

MECHANICAL SPECIFICATION

**IWA Finance Building
Clontarf**

Project No: 26.3176

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Stage	Revision	Date	Prepared	Checked	Approved
Tender	0	06 August 2026	SOH	JD	MF

A GENERAL PRELIMINARIES

A.1 STANDARD ENGINEERING SPECIFICATION

The Standard Mechanical and Electrical Building Services Engineering Specification shall be read in conjunction with all or any of the sections included in the Specification Summary Sheet.

The complete Specification of Works to be carried out shall include all forms of tender, forms of contract and contract drawings.

The aforementioned may be separate or combined together in one or more bundle to comprise the Tender Documents which shall be read as a whole, and **all** items shall be included for in the submitted priced Tender with **no** exclusions or qualifications.

A.2 DEFINITIONS

In the Standard Engineering Specification, the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires: -

"The Employer" shall be as defined on or with the Form of Tender.

"The Contract Administrator" shall mean the appointed representative Defined, on or with the Form of Tender. The contract administrator for the mechanical, electrical and lift services shall be the consulting engineer.

"The Contract" shall mean the Form of Contract described on or with the Form of Tender.

"The Works" shall mean the whole of the Works described in the Specification to be executed by the Mechanical, Electrical, and Lift Contractor.

"The Specification" shall mean the complete Specification of Works described above.

"The Main Contractor" shall mean the firm appointed to carry out the whole of the Contract where applicable.

"The Mechanical and Electrical Contractor" shall mean the firm appointed to carry out the whole of the Works described in the complete Specification.

Where the Form of Tender states that the Mechanical and Electrical Works shall be carried out under a Sub-Contract with a Main Contractor then the Mechanical and Electrical Contractor shall be referred to, and act as, a "Sub-Contractor".

A.3 COMMUNICATIONS

The Contractor shall communicate only with the Consulting Engineer.

A.4 VISITS TO SITE

Tenderers shall visit the site by prior arrangement with the Contract Administrator before completing their tenders and will be deemed to have satisfied themselves on the full nature of local conditions as regard accessibility, transport and storage of materials, the supply of, and

conditions affecting labour and to have obtained all necessary information on all matters affecting the execution of the Works.

Claims on the grounds of want of knowledge in such respect, will **not** be admitted.

A.5 INSPECTION OF ARCHITECTURAL/STRUCTURAL DRAWINGS

Where the Works are part of a building project, Architectural/Structural or other Services drawings will be available for inspection during the tender period at the Contract Administrator's offices within normal working hours. Tenderers will be deemed to have inspected these drawing and included for all matters relating to the execution to the Works.

Claims on the grounds of want of knowledge in such respect will **not** be admitted.

A.6 LABOUR & SUPERVISION

The Contractor shall employ experienced and qualified workmen to carry out the Mechanical Works. Such workmen may be assisted by apprentices or labourers, but always during the execution of the Works, their numbers shall not exceed the number of skilled workmen.

The Contract Administrator may at any time request proof of the level of qualification and / or competence of any person involved with the Contract on behalf of the Mechanical, Electrical, or Lift contractor and if not satisfied may request their replacement.

The Contractor shall employ one representative, whose name shall have been previously communicated in writing to the Contract Administrator, to superintend the carrying out of the Works on site. The said representative shall be present on the site at all times during working hours and any orders or instructions which the Contract Administrator may give to the said representative shall be deemed to have been given to the Mechanical, Electrical, or Lift Contractor.

The Contract Administrator shall have the power to request the contractor to remove from the works any person employed by them who in their opinion is incompetent or misconducts themselves or does not comply with the above paragraphs of this clause. Any person or persons so removed shall not be employed again on the works without the permission of the person who requested their removal.

A.7 IDENTIFICATION

The Contractor shall ensure that all his operatives carry an identification card c/w Photograph when requested.

