

**Climate Action Summer Works Scheme. Woodwork
Room Refurbishment at Deansrath Community
College, Clondalkin, Dublin 22, Co. Dublin**

**Works Requirement document – Volume A.2.4
Specification of Performance, Standards and
Materials**

For

Mechanical Services Installation

Project Ref: 0839

Date: June 2026

Table of Contents

Page

Section 1:

Preliminaries And General Clauses:	4
Contract Safety & Health Procedures:	10

Section 2: **Particular Specification:**

Element 52: Drainage and Refuse Disposal	14
---	-----------

- 52.1 Extent and programme of works
- 52.2 Waste pipework
- 52.3 Waste pipe supports
- 52.4 Blank caps and cleaning doors
- 52.5 Inspection and testing
- 52.6 Dilution recovery traps
- 52.7 Disconnection and Removal of Obsolete Waste Systems

Element 53: Hot and cold water services	17
--	-----------

- 53.1 Extent of works in this section
- 53.2 Pipework
- 53.3 Pipe supports
- 53.4 Control valves and stop cocks
- 53.5 Pipe sleeves
- 53.6 Wall and ceiling plates
- 53.7 Branches and connections to fittings
- 53.8 Special risk fire posts
- 53.9 Insulation
- 53.10 Testing
- 53.11 Commissioning
- 53.12 Labelling
- 53.13 Painting
- 53.14 Chlorination of system
- 53.15 Disconnection and Removal of Obsolete Domestic Services

Element 56: Space Heating	21
----------------------------------	-----------

- 56.1 Extent of works in this section
- 56.2 Pipework
- 56.3 Pipe supports
- 56.4 Provision for anchoring, guidance & expansion of pipework
- 56.5 Provision for air venting & Drainage
- 56.6 Valves
- 56.7 Pipe sleeves
- 56.8 Wall and ceiling plates
- 56.9 Radiators
- 56.10 Radiators valves
- 56.11 Flushing out of system

- 56.12 Insulation
- 56.13 Tests
- 56.14 Commissioning
- 56.15 Painting
- 56.16 Labelling
- 56.17 Chemical Dosing System (effected circuit)
- 56.18 Zone Control Valves
- 56.19 Disconnection and Removal of Obsolete Services

Element 57: Ventilation Services

26

- 57.1 Extent of works in this section
- 57.2 Ductwork
- 57.3 Ductwork supports
- 57.4 Access doors
- 57.5 Turning vanes
- 57.6 Balancing and control dampers
- 57.8 Grilles and Diffusers
- 57.9 Extract fans
- 57.10 Ductwork connections to canopies Grilles and diffusers
- 57.11 Test points
- 57.12 Dust Extraction System
- 57.13 Air registers
- 57.14 Supports
- 57.15 Inspection, testing, certification & commissioning
- 57.16 Training & Demonstration
- 57.17 Commissioning
- 57.18 Testing
- 57.19 Labelling
- 57.20 Painting

SECTION 1: PRELIMINARIES AND GENERAL CLAUSES:

01. Description Of Site:

The site is the existing Deansrath Community College, Clondalkin, Dublin 22, Co. Dublin, which is easily accessible from the road. The site boundaries are defined on the architect's drawings, and this Contractor shall confine his operations to the area indicated.

This Contractor shall be deemed to have made a thorough examination of the site and all features thereof, the existing premises, together with all internal and external services, adjoining premises and property or other things affecting the proposed works, to ascertain precisely the nature and extent of same and the condition under which the works will have to be executed, as no claim will be allowed on the grounds of want of knowledge in this respect.

02. Description Of Works:

The works covered by this specification comprises of the Mechanical Services Installation works complete, within the Woodwork Room Refurbishment areas, as shown and as detailed on the accompanying drawings.

The decommissioning of the existing systems, as detailed, shall be allowed for.

These works are to be carried out by a suitably qualified and registered Mechanical Contractor as a domestic contractor to the Main Contractor.

The contractor shall include all labour, materials, import charges and transport which may be required for and in the construction of works detailed in the Specification and as shown on drawings, and shall provide at this own expense for all necessary power, plant, tackle, machinery, tools, apparatus, instruments, scaffolding, ladders, hoists, fencing and other equipment for the workmen and for the erection, testing, demonstration and commissioning of the complete plant in the manner described, together with the carriage thereof to the spot where they are required to be used and their subsequent removal.

03. Site Conditions:

This Contractor is strongly advised to visit the site and ascertain the facilities of access thereto, the supply of labour and materials the district will afford and general convenience of working. He shall be taken to have made himself acquainted with the nature of the works; the site and all existing buildings and all other things insofar as they may have any connection with or effect the works.

Contractors must refer to the Construction Industry Federation standardised approach to commencing construction projects in Ireland which incorporates the COVID-19 public health requirements, and ENSURE that all measures required in order to comply with these guidelines are included for. This document is available at www.cif.ie and a copy of same is included with the tender documentation issued for the works. All the above matters must be taken into account when tendering and no charge for any extra labour or materials will be allowed in consequence of this Contractors failure to do this.

The Contractor must notify the project Architect/Engineer immediately should site conditions alter significantly from those as stated in the tender documents.

04. Covid 19

The contractor shall allow in his tender for working on site in line with the CIFs Standard Operating Procedure (SOP) and, for any additional time and cost incurred to accommodate the implications of C19 restrictions. Please refer to CIF Construction Sector C-19 Pandemic SOP – V.9 October 2021, and/or all subsequent editions.

Ensure all directly and indirectly employed staff have undergone the CIF's COVID-19 safety induction programme and have a digital card and follow the instructions of the main contractors C-19 compliance officer.

05. Tender Drawings

The design drawings issued within the tender package must be read in conjunction with all relevant project specifications. If the contractor has any queries regarding design drawings issued prior to tendering they shall notify this office immediately. It shall be otherwise deemed that the contractor has understood and priced for all works as designed.

06. Tender Returns:

The Mechanical Contractor shall be deemed, before tendering, to have made a thorough examination of the Drawings, Specifications, Conditions of Contract, the Site and other things affecting the proposed works to ascertain precisely the nature and extent of same and the conditions under which the proposed works will have to be executed.

The Tenderer must complete the tender return / pricing pages accompanying this specification document, in full, where each elemental item is to be priced for separately.

07. Payment:

The Contractor must submit Progress Statements for each Claim and Interim Certificate Amounts may be at the Engineer's Discretion.

08. Ascertainment of Prices for Variations:

Any oral instructions, directions or explanations given by the Architect or Engineer upon the Works to Mechanical Contractor shall if involving a variation be confirmed in writing by the Mechanical Contractor to the Architect or Engineer within five working days. The rates in the Priced Bill of Quantities referred to in the clause above applied to the Works shall determine the value of work carried out as a variation when such work is of a character similar to that to which the aforesaid rates apply and is carried out under similar conditions. The aforesaid rates shall also determine the value of any work omitted.

