toilet flushing in accordance with The Queensland Development Code Section MP4.3 – “Alternative Water Sources”. This is a referenced document under the Building Act 1975 (section 30).

Pipes and fittings

- Pipe work within buildings shall be copper unless briefed otherwise.

- Pipe work cast in slabs shall be protected with an integral protective sleeve.

- All supply pipe work, both internal and external shall be concealed in internal walls, ceiling unless approved otherwise.

- External pipe work where approved to be exposed shall be securely fixed and covered by heavy duty vandal resistant covers or ducts.

Valves

Version 2.0  Date: 29 July 2011
Section 5.12. – Services
Building Design Standards for DET Facilities

- Provide master isolation valve systems on main water supply lines into the site and to each major building zone where briefed.

- Provide isolation valves on the supply line to each building, each area to be serviced (e.g. each toilet area, group of fixtures) and any fixtures where briefed. Refer Section 5.13 Sanitary Fixtures.

- Within buildings, locate isolation valves in service ducts for ease of access and not in ceilings unless specifically approved.

- Provide backflow prevention devices in accordance with relevant statutory requirements and AS 3500.

Tapware

- Tapware shall be the type and configuration as briefed and as scheduled. Refer to Section 5.13 Sanitary Fixtures.

- Tapware shall be chrome finish with anti-vandal, star pattern design handles.

- Handles shall be colour coded ‘blue’ for all cold and ‘red’ for all hot.

- Cold water handles/taps shall be on right hand side and hot water handles/taps on left hand side.

- External hose cocks shall be vandal resistant design with removable handles.

Hot Water Units & Piping

- Hot water units to service all hot water fixtures shall comply with AS/NZS 3500.

- Hot water units shall be located centrally to main usage areas to minimise pipe runs.

- The size and type of hot water system shall suit the required demand pattern.

- Instantaneous hot water systems rather than storage systems shall be used for low usage applications.

- Storage type applications shall use energy efficient systems either solar or heat pump where applicable in conjunction efficient booster systems.

- Units shall have safe tray and discharge overflows to an independent waste inlet.

- Hot water pipes shall be lagged.

- Isolating valves shall be fitted to the cold supply inlet.

- Hot water storage temperature shall be set at minimum of 60ºC.

- Hot water supply to basins and showers in both student and staff locations shall be have temperature limiting devices set at 45ºC in accordance with relevant Australian Standards (AS/NZS 3500.4.2:1997).
Section 5.12. – Services
Building Design Standards for DET Facilities

- Local hot water temperature mixing valves shall be fitted to facilities for persons with disabilities (access toilets/showers).
- Recirculating pumps shall be provided in hot water lines where they exceed code requirements for length of system run.

**Boiling and Chilled Water Units**

- Combined boiling water and chilled dispenser units shall comply with AS/NZS 3500 and shall be under-bench type of a capacity to meet the expected usage as briefed.
- Water shall be delivered at a nominal 95°C.
- Units shall be fitted with a 24hr and 7 day timer switch to enable switching off after hours, on weekends and school holidays.

5.12.3 **Sewer Drainage and Sanitary Plumbing**

- Provide drainage systems to comply with relevant Australian Standards.
- Design the system for ease of maintenance and servicing.
- Allow for connection to future buildings and additions.
- Provide inspection openings on all bend and junctions on pipes up to 65mm diameter.
- Provide inspection pits on all bends and junctions in accordance with relevant Australian Standards.
- Acoustically lag all pipe work located in ceilings above offices or in locations where noise may impact on habitable rooms.
- Floor waste gully grates shall be removable, 100mm diameter, chrome plated.
- Provide falls in floors to floor wastes at minimum of 1:80 generally and 1:60 for PWD shower/toilets.
- Provide connection of air conditioning condensation outlets to the drainage system.
- All concealed drainage pipe work shall be PVC unless briefed otherwise;
- Waste traps on fixtures that accept corrosive wastes shall be of polypropylene, stainless steel and other approved material.
- All internal exposed drainage pipe work shall be chrome plated copper unless briefed otherwise.
- All external exposed drainage pipe work shall be protected by vandal resistant covers with suitable tamper proof fixings to enable removal for maintenance only.
- Provide, where briefed or required by relevant Australian Standards:
5.12.4   Mechanical Services

General

- All mechanical services are to conform to current statutory requirements and relevant Australian Standards.

- Noise generating equipment shall be attenuated and isolated to achieve maximum 40dBA in adjacent habitable rooms and at site boundaries.

Mechanical Ventilation

- Refer to Section 5.8.5

Gas Services - General

- Gas services shall comply with statutory requirements and relevant Australian Standards.

- Natural gas or LP gas supply systems shall be provided to suit available supply.

