



MCLA SPECIFICATION

MCLA Specification of Windows and Doors

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This document shall be read in conjunction with all drawings, schedules and other information issued by McLoughlin Architecture and works shall be carried out accordingly unless otherwise instructed.			

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1. INTRODUCTION

1.1 APPLICATION

- This specification states the minimum standards for new or replacement windows for use in educational facilities and should be read in conjunction with other relevant design specifications and reference documents.
- This specification shall be read in conjunction with Architects accompanying tender drawings and specification and Contract Works Requirement. The Specification and specified schedule will set out the nature and quality of finish required and provides for samples to be prepared to ensure the standard required is agreed and approved in advance. The contractor will be required to produce method statements, which shall address the relevant issues to work operations.
- Notwithstanding the above, it will remain the responsibility of the contractor to ensure that any window installation is fit for purpose and complies with the relevant I.S., EN and B.S. Standards. Contractor should also be aware of and take into account the requirements of the current Irish Building Regulations.

1.2 GENERAL PERFORMANCE REQUIREMENTS:

- Windows must have a design life span of 40 years.
- **Design Note:** A good quality daylight distribution is required in each room with the average day lighting factor for each room to be in the range 4.5 to 5.5% with the emphasis on an even light distribution throughout the space. A schedule of all rooms and associated daylight factor is to be provided. In calculating the above daylight factor the computer area and the area 700mm in front of the storage wall/ cloaks (if provided) may be excluded.
- **Existing Building Design Note:** In the case of a window replacement project where it is not possible to meet the full requirements of this specification (e.g. Daylight Factor) designers should maximise the potential of the existing openings.
- **Design Note:** All spaces should have the benefit of 1/3 high and 2/3 low level natural ventilation opening sections in the windows. Tilt and turn windows are not appropriate. The ventilation and window design with respect to geometry and opening sections must be based on overheating calculations with computational modelling taking into account the "g" value for the glazing unit which should take into account the air tightness standard. Adequate natural ventilation should be achievable without draughts.
- **Design Note:** It is a requirement that window ventilators be eliminated from all window units where possible. They should only be provided where there is no alternative option for passive ventilation. Preference should be given to controllable wall ventilation. Controlled background ventilation openings to comply with the building regulations should be provided in addition to any sash openings.
- If rooms must be north facing due to site restrictions efforts should be made to achieve solar penetration to the rooms.
- Blinds to classroom windows shall be manually operated chain driven roller system units with light coloured dense basket weave sunscreen material with a 5% openness factor (50% visible light transmission). Materials used in the manufacture of the blinds should meet the

designation of 'flameproof' when assessed in accordance with BS 3120: 1959. A test certificate as in appendix 'C' of "fire safety of furnishings and fittings in places of assembly" should be supplied for each item specified.

2. COMPLIANCE REQUIREMENTS

2.1 GENERAL

- All windows proposed for use in educational facilities must conform to this specification. It will be the responsibility of the Window Manufacturer to provide independent accredited test report conforming to this specification to the project supervisor prior to the selection of any proposed window system. The minimum requirements are set out in Table 1.
- Where an independent test report cannot be produced or validated for the criteria in this specification the proposed window system will not be approved for use.
- Building materials and products - IS EN ISO 10456:2007 - Hygrothermal properties for determining declared and design thermal values (includes corrigendum 2009) – All individual materials used in the fabrication and manufacture of windows are to be compliant with this standard regarding the rounding up or down of the declared thermal values.

2.2 INDEPENDENT ACCREDITATION

- The contractor is required to submit independent accredited approval from the manufacturer of the selected/proposed window system tested on a specimen size of 1500mm high x 1200mm wide full Top Hung opening sash to comply with the following Department of Education and Science product requirements:

Table 1 – Submittal / Design Statements	
Reference	DOES Requirements
BS EN 12207:2016 Windows and doors - air permeability – classification (supersedes EN 12207:2000)	Class 3 at 600Pa. or better.
BS EN 12208:2000: Water tightness	Test Class 9A at 600Pa. or better.
BS EN 1991-1-4:2005+A1:2010) Eurocode 1. Actions on structures - General actions - Wind actions (supersedes IS EN 12211: 2000)	P1= 1600Pa., P2 = 800Pa., P3 = 2400Pa.

BS EN ISO 16283-1:2014 Acoustic Performance (supersedes BS EN ISO 140)	The R_w sound reduction index for the Glazing should not be less than 27db.
Thermal Transmittance ISO/NP 10077-1: 2017 and ISO 10077-2: 2017	Table F.4 — Thermal transmittances for vertical windows with fraction of the frame area 20 % of the whole window area, glazing spacer bars with improved thermal performance 1.2W/m²K. Design size: 1.2wide x 1.5m high top hung opening sash full size. Manufacturer to provide documentary evidence that the above sized window has a thermal performance of 1.2W/m²K or better.
BS 6262-1:2017 (Supersedes BS 6262-1:2005)	Glazing to conform to the guidelines set out in this standard. Thermal transmittance for standard glazing shall be no greater than - 1.2 W/m²K = Centre pane U value. All units to be 44mm minimum overall thickness. Minimum typical centre pane makes up: 4mm glazing – 16mm argon filled cavity (90%) - 4mm glazing – 16mm argon filled cavity (90%) - 4mm soft coat thermal glazing with glass having an emissivity value of 0.01. Where safety glazing is required, the supplier shall submit calculations to show an overall U-value of 1.2 W/m²K. The spacer used to separate the glazing should be a warm edge spacer bar and the space between the panes filled with Argon gas. A minimum requirement for the U-value of the glazing for a window Design size: 1.2wide x 1.5m high top hung opening sash full size shall be 1.2 W/m²K
BS EN 12206-1:2021 (Supersedes EN12206-1 2004)	Polyester Powder coating Interpon D or Syntapulvin applied by Qualicoat approved applicator using a standard RAL colour in matt finish.
BS EN 1670:2007 Building Hardware. Corrosion resistance. Requirement and test method.	All Ironmongery to comply with the requirements this standard. Multipoint single lever locking system is to be incorporated in all opening sashes.