09. Works Programme:

The Mechanical Contractor shall include within his Programme, details of his intended timing and order for the construction of the Mechanical Services Works and the dates by which any significant items of information will be required from the Main Contractor.

10. Guarantees and Warranties

All manufacturers guarantees and warranties on plant, equipment, etc., shall be valid up to the end of the Defects Liability Period.

11. Defects Liability Period:

All manufacturers guarantees and warranties on plant, equipment, etc., shall be valid up to the end of the Defects Liability Period. Refer to the Conditions of Tendering in the Main Contract Document.

12. Samples / Materials And Products:

The Mechanical Contractor shall issue details of all specified equipment and plant for approval prior to placing order. All equipment and plant shall be approved on site by the engineer prior to installation. Such approval shall not relieve the Contractor from responsibility for making good any defects which may arise as a consequence of failure or otherwise of any materials during the contract period.

The entire installation shall be constructed from new materials and equipment and all materials and workmanship shall be the best of their respective kinds in accordance with the specification. All materials and equipment selected or proposed by the Contractor shall be provided by manufacturers who have local maintenance and servicing capacity available within the Republic of Ireland as necessary.

13. CE Marking

All mechanical equipment, systems supplied and installed shall conform to the appropriate EU Directives and shall carry the applicable CE Marking.

14. Builders Work:

The Mechanical Contractor shall be responsible for the correct marking out and providing all builder's works information/drawings to enable the Main Contractor to fulfil his obligations with regard to Builder's Attendances. Where services pass through partitions (walls, ceilings) the Mechanical Contractor shall maintain the fire rating if applicable within the services e.g. Fire dampers in ductwork etc. The Mechanical Contractor shall refer to the Architect to identify all Fire Walls within the building.

The Main Contractor shall be responsible for making good of all builder's work open around services and ensuring that the making good does not damage the services installed

15. Supervision:

The Contractor shall make available throughout the duration of the works a Project Supervisor or Site Foreman with appropriate qualifications and or experience to attend site meetings and receive instructions as are necessary for the execution of the contract, and to carry out superintendence of the works on site. The Project Supervisor /Site Foreman shall keep accurate records and details of all aspects of the works as necessary.

16. Labour:

This Contractor shall ensure that all employees are registered for PAYE / PRSI and that all employees have successfully completed a SafePass course. Only fully qualified and competent tradesmen, together with their necessary labourers, or helpers, shall be employed by the Contractor on the works, which shall be carried out and completed in the best substantial manner.

17. Site Establishment:

It is the responsibility of the Main Contractor to provide adequate temporary water, power and lighting supply for the duration of the Construction period.

18. Protection of Existing Services:

When stripping out the redundant services the Contractor shall ensure that no unnecessary damage is caused to either the equipment and/or the building fabric which is to be retained. This Contractor shall make good, at his own expense any damage caused whatsoever to existing services to the complete satisfaction of and in accordance with the instructions of the Engineer/Statutory Authority concerned, and shall keep the Client indemnified at all times from claims in connection with the damage.

19. Electricity Supply:

The electricity supply within the existing school is a 380/220 Volts, 50 cycles, and all electrical plant and equipment must be suitable for this supply.

20. Wiring Details:

The General rules for wiring of supplies of Electrical Energy, as laid down by the Electro Technical Council of Ireland, National Rules for Electrical Installations, 5th Edition IS 10101:2020, together with the regulation laid down by the E.S.B., shall be strictly adhered to, as shall the requirements of the 18th Edition of the I.E.E. Rules and Regulations.

21. Trade Names

Any reference to Trade names shall be for the purpose of describing the Specification standard of the article or material to be used and it does not imply that the specified trade name solely must be used.

22. Inspection Prior to Concealment

Where work requiring inspection or testing is subsequently to be concealed, due notice shall be given to the Main Contractor/Engineer to accommodate necessary inspection and witnessing of testing where required before concealment. Failure to give due notice, of at least 48 hours, shall necessitate the Contractor uncovering the work and reinstating at their own expense.

The Engineer reserves the right to forego its inspection; however this will in no way relieve the Contractor's responsibility to comply with the specification and drawings. All work that is not installed to the required standard or does not demonstrate adequate co-ordination with the building and other services must be removed and re-installed in full compliance with the tender documentation and relevant standards at the Contractor's cost and without any associated increase in the project program

23. Tests/Commissioning On Completion:

The contractor shall test all installations on completion in accordance with standard test procedures, that is, relevant I.S. / B.S. / E.S. and Codes of Practice.

The Contractor shall notify the Main Contractor in writing when the mechanical services installation or parts thereof are ready for testing and commissioning, allowing sufficient time period for programming the testing, commissioning and handover of the systems. The contractor shall issue a seven day notice period to the Engineer prior to tests being carried out to allow for the Project Engineer to witness, if he so wishes.

The Contractor shall prove that all test results are in accordance with the performance based specification issued, and furnish the project Engineer with the report / certificate issued by the specialist commissioning company. All test / commissioning certificates are to be included in the project O&M manual.

24. Making Good Damage:

The Contractor shall inspect all equipment and materials on arrival on site for defects or any failure to meet the specification and shall replace any defective equipment or materials as necessary. The Contractor shall take all necessary precautions to ensure that there is no damage or defacements caused by their employees or representatives to the furniture, fittings or other equipment within the buildings or to the premises themselves or to adjoining premises, and shall make good at their own expense any damage caused to the premises or its contents during the works, to the entire satisfaction of the Employer's Representative.

25. Instruction:

This Contractor shall liaise with the Main Contractor in providing for instructing the Employer in the operation of the mechanical services installations on completion of the installation works. He shall provide two sets of record drawings, for the installed systems and full operating and maintenance manuals.

26. Drawings:

Copies of drawings of the building are issued with each Specification. Dimensions and other information shown on the drawings forming part of the Contract are believed to be correct, but no responsibility for same is accepted. This Contractor should note that, prior to finally positioning and outlets or fittings, these must be agreed with the Engineer. The Contractor shall be responsible for the setting out of the work and he shall rectify any errors he may make, either in setting out the work or during its progress. The Contractor shall not deviate in the execution of the work from the Specification or Drawings herein referred to, except upon written order signed by the Employers Representative authorising such deviation.

This Contractor shall keep on site a full set of the Construction Drawings, on which he shall record and note the actual layout of all the mechanical services installations as installed, including routes.

This Contractor shall include for the preparation of final marked-up drawings, at practical completion stage.

27. Maintenance:

The works shall be maintained by the Contractor in perfect condition for 12 months after the issue of the Engineers certificate of practical completion and any work or material exhibiting defects during that period shall be made good by the Contractor at his own expense.