- LP gas supply system shall be from a gas cylinder installation unless briefed otherwise, in accordance with the following:
  - A double cylinder installation shall be connected in parallel with two sets of valves/ regulators.
  - A secure mesh or vented enclosure shall be provided, sized to suit the gas cylinders with lockable gates/ doors.
  - The gas cylinder enclosure shall be located as close as possible to high usage rooms and in close proximity to service road for ease of access for bottle replacement or on-site refilling.
  - The gas bottle enclosure shall be mounted on a concrete plinth above adjacent garden beds, with hard paving access.
  - Appropriate hazardous material signage shall be provided.
  - The gas cylinder enclosures shall be mounted against a blank, fire proof wall, not on any wall facing an adjacent building which could be a fire source.
Section 5.12. – Services
Building Design Standards for DET Facilities

- All above ground pipe work shall be type B copper tube.
- All pipe work shall be concealed in suitable joinery or ducts.
- All exposed pipe work shall be protected from mechanical damage through the use of aluminium ducting with removable access covers.
- Permanent ventilation shall be provided to enclosed pipe risers.
- Pipe work shall not be installed in wall cavities or concealed voids.
- Pipe work may be run in ventilated roof spaces provided it is accessible.
- Allow 10% of spare capacity in pipe work sizing for future upgrades.
- Gas turrets for laboratory bench top use, shall be 2-way 90° outlets with push-turn or lift-turn taps.
- Gas turrets shall be located where shown in brief or layout and be minimum 600mm from power outlets. Refer also 5.13 Sanitary Fixtures.

Gas Controls and Isolation Systems

For each building containing a central gas supply system:

- A fail-safe gas security and safety control system shall be provided to each building to effectively isolate supply at the gas source using keypad operated Master Gas Control located in a staff only accessible area.
- A 24 hr/ 7 day digital timer control switch shall be provided in the Master Control Panel to allow the flow of gas only within hours set by staff.

For each room served with gas outlets or gas cooking appliances (Science Labs, Science Prep Room, Food Kitchens, and Catering Kitchens):

- A room solenoid shut-off valve shall be operated by a room control panel using a keypad. Acceptable product – Kromschroder SK32 control panel and Laboratory Shut-off Valve (LSV) or approved equal.
- The solenoid isolation valve shall be located in an accessible but concealed location such as a service duct, lockable cupboard or in clearly labelled stainless steel enclosure.
- An emergency gas shut-off button with twist reset shall be provided to activate the solenoid isolation valve.
- Shut-off buttons shall be located generally close to the main entry door or near the teacher demonstration areas but not next to entry doorways where they can be easily bumped and tampered with. (Note: Where feasible, the gas and power shut-off buttons shall be combined into one shut-off button).
- A gas leakage detection sensor shall be provided to shut-off the solenoid isolation valve if there is a gas leak in the room, located 300mm above floor level for LPG installations and 300mm below the ceiling for NG installations.
Compressed Air

- Compressed air supply systems shall comply with relevant Australian Standards.
- The compressor shall be located in a room or enclosure with appropriate acoustic control measures to maintain acceptable noise levels for adjacent habitable rooms.
- Compressed air receivers shall be sized to maintain required design supply pressure for the number of outlets through start/stop cycles.
- Compressor shall have a dial pressure gauge, valved drain point, automatic condensate drain and pressure relief valve.
- The filtration system shall be capable of removing water droplets and particulate material to 1.0gm.
- Separated liquids shall be automatically drained away from filter material.
- Exposed pipe work shall be concealed or covered to protect from mechanical damage.
- Size all pipe work to ensure that pressure loss does not exceed 10% of the design supply pressure.
- Low pressure compressed air installation shall operate between 21-28kPa via an adjustable pressure reduction valve located to be accessible by staff only.

Science Fume Cupboards

- Fume cupboards shall comply with relevant Australian Standards and shall be installed in accordance with the manufactures instructions. *Acceptable product - ‘Hamilton H12S’ or equal approved.*
- All parts shall be corrosion resistant.
- The cupboard shell and work surface shall be constructed in one piece, chemical resistant material such as UPVC.
- Fixed viewing panels and sliding sashes shall be toughened glass unless briefed otherwise.
- Lighting to provide minimum 320 lux at the bench level.
- Sink shall be nominally 300 x 300 x 200mm deep, stainless steel 316 grade with gooseneck cold water supply outlet.
- Gas service shall be by a single gas turret operated by an external remote control handle located on the front external face of the cabinet.
- Fan and exhaust volume shall maintain the required face velocity through the open sash area with adequate make up of exhaust air quantities.
- Supply air system not to interfere with air flow patterns.
- A double power outlet shall be mounted on the front external face.
Separate fan control and light switch shall be located on the external face.

Cold water tap (refer 5.13 Sanitary Fixtures) shall be controlled by remote control handle located on the front external face.

5.12.5 Fire Services

- Fire, heat and smoke detection alarms refer to DET – Network Infrastructure Procedures and Standards (DNIPS).

- Provide hydrants, fire hose reels, wall mounted portable extinguishers and fire blankets in accordance with relevant Australian Standards and statutory requirements.

- Fire hose reels shall have appropriate backflow devices as required by relevant legislative requirements.

- Fire hose reels shall have a floor waste located under to contain leaks.

- Fire hose reels shall be located inside a building unless briefed otherwise.

- Where fire hose reels are located externally, they shall be in a secure lockable cabinet with the key housed in a break-glass container.

- In addition to those required to meet statutory requirements, additional portable extinguishers and blankets shall be provided where briefed, typically where activities of staff and students may involve the risks of injury from fire (e.g. Food and Catering Kitchens, Science Labs, Art Studios, Industrial Technology and Design Workshops etc.).