The contractor shall, prior to commencement of any work on the premise, report to the responsible person for that premise and produce his/her identification card for all operatives intending to carry out work.

A.8 WORKING HOURS

Work shall be carried out during the normal working hours of the site. However, it shall not be carried out outside the hours of 8.00 am to 6 pm, on Mondays to Fridays without the written approval of the client.

A.9 OVERTIME

Payment of overtime will not be considered unless written authority is given by the Client, and only then with agreement.

A.10 PROHIBITION OF TRANSFER OF CONTRACT

No part of the contract, or any interest in it shall be Transferred or assigned by the contractor directly or indirectly to any person or persons whomsoever.

A.11 SITE MEETINGS

Periodical meetings will be held at the site as and when required by the design team.

The contractor shall arrange to have an accredited representative present at each of these meetings.

The Contractor shall have previously communicated the name of the contractor's representative in writing to the design team.

A.12 SCHEDULE OF RATES

A Schedule of rates giving details of prices and quantities for each section of the work **will be required** to accompany the submission of tender.

This schedule must show the rates of **each** piece of apparatus, labour rate for erection, rates per unit length (inclusive of labour) for the installation of each size of cable, conduit, trunking etc.

The final grand total shall agree with the tender figure.

A.13 VALUATION OF VARIATIONS

The Specialist Contractor's price is lump sum fixed price, there will be no variations to the Contract Sum, unless additional works are instructed by the Employer's Representative, and these will be carried out in accordance with the appropriate clauses.

Notwithstanding the Conditions of the Contract, no work shall be commenced upon any variation or cost incurred, unless otherwise authorized by the Contract Administrator, before:

- a) The value of the variation has been agreed.
- b) The Contract Administrator's written instruction has been issued.
- c) The Main Contractor's official order has been received.

A.14 PAYMENTS

In the case where the Mechanical and Electrical Services Installer is named Sub-Contractor, payments will be made via the Main Contractor and the appropriate retention and Main Contractors Discount will be deducted.

On the issue of the Certificate of Practical Completion, or the Certificate of Taking Over, retention shall be held as prior agreed.

At the discretion of the Contract Administrator, after twelve months of the Defects Liability Period has elapsed, all retention monies will be released, providing a Certificate of Indemnity is received from the Mechanical and Electrical Services Contractor, indicating that the Employer is indemnified against the cost of remedying any defects, including consequential damage to the building, to fabric and furnishings and the cost of builder's work associated with the remedying of such defects and consequential damage which shall appear in the latter six months of the twelve months Defects Liability Period of the Contract.

B PARTICULAR PRELIMINARIES

B.1 CONTRACT DRAWINGS & SPECIFICATION

The Contract Drawings are intended to show the general arrangements of the various items of the Works as described in the Specification to be supplied and installed under the Contract. They do not necessarily show exact runs or full details of all accessories, fitting etc, required and in some instances are merely diagrammatic.

However, the Specification and Drawings must be understood to cover everything required to make a first class installation and the Contractor should include for all items necessary for the proper execution of the Works in his Tender.

Anything shown on the Drawings which is not included in the Specification, or anything herein and not shown on the Drawings shall be deemed to be required as part of the Contract.

Any anomalies, which arise between Drawings or between Drawings and the Specification, should be reported to the Consulting Engineer before the Tender is submitted. Such discrepancies must be pointed out at the time of tendering and will not be accepted as a basis for extra claims and work during the progress of the installation. All Contract Drawings and the Specification are the property of the Employer.

All tender and contract drawings including specifications shall be issued in PDF format. If paper copies are required from the consultant, a charge for paper copies shall be applied. Payment for such copies shall be made in full at handover of the paper copies. The following charges shall apply:

A1 – Black and White	€2.50 per sheet
A1 – Colour	€4.00 per sheet
A0 – Black and white	€3.50 per sheet
A0 – Colour	€5.00 per sheet

Specification up to 150 pages €5.00 per copy

B.2 WORKING DRAWINGS

Notwithstanding the provision of the Contract Drawings the Contractor shall be responsible for taking his own particulars and providing at his own expense all necessary working and detail drawings as requested by the Consulting Engineer, copies of which must be first submitted for comment before the work is put in hand. Comments on working drawings will not relieve the Contractor of his responsibility to ascertain exact building dimensions and location of other services.