2.3 PRODUCT DATA

- The contractor is required to submit to the project supervisor manufacturer's product data for all materials in this specification.

2.4 SHOP DRAWINGS

- The contractor is required to submit to the project supervisor profiles, accessories, location, and dimensions.

2.5 SITE DIMENSIONS

- The dimensions provided on the tender documents are indicative and should only be used for pricing. It is the Contractor's responsibility to produce the dimensions with which the windows will be manufactured.

2.6 SAMPLES

- Manufacturer to provide upon request; sized to represent material adequately.

2.7 CONTRACT CLOSEOUT

- The contractor is required to submit to the Architect the window manufacturer's warranty prior to the contract closeout.

2.8 HANDLING

- NOTE 1 Window types and examples of handing are shown in Figure C.1 and Figure C.2 of BS 4873:201
- These handing illustrations show the traditional British designations.
- NOTE 2: The handing of a multi-light or a horizontally sliding window is related to the position of the largest opening light.
- NOTE 3: The handing of a vertically pivoted window is described by the position of the pivots in relation to the opening out portion.
- The handing shall be in accordance with the tender drawings provided.
- In specifying the handing all windows shall be viewed from the outside unless otherwise stated.
- For a multi-light window, the arrangement of the multi-light shall be shown on a diagram.
- The handing of side-hung, top-hung and bottom-hung casements is related to the position of the hinges.
- The proportion opening outwards of a vertically pivoted window shall be stated.

2.8 WINDOW AND DOOR WARRENTY / GUARANTEE REQUIRMENTS

- All window and door systems shall have an insurance backed guarantee / warranty addressed to BOM Kildangan National School with Minimum periods requirements outlined below:
- Minimum requirements with regards to manufacturer's warranty periods for all the principal elements of the works are enclosed below.
- All warranty periods shall be from date of Practical Completion of the works.
- Warranty is defined as the period of time over which the specialist window-contractor is responsible and liable (including all costs in their entirety) to replace and/or repair any defective element, part, component, item of the works should it be defective, become defective or malfunction so that it becomes unsuitable for its intended purpose or use. This includes but is not limited to failures of materials and workmanship in relation to loss of hermetic seal in insulating glass units, non-retention of desiccant within spacer bars, delamination of glass, discolouration and/or deterioration of glass coatings and glass breakage.
- Warranty periods for the routine cleaning of all internal and external finishes shall be valid for periods of a minimum of one year between cleaning and maintenance actions.
- Manufacturers warranties shall consider of the location of the building and its external environment as defined within ISO 12944-2:2017.

<u>Element</u>	<u>Manufacturer's Warranty (Min)</u>
Steel framing	25 years
Stainless steel framing	25 years
Aluminium framing	25 years
Anodised finish to aluminium	25 years
PPC finish to aluminium	25 years
PVDF finish to aluminium	25 years
Galvanised (hot-dip) finish to mild steel	25 years
Non-Accessible Access equipment/componentry	25 years
SFS Lightweight Walling	12 years
Glass Fibre Reinforced Concrete	12 years
Solid Surface Materials	12 years
Insulating glass units	12 years
Glazing – laminated, HS & FT	12 years
Aluminium copings, pressings, flashings	12 years
Aluminium parapets, gutters	12 years
High density boarding	12 years
Stainless steel finish	12 years
Paint finish to external galvanized steel	12 years
Paint finish to internal galvanized steel	12 years
Sealants	12 years
Gaskets	12 years
Membranes (Air, Water & Vapour)	12 years
Insulation (Exterior)	12 years
Insulation (Interior)	12 years
Insulation (Vert. & Hor. Compartments)	12 years
Accessible Access equipment/componentry	12 years
Ironmongery / Hardware	5 years
Motors / Mechanisms	5 years