- Fire extinguishers shall be 4.5 kg dry chemical tri-class.

- Fire blankets shall be 1800mm x 1200mm woven glass fibre fire blankets in quick release red container.

- Evacuation signs and diagrams shall be provided in accordance with Section 18 of Subdivision 1 of Division 1 of Part 4 of the Building Fire Safety Regulation 2008 along every evacuation route of the building.

5.12.6 Lift Services

- Lifts shall cater for a wheelchair and a carer and shall comply with statutory requirements and relevant Australian Standards and shall be:
  - Type - ‘motor-room-less’ (MRL).
  - Lift speed – 1.0 m/s.
  - Load/ capacity - 1000kg, 13 person rated.
  - Lift car minimum dimensions - 1400 x 1600 x 2200mm high.
Section 5.12. – Services  
Building Design Standards for DET Facilities

- Drive type – variable voltage variable frequency AC drive, energy efficient regenerative breaking.
- Door - 900 wide x 2100mm high, two piece centre opening doors.
- Controls – Key operated switch on external call buttons.
5.13 Plumbing Fixtures
## 5.13 PLUMBING FIXTURES

- All sanitary fixtures shall be in accordance with relevant Australian Standards.
- Fixtures that are briefed according to codes as scheduled below, shall be in accordance with the following minimum standards:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| S1   | *Science Gas Turret*  
Dual outlet gas turret, 90°, with push-turn or lift-turn handles, bench mounted generally 100mm from splashback and 600mm distance from GPOs (Enware LF 125PT or Broen 05-4 or equal) |
| S2   | *Lab Bench Sink (student side bench)*  
Single bowl, inset type, 300 x 300 x 200 nom deep, stainless steel 316 grade (or approved resin type), acid resistant grated outlet and waste. Bench mounted lab type tap, gooseneck spout with tube nozzle outlet, chrome plated, 5 star WELS rated (Enware LF109 or equal), cold water only, backflow prevention valve, concealed trap and waste pipe with screw off drain plug. |
| S2h  | *Lab Bench Sink (demonstration bench)*  
Sink as for S2  
Bench mounted lab type combination tap set, gooseneck spout with barbed tube nozzle outlet, chrome plated, 5 star WELS rated (Enware LF107 or equal), hot & cold water, backflow prevention valve. |
| S3   | *Emergency Eyewash & Hand-held hose Unit*  
Stainless steel bowl with lever operated twin aerated eye/ face wash nozzles and hand held aerated hose (Enware EF300 &EL420 or equal), cold water only. |
| S4   | *Fume Cupboard Sink*  
Sink and tap as for S2 (refer Section 5.12.4 Fume cupboard for requirements). |
| S5h  | *Preparation Glassware Wash-up Sink*  
Double bowl sink unit, nom 2700 long with one 725 x 350 x 300 deep bowl and one 725 x 350 x 170 deep bowl, with 450 long drainers both ends and integral lip at back for splashback, stainless steel 316 grade (or approved resin type), acid resistant grated outlet and waste, SS lid for one bowl.  
2 x lab combination tap sets (1 per bowl), swivel gooseneck spout with barbed tube nozzle outlet, hot and cold bib cocks with barbed tube nozzle outlets, chrome plated, 5 star WELS rated, (Enware LF108 or equal), hot and cold water, backflow prevention valve, concealed trap and waste pipe with screw off drain plug. |
| S6h  | *Preparation Chemical/ Biology Bench Sink*  
Double bowl sink unit, 450 x 350 x 170 deep bowls, stainless steel 316 grade (or approved resin type), acid resistant grated outlet and waste with 450 long drainers both ends and integral lip at back for splashback. |
### Lab combination tap set, gooseneck spout with barbed tube nozzle outlet, hot and cold bib cocks with barbed tube nozzle outlets, chrome plated, 5 star WELS rated, (Enware LF108 or equal), hot and cold water, backflow prevention valve, concealed trap and waste pipe with screw off drain plug.

**S7 Cleaners Sink**

Stainless steel cleaners sink nom 560 x 475 x 200 deep with swing grate, chrome plated brass grated waste outlet, mounted on SS SHS frame with adjustable feet, nom 500 x 600 stainless steel splashback. Wall mounted hose cock chrome plated, 5 star WELS rated, cold water only.

**S8 Sink – student practical learning areas**

Single, double or 1 ½ bowl (refer brief or layout) sink unit, in-set type, nom 1500 long with nom 390 x 390 x 170 deep bowls, 450 long drainers both ends, single hole for mixer tap, chrome plated brass grated waste outlet, Lever handle tap, swivel gooseneck aerated spout, (3 star WELS rated, (Enware FHS109 or equal), cold water only, concealed trap and waste pipe with screw off drain plug.

**S8h Kitchen Sink – staff areas and student food kitchens**

Double or 1 ½ bowl (refer brief or layout) sink unit, in-set type, nom 1500 long with nom 390 x 390 x 170 deep bowls, 450 long drainers both ends, single hole for mixer tap and hole for auto boiler tap where required, chrome plated brass grated waste outlet, Flick mixer tap, 5 star WELS rated, (Enware SLM 307 or equal), hot and cold water.