Where the Contractor chooses to prepare the working drawings utilising AutoCAD or equivalent, base building outline discs in .dwg or .dxf format will be provided at cost.

For ducting, pipework and containment installations, the Contractor shall submit for the Consulting Engineer's approval, either in electronic format or, three paper copies of drawings showing the proposed routes, dimensioned to show the exact points of vertical/horizontal runs

and positions. If any of the services are installed prior to comment, or not in accordance with the issued drawings, the Consulting Engineer will be entitled to instruct these to be altered, at the Contractor's cost, to comply with his requirements.

The Contractor will be responsible for taking dimensions from site for all equipment to be specially fabricated and for preparing his own detailed working drawings from these measurements. Such drawings shall be submitted, either in electronic format or, in triplicate for the Contract Administrator's comment before manufacture is commenced.

The Consulting Engineer's comment of working drawings will not relieve the Contractor of his responsibility for errors and incorrect setting out. The Consulting Engineer's comment is to be general and is not intended to serve as a check and does not relieve the Contractor from furnishing the materials and performing the work as required by the Drawings and Specification.

The Contractor shall be responsible for any discrepancies, errors or omissions in the working drawings and other particulars supplied by him, whether such drawings and particulars have been approved, in principle, by the Consulting Engineer or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particulars furnished in writing to the Contractor by the Consulting Engineers.

Following the comments of any working drawing the Contractor shall formally issue two copies of the approved drawing to the Consulting Engineers.

B.3 SETTING OUT

The Contract Drawings are for tendering purposes only and are not to be used for setting out. Except where specific dimensions are given, the Contractor will verify all setting out on site and shall make use of all detail, large scale, furniture, and internal wall elevation drawings held by the Main Contractor.

Notwithstanding the submission, approval and issue of Working Drawings, the exact positions of all services, plant and equipment must be agreed on site with the Consulting Engineer before they are set out. Drawings shall not be scaled for this purpose.

The Contractor shall accurately set out the works and he shall keep them correct in every way according to the Drawings and Specification.

In all instances where services such as gas, hot and cold water, heating, electricity, Telecom. TV, etc. run in conjunction with and/or parallel to any service installation, the setting out of the whole of the services is to be approved before work is commenced on that portion of the installation.

B.4 BUILDERS' WORK

The following work shall be deemed to be Builders' Work, which shall be provided by the Main Contractor: -

- a. Cutting away through walls, floors, and ceilings for passage of all mechanical and electrical services etc. and making good after.
- b. Chasing of walls for conduits, accessory boxes, pipework, and fittings

- c. Auxiliary timber noggins and the like for supporting luminaires and ceiling mounted accessories.
- d. All underground pipe ducts, lighting column pits, trenching etc.
- e. All painting of surface services.
- f. Removal and replacement of other parts of the building fabric as may be necessary.
- g. Items of general and special attendance.
- h. Taking delivery, unloading, taking on store, Hoisting materials, Power for fixing Scaffolding, Protecting completed installation

The Contractor shall inform the Main Contractor of the location and details of any of the above Builders' Work required by marking out on site or, if requested, by drawings.

The Contractor shall be responsible for the accuracy of the Builders' Work information and shall recompense the Main Contractor for any abortive work carried out due to inaccurate information.

The Contractor shall be fully responsible for the levels and squareness of fittings when fitted to chases etc., and to this end will ensure the accuracy of all works carried out in this connection by the Main Contractor.

The Contractor shall permit nothing to be done which may injure the stability of the works and no cutting through floors, walls, etc. will be allowed, other than where required by the Drawings, without the sanction of the architect.