WINDOW & DOOR - O&M MANUAL REQUIREMENTS

- It is a contractual requirement that the specialist Window-contractor shall produce an Operations and Maintenance manual for the works. The required format (physical O&M Manual) for submission is to be agreed with the Architect at tender stage however as a minimum four no. hardcopies and digital versions of the final approved manual will be required. Draft digital copies of the specialist window-contractors O&M Manual shall be submitted for review to the Architect no less than eight weeks in advance of the agreed date for Practical Completion.
- The O&M Manual shall include, but not be limited to, the following:
 - Current, as of date of issue, contact details of each company/contractor involved in the supply or manufacture of elements, materials and components.
- All project approved certification, documentation and trade literature in relation to elements, materials and components used in the works.
- A full set – in A3 format – of approved as-built drawings with all approved changes incorporated and supplemented with a comprehensive text based technical description of each element and system type of the works.
- Full set of structural calculations for reference.
- Records of any toughened glass, including heat soak testing records. Include any records of NIS breakages that occur on-site during construction.
- A full list of warranty statements clearly identifying any terms and conditions.
- The approved Maintenance & Access Strategy Report which shall include methodology covering the procedures for replacement components, elements and materials which have been identified as 'Replaceable' items and therefore having a design life which is less than the design life of the works.
- The approved Maintenance & Access Strategy Report, which shall include methodology covering the procedures for replacement of damaged and/or defective components, elements and materials.
- Manufacturers recommendations and methodology for all routine cleaning and maintenance including but not limited to appropriate cleaning products, repair products, lubrication of component parts etc.
- Record/ check sheets for routine cleaning and maintenance works.
- Elevation drawings (and plans of glazed roofs) marked up with reference to glass specification for each location. Glass specification sheets with full IGU composition including coatings, glass types, spacer types etc. to be provided to allow ease of replacement ordering.
- Outline access and strategies for cleaning and routine maintenance are contained within the Architects documentation and the contract documentation. The specialist window-contractor is to ensure that they familiarize themselves with the outline minimum requirements and suggested cleaning concepts within that documentation.
- It is the responsibility of the specialist window-contractor to identify any areas of concern with regards to the proposed strategies for routine and non-routine maintenance, cleaning and replacement work, should they be needed.
- Similarly, any general concerns with regards to routine and non-routine maintenance, cleaning and replacement works are to be identified at tender stage by the specialist window-contractor.
- It is the responsibility of the specialist window-contractor to propose a maintenance and access strategy for both routine and non-routine maintenance, cleaning and repair/replacement works.
- The design of the systems, elements and component parts shall be undertaken in a manner that where possible all air seals, gaskets and membranes can be accessed, for inspection, repair and replacement, in a reasonably practical manner.

- This Maintenance & Access strategy report, in draft form and clearly identifying safe working load requirements, should be submitted to the Architect for his/her review. This report, produced by the specialist window-contractor is to involve the advice and input of locally sourced cleaning and maintenance specialists – a selection of suitable names can be provided by the Architect upon request. This report is to be continuously updated as the design develops and installation methodologies are being developed. The final issue of this report for comment is to be made in advance of the issue of the Operations & Maintenance Manual so that it can be approved for inclusion in the O&M Manual.
- The aim of the Architects maintenance strategy report and the strategy and system ultimately developed by the specialist window-contractor is the provision of access to all areas of the external facade elements to allow general routine cleaning, inspection of elements and components and the repair and/or removal/ replacement of parts which are deemed to be defective. The specialist window-contractors report shall also allow and propose methods to be used to enable the maintenance personnel to inspect elements and component parts at the recommended intervals outlined in the manufacturer's warranty statements.
- The maintenance regime and strategy proposed by the specialist window-contractor for his elements and component parts are to be designed in a manner that when undertaking cleaning, maintenance and repair/replacement that it can be undertaken in a safe manner and that by following the provisions in the maintenance regime the appearance or safety of the facade, elements and component parts are not detrimentally affected.
- The design of the systems, elements and component parts shall be undertaken in a manner that will allow the insulating glass units, and spandrel glazing to be demounted and replaced without the need for progressive dismantling of adjacent elements and/or glazing.
- Sloped elements, canopy and other maintenance zone areas are likely to utilize fall restraint system solutions installed by others. The specialist window-contractor shall ensure that the design and execution of his systems, element and component parts allows for these interfaces.
- The specialist window-contractor at tender stage is fully responsible for and is to identify any elements or component parts, which are to be considered for spares. Items to be considered are those which, in the case that replacement parts, components or elements are needed will involve amongst other reasons, complex procurement routes, long lead times and those which are of a visually critical nature. Once identified the specialist window-contractor is to propose suitable storage solutions required for his spare's strategy and a comprehensive list of reasons for why spares should be considered by the overall Client. Within the Defects Liability Period the specialist window-contractor is fully responsible for maintaining a Register of Maintenance & Defects. This document shall be proposed and submitted for review in draft form as part of the O&M Manual submission and shall include but not be limited to:
 - clearly identified description and location of the defect in written and drawing format, date at which the defect was identified and the actions subsequently undertaken to address the defect, documented confirmation from the Architect that the defect has been adequately addressed. Similarly, maintenance related items contained within the Register of Maintenance & Defects shall include but not be limited to maintenance schedules for each component of the works, check sheets for sign-off of works undertaken and the authority providing approval.
- It is the responsibility of the specialist window-contractor to allow for the provision of an experienced staff member to spend an appropriate amount of time with the Building Manager at handover stage. This procedure shall allow the building management team to understand the requirements and procedures contained within the O&M Manual.