**S9h Commercial Pot Sink – canteens and student catering kitchens**

Single or double bowl (refer brief or layout) pot sink unit, nom 500 x 400 x 300 deep bowls, 450 long drainers both ends integral with SS bench, integral 300 high splashback, chrome plated brass grated waste outlet, spring action pre-rinse spray hose (6 star WELS rated) and combination pot filler, swivel aerated spout, lever handles (3 star WELS rated), (Enware FHS141 or equal), hot and cold water.

**S10 Art Sink**

Double bowl sink unit, nom 2400 long with nom 2 x 550 x 400 x 300 deep bowls, 450 long drainers both ends, integral splashback, inset into bench top, chrome plated brass grated waste outlet, 2 Lever handle taps, swivel gooseneck aerated spouts (one per bowl), (3 star WELS rated, (Enware FHS109 or equal), cold water only. CP copper or concealed waste pipes to nom 40L paint/ clay trap under sink.

**S11 Sculpture/ Printmaking Sink**

Single bowl sink unit, nom 2400 long with nom 1200 x 400 x 300 deep bowl, 450 long drainers both ends, integral splashback, chrome plated brass grated waste outlet, Spring return, pre-rinse spray hose (5 star WELS rated) and combination pot filler, swivel aerated spout, lever handles (3 star WELS rated, (Enware FHS101 or equal), cold water only. CP copper or concealed waste pipes to nom 40L paint/ clay trap under sink.

**S12 Soap Dispenser**

Wall or splashback mounted Stainless steel, vandal resistant, lockable

---

Section 5.13. – Sanitary Fixtures  
*Building Design Standards for DET Facilities*

Version 2.0  Date:  29 July 2011
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| S13 | Paper Towel dispenser  
Wall or splashback mounted stainless steel, vandal resistant, lockable (Enware ENF-RODX 600 or equal) |
| S14h | Vanity Basin – staff amenities  
Vitreous china basin, white semi-recessed type (Caroma Linea or equal), chrome plated brass grated waste outlet (not plastic), Flick mixer tap, (Enware SLM306 or equal), 5 star WELS rated, hot and cold water. |
| S15 | Toilet & in-duct/ in-wall cistern – student amenities  
Vitreous china pan white with wall faced concealed trap (Caroma Leda or equal), white closed front seat with flap (Caroma Pedigree or equal), In-duct mounted (or in-wall with vandal resistant cover plate) 4.5/3 litre dual smart flush cistern with cp stopcock, cold water. Push buttons mounted at max 1200H. |
| S16h | Food Rinse/ Wash sink  
Single bowl (refer brief or layout) sink unit, nom 390 x 390 x 170 deep bowl, 450 long drainers both ends integral with SS bench, integral 300 high splashback, single hole for mixer tap, chrome plated brass grated waste outlet, Flick mixer tap, 5 star WELS rated, (Enware SLM307 or equal), hot and cold water. |
| S17 | Auto Boiler & Chilled Water Unit  
Under bench commercial filtered boiling and chilled water unit, with hob combination tap on sink, sized to suit usage (Zip Commercial Hydrotap or equal), cold water supply. |
| S19 | Hand basin - cold water  
Vitreous china wall mounted white basin, (Caroma Concorde or equal), chrome plated brass grated waste outlet (not plastic), Flick mixer tap (Enware SLM306 or equal), 5 star WELS rated, cold water only |
| S19h | Hand basin – hot & cold water  
Basin as for S19  
Flick mixer tap, (Enware SLM306 or equal), 5 star WELS rated, hot and cold water  
Alternative for PWD/ access basin (Enware SLM606D or equal), Alternative tap for food areas – knee operated (Enware HFS775). |
| S20 | Drinking Fountain  
Wall mounted stainless steel nom 200 dia bowl, with splashback and front skirt to conceal fixings & pipework, mounting height to suit disabled, adult or junior as required  
Chrome finish shielded bubbler with self closing push button valve (RBA model A8901 or equal), cold water only |
| S21 | Wash Basin/s - Student Amenities  
Wall basin unit (single, double, triple or quadruple bowls - number of bowls as per brief) 304 grade stainless steel, bowl/s integral with countertop, splashback, (‘RBA Curvilinear’ single, double, triple or quad station or Stoddard or equal), trap covers to conceal pipework and fixings, single tap per bowl, timed flow pillar cock, 5 star WELS rated, (Enware ...
### Section 5.13. – Sanitary Fixtures