28. Tax Clearance Certificate & C.I.F. Pension/Sick Pay Scheme:

It will be a condition for the award of the Contract that the firm being considered must be able to produce, within seven days of being requested to do so, a Tax Clearance Certificate from the Collector General of Taxes, Sarsfield House, Limerick and provide evidence of Membership of the Construction Industry Federation (C.I.F.) Pension/Sick Pay Scheme.

29. Insurances:

The Contractor shall comply with the requirements of Clause 10 of the “Short Public Works Contract” relating to Insurance and Compensation. He shall effect adequate insurance in his own name and also in the name of the Employer to cover all the risks or claims specified in the aforesaid “Short Public Works Contract” and shall hold the Employer indemnified against all such claims and risk in anyway arising out of the works included in the Contract.

The minimum sum for public liability insurance shall be €6,500,000.00 (six million, five hundred thousand euro) for any single claim, including employer’s liability of €13,000,000.00 (thirteen million euro) and including all risks as stated in the attached “Tender and Schedule”.

CONTRACT SAFETY AND HEALTH PROCEDURES:

B1. BASIC LEGAL REQUIREMENTS:

Contractors must comply with the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021 and any other statutory provisions and common law duties. Steps must be taken to ensure the provision of adequate and suitable plant and equipment.

Only those Contractors and Employees having appropriate training and experience should be allowed work, on the premises. The Contractor shall appoint a Project Supervisor as required by the Site Health and Safety Regulations.

B2. SAFETY COMMUNICATION:

The Contractor is required to ensure that all the Employees, Sub-Contractors and all their Employees, whilst on the Company premises are informed of the Health and Safety Rules and Procedures.

B3. PERIOD OF WORK:

The Contractor must notify the Project Co-ordinator in an appropriate way before commencing and on completion of their task. Prior application must be made for any work to be undertaken outside of normal office hours.

If work is to be phased, the method of phasing the work is to be prepared, agreed and distributed to all parties.

B4. VEHICLES:

Vehicles used by Contractors or their Employees are allowed on the Companies premises for delivery, parking or collection subject to local instructions. All drivers are requested to exercise maximum care when on Company premises and particularly when Employees or Members of the Public are entering or leaving.

Drivers of large vehicles operating in confined circumstances must ensure there is a person in attendance to assist with reversing etc.

B5. DELIVERY AND DEPOSIT OF MATERIALS AND GOODS:

No materials, goods or equipment shall be stored in Plant Rooms or placed so as to obstruct general work areas, gangways or fire exit routes.

All rubbish especially dangerous or flammable materials must be removed from the premises daily.

B6. CONTRACTORS WORK AREA:

The Contractor must keep locked, the doors to flat roofs with unprotected edges, plant rooms and electrical apparatus, unless in attendance. Where possible, the Contractor's work should be clearly defined and physically separated from all parts of the premises. The area may be marked by a temporary partition or tape backed up with warning signs.

The segregated area will become the responsibility of the Contractor. Visitors to Contractor's work must be accompanied by Contractors representative. Under no circumstances should portable or temporary methods of heating be introduced to the Contractors Area, without prior written authorisation.

B7. RAISED SURFACES, HOLES AND PROJECTIONS:

Raised surfaces, holes, trailing leads or surface and projecting equipment must not be left at any time without taking the necessary safety precautions. All opening must be securely fenced or covered over and marked with warning notices. Loose materials of whatever kind must not be left about or allowed to obstruct the roadway, gangways or working area.

B8. FIRE EQUIPMENT:

The removal or obstruction of Fire Extinguishing Equipment from its original location is prohibited. A Contractor is responsible for providing and maintaining any specialised fire extinguishers and equipment for the work in progress.

B9. EVACUATION OF BUILDING:

The contractor must read Fire Instructions displayed on the premises and comply in the event of an emergency evacuation. He/she is not to eliminate or diminish exists during alterations.

B10. EXISTING SERVICES:

It is the Contractors responsibility to ascertain the existence and whereabouts of electrical cables, drains, air, gas, and water mains. The Contractor must familiarise himself/herself and how to operate the main and/or local isolation points for services before starting work and in anticipation of an emergency.

B11. PLANT, TOOLS, AND EQUIPMENT:

All plant, tools and equipment brought onto the Company's premises should be of safe design and in a safe condition. Particular attention must be given to checking the electrical and mechanical integrity of any hired equipment. Earth leakage circuit breakers should be fitted on all 220 volt cables. Equipment operating at 110 volts is preferable.

B12. SAFEGUARDING OF MACHINERY:

All machines such as circular saw tables and pipe threaders must be guarded in accordance with statutory requirements.

B13. SAFETY STATEMENT:

Contractors are required to have safety statements available for inspection by the Clients H.S. and W. offices. They are also required to prepare method statements when undertaking tasks requiring special skills or technology.

B14. PORTABLE ACCESS EQUIPMENT:

Where ladders, step-ladders and trestles are necessary, they must be used in a safe manner for work to be done. Ladders should be securely tied at the top or held by a person at the bottom unless they incorporate suitable safety devices. The equipment should be of suitable construction and free from defect. Equipment and materials must be carefully moved and not thrown or dropped from a height.

B15. WARNING OF DANGER:

Care must be taken, at all times to protect the Client's employees and members of the public from danger and to protect property and work in progress from damage.

Any circumstances which give rise to such danger or damage must be reported immediately.

B16. PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING:

All Contractors employees must be issued with, and make full use of, all such protective equipment or clothing, as required by statute or any regulations made thereunder. They must also meet any locally agreed requirements for protecting the employee, e.g., for the use of safety helmets and protective footwear.

B17. ACCIDENTS:

In addition to the statutory obligations for Contractors to report dangerous occurrences and accidents to the appropriate authority, all accidents must be reported to the safety co-ordinator of the Clients.

B18. HOT WORK:

In the event of the Contractor carrying out any of the following works he must carry the appropriate insurance and also comply with all the procedures and safety precautions set out in this insurances:

1. All activities involving flame.
2. Hot air or arch welding and cutting equipment.
3. Braising and soldering equipment and blow lamps.
4. Bitumen boilers and other equipment producing heat or having naked flame

B19. SAFETY, HEALTH, WELFARE & ENVIRONMENTAL ISSUES

This Contractor shall comply fully with all statutory safety, health and welfare regulations regarding work people, including those employed by Sub-Contractors employed on the site and particularly the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021 and provide all relevant details to the Main Contractor to carry out the function of Safety Planning Supervisor for the construction phase of the works.

This Contractor shall comply in all respects with the Factories and Safety in Industry Acts and any other Acts and with any Statutory Instruments or Regulations issued thereunder.

This Contractor is required to provide a safety method statement clearly indicating the proposed sequence of his works and the precautions he will be taking at each stage in the works to protect his employees, and those of the main contractor, other sub-contractors, visitors and the Employers personnel and any plant and equipment, etc. Full details of any chemicals or substances proposed to be used in the project construction process should also be detailed fully and the Employer's prior written approval received for its use.