The contractor shall be provided with general attendance, free of charge, general attendance shall include only allowing use of scaffolding, mess rooms, sanitary accommodation providing space only for office accommodation and for storage of plant and materials.

B.5 FIRE PROTECTION

When opes are cut through wall or floors to enable services to pass through, the Main Contractor must make them good with incombustible material. Internal fire barriers in conduit, trunking, ducts, etc. shall be the responsibility of the Mechanical and Electrical Services Installer.

B.6 FIXINGS

The Contractor shall include for all drilling and plugging for the erection of all materials and equipment required by the Specification. This shall include the fixing of metalwork, screws, clips, bolts, brackets, saddles, etc. for the proper support of services and for the suspension or support of services.

In any building partially or fully occupied by the Employer or other person's noise and hindrance whilst carrying out any of the above shall be kept to a minimum.

The architect's and the Main Contractor's approval shall be obtained as to all methods of fixing proposed before the work is commenced and, in particular, the approval shall be obtained, in writing, before welding, drilling, burning, cutting, cartridge injecting or altering structures or foundations in any way.

The Contractor shall rectify at his own expense any damage whatsoever caused by negligence on the part of his workmen to decorations, paintwork, building fabric or structure etc.

B.7 PAINTWORK

The Contractor shall be responsible for protecting all equipment that has been installed from damage, and shall thoroughly clean all equipment before it is handed over. Any damaged paintwork shall be made good in a colour and type of paint to match the original.

Mild steel or iron brackets or other items to be built in are to be painted before building in. In the case of materials or plant which is delivered to the site already primed, the Contractor shall ensure that the primer is suitable for the type of paint to be subsequently applied and shall make good any damage to the primer before further coats are applied.

All items that are to be painted shall have an under-coating and a finishing coat in addition to a primer appropriate to the material being painted, the finishing coat shall be to a colour to be approved by the Consulting Engineer.

All paints, including priming, undercoats and finishing coats shall be of the best quality, and shall be obtained from a reliable, and are to be used in accordance with the Maker's instructions. Painting shall be done in accordance with the best practices in the Trade, all surfaces to be painted, must be thoroughly prepared, including removal of dust, grease, and protective coatings, and in the case of iron and steel, the removal of rust and scale by abrasion, followed by the application of an anti-rust solution to remove pitted rust.

B.8 WORKMANSHIP

Workmanship shall conform to the highest standard of current Mechanical and Electrical installation practice. The Consulting Engineer reserves the right to reject any work, which in his opinion does not meet such a standard. Rejected work shall be rectified immediately or taken down within two days and corrected as soon as is practically possible.

B.9 MATERIALS

Unless otherwise specified all material to be used throughout the installation shall be new and shall be of EU manufacture.

All materials shall be of the best of their particular type and the Contractor may be called upon to submit for approval samples of the various materials intended for use in the execution of the work. All materials are to comply with the appropriate Standards and regulations.

Materials, which are specified, to be supplied by a particular Manufacturer shall **not** be varied without the written approval of the Consulting Engineer.

In these specifications trade names and/or suppliers are sometimes used for the purpose of brevity and clarity of technical, aesthetic, and functional intent. Such references are for the conveniences of the tenderer in clearly indicating the standard of technical, aesthetic, and functional requirements sought by the specifier. The intention is not to favor one product over another or to eliminate other products/suppliers.

Other materials/suppliers may be put forward for consideration as equivalent materials to those stated in the specification.

Approval for substitution of equivalent materials/suppliers will be given where the alternative material/supplier are demonstrable equal in full accord with the original specification.

Equivalence of an offered substitution will be judged on the basis of objective, clear and verifiable independent proof of similar compliance with equal standards to those specified.