3. MATERIALS

3.1 ALUMINIUM

- Extruded aluminium profiles shall be fabricated from designated treated alloy 6060 or 6063 in tempers T4, T5 or T6 conforming to BS EN 755-9:2016.
- When ancillary components such as sills, couplings etc. are formed from sheet materials they shall be fabricated from designated alloys 1200, 3103, 5005 or 5251 conforming to BS EN 485-2:2016 (+A1:2018)
- in temper suitable for the particular type of application and degree of forming to be adopted
- The aluminium profiles used in the construction of the frames excluding glazing beads, nibs, interlocks and similar features shall be, at minimum tolerance, not less than 1.2 mm thick.
- Powder Coated Finish
 - The aluminium shall be finished with the following:
 - A powder coating conforming to BS EN 12206-1:2021 Paints and varnishes - coating of aluminium and aluminium alloys for architectural purposes. Coatings prepared from thermosetting coating powder
 - Polyester Powder Coating
 - A Polyester Powder coating Interpon D or Syntapulvin (Not a mixture of both) applied by Qualicoat approved applicator using a standard RAL colour in matt finish to BS EN 12206-1:2021. Prior to the application of the polyester power coating the aluminium profiles are to be pre-treated using an 8-stage process of acid etching, Chrome or Chrome Free process to Qualicoat approval and water rinsing. A guarantee of 25 years must be applied for in advance of starting the project on site. It is noted that this period of time is subject to the location or proximity of the school to marine environment. Therefore 'Architectural powder coating to Qualicoat 'Seaside' standard from approved supplier' is required.

3.2 REINFORCEMENT

- The use of reinforcement in plastics windows and door sets shall conform to the recommendations in British Plastics Federation publication 323/1.
- Reinforcement should be non-hygroscopic and should have no adverse effect on the performance of the window or door. Where metal reinforcement is used it shall be manufactured from one of the following metals:
- Mild steel sheet, hot-dip zinc coated, conforming to BS EN 10346:2015, coating designation Z275. This type of reinforcement shall only be used in profiles or systems designed and sealed so that no exterior moisture can come into contact with the reinforcement;
 - Mild steel sections which are subsequently given a corrosion resistant coating in order to conform to the requirements in (i). This type of reinforcement shall only be used in profiles or systems designed and sealed so that no exterior moisture can come into contact with the reinforcement;
 - Austenitic stainless-steel sheet or strip conforming to BS EN 10088-2:2014
 - Extruded aluminium alloy conforming to BS EN 485-2:2016 Aluminium and aluminium alloys - sheet, strip and plate. Mechanical properties (+A1:2018)
 - BS EN 515:2017 Aluminium and aluminium alloys - wrought products - temper designations

- BS EN 755-9:2016 Aluminium and aluminium alloys - extruded rod/bar, tube and profiles. Profiles, tolerances on dimensions and form
- This type of reinforcement can be used in any type of profile or system.
- Windows fabricated with reinforcement to comply with this document shall be tested to the requirements of Table 1 including reinforcement.

3.3 THERMALLY IMPROVED FRAMES

- Where window frames are thermally improved by the inclusion of an insulating barrier or cladding, the insulating material should be stable under the conditions of service, e.g. under wind and dead loads and within the likely surface temperature range of the frames. The thermal barrier or cladding system should be sufficiently robust to withstand tests carried out in accordance with BS 6375-1:2015 and BS 6375-2: 2009.
- BS 6375-1:2015+A1:2016 specifies performance requirements for the strength of windows based on a series of mechanical tests that check the integrity of the frame.

3.4 FRAME JOINT SEALING MATERIALS

- When the completed window is tested in accordance with BS 6375-1:2015 and BS 6375-2:2009, there shall be no degradation of the sealing or the operational function of the window due to failure of the sealing materials.
- Materials should be able to withstand stresses during assembly, transportation, installation and operation of the window.

3.5 BEARING DEVICES AND HARDWARE

- Metallic materials used for bearing devices and hardware shall have at least the equivalent corrosion resistance to BS EN 1670:2007, class 3 when subjected to a neutral salt spray test as specified in BS EN 1670:2007.
- For environments in highly contaminated localities such as those subject to combinations of industrial and coastal pollution, BS EN 1670:2007, class 4 should be used.
- Requirements for hardware materials are specified in BS EN 13126-5:2011+A1:2014). These requirements apply to both metallic and non-metallic materials.

3.6 HARDWARE

- Where non-metallic components are incorporated, the material and specification for these should be selected according to the required function.

3.7 HINGES, STAYS AND PIVOTS

- Friction hinges, variable geometry stays and friction pivots are expected to maintain friction without adjustment or, when adjustment devices are provided, with adjustment. Corrosion test reports to be submitted.

3.11 WEATHERSTRIPPING:

- Weatherstripping shall be one of the following:
- Ethylene propylene diene monomer (EPDM); or
- Plasticized PVC (PVC-P); or
- Polychloroprene (CR); or
- Polypropylene pile; or
- Sheathed cellular elastomeric polymer; or
- Silicone (Si); or
- Thermoplastic elastomer (TPE).
- Non-cellular forms of materials i), ii) and iii) are specified in BS 4255-1:1986.
- Guidance on weatherstripping products is given in BPF WG 345/1 [1].

3.12 GLAZING GASKETS

- To minimise gaps in joints and shrinkage internal gaskets are to be serrated to allow for the gasket to be continuous and not requiring mitre jointing at corners. The internal gaskets are to have one joint only which is to be sealed and located at a low critical area.
- Glazing gaskets shall be one of the following:
 - Chloroprene rubber, solid (cellular); or
 - Chloroprene rubber, solid (non-cellular) conforming to BS 4255-1: 1986; or
 - Cured ethylene propylene diene monomer (EPDM); or
 - Plasticized PVC; or
 - Plasticized PVC gaskets should not be used with polycarbonate glazing materials.
 - PVC nitrile; or
 - Thermoplastic elastomer (TPE); or
 - Uncured ethylene propylene diene monomer (EPDM).
- Glazing compounds shall be non-setting compounds, preformed mastic tapes, gun grade solvent release type sealants, one-part or two-part curing sealants or two-part rubberizing compounds. Gun grade sealants shall conform to BS EN ISO 11600:2003+A1:2011.