This Contractor shall include for complying with the Safety, Health and Welfare at Work Acts and Regulations current at the date of tender.

The Main Contractor shall be appointed by the Client under a collateral agreement to the main contract as Project Supervisor for the Construction Stage in respect of the project pursuant to the Safety, Health and Welfare at Work (Construction) Regulations 2013 to 2021. This Contractor shall include all costs for the provision of the necessary services and details to the Main Contractor to perform his duties as Project Supervisor for the Construction Stage pursuant to Regulations 6 and 7 of the Regulations.

This Contractor shall include for providing all necessary information as requested by the Project Supervisor for the Construction Stage to enable the preparation and completion of the Safety File including record drawings, specifications, maintenance and operating manuals and commissioning certificates. The record drawings and Maintenance Manuals shall be as required under previous clauses of this document.

SECTION 2: SPECIFICATION PARTICULARS:

ELEMENT (52): DRAINAGE AND REFUSE DISPOSAL

52.1 Extent and Programme of Works

This section covers the running of soils and wastes from sanitary and other water using fittings from the waste outlets to the main soil vent stacks and to the underground drainage system, which will terminate just above ground floor level. Pipework includes anti-syphons and vent connections and traps to all fittings but not sink units, taps and waste outlets. All underground drainage is to be undertaken by others.

52.2 Soil and Waste Pipework

Soil and waste pipes generally shall be run in PVC pipe complying with BS 4514 with fittings generally in PVC complying with BS 5255. Other plastics such as polypropylene and high density polyethylene may be used for particular fittings and applications. Joints shall be solvent welded on PVC pipe, but special sockets with synthetic O-rings may be used in some cases, particularly with polypropylene. On no account shall solvents be used for jointing on polypropylene. Pipe ends shall be cut square using a fine tooth saw and all swarf shall be removed with glass paper. The cut end of the pipe and the socket into which it shall be inserted shall be cleaned with a patent cleaner recommended by the pipe manufacturer. In the case of PVC pipe an approved solvent welding cement shall then be applied to both cleaned surfaces in accordance with the manufacturing instructions. The pipe shall then be fully inserted into the socket with a slight twisting motion and any excess solvent removed with a clean cloth. The joint should then be held firm in position for at least 20 seconds to allow it to set and should not be handled for about 2 minutes. In certain instances where soils and wastes are exposed on wall surfaces, wastes may be run in light gauge copper, painted or chromium plated as indicated on the drawings.

52.3 Soil and Waste Pipe Connections

The Contractor shall allow for connecting the outlets of all sanitary and other fittings with waste outlets to the soil or waste pipework as appropriate. Traps generally shall be in polypropylene unless otherwise stated, mounted immediately below the fitting and complying with BS 5572. All traps shall be accessible and provided with adequate facilities for cleaning, and where necessary shall be capable of being easily dismantled or removed. Traps from bowl type urinals should be in brass chromium plated, where required.

Traps with outlets for pipes up to and including 50 mm size should have minimum water seal of 75 mm and where over 50 mm outlet the seal should not be less than 50 mm unless otherwise indicated.

Bottle traps shall be used on wash hand basins where the trap is exposed. Where siphonage may occur due to the arrangement of small discharge pipework, re-sealing traps may be used provided the Engineers approval is obtained for each location. Dilution traps shall be provided and fitted on all sinks in the Art Rooms and Kiln Room by the Mechanical Contractor.

52.3 Waste Pipe Supports

Pipe used shall be supported generally as outlined in the Guide published by the Institute of Plumbing. Supports shall be spaced at not more than 12 times the diameter of PVC pipe 32 mm and above whilst vertical pipes should be supported at intervals not greater than 24 times the pipe diameter.

Pipe supports should be by a suitably designed galvanised metal collar or intermediate bracket and suspension for fixing to wall or underside of floor. Collars on vertical pipes should be located so that the support is at the boss branch. Metal pipe clips can be adapted to suit the outside of a vertical pipe by the addition of a barrel clip collar. UPVC pipe clips should be used between anchor points on vertical pipes when it is necessary to accommodate some movement due to thermal expansion.

Polythene pipework run horizontally shall be continuously supported along its length by a light weight galvanised metal channel or a wooden layboard of a suitable size. Where continuous support is not possible pipe clips should be used at 380 mm centres. Pipe clips shall also be used on vertical runs at 1.2 metre centres.

52.4 Blank Caps and Cleaning Doors

Blank caps and cleaning doors shall be provided at all branches and other locations where rodding access is necessary for cleaning or removal of blockages. Generally their position shall be at branches as indicated on the drawings but the Contractor shall review the proposed runs before installation and shall consult with the Engineer before installation commences to see whether any additional cleaning doors are necessary.

52.5 Connections to Main Contractors Drainage

The Contractor shall make off all soil and waste connections to the sockets provided under the main area of works contract, and which generally are to finish flush or close to the floor. Where this is of PVC a joint ring socket should be located at ground level to allow for some differential movement without damaging the vertical stack.

Where connections are to cast iron, a ring seal collar shall be fitted and caulked with lead and gaskin. Where the connection is to a clay drainpipe a 2:1 sand and cement adapter and gaskin shall be used around the ring seal

52.6 Inspection and Testing:

All pipework installations shall be tested in accordance with BS 5572. Inspections and tests should be carried out as the work proceeds to ensure that all work is free from defects, sound and unblocked before building work enclosing it or making it more difficult of access proceeds.

Completed works should be carefully inspected to see that no foreign matter is lodged or has adhered within the pipes, and no jointing material projects therein. It should then be tested for soundness and performance.

The soundness test should be carried out by charging the water seals of all fittings and inserting test plugs or bags in to the open ends of all pipes to be tested, a small quantity of water being admitted to the lowest plug or bag to ensure a good seal. A tee piece should be provided on one opening, fitted with a cock at each end. A manometer should then be connected to one of the cocks so as to measure the air pressure inside.

Alternatively, the manometer can be connected through a suitably modified plug, or through a flexible tube inserted through a water seal, any water in the flexible tube being removed. Air should then be pumped in to the system until a pressure of 38 mm w.g. is achieved, when the cock on the air line should be closed, the pressure should be maintained constant for five minutes.

When the system is complete it should be tested to ensure that all appliances drain speedily, quietly and completely, after which it should be tested for self and induced siphonage in branches, and for induced siphonage and back pressure in discharge stacks, as set out in BS 5572. Fittings should be filled to overflowing, the plug pulled, and the seal checked by dipstick or otherwise after emptying to ensure that at least 25 mm seal remains.