Where appropriate verification is provided through a detailed technical dossier, drawings, data sheets and/or a test report from a recognized body, a material/product substitution will be permitted by the architect who is the client representative. Any increased costs arising whatsoever from such a substitution in terms of redesign, rescheduling, health, and safety issues etc. shall be borne by the Contractor.

Alternative suppliers/installers will need to prove their ability to perform their sub-element part of the main contract through the submission of proof of their technical and/or professional capacity (education, experience, equipment etc.).

The contracting authority, through its architect who is the client representative, will determine on a case by case basis, from a technical, aesthetic, and functional perspective, what constitutes an equivalent standard/product. Verification will take place only after the award of contract, as part of the contract management regime. Sufficient time is to be allowed to check submissions and provide samples as indicated in this specification.

When for any reason the Contractor proposes a change from the specified materials for approval, he shall provide samples, free of charge, to the Consulting Engineer for evaluation together with all back up technical and other reference information requested by the Consulting Engineer.

The Contractor shall ensure that all materials, which are installed or stored on site, are properly protected. The Consulting Engineer reserves the right to reject any materials which are damaged or corroded due to poor storage, installation, or lack of protection, or materials which do not comply with the Specification.

Rejected materials, whether installed or stored, shall be removed from site within two days and replaced as soon as is practically possible.

It shall be the Mechanical and Electrical Services Installer's responsibility to ensure that all materials are ordered and delivered to site in sufficient time to enable him to complete his work within the period of contract. No additional claims will be allowed for non-compliance.

B.10 PRODUCTS SPECIFIED BY NAME

It should be noted that, for tender purposes, the reference to any particular item or product within this specification lays down the parameters required for that product. These parameters will include type and standard of aesthetic finish, applied technology/inter-component compatibility, thermal capabilities, technical suitability, and physical dimensions.

Alternative products may be offered if full details are submitted in writing, at the submission of any tender for evaluation and approval by the Consulting Engineer. Any such alterations shall

be detailed in the form of a separate schedule indicating any projected cost savings against any scripted product.

B.11 TESTING AND COMMISSIONING

At an early stage of the Project the Contractor shall compile a programme of testing and commissioning of all services contained in this Specification document.

The Contractor shall further provide a method statement supported by risk assessments detailing the procedures for carrying out the on-site tests.

The opportunity shall be afforded to the Consulting Engineer, or his appointed representative, to witness all or any tests carried out either on site or at manufacturer's works, and to facilitate this, the Contractor shall give not less than **eight days' notice** of tests to the Consulting Engineer.

The Contractor shall provide all necessary facilities and equipment to carry out all tests and inspections either on site or at manufacturer's works.

An 'approved' engineer shall be appointed by the Contractor to supervise the whole of the testing, commissioning, performance testing and instruction of Client's staff together with all specialized personnel (including manufacturer's representatives) and all of their activities shall be coordinated by him.

All equipment, material and systems contained in this Specification document shall be tested and if such inspection/test fails, the process shall be repeated until satisfactory results are obtained.

Comprehensive records of all commissioning and testing shall be maintained and shall contain the following information: -

- a) Project title
- b) Details and date of test
- c) Instruments used, serial numbers, calibration dates
- d) Signatures of those witnessing test
- e) Mechanical and Electrical Services Installer's name
- f) Specific location of the item(s) in the Works

All such documentation shall be included in the O & M manuals.

Fuel for testing shall be provided by the Mechanical and Electrical Services Installer.

B.12 COMPLETION DETAILS

At the completion and final hand over of the project, the Contractor is required to have carried out the following: -

- a. Fully completed all works detailed in the Specification and shown on the Contract Drawings.
- b. Fully completed all works relating to Variations to the Contract, for which Architect's Instructions have been issued, thus forming part of the Contract.

- c. Submitted to the Consulting Engineer, all duly completed inspection and Completion Certificates.
- d. Submitted to the Consulting Engineer, Record Drawings.
- e. Submitted to the Consulting Engineer, a Maintenance Manual and Job Profile.