3.13 FIXINGS

- All straps, clips, brackets, lugs, screws, nuts, bolts, rivets, metal washers, shims and other fixings shall be manufactured from one of the following: stainless steel grade A2, A4 or F1 conforming ISO 3506-1:2020 - Fasteners — Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes or
- ISO 3506-2:2020 - Fasteners — Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 2: Nuts with specified grades and property classes steel which has been finished by one of the following methods: zinc plating in accordance with EN ISO 2081:2018

Metallic and other inorganic coatings - electroplated coatings of zinc with supplementary treatments on iron or steel, code Fe/Zn 12 or Fe/Zn 25, and chromate passivation in accordance with BS 6338:1982, ISO 4520-1981, class 2C or 2D; hot dip galvanizing in accordance with ISO 1461:2022 - Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods to a minimum coating mass of 460 g/m²; spraying with a zinc coating in accordance with ISO 2063-2:2017 - Thermal spraying — Zinc, aluminium and their alloys — Part 2: Execution of corrosion protection systems. symbol Zn4; any other protective treatment of equivalent performance to those specified in 4.1 Aluminium (a) to (c), of an alloy having mechanical strength properties at least equal to that of the frame.

- Spacer shims used at fixings, which serve only as packing and do not influence the structural integrity of the fixing, may be of extruded or moulded plastics material.
- Fixing devices should be capable of withstanding the design wind load (see BS EN 1991-1-4:2005+A1:2010) and any operating forces of the windows. Provision should also be made to prevent water penetrating any holes provided for the fixings.

3.14 GLAZING MATERIALS:

- Glazing type and thickness shall be selected, using the recommendations given in BS 6262: 2018, to withstand the design wind pressure calculated in accordance with BS 6375-1:2015 or BS EN 1991-1-4:2005+A1:2010. The type and quality of glass shall conform to BS 952-1:1995.
- The exposed edges of glass adjustable louver blades shall be abraded, ground or polished.
- Insulating glass units shall conform to BS 6262-1:2017.
- Standards specifying requirements and test methods for glass, BS EN 1279-3: 2018 - Glass in building - Insulating glass units Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances
- Work sizes and manufacturing tolerances:
- Work sizes
- The work sizes for overall length and height shall be documented. The site survey of the windows will be the responsibility of the window contractor and comply BS 8213-4(2016) : 2016, Windows, doors and roof lights – Part 4: Code of practice for the survey and installation of windows and external doorsteps.
- Manufacturing tolerances
- The size of an assembled frame shall be within ± 1.5 mm of the documented work size in any dimension, and the difference between the diagonals of the assembled frame shall be not more than 4 mm.

4 DESIGN AND CONSTRUCTION

4.1 WORK SIZES AND MANUFACTURING TOLERANCES

- The work sizes for overall length and height shall be documented. The site survey of the windows will be the responsibility of the window contractor and comply with BS 8213-4:2016

Windows and doors. Code of practice for the survey and installation of windows and external door sets.

- The size of an assembled frame shall be within ± 1.5 mm of the documented work size in any dimension, and the difference between the diagonals of the assembled frame shall be not more than 4 mm.

4.2 OPERATION

- The completed window shall conform to the performance requirements for operation and strength specified in BS 6375-2:2009.

4.3 MARKING

- Pre manufactured window components shall be marked or labelled with: The name or trade mark of the manufacturer; the number and date of the British Standard, i.e. the relevant standard for the appropriate material used to construct the window.

4.4 WEATHER-TIGHTNESS

- The following weather-tightness requirements apply to all types of windows.
- The completed window shall meet the weather-tightness requirements for the appropriate classification specified in BS 6375-1:2015, when tested in accordance with BS 6375-1:2015 and, for Triple windows, with the appropriate additional procedure given below.
- For air permeability, Triple windows shall be tested with both windows closed, the length of opening joint being that which is visible on the inner surface of the inner window only.
- For water-tightness, Triple windows shall be tested with both windows closed and the performance class shall be that obtained by the outer windows.
- For wind resistance, Triple windows shall be tested with the inner window open and the outer window closed. The test shall then be repeated with the inner window closed and, if the outer window contains opening light(s), this (they) shall be opened.