52.7 Disconnection and Removal of Obsolete Waste Systems

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be de-commissioned, disconnected and removed. The contractor's attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (53): HOT & COLD WATER SERVICES

53.1 Extent of Works in This Section

This section covers the extension of the existing water services from the infrastructural mains, as detailed.

The hot and cold water distribution systems, as shown and as detailed, shall be allowed for.

53.2 Pipework

All pipework with the exception of the Mainswater supply service, as specified previously, shall be in light gauge copper complying with Irish Standard IS 238 and BS 2871 with brazed joints. Compression fittings shall not be used except with the expressed approval of the Engineers. Also included is the Borewell system of water supply as shown and as detailed at the back of this specification document.

Copper pipework shall either be certified as complying with the Irish Standard Specification I.S.238 in accordance with the Irish Standard Authority of Ireland on behalf of the Institute of Industrial Research and Standards and shall bear the Irish Standard Mark or shall be certified to an international standard or a national standard of another Member State of the European Community which provides an equivalent guarantee of safety and suitability.

53.3 Pipe Supports

Pipework where run on the surface shall be supported by means of bronze school board type brackets built-in or screwed on according to location. In certain positions single or multiple brackets may be used.

Pipework run in horizontal formation at high level, or in the false ceilings/roof space shall be supported on unistrut sections supported from the underside of the concrete slab or roof steelwork with drop rods. Pipework shall rest on patent individual pipe rollers fixed to the unistrut channel.

53.4 Control Valves and Stop Cocks

Stopcocks of the 'Ballofix' type or similar approved, shall be provided where indicated or required to allow isolation of supply for renewal of washers or other maintenance. Where possible they shall be so arranged as to control fittings or groups of fittings in individual locations, and shall be mounted in such positions as to be screened by the fittings. No stopcocks shall be fitted in an exposed position except with the Engineers approval. Stopcocks shall be fitted to all branches of the external water main.

Cocks shall be gunmetal gland pattern, key operated, and shall be supplied with a suitable key, and hinged C.I. cover which shall be handed over to the main contractor for fitting to a concrete chamber provided by him.

53.5 Pipe Sleeves

In all places where pipes pass through solid walls or floors suitable sleeves shall be provided and fitted at such points. Sleeves shall be in one length and to be fixed flush with the surface of the finished wall or floor.

53.6 Wall And Ceiling Plates

The Contractor shall supply and install wall, floor and ceiling plates on all pipes which are installed through floors, walls or ceilings. These shall be of set screw pattern zinc alloy die castings type with chromium plated finish, all to the approval of the Engineers. They should be heavy quality Halls Thimble type or equal approved.

53.7 Branches And Connections To Fittings

All sanitary fittings complete with taps shall be supplied and placed in position by others.

All branches from the mains to fittings shall be located in the position shown on the drawings and shall generally be run on the surface except where otherwise indicated, or where concealed by wall fittings. They shall be secured by bronze pipe saddles multiple or single according to location, and securely fixed to the wall. Connections to fitting shall be made with a copper to iron adapter, Braided flexible connections shall be provided as required.

53.8 Special Risk Fire Posts:

Special risk fire posts shall be established and equipped in the positions as detailed in the attached schedule. They shall conform to the following and shall comply with I.S.290 : 1986 and I.S.291 : 1986. The foam spray extinguisher (AFFF) shall be 6 litre capacity and the Co2 extinguisher shall be 3 kg, all located internally and wall mounted.

53.9 Insulation:

All hot and cold water services pipework in floor voids, rising ducts in ceiling spaces in wall cavities or anywhere there is a risk of causing condensation shall be insulated with performed rigid insulation sections of density 80 kg/m² fixed with circumferential bands of non-ferrous metal, plastic fabric of approved adhesive sheet.

Finish to insulation on concealed pipework shall be canvass or performed sections, factory applied, and secured on site with adhesive and bands. Finish to insulation on visible pipework shall be pliable plastic performed, taped and sealed with adhesive or wrapped and sewn on, left unpainted. Insulation thickness shall be as follows:

Pipework up to 50 mm bore 32 mm thickness
Pipework 65 mm and over 40 mm thickness

Valves below 20 mm bore need not be insulated. Valves of 20mm bore and above shall have their bodies and flanges insulated with performed muff covers arranged for easy removal, finished with fabric sewn-on or applied with adhesive.

53.10 Testing:

After the installation is complete but before the insulation is applied the pipework and valves shall be hydraulically tested to 7 bar (about 100 psi) and shall remain droptight at that pressure for a period of eight hours. All fittings shall be disconnected during the hydraulic test, and open ends capped. All brazes shall be lightly hammer tested and pulled by hand while under pressure. Should any leakage occur, the Contractor is to make good at his own expense, notwithstanding that previous tests may have been satisfactory.

If necessary the Contractor may be required to test the system in sections and no extra will be allowed on this account unless previously agreed. After a satisfactory test under cold water pressure and once the insulation has been applied, the valves connecting the circulating mains shall be opened up and the system shall be operated to ascertain that circulation is satisfactory. The Contractor shall be held responsible for the efficient working of the system (faulty design excluded) and for defects arising from faulty materials and workmanship.

Outlets shall then be opened one at a time to demonstrate that they can deliver the requisite flow of water, after which about 1/5th of those installed shall be opened simultaneously to demonstrate that the system can meet normal load in a satisfactory manner.

The Contractor shall demonstrate that all thermostatic mixing valves can maintain the range of temperatures on the valve control plate to the engineers satisfaction.

The Engineer is to be duly notified before each test is made.

53.11 Commissioning

The Contractor shall include for instructing the personnel responsible for the operation of the system in the correct operation and maintenance of the entire system. During the commissioning period he shall go over with them the commissioning and servicing manuals and shall ensure that they understand fully and are properly instructed in planned maintenance of all aspects of the plant. A signed statement from the employer stating that such instructions have been given will be required.

53.12 Labelling

All valves etc., shall be carefully labelled to indicate their purpose, size and duty. Labels shall be manufactured from 3 mm thick brass plate chromium plated and having the wording engraved in 6 mm high block lettering. They shall be secured to the apparatus concerned by 3 mm diameter chromium plated screws. All drinking points shall be suitably labelled using engraved labels to directly over same.

53.13 Painting

All exposed metalwork shall be thoroughly wire brushed and painted with two coats of approved rust inhibiting paint. The Contractor shall pay special attention to the pipe supports in the under floor ducts ensuring that they are completely protected against corrosion.

53.14 Chlorination of system (New Works)

The contractor shall include for the chlorination of the domestic services pipework systems, on completion of the systems but prior to the clients taking occupation, in accordance with BS 8558:2011 Standards.

Evidence must be provided that the system is fully treated in accordance with the standards and a signed statement to this effect must be presented to the engineer at practical completion stage of this project.