#### Building Design Standards for DET Facilities

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| S 28 | **Toilet Suite – Persons with disabilities**  
Vitreous china pan, white, with wall faced concealed trap (for easy cleaning) (Caroma Leda Care 800 wall faced Invisi series II suite or equal),  
In-wall/ in-duct 6 litre dual smart flush cistern, push buttons at max 1000 mm above floor, with cp stopcock, cold water supply.  
Comply with AS 1428.1. |
| S30  | **Wash/ Quench Trough**  
Wall mounted stainless steel trough, nom 1200 x 300 x 200 deep with 600 high SS splashback, mounted on heavy duty stainless steel frame.  
(Stoddart WT S5 or equal)  
3 cp hose cocks at 600 above trough bottom, cold water only. |
| S33  | **Utility Tub**  
Single bowl sink unit, inset type, nom 1200 long with nom 48 L bowl, drainer one end, chrome plated brass grated waste outlet (not plastic),  
Lever handle tap, swivel gooseneck aerated spout, (3 star WELS rated, cold water only (Enware FHS109 or equal), cold water only.  
Waste to nom 40L paint/ clay trap under sink (where applicable). |
| S39  | **Laundry Tub – inset type**  
Single SS 70 litre (Clark flushline 70 L or equal) chrome plated brass grated waste outlet (not plastic),  
Lever handle tap, swivel gooseneck aerated spout, (3 star WELS rated, (Enware FHS109 or equal), cold water only. |
| S40  | **Pot Filler Laundry Arm**  
Splashback mounted telescopic laundry arm (for filling large pots insitu on stove, Cold water only (Enware SP251 or equal) |
| S57A | **Urinal – wall mounted**  
Wall hung vitreous china urinal stall, white, concealed trap, (Caroma Integra smart flush or equal), cold water only. |
| S57B | **Urinal waterless– wall mounted**  
Wall hung vitreous china urinal stall, white, concealed trap, Uridan KHC-2. |
| S58  | **Safety Drench Shower with Eye Wash**  
Combination overhead drench shower and eye/face wash, hand and foot operated (Enware EC207 or equal), cold water only. |
5.14 Fit-Out, Fixed Equipment and Furniture
## Contents

5.14  FIT-OUT, FURNITURE AND EQUIPMENT ................................................................. 91

5.14.1  Fixed Joinery ....................................................................................................... 91

5.14.2  Fixed Equipment ................................................................................................. 95

5.14.3  Loose Furniture ................................................................................................. 99

5.14.4  Plug-in Appliances ............................................................................................. 100
5.14 FIT-OUT, FURNITURE AND EQUIPMENT

5.14.1 Fixed Joinery

General

- All joinery shall be in accordance with relevant Australian Standards.
- Reconstituted wood-based products including glues used for construction of joinery, furniture and fittings (MDF, particle board, cork-board, pin-board etc) shall comply with formaldehyde emissions class ‘E0’ (E-zero) in accordance with AS/NZS 1859.1: 2004 and amendment 2006.
- MDF or particle board shall be high performance moisture resistant.
- High pressure laminate (HPL) sheet shall be in accordance with AS2924.
- Bench-tops, where briefed for standard joinery applications, shall be nominal 33mm thick, high performance moisture resistance particleboard or MDF with nominal 0.8mm thick high pressure laminate (HPL) to both faces.
- Front and exposed ends of standard joinery bench-tops shall have HPL full wrapped (post formed) around top and bottom edges with nom 10mm radius. Internal corners shall have mason mitres and external corners shall have 45° truncated rounded profile.
- Cupboard gables, interiors and doors for standard joinery applications, shall be minimum 16mm thick MDF, low pressure melamine (LPM) finished with edges finished with 2mm PVC hot resin glued edging.
- Shelves for standard joinery applications shall be minimum 18mm thick MDF, low pressure melamine (LPM) finished both sides with edges finished with 2mm PVC hot resin glued edging. Shelves with longitudinal span greater than 600mm shall be edge stiffened to prevent sagging/ deflection.
- Hinges shall be commercial quality, self-closing, and 170 degree opening. Acceptable product - 'Blum - Modul 170 deg' or equal approved.
- Bench-tops, splashbacks, gables, drawers and shelves etc. where briefed in specialist spaces that require high durability surface, resistant to heat, chemicals and moisture (e.g. Food Kitchens, Science Laboratories & Prep Rooms, Art Studios and Workshops) shall be ‘compact’ laminate, unless briefed otherwise.
- Stainless steel sheet bench tops, splashbacks and shelves where briefed in food preparation areas (e.g. Commercial Catering Kitchens, Canteens etc.) shall be 304 grade, commercial quality construction and detailing, to comply with ‘Queensland Government - Design and Fit-out Guide for State Food Business’. Refer Section 5.1.11.
- Polymer resin bench-tops, including integral sinks, splashbacks etc., where specifically briefed, shall be Broen SPF Lite of equal approved.
Compact Laminate

- Compact laminate bench tops, shall be minimum 10mm thick, shall have a fine stippled textured surface finish that is easily cleaned and shall have a colour and pattern to hide marks and stains. Note: plain solid colours, (including black and white) without pattern are not permitted.