4.5 VENTILATION OF ROOM DIRECT TO EXTERNAL AIR

- Each window assembly must be manufactured in accordance with Part F Table 1 Ventilation of room direct to external air of the current Building Regulations and achieve a minimum rapid ventilation area of 1/20th of the floor area of the room. The selected fabricator must demonstrate compliance through calculations mentioned earlier.
- The following criteria should be used for background ventilation:
 - Floor area up to 10 m² - 6500 mm² -
 - Floor area over 10 m² - 650 mm²/m² of floor area
- Window ventilators are only to be provided where no alternative means of passive ventilation can be provided. Designers are required to provide controllable passive wall ventilators where necessary. Wall vents should be of a high control standard and be capable of completely turned off (Hit and Miss is not acceptable)

- Where indicated on window schedule, each window shall incorporate a Ventilator and shall be polyester powder coated offering a single colour facility to match the window profiles. They should be fitted with an external, aluminium hood. The glazed in vents should be fitted with rod control.
- Each vent must be capable of providing a minimum free airflow in accordance with Part F of the current Building Regulations. Vents shall be tested to BS 6375-1:2015, and achieve the same requirements of the window unit for purposes of Air permeability, water tightness and wind resistance

4.6 DESIGN FOR GLAZING

- The frame design shall be such that:
 - The glazing shall comply with current Irish Building Regulations;
 - The window can be glazed in accordance with BS 6262: 2017
 - Re-glazing is possible without the need to remove the outer frame from the structure of the building;
 - It is possible to renew the weatherstripping without removing the outer frame from the structure of the building;
 - It is possible to replace the hardware without removing the outer frame from the structure of the building.

4.7 OPENABLE WINDOWS

- For windows that are intended to be openable, the opening sashes however designed shall move freely and smoothly without hindrance throughout their intended range of movement.
- The range shall be restricted to an opening for child safety and to ensure adequate free openable area.
- **All opening sections to be fitted with restrictors** preventing sections from opening beyond 100mm. High level opening sections to be fitted with winders allowing windows to open 320mm.
- All high-level opening sections (1500mm above F.F.L) to have low level manual winders for opening, supplied by window contractor. Where opening window that are considered to be unreachable, they shall be fitted with manual winding window gearing. Each set of windows shall be controlled by 1 no. Operator; windows shall be opened using 380mm chain openers with conduit, winder cables and saddle fixings to wall. All components shall be finished in a selected polyester powder coated paint finish.

4.8 REMOTE WINDOW OPENING DEVICES

- Where opening window that are considered to be unreachable, they shall be fitted with manual winding window gearing. Each set of windows shall be controlled by 1 No. operator; windows shall be opened using 250mm chain openers with conduit, winder cables and saddle fixings to wall. All components shall be finished in a selected polyester powder coated paint finish as per window schedule.

- Where indicated on drawings, the windows shall be controlled by chain operated actuators with 230V motors with reverse polarity for open/close operation, and should have automatic limit switching between 90mm and 400mm, effective stroke distance of high-level windows to ensure adequate free openable area.

4.9 FRAME JOINTS

- Joints in frames shall be made either by welding or by mechanical means (e.g. cleating and screwing) and shall have flush, stepped or lapped surfaces. For flush joints formed by mechanical means, any deviation from the same plane shall be within the limits set by the use of extrusion tolerances given in BS EN 755-9:2016 Aluminium and aluminium alloys - extruded rod/bar, tube and profiles. Profiles, tolerances on dimensions and form.
- Welded joints shall be cleaned off smooth on surfaces that are exposed when the window is in the closed position and where the joints would otherwise project into the glazing space.
- Sealing of joints
 - Any frame joints, including those of the thermal barrier or cladding, which would otherwise cause loss of watertightness and/or increase of air permeability, should be sealed with sealant or by other means to achieve the performance required.
 - Deviations in the plane of flush joints
 - No allowance is given for assembly and machining tolerances. Therefore, to achieve the requirements specified it can be necessary to use extrusions with closer tolerances than those given in BS EN 755-9:2016 Aluminium and aluminium alloys - extruded rod/bar, tube and profiles. Profiles, tolerances on dimensions and form
 - In practice, to avoid sharp exposed edges etc., manufacturers might need to agree tolerances with the extrusion supplier. It can be necessary to fit "L" shaping backing plates (chevrons) to flanges of mitred cornered frames to correct misalignment due to angular tolerances.

4.10 GLAZING LIGHT TRANSMITTANCE FACTOR

- The total solar transmittance of the window shall comply with the requirements of BS 6262-2:2005 Glazing for buildings —Part 2: Code of practice for energy, light and sound.
- The glazing light transmittance factor shall comply with the requirements of BS EN 17037:2018 Daylight in buildings (+A1:2021) (Incorporating corrigendum October 2021)
- The accessible parts of finished windows should as far as reasonably practicable be free from all sharp edges, burrs etc.

4.11 GLASS AND GLAZING

- Argon Filled minimum triple glazed Clear sealed units 4/16/4/16/4mm with a Windows shall be glazed in accordance with the recommendations given in BS 6262: 2018.
- Attention is drawn to the glazing safety recommendations of BS 6262-4:2018 Glazing for buildings. Code of practice for safety related to human impact (Incorporating corrigendum No. 1)