53.15 Disconnection and Removal of Obsolete Domestic Services

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractor's attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (56): SPACE HEATING

56.1 Extent of Works in This Section:

This section covers works to the existing LPHW system within the areas of the proposed works, as shown and as detailed on the accompanying drawings. The necessary draining down, in part, of the existing system, as required, to include refilling and rebalancing on completion of the works, shall be allowed for.

The necessary valving off of the existing heating system to suit the phasing of the works, as required, shall be allowed for as part of the works.

56.2 Pipework:

All piping shall be in medium quality mild steel complying with B.S.1387, with all joints butt welded to API 1104 standards.

56.3 Pipe Supports:

All pipework for vertical risers or where run on the surface shall be supported by means of school board type brackets built in or screwed on, according to location.

56.4 Provision for Anchoring, Guidance & Expansion of Pipework:

Pipework is to be laid out and fixed so that as much of the thermal expansion as possible can be taken up within the system.

Anchoring of the high level heating mains shall be provided where indicated.

All pipework shall be neatly installed and graded so as to allow for venting and drainage.

All pipework shall rest properly on supports at all times. Particular care shall be taken of the spacing between pipes when setting out to ensure that due consideration has been taken of the insulation thickness to be applied and its effect on the neatness of the finished installation.

56.5 Provision for Air Venting and Drainage:

Provision shall be made for venting of air and for drainage of pipework where required and shown on the drawings.

Devices for air venting shall be provided on all high points in the pipework. Normal provision shall be for an equal tee installed with the branch upwards and an extension piece 150 mm long of the same bore as the pipe being vented but not less than 20 mm and not greater than 50 mm to form air pocket.

The top of the extension piece is to be plugged and fitted with an 8 mm bore needle-sealed key operated air cock. Where access to this air cock is difficult an 8 mm bore extension tube shall be run to an agreeable position to be agreed on with the Engineer.

Where special provision is required, a larger air bottle shall be provided when so indicated on the drawings or requested by the Engineer. Larger air bottles shall be formed of an extension piece 200 mm long.

Automatic air vents (AAV) shall only be used where indicated and shall be fitted to 50 mm high air bottles. They shall have gun metal or brass bodies non ferrous or stainless steel floats and guides, and non-corrodible valves and seats. A lockshield valve shall be provided in the connection to each. Discharge pipework 8 mm bore shall be run from the AAV to discharge at the nearest convenient visible point.

Drainage shall be provided for at low points of the system and where indicated at branches. Drainage cocks shall be 15 mm bore key operated with hose unions.

56.6 Valves:

Isolating and regulating valves shall be provided and fitted in the locations indicated. Gate valves of the non-rising stem type with gunmetal body and screwed ends, with wedge type gate and handwheel of die-cast enamelled metal indicating direction of opening shall be used for isolating. Regulating valves shall have characterised plugs and lockable indicators to show the proportional opening of the valves.

56.7 Pipe Sleeves:

Pipe sleeves of appropriate diameter shall be fitted where pipes are installed through wall and floors. These shall finish flush with the wall surface in all cases.

56.8 Wall and Ceiling Plates:

The Contractor shall supply and install wall, floor and ceiling plates on all pipes which are installed through walls, floors and ceilings. These shall be of the set screw pattern zinc alloy dye castings type with chromium plated finish.

56.9 Radiators;

The Contractor shall include for the radiators of material specification the applicable standards and the performance required as scheduled.

Panel radiators shall be rigidly supported on steel brackets supplied by the radiator manufacturers. These shall be fitted at the back of the radiator and shall be generally concealed from view. Radiators shall have a clear space of 40 mm between the back of the radiator and the wall, and 225 mm between the bottom of the radiator and the finished floor.

In no case is any radiator to stand above the bottom of any window board, and the Contractor is to arrange to check the Schedule of Heaters with the Engineer before ordering to ensure that this is so. All radiators shall be provided with a key operated chromium plated air vent. All keys shall be interchangeable. The Contractor shall also allow in his tender for disconnection and temporary removal of all new radiators for wall finishing and for decoration.

56.10 Radiator Valves:

Control valves shall be fitted on the flow and return connections to all radiators. The valves on the flow shall be of the handwheel pattern with mushroom composition handwheels, while those on the return shall be of the lockshield pattern. Where exposed valves shall be of the easy clean chromium plated finish.

Control valves shall be gunmetal throughout and shall be of angle or straight pattern to suit connections. Valves generally shall be complete with gunmetal unions fitted on the heater side so as to allow disconnection of heaters without emptying down the system.

A number of panels have TRV's fitted of Myson TRV II or equivalent, as shown on accompanying drawings.

56.11 Flushing Out of System:

The Contractor shall include for flushing out/filling of the entire heating pipework and radiator system. The Contractor shall confirm with the engineer what treatment/agent he intends to use.

56.12 Insulation:

All pipework in floor ducts, above ceilings, in rising ducts, void and all the heating pipework not being used as useful heating surface shall be insulated.

The pipework shall be insulated with performed rigid insulation sections of density 80 kg/m² fixed with circumferential bands of non-ferrous metal, plastic fabric or approved adhesive sheet and to the following thickness.

- | | |
|--|--------------|
| • Pipe Sizes up to and including 32 mm | 38 mm thick |
| • Pipe sizes from 38 mm to 51 mm | 50 mm thick |
| • Pipe sizes from 51 mm to 75 mm | 50 mm thick |
| • Pipe sizes over 75 mm | 50 mm thick. |

All bends and tee's etc., on pipes shall be properly insulated with canvas backed rigid fibreglass sections suitably mitred to match the bends etc., and secured in place.

56.13 Tests:

After the installation is complete but before the insulation is applied, the pipework and valves shall be hydraulically tested to 690 kN/m² and shall remain droptight at that pressure for a period of eight hours. Should any leakage occur, the Contractor is to make good, at his own expense, notwithstanding that previous test may have been satisfactory.

After satisfactory test under cold water pressure, and when the insulation has been applied the valves connecting the heating mains shall be opened up and the system shall be operated to ascertain that circulation is satisfactory. The Contractor shall be held responsible for the

efficient working of the system (faulty design excluded) and for defects arising from faulty materials and workmanship.

56.14 Commissioning:

The Contractor shall include for instructing the personnel responsible for the operation of the system in the correct operation and maintenance of the entire system. During this period he shall go over with them the commissioning and service manuals and shall ensure that they understand them fully and are properly instructed in planned maintenance of all aspects of the plant. A signed statement from the Employer stating that such instructions have been given will be required.

56.15 Painting:

The manufacturers priming cost on tanks, radiators and other equipment shall be accepted as being a suitable finish provided it is undamaged and clean.

Any rust marks on any of the equipment or pipework shall be well rubbed down and cleaned and shall be primed and painted. All purpose made brackets or supports shall be primed and painted on all surfaces. The finishing coat where required shall be applied under another contract.