- The following compact laminate products, colours and finishes are acceptable for bench-tops:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Acceptable Product or equal approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abet Laminati</td>
<td>10mm compact grade</td>
</tr>
<tr>
<td></td>
<td>Finish - ‘Zodia’</td>
</tr>
<tr>
<td></td>
<td>Colours - ‘Asphalt’ or ‘Coral Grey’ or ‘Reef Blue’</td>
</tr>
<tr>
<td>Duropal</td>
<td>10mm, Chemical Grade, Micro-plus</td>
</tr>
<tr>
<td></td>
<td>Finish – ‘TC’</td>
</tr>
<tr>
<td></td>
<td>Colours – ‘Corn’ or ‘Light Grey Corn’.</td>
</tr>
<tr>
<td>Laminex Industries</td>
<td>13mm, XR grade</td>
</tr>
<tr>
<td></td>
<td>Finish - ‘Dimensions’</td>
</tr>
<tr>
<td></td>
<td>Colours – ‘Astro’ or ‘Lunar Dust’</td>
</tr>
<tr>
<td>Lamicolor</td>
<td>10mm, Compact Laminate</td>
</tr>
<tr>
<td></td>
<td>Finish - ‘Crystal’</td>
</tr>
<tr>
<td></td>
<td>Colours – ‘Porfido’ or ‘Composite White’ or ‘Fiesta Verde’</td>
</tr>
<tr>
<td>Polyrey</td>
<td>12.5mm, Compact laminate</td>
</tr>
<tr>
<td></td>
<td>Finish - ‘Surf’</td>
</tr>
<tr>
<td></td>
<td>Colours – ‘Vega Flannel Grey’ or ‘Caviar’ or ‘Iquitos Black’ or ‘Beton Blue’</td>
</tr>
</tbody>
</table>

- Compact laminate for shelving, gables, drawers and other joinery, shall be the same material as the bench-tops, unless briefed otherwise. Only the colour and finish of these components may be varied from the approved products and colour range for bench tops above.

- Construction of compact laminate bench tops (including all wall mounted, fixed peninsular, mobile peninsular and adjustable height benches), splashbacks, shelving, gables, drawers and other joinery, where briefed shall comply with the following:
  - Exposed edges and corners shall have bull nose profile with a minimum 10mm radius.
- Where peninsular benches are fixed to perimeter benches, exposed edges shall have 2mm, 45 deg, arris edges or the joint shall have a ‘mason mitre’ with bull nose edges.

- Exposed corners shall have minimum 10mm radius.

- Horizontal surface joints in bench tops shall be adhesive butt jointed with compact laminate ‘biscuit’ joiner or other approved joint system.

- Fixings shall be stainless steel metal thread screws concealed from exposed faces.

- Support brackets shall be either compact laminate or powder coated steel flat sheet/tubing.

- Support brackets shall be cantilevered from the wall (without legs) fixed effectively to wall structure (or to backing support panel).

- The bench top system, including sheet thickness, longitudinal support framing and the size and spacing of support brackets, shall be designed so that the bench top deflection does not exceed 5mm when loaded with 80kg per linear metre.

- Supports bracket ends and any longitudinal stiffening framing shall be set back 50mm from front edge of bench top.

- Support brackets shall have suitable openings at the wall to allow loose cabling (e.g. power and data cables) to be installed along wall under the bench.

- Proprietary circular cable port inserts shall be provided in bench-tops at spacing as shown on plans.

- Adjustable height benches where briefed, shall be as above, mounted on manual wind up frame, height adjustable from 680mm to 900mm high, 160kg lift rated. **Acceptable product:** – ‘Er-T-Go1’ or equal approved. Electric operated adjustable system shall be provided only where specifically briefed.

- Fixed peninsular benches shall be open under and supported at the outer end by a ‘T’ or narrow ‘H’ leg frame and shall be stiffened and braced with a suitable longitudinal support frame under bench top (not near floor level).

- Mobile peninsular benches shall have a compact laminate top, mounted on a powder coated steel frame with lockable 100mm dia heavy duty castors (Fallshaw or equal), height shall match perimeter benches.

- Under bench fascia rail for mounting of power and data outlets, shall be compact laminate of suitable size and construction.

- Splashbacks shall match the bench top material and shall be fixed to the bench top with an effective mechanical fixing such as an aluminium joiner strip and the joint shall be effectively sealed.

- Where splashbacks are located under windows, the splashback material shall be extended to include the window sill so as to provide an effective moisture seal to the splashback and to the window frame.
- All shelves (either open wall mounted or in cupboards) unless briefed otherwise, shall have front edge upturned stiffening of minimum 10mm thick (in addition to the shelf thickness). Shelves shall be capable of being installed with an upturned edge (for science chemical container storage) or down turned edge for general storage.

- All shelves shall be supported on suitable wall brackets or pins at spacing to ensure maximum 5mm deflection when loaded with 10 kg per linear metre.

**Bag-racks**

- Typical bag rack configuration per learning space – 500mm deep x 3000 long x 3 shelves high with top shelf at 900mm high, mid shelf at 525mm high and bottom shelf 150mm high.

- Bag racks shall be constructed of heavy duty, durable materials.

- Where specifically briefed, bag storage using hooks shall be provided. Hooks shall be protected by a suitable pelmet for safety.

- Bag racks shall be located to be protected from rain and direct sun (e.g. under veranda roofs against the building wall).

- Bag racks shall be located away from edges of balconies unless protected by full height screen walls.

**Student Lockers**

- Lockers shall be located in recessed alcoves as shown on briefing plans.

- A secure roller door shall be provided to the front of locker alcove.

- Locker alcove shall be 750mm depth x height to accommodate lockers 4 tiers high x width to suit number of lockers briefed for lockers nominally 375mm wide.