- Glazing units shall be a minimum 44mm triple glazed units, low "E" argon filled (90%) glazing units. Safety glass to be 6.8mm laminated to BS 6262 & BS 6201- Glass in Buildings. All glazing must be installed in accordance with BS 6262 and the triple -glazed unit manufacturer's and system supplier's instructions.
- All windows shall contain sealed units, which shall be manufactured in accordance with EN1279-2: 2018 and EN1279-3: 2018 and carry the necessary and appropriate guarantee.
- The glazing light transmittance factor shall not be less than 70%
- Clerestory high-level windows to have sandblasted finish to Face 2 of triple - glazed units to reduce glare (GP Halls)
- All glass below 800mm is safety glass
- Safety glass is provided in all General Purpose (GP) Room windows above a height of 1 metre above the finished floor level for safety reasons
- U-value: Design size: 1.2wide x 1.5m high top hung opening sash full size. Manufacturer to provide documentary evidence that the above sized window has a thermal performance of 1.2 W/m²K or better. The centre pane "U" Value of each sealed unit when combined with the window frame should achieve a target figure of 1.2Wm²/K when treated as a single element. Each fabricator/installer must demonstrate compliant glass choice with tender return. All glazing shall conform to BS 6262. Use thermally broken warm edge spacer in the triple glazed units to increase thermal efficiencies. All glazing shall be Low E Hermetically U value ≤ 1.2 W/M²K
- Any perimeter taping must be transparent to permit inspection of unit edge condition.
- Glazing System: triple -glazed units, panels and inserts shall be supported continuously along all four edges by specialised glazing support blocks. All windows shall be dry glazed using external 'snap in' extruded aluminium beads with captive 'E' gaskets externally and wedge gasket internally. The corners of the gaskets shall be accurately mitred together and sealed to ensure an effective joint. Setting blocks and location pieces shall be fitted in accordance with BS 6262: 2018 in order to ensure the windows are maintained square and rigid.

4.12 SECURITY

- When the completed window is tested in accordance with PAS 24:2016 Enhanced security performance requirements for door sets and windows in the UK - door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk it shall not be possible to gain entry.
- The manufacturer should establish whether any of the security devices listed in PAS 24:2016 Enhanced security performance requirements for door sets and windows in the UK – door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk is to be provided.
- A glazing system that prevents the removal of the glass by dismantling the system entirely from the outside is available as an optional feature PAS 24:2016.
- Guidance for security against crime is given in BS 8220.
- Handles shall suit single lever wrap around multipoint locking type. The opening is to be restricted for child safety and to ensure adequate free openable area. To meet the required security level and safety standard all lower opening vent frames shall be fitted with one non releasable locking restrictor. These will restrict the window opening in line with the rapid

ventilation calculations. These should be fitted in accordance with manufacturer's recommendations and as detailed in their technical literature.

4.13 BLINDS

- Blinds to windows in teaching spaces shall be manually operated heavy duty contract grade steel tube spring-less rollers, complete with side winder endless ball chain control units and child safety clips appropriately sized for each opening and shall be in compliance with Irish Standard EN 13120:2009+A1:2014– Internal Blinds.
- The blind material shall be light coloured dense basket weave sunscreen material.
- The blinds must perform such that they eliminate glare to the teaching walls and white/black boards, associated data projection screens and white interactive boards, reduce heat transfer to the room and still permit light transmission to the internal space.
- The daylight transmission, solar absorption, openness factor and shading co-efficiency must all be taken into account when selecting the appropriate sun screen shade cloth for the teaching spaces.
- In order to achieve the above requirements and ensure the blinds are fit for purpose as outlined consideration should be given to
 - Light transmission values in the 9% to 12% range
 - Solar absorption in the 17% to 20% range
 - Optimum shading coefficient
 - Openness factor in the 3% to 5% range (All blinds on East and South facing Classroom windows to have a 3% openness factor, subject to mock up on site).
- In addition, on East and South facing elevations a second blind, with an openness factor of 1%, should be fitted to the classroom window nearest to a teaching wall containing an interactive whiteboard for use only when the interactive whiteboard is subject to direct sunlight, i.e. early in the morning, low winter sun, etc.
- Both blinds to be light in colour and identical in colour.
- **NOTE:** These are guidance values and should not be taken as absolute selection criteria. Each case must be assessed on its own circumstances.
- A full-size mock-up for a south facing teaching space with interactive white board and data projector operational must be conducted prior to final selection of the blind material.
- Manufacture and installation of the blinds shall comply with the requirements of the Irish standards EN 13120:2009+A1:2014 Internal blinds - performance including safety requirements.
- Materials used in the manufacture shall be in compliance with requirements of the granted FSC
- A test certificate as in Appendix C of "Fire safety of furnishings and fittings in places of assembly" should be supplied for each item specified.
- Some administration areas such as the Principal's Office and Administration Office may require blinds that allow privacy at night from external viewing. This should be taken into account when selecting blinds for these areas.
- In the interests of reducing energy costs clear instructions outlining how blinds should be used in teaching spaces shall be provided in each classroom on a laminated label as outlined in Section 3.3.16 Labelling, below.