56.16 Labelling:

All valves, etc., shall be carefully labelled to indicate their purpose, size and duty. Labels shall be manufactured from 3 mm thick brass plate chromium plated and having the wording engraved in 6 mm high black lettering.

They shall be secured to the apparatus concerned by 3 mm diameter chromium plated screws.

56.17 Chemical Dosing System (affected circuit)

This includes for the chemical dosing of the heating system installation. A suitable protection treatment against scale and corrosion must be added to the heating system during commissioning activities. The selected inhibitor should be applicable for the proposed system, with the correct concentration achieved. Evidence must be provided that the system is fully protected with the use of such an inhibitor, either by test results, or at least on a company letter headed document, signed by the manager.

56.18 Zone Control Valves

This includes for the supply, installation, testing and commissioning of the new zone valves, as detailed on the accompanying drawings. Zone valves shall be of the “lift & lay” type (satchwell/stafa or equivalent). The detail for fitting same to the system of pipework shall be as detailed.

56.19 Disconnection and Removal of Obsolete Services

The contractor is strongly advised to visit the site to familiarise himself with the full extent of the works to be disconnected and removed. The contractor's attention is drawn to the fact that no allowance will be made due to lack of knowledge of the existing on site conditions and the extent of the works to be disconnected and removed as part of this element of the works.

ELEMENT (57): DUST EXTRACTION / VENTILATION SERVICES

57.1 Extent of Works in This Section

This section shall include ventilation systems to include dust extraction as detailed hereunder.

57.2 Ductwork

The Contractor shall supply and install sheet metal ductwork as shown on the accompanying drawings. The sizes of the ductwork shall be as indicated on the drawings but the Contractor shall satisfy himself that the ducts can be accommodated in the positions shown before proceeding with fabrication. The ductwork shall be constructed of best quality galvanised sheet steel complying with B.S.EN10143 : 1993 and fabricated in accordance with good practice in a neat and workmanlike manner true to size and internally free from sharp edges and obstructions. Ductwork associated with the Kiln shall be of fire rated and high temperature resistant.

All ducting where the width or height dimension is more than 600 mm must be cross broken during construction so that when erected it shall be rigid and free from movement or drumming, and truly airtight under all operating conditions.

The gauge of sheet metal used shall be as follows:

- Up to 300 mm longest side 22 BG
- Over 300 mm and up to 530 mm 20 BG
- Over 530 mm and up to 1500 mm 18 BG

All ductwork shall be jointed in accordance with the following:

- Up to 300 mm longest side-slip joints and self-tapping screws
- Over 300 mm longest side as detailed below.

<u>Longest Side</u>	<u>Gauge</u>	<u>Distance Apart of joints</u>	<u>M/S Angle sections for duct stiffening and at joints</u>
Up to 300 mm	22	2 metre	Slip joints
300 to 500 mm	20	2 metre	25 mm x 25 mm x 12.5 mm
500 to 1000 mm	18	2 metres	31.75 mm x 31.75 mm x 4.75 mm

Joints shall be properly made with jointing compound and tightened up with nuts and bolts. Flat washers to be provided under all nuts, and nuts, bolts and washers shall be rust proofed. Access doors at least 200 mm diameter with suitable airtight sealing gasket shall be provided in the ductwork at each side of all dampers.

57.3 Ductwork Supports

All ductwork shall be supported at 1.5 metres intervals irrespective of size.

The supports shall be as indicated on the drawings and in general shall consist of two 6.35 mm diameter drop rods connected under the duct by means of 19.05 mm x 25.4 channel manufactured from 14 s.w.g. galvanised mild steel with 38.1 mm x 9.525 mm thick soft rubber inserted between the ductwork and bracket and secured to the latter by a suitable adhesive. The insert shall extend over the complete width of the duct.

The drop rods shall be threaded and screwed into suitable fixings "Rawlsets" "Redheads" or similar to approval. The bottom of the suspension rods shall be threaded at least 76 mm to allow for height adjustment and when finally located at level, locknuts shall be fitted.

57.4 Access Doors

Access doors at least 200 mm diameter with suitable airtight sealing gasket shall be provided in the ductwork at each side of all dampers, heater batteries, duct stats and other accessories.

57.5 Turning Vanes

Double thickness galvanised sheet metal turning vanes shall be installed in all right angle bends and at all supply duct branches and at all splitter dampers and should be fitted in such a manner that no vibration shall occur.

57.6 Balancing and Control Dampers

The Contractor shall supply, deliver, erect and adjust balancing and control dampers in the ductwork to the sizes and in the locations indicated on the drawings.

Dampers shall have low profile aerofoil blades and concealed linkage.

57.7 Extract Fans

The Contractor shall supply, deliver and install the extract fans in the positions indicated of material specification, the applicable standards and the performance specified, as scheduled and as shown on the accompanying drawings. The fans shall incorporate back draught shutter.

Fans shall be provided with matching speed controllers an inline duct attenuator sections, as scheduled.

57.8 Ductwork Connections to Canopies Grilles and Diffusers

The Contractor shall ensure that special care is taken to ensure an airtight joint between the ductwork and other components of the extract system. All joints shall be covered with approved sealing bands and soft rubber gaskets shall be used on flange bolts. Approved type flexible jointing material shall be used at flexible joints in ductwork and where ductwork is connected to any item of equipment likely to create vibration.

57.9 Test Points:

Test points for commissioning shall be provided, as required. These shall consist of 25 mm threaded brass parallel nipple braces to the duct and fitted with 25 mm blank cap for air tight seal.

57.10 Air Registers:

This includes for the supply and fixing of all supply and return / exhaust air registers, as shown and as scheduled.

57.11 Supports:

Ductwork systems shall be supported in accordance with DW 142 for low velocity ductwork systems.

57.12 Dust Extraction System

Scope of Work

The Contractor shall supply, install and commission the Woodwork Dust Extract systems as detailed herein and the drawings. The dust extraction systems shall include a central dust extract system comprising the extract fan, weatherproof fan housing, bag filter and weatherproof housing, filter shaker unit and a collection bin in an enclosure and the dust extract ductwork, control dampers, point of use articulated extract arms and controls etc as required for a complete centralised dust extraction system. Local woodwork dust extraction units shall be provided for the sanders and recirculation air filtration units shall be provided with HEPA filters for secondary dust collection.

Centralised Dust Extract System

The central dust extract system shall be as MAE 15E wood waste extraction system as scheduled on the drawings or equal and pre-approved. The Contractor shall appoint a specialist to supply and install the central dust extract filter unit, the extract ductwork system and woodwork equipment connections as detailed and scheduled on the drawings.

The centralised dust extract system shall serve the following equipment

- 1) Table Saw
- 2) Planer Thicknesser
- 3) Band Saws
- 4) Lathes
- 5) Chop Saw

Final connections to equipment shall be in accordance with Department of Education TGD 032 (Refer to equipment schedule) and equipment manufacturer's recommendations.