**Whiteboards and Music Whiteboards**

- Whiteboards shall be white vitreous enamel surface on steel sheet bonded to suitable backing sheet, with edge framing all sides and with pen rail along bottom edge and concealed fixing to wall. *Acceptable product: ‘Tims Omniplate’ 402P with UB 3000 edge frame, or equal approved.*

- Music whiteboards shall be as above with black music lines permanently marked. *Acceptable product: ‘Tims Omniplate’ 402P with music lines and UB 3000 edge framing, or equal approved.* Fire hose reels shall have

- Whiteboards shall be generally 1200mm high, mounted at 900mm above floor, length as briefed or shown on plans.

**Pin boards**

- Pin-boards shall be dense foam substrate with ‘velcro’ compatible fabric surface finish, with total thickness minimum 8mm, glued to suitable backing sheet, with suitable perimeter edge framing and concealed fixing to wall. *Acceptable product: ‘Melded Fabrics – Noticeboard Prelude’, or equal approved.*
• Pin-boards shall be generally 1200mm high, mounted at 900mm above floor, length as briefed or shown on plans.

**Mirrors**

• Mirrors (including those in Dance Studio and student amenities) shall be grade A safety glass with vinyl backing in accordance with AS/ NZS 1288 clause 5.11.

**Overhead display wires**

• Overhead display wires shall be 3mm galvanised wire with white PVC covering to give nominal 5mm diameter wire.

• Wires shall be mounted generally at 2200mm above floor level with suitable eye bolts fixed into strong points in walls and window framing.

• Wires shall have thimble eyes at both ends with a 10kg tension spring at one end.

• Display wires shall be located so as not to conflict with ceiling fans and light fittings.

**Privacy Blinds**

• Acceptable product- ‘Hunter Douglas/ Luxaflex’ micro perforated venetian blinds, or Sheer view roller blinds or equal approved.

5.14.2 Fixed Equipment

**Electric Stove and Cook tops**

• All electric appliances shall be in accordance with relevant Australian Standards.

• Electric stoves and cook tops shall be constructed and fitted to minimise risk of danger to equipment users including anti-tilt fixings where required.

• Each oven shall be provided with isolation switch located near the appliance. The isolation switch shall be lockable only where specifically briefed.

• Electric cook tops shall have hob inset and fixed into bench top that cannot be lifted to expose electrical wiring.

• The list of appliances to be provided in each space shall be as defined in the project brief.

**Commercial Gas Stoves and Gas Cook tops**

• Gas cooking appliances shall comply with relevant Australian Standards.

• To minimise tampering by students, gas appliances shall have controls knobs that cannot be easily removed or turned to an incorrect indicator position. Control knobs shall be designed to be tamper proof, e.g. fixed to the spindle with allen key grub screws.
Appliances shall be designed to prevent gas building up prior to lighting. Bench fitted cook-tops shall have fully sealed hobs, fixed and sealed into the bench top to prevent gas leaking into any under bench components. Note: Domestic type upright gas stoves which have gas ovens and gas grillers shall not be provided.

Bench fitted cook-top burners shall have flame-failure cut-out systems and lit via an electronic ignition.

Commercial gas stoves shall have cook-top and oven burners with flame-failure cut-out systems.

Commercial gas stoves shall have the cook-top burners lit via piezo ignition and the oven burner lit via a pilot light with piezo ignition.

Commercial gas ovens shall have automatic cut off of both the fan and the burner when the oven door is open.

Commercial gas stoves that are movable shall be connected to gas supply with a flexible hose (nom 1.2m long) with restraining chains not exceeding 80% of the length of flexible hose and fixed to ensure the hose does not touch floor in the installed position.

A gas isolation stop cock shall be provided to each commercial gas stove and to each group of two cook-tops.

Anti-tilt mechanism shall be provided to commercial gas stoves where recommended by the manufacturer.

Warning signage outlining the manufacturers recommended lighting and shut down procedure, shall be posted in prominent position for attention of teaching staff and students.

Refer also to Section 5.12.6: Gas reticulation & Section 5.6.6: Health and Safety.

The list of appliances to be provided in each space shall be as defined in the project brief.

Industrial Technology (Manual Arts) Machinery

All fixed machinery shall comply with DET preferred supplier arrangement for machines and equipment to be used in state secondary schools industrial technology workshops.

The list of machines to be provided in each space shall be as defined in the project brief.

Machines shall be located to ensure safe use and adequate circulation with yellow safety lines painted on floor to define each machine workspace.

The proposed layout of machines shall be subject to approval by DET Workplace Health and Safety officers in consultation with school staff where possible, prior to fixing in position and painting safety lines.

Art Kilns
Pottery kilns are provided in schools for the firing of students’ clay work. Since raku, earthenware and stoneware clays are the most commonly used, the kiln needs to reach temperatures of up to 1300º C to allow for proper maturity. Both bisque and glaze firings will occur.

Kilns shall be installed in a purpose built kiln house which has a powered environmental control mechanism (mechanical exhaust system) for kiln emissions. Refer to Section 5.8.5 Mechanical Exhaust Ventilation.

Locate the kiln house external to art classrooms as a detached stand alone installation where there is no possibility of exhaust fumes entering the buildings or adjacent buildings through open windows, with no direct entry from the adjacent classroom (personnel must exit the Art block before being able to enter the Kiln Room).

The kiln shall be free standing, front loading, and electric for connection to 415V three phase supply.

The kiln shall be fitted with an exhaust range hood or flues appropriate to the specifications of the kiln.