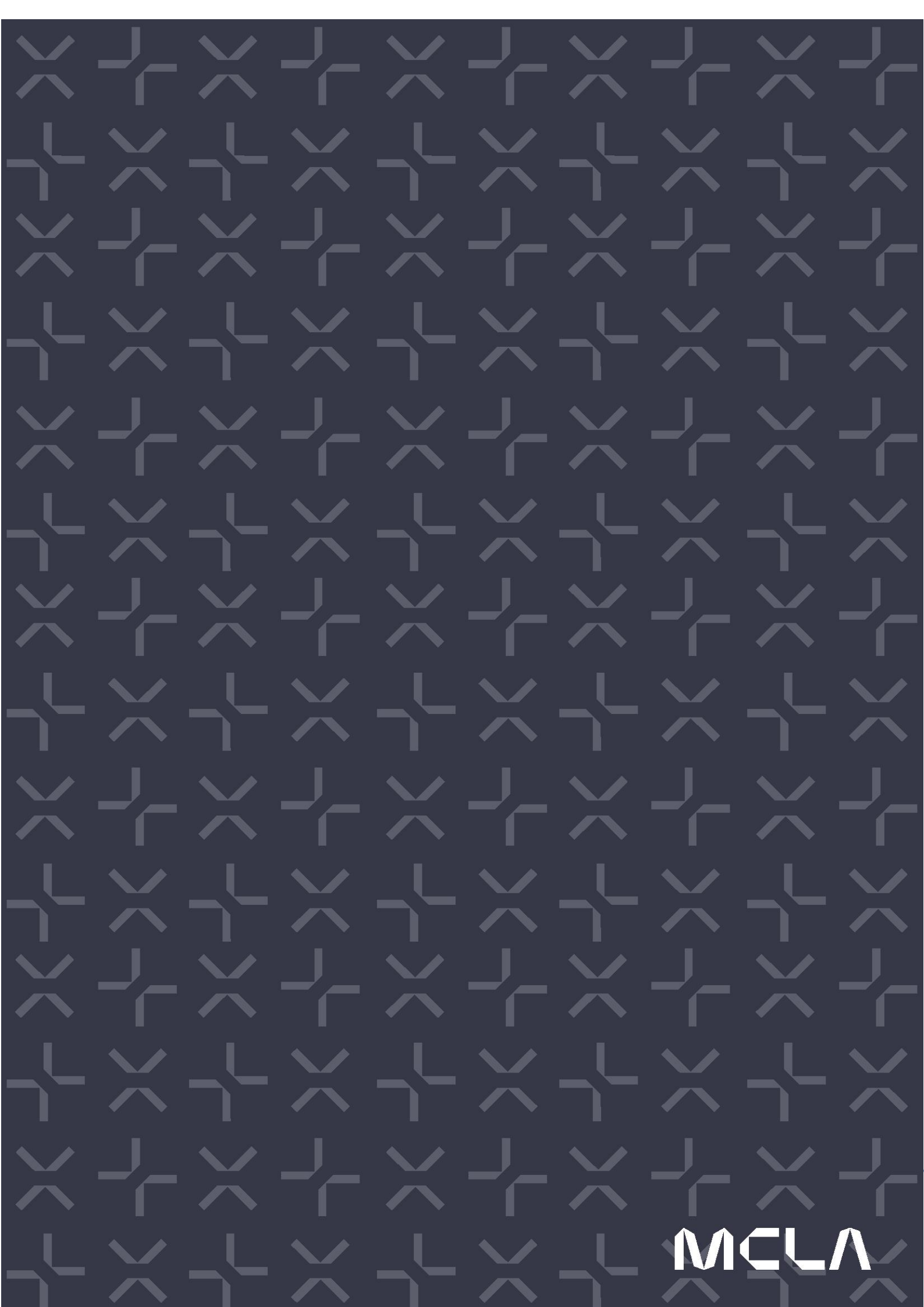
3.14 LABELLING

- A laminated label incorporating simple instructions for operating the following elements if present in the room shall be located in a suitable location near the door in each teaching space:
 - Natural Ventilation: Advice on how the space can be naturally ventilated effectively and efficiently via the windows during schools' hours.
 - Blinds: Include the following "Raise blinds when not required in order to reduce lighting energy used".

5. GLOSSARY OF TERMS

- **Aluminium alloy window:** window incorporating aluminium alloy framing members and glazing rebates.
- **Bearing device:** wheel, roller, skid or other device fitted at the head or sill of a horizontally sliding window to support the weight of the sash and to facilitate movement.
- **Casement:** window, or part of a window, which opens on hinges, pivots or variable geometry stays.
- **Coupled window:** glazed frame with another glazed frame hinged or fastened to it, so that both open together for ventilation and can be separated for cleaning purposes.
- **Design wind pressure:** wind pressure that can be expected on a surface of a building having taken into account the S_a , S_d and S_b factors and the shape of the building by applying pressure coefficients to the dynamic pressure of the wind. NOTE See BS EN 1991-1-4:2005 Eurocode 1: Actions on structures. General actions - Wind actions (+A1:2010) (incorporating corrigenda July 2009 and January 2010)
- **Triple glazed window:** Three panes of glazing within a single frame superimposed in the same wall opening.
- **Fixing:** an item that is used to secure separate members of a window assembly to each other, to secure an item of hardware to a window member, or to secure a completed window assembly into the structure of a building.
- **Glazing gasket:** plastics or synthetic rubber member, used between the glass and the frame and/or the glass and the bead.
- **Hardware:** fitting attached to a window that is used to operate and/or secure it.
- **Insulating glass unit:** two or more panes of glass manufactured to size and shape, spaced apart and then hermetically sealed in a factory, ready for glazing.
- **Multi-light window:** window incorporating opening and/or fixed lights within one perimeter frame.
- **Sash:** movable frame of a horizontally or vertically sliding window
- **Secondary window:** window either fitted into the same wall opening as an existing window, or applied to an existing window, to provide improved thermal and/or sound insulation
- **Thermally improved frame:** frame of an aluminium alloy window that incorporates an insulating material to improve the thermal performance NOTE: It may be of the thermal barrier type, where the inner and outer faces are separated by the insulating material.
- **Weathertightness:** performance in respect of air permeability, watertightness and wind resistance.
- **Weatherstripping:** material around opening lights to reduce air and/or water penetration.

End of Document.



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