The Contractor shall allow for all necessary ductwork transformation and flexible connections for the complete system installation. All duct work is to be in accordance with DW 144 and C.I.B.S.E. guidelines.

The Contractor shall include for testing and commissioning of the complete system and demonstration to the client staff.

Local Dust Extraction Units

The woodwork room shall be provided with standalone dust extraction units for sanding machine, preparation areas, all as per the accompanying drawings as Coral Grindex or equal which shall be mounted on castor wheels and shall include an articulated arm with point of use extract hood to serve hand tools and shall have M cell 2 x 12m² filter, spark extinguishing box and shall be sound attenuated to max 74.5 dBA. The contractor shall also supply a mini portable dust extract unit mounted on a castor wheel base as Record Power model DX 4000 or equal.

Air Filtration Units

The Woodwork rooms shall be served by a ceiling hung air filtration units as a secondary means of dust removal. The air filtration units shall be as particularly specified on the drawing or equal and pre approved. The units shall have the following features

- ☐ Disposable Electrostatic Outer Filter attracts more dust particles than standard filters
- ☐ Electrostatic Outer Filter
- ☐ Fully enclosed ball bearing motor with overload protection for long, dependable service
- ☐ Inner Pocket Filter is removable for easy cleaning
- ☐ Remote Control has built-in timer with 2, 4 and 8-hour settings; automatically shuts system off at the end of the time setting
- ☐ Rubber feet prevent marring of surface when placed on workbench
- ☐ Two-Filter System with Air Diffuser disperses outgoing air into a broader pattern

Ductwork

This clause covers the materials of construction to be used in the design, fabrication and erection of medium pressure ductwork for use in HVAC air distribution systems. The ductwork shall be installed and commissioned in accordance with DW144. Dust extract ductwork shall be fabricated from 0.9mm galvanised sheet metal ductwork in accordance with DW144. Ductwork shall be circular with a single longitudinal seam. All bends shall be long radius swept type.

Provide access panels for cleaning purposes in accordance with DW 144 particularly at all changes in direction and low points. Final connections to the woodwork equipment shall be completed in flexible ductwork with quick fit connectors for ease of connection and maintenance and to minimise vibration. Manual isolating dampers shall be installed on all branches to machines at 1.6m above finished floor level located for ease of access and to minimise nuisance / risk of injury. All ductwork shall be rigidly supported from unistrut brackets fixed between two roof purlins with threaded rod hangers in accordance with DW 144 determined by the larger duct dimension.

Sealant Gaskets

All ductwork joints shall incorporate neoprene or silicone sealant gaskets. Certification of sealant used shall be provided. The contractor shall allow for renewal of existing gaskets in ductwork that is to be retained.

Access Openings

All access openings shall be rigidly formed and fitted with airtight covers, so designed as to be simply and speedily removed and re-fixed. Multiple set screws or self-tapping screws are not permitted as a method of fixing. Access doors shall be provided for the purposes given below as indicated on the drawings:

- a) Access for personnel for maintenance operations
- b) Access for routine maintenance lubrication of items
- c) Access for cleaning.
- d) Access for items concealed in ducts (e.g. dampers, fusible links, etc.).
- e) Test holes to permit entry of pitot tubes and other equipment

Measurements

The Mechanical Contractor shall be responsible for taking all measurements as necessary for the fabrication and erection of all ductwork.

Noise and Vibration

All equipment and ductwork shall be such that all noise is eliminated and that no drumming, windage, vibration or other noises are audible.

Back Draft Dampers

The Mechanical Contractor shall supply and install flap type back draft dampers in extract ductwork.

57.13 Inspection, Testing, Certification and Commissioning:

Commissioning of the dust extract / ventilation systems shall be carried out in accordance with the procedures, checks and tolerances given in the BSRIA Application Guides for Air Systems to achieve the standards set out in the CIBSE commissioning codes. Preliminary checks and procedures shall be performed as detailed in the CIBSE commissioning codes. The purpose of these checks are to ensure that the system is statically completed, as defined in section B4 of BSRIA 3-89 commissioning of air systems in building. It should be noted that all ductwork shall be completed before plant is first run using access openings in ductwork.

As part of the inspection, testing and commissioning, a measurement of the ducts input velocity should be taken to check if the equipment installed is achieving the correct amount of air extraction. Instrument and methods of measurement shall be as detailed in BSRIA application guide, 3-89 and CIBSE commissioning guide section A3. A commissioning sheet will be provided for recording the commissioning results in due course.

57.14 Training and Demonstration:

On completion of the installations a certificate shall be completed to confirm that the systems have been demonstrated to the users and that instruction manuals have been issued to the School Principal. Each certificate shall be signed and dated by the School Principal, and the Consulting Engineer. User shall be provided, prior to demonstration when an operating and maintenance manual, which clearly indicates all aspects of operation and equipment and sets out the procedures for routine maintenance. The manuals shall include contact details for suppliers and replacement parts.

57.15 Commissioning

The Contractor shall be responsible for the starting up of the systems and the setting up and balancing of the air quantities passing through all grilles, ducts and fans provided under this section. He shall produce the following data for system review:

- (a) Total air quantity handled by each fan, duct and grille.
- (b) Running and rated fan speeds.
- (c) Fan running current under design load and rated motor current.
- (d) Fan total pressure under design load.
- (e) Static pressure drops across ductwork systems under design load.
- (f) Noise levels in occupied spaces.

Tabulated results shall be provided for each plant item laid out separately in a format to be agreed by the Engineers so as to demonstrate that the systems are operating correctly and in accordance with the design.

The Contractor shall provide all reasonable assistance to the Engineer including the use of all necessary instruments, ladders, etc., to check the test results provided by the Contractor.

57.16 Testing

The Contractor shall include in his tender for testing all the equipment covered in this section. Testing may, if necessary, be carried out in sections and the Contractor shall be allowed no extra on account of this. Tests shall cover the air tightness of the plant, plenums and all ductwork, the correct operation of all motors, dampers, and any other equipment in this section. The tests shall also include the adjustment of the air system and its related plant and shall ensure that the air quantity through each grille is as indicated on the schedule.

All balancing and other dampers shall be tested for free movement and correct operation.

The Contractor shall be held responsible for the efficient working of the system (faulty design excluded) and for defects arising from faulty materials and workmanship.

57.17 Labelling

All plant items supplied under this section shall be provided with labels manufactured from ivoring or similar approved plastic and wording to approval. Labels shall measure approximately 150 mm x 100 mm and be affixed to the plant item by C.P. self lapping screws. This shall also extend to labelling as to how the natural ventilation is addressed in all teaching spaces.

57.18 Painting

All exposed metalwork, etc., shall be thoroughly cleaned and painted with one base coat of rust inhibiting paint and two coats of an approved colour finishing paint.