All of the above shall be produced in such a format as to allow for ease of inclusion into the Building Log Book.

B.13 INSTRUCTION PERIOD

After an installation has been completed, tested, and handed over to the Employer, and when instructed, the Contractor shall supervise and be completely responsible for the running of the plant detailed in this Specification, for a period during which he shall demonstrate to the persons appointed by the Employer to be in charge, the running conditions, operation of the plant, correct setting and maintenance controls etc. to attain the desired results.

The Contractor should ensure that the person(s) is familiar with the positions of equipment and facilities for the isolation of the installation, particularly under emergency conditions. The instructional period may not take place immediately on completion, but when considered desirable by the Consulting Engineer.

B.14 OPERATION & MAINTENANCE MANUALS

Prior to the issue of the Practical Completion Certificate for Works, comprehensive Operation & Maintenance Manuals finalized in detail and approved shall be provided. It is advised that great importance will be placed upon the quality, accuracy, clarity, and completeness of the Operation & Maintenance Manuals and upon their being made available promptly.

A complete draft copy of the manual must be submitted not less than **2 weeks before** the date of Practical Completion. Any amendments necessary in the light of any comments shall be made and the manual re-submitted for the Consulting Engineer's approval.

Only after the Consulting Engineer's approval are the final copies of the manual to be produced.

The finalised copies are to be provided to the Consulting Engineer not less than **2 weeks before** the date of Practical Completion

Failure to issue these in time will result in withholding the Practical Completion Certificate.

From time to time, as required throughout the execution of the Works, evidence of adequate and accurate records, to enable the ultimate completeness and accuracy of the Operation & Maintenance Manuals, shall be progressively examined as the work on site proceeds.

All Operation & Maintenance Manuals shall be provided in triplicate together with CD-ROM containing all documentation, following the issue of one set for approval.

The Operation & Maintenance Manuals shall be adequate for the following purposes: -

- a. To record clearly the layout of the various sections of the Works as actually installed, and to identify and locate all component parts thereof especially isolation points, distribution boards etc.
- b. To make it possible to comprehend the extent and purposes of the Works and the method of operation thereof.
- c. To set out clearly the extent to which maintenance and servicing is required and how, in detail, it should be executed.
- d. To provide sufficient and readily accessible information properly to facilitate the ordering of spares and replacements.

The Operation & Maintenance Manuals shall be correlated so that the terminology and the numerical and/or other references used therein are consistent with and similar to those used in the physical identification of component parts of the Works.

Operating and Maintenance Instructions shall be provided and shall comprise the following as applicable (all contained in volumes strongly bound in flexible covers and suitable for heavy usage over a long period), written to be read in conjunction with the Record Drawings:

- a. A general description of the scope, purpose, and manner of working of each system or apparatus forming part of the Works.
- b. A detailed description of the scope, purpose, and manner of working of each system of automatic controls and/or monitoring instruments.
- c. A detailed description of the scope, purpose and manner of working of each system of special services.
- d. Data on general design parameters and normal operating conditions (e.g., voltage, current etc.) based on commissioning tests.
- e. Clear and comprehensive instructions for the switching on, starting up, running, and closing down of each such system or apparatus.
- f. Clear and comprehensive instructions for dealing with emergency conditions for each system or apparatus.
- g. Instructions in respect of any precautionary measures from time to time necessary (e.g., against corrosion or freezing).
- h. Instructions in respect of the care of apparatus when subject to seasonal disuse.
- i. Instructions as to the nature, extent, and frequency of servicing necessary to properly maintain the Works in good condition and as to the materials to be used for the purpose. This information may be supported in detail, but not replaced by, maintenance instructions provided by the suppliers of particular component apparatus.
- j. The names and addresses of suppliers of all major components of the Works as may be required to obtain spare parts or replacements.