Kiln shall be insulated with either a sealed ceramic fibre lining or a fire brick lining.

The metal frame and body shall have substantial resistance to the corrosive emissions from the firing process and where metals of different types are used in construction, must together be resistant to corrosion.


The kiln operating controller shall have the following:

- A commercially available kiln controller and pyrometer which can be maintained and repaired
- Secure enclosure and protected by a lockable cover
- On-off switch
- Soak timer 60 minute
- Indicating lamps showing:
  - power on
  - elements energised
  - cycle completed
- Automatic cut-off switch fitted to door
- Safety heat fuse for thermal runaway shutdown protection
• The element shall be Kanthal “A1” rated for continuous element temperatures of approximately 1300°C. The wire element must have a melting point of over 1400°C. Individual elements must be easily replaceable.

• The insulation temperature rating of the hot face lining shall be approximately 1350°C and the temperature of the external casing during firing shall not exceed 130°C.

• The door shall have a key lockable securing mechanism and shall have robust, corrosion resistant fittings, such as hinges etc.

• The kiln shall be provided with a spy hole and refractory bung/s or damper system.

• Opening the door shall de-energise the heating element and the cycle shall continue upon closing the door.

• Corrosion resistant metal labels shall be securely fixed to the kiln in a prominent position. These include:
  a. A robust plaque or plate attached to the front or side of the kiln stating suppliers and manufacturer’s name and contact details as well as contact name and telephone number of service agent for the item
  b. A warning label, adjacent to the spy hole shall contain information referring to:
     - Radiant heat emitted from the open spy hole
     - Possible eye damage
     - Protective eyewear to be worn when looking inside the kiln
  c. A general operational label is to be displayed indicating:
     - General operating instructions
     - Pertinent warnings
     - Thermocouple details such as type at exit point on casing

• All kilns shall include: 1 shelf, 2 half shelves and 8 of each 25, 50, 75 and 130mm props. Shelves to be a minimum of 19mm. All furniture supplied with and for the kilns must be rated for continuous operation of approximately 1300°C.

• Kiln capacity shall be as shown in the project brief.

• Each kiln shall be supplied with a User Operational Manual which will include a list of components with sources of supply for repair or replacement.

• In addition, the kiln supplier shall supply written basic operational parameters for common firing situations. Advice as to maximum temperature that the kiln door can be opened slightly at the end of the cycle and possible consequences of such action. Format shall be suitable for laminating and displaying near the kiln. This information is in addition to the user manuals for the controller and any associated equipment.
• Information relating to the composition of insulating materials used in kilns must be obtained from the manufacturer and supplied with a Material Safety Data Sheets (MSDS).

• Installation shall be certified that it is installed in compliance with AS/NZS3000 and in accordance with the Workplace Health and Safety Act 1995 and the Electrical Safety Act 2002 including all amendments/versions to date.

• The kiln supplier/ installer shall demonstrate and certify that the system operates to allow:
  
  (i) The ventilation system to be able to run independently of the kiln for testing the ventilation system.

  (ii) The ventilation system to be turned on when the firing cycle is started by the controller set to auto and will continue for 1 hour after the firing cycle is completed.

• Manufacturer’s warranties shall be a minimum of twelve (12) months on equipment and parts from date of installation.

• All electrical works is to be certified by a suitable qualified electrician who shall complete essential approved test on installation and issue a written certification report to the school.

5.14.3 Loose Furniture

• Furniture selection shall be of a quality and durability suitable for use in schools and shall be in accordance with DET Preferred Supplier Agreement 2010 (CPO 800 - 09).

• Preference shall be given to products which have environmental certification complying with AFRDI ‘green tick’.

• For examples of contemporary furniture that encourages effective and flexible learning refer to Learning Architecture at http://www.learningplace.com.au/

• Fixed height school desks and chairs shall have the following nominal range of heights:

  Desk Height

  Size 2 - 510mm; Size 3 - 540mm; Size 4 - 580mm; Size 5 - 630mm; Size 6 - 680mm; Size 7 - 725mm.

  Chair Height

  Size 2 - 325mm; Size 3 - 345mm; Size 4 - 370mm; Size 5 - 400mm; Size 6 - 450mm; (no size 7).

  Recommended sizing mix of School Chairs and Desks – Years Prep to 7:

• Provide sized desks and chairs to each year group in approximately the following ratios:

  Prep: 80% x size 2, 20% x size 3
Year 1: 20% x size 2, 80% x size 3
Year 2: 40% x size 3, 60% x size 4
Year 3: 40% x size 4, 60% x size 5
Year 4: 50% x size 5, 50% x size 6
Year 5: 33% x size 5, 67% x size 6
Year 6: Desks: 33% x size 5, 67% x size 6
       Chairs: 33% x size 5, 67% x size 6
Year 7: Desks: 50% x size 6, 50% x size 7
       Chairs: 100% x size 7

Recommended Sizing mix of School Chairs and Desks – Years 8-12:

- Provide sized desks and chairs:
  Desks: 100% Size 7
  Chairs: 100% Size 6

5.14.4 Plug-in Appliances

- Appliance selection shall be of a quality and durability suitable for use in schools and
- Appliances shall have an energy efficiency rating of 3 stars or better.