Copies of manufacturers' data shall be supplied with respect to the nature, type and method of operation of individual pieces of equipment, together with their detailed maintenance instructions. Such data, in the form of individual booklets and the like, shall be indexed and cross referenced to the Operating and Maintenance Instructions and presented suitably protected in box files or folders.

An asset list of all equipment and services together with all associated technical information pertinent to such services and information shall be included.

A copy of all Test Certificates, Inspection and Test Records, Commissioning and Performance Test Records for the installations and equipment, etc., used in the installations.

B.15 RECORD DRAWINGS

Prior to the issue of the Practical Completion Certificate for the Works, comprehensive Record Drawings finalized in detail and approved shall be provided. It is advised that great importance will be placed upon the equality, accuracy, clarity and completeness of the Record Drawings and upon their being made available promptly.

Draft copies of the drawings must be submitted not less than **2 weeks** before the date of Practical Completion. Any amendments necessary in the light of any comments shall be made and the drawings re-submitted for the Consulting Engineer approval.

Only after the Consulting Engineer approval are the final copies of the drawings to be produced.

The finalised drawings are to be provided to the Consulting Engineer not less than **2 weeks** before the date of Practical Completion

Failure to issue these in time will result in withholding the Practical Completion Certificate, or alternatively the Consulting Engineer may produce them, and the **actual** production cost will be contra-charged to the Mechanical and Electrical Services Installer.

From time to time, as required throughout the execution of the Works, evidence that adequate and accurate records such as will ensure the ultimate completeness and accuracy of the Record Drawings shall themselves be progressively examined as the work on site proceeds.

All Record Drawings shall be provided in triplicate, following the issue of one set for approval. In the case of drawings and diagrams prepared by the installers, they shall be produced on AutoCAD v 2008, with 3 no CD-ROMs and 3 no sets of prints provided.

Drawings prepared by suppliers of component items shall be in the same form as above, except where they are incorporated in Instruction Manuals when paper is acceptable. The Record Drawings shall include the information listed in the following paragraphs, as applicable. All such drawings shall clearly be endorsed **RECORD DRAWING** near to the title block and shall be drawn to a scale of not less than one hundredth full size, which shall show the following as installed: -

- a. The location, including level if buried, of Public Service connections provided, together with the points of origin and termination, size and materials of cables, ducts, pipes and/or other relevant information.

- b. Location, identity, size and details of all apparatus and control equipment served by, or associated with, each of the various services. The information with respect to size and details may be presented in schedule form subject to the prior agreement of the Contract Administrator.
- c. The location and identity of each room or space housing plant, machinery or apparatus.
- d. Main and sub-main cables, showing original, route, termination, size and type of each cable.
- e. Distribution diagram, or diagrams, which shall show size, type and length (to within one yard for imperial measure or one meter for metric measure) of each service.
- f. Control wiring diagrams, which shall show all equipment supplies as part of the Works.
- g. Manufacturer's drawings and internal wiring diagrams which shall show all special equipment supplied as part of the Works.

B.16 DEFECTS LIABILITY, MAINTENANCE & SERVICING

Notwithstanding the conditions of the Contract the Contractor shall be responsible for any defects which may occur, for a period of 12 months from Practical Completion, in the entire installation detailed in the Specification with the exception of GLS Tungsten lamps for which the Employer will take responsibility.

Following notification of a defect the Contractor shall rectify the item within 24 hours except as may be agreed otherwise with Consulting Engineer.

The Client will carry out routine maintenance to the installation in accordance with the documentation issued by for all building engineering services thus ensuring that such installation is maintained and serviced correctly thus meeting all statutory requirements.

B.17 EMERGENCY CALL OUT

For the duration of the contract and for the defects period an Emergency Call out Service must be available 24 hours per day at all times including week-ends and bank holidays.

The Call Out is to be covered as soon as possible and the operative attending site must be on site within 2 hours of receiving the Emergency Call Out notice.

If the Contractor is unable to respond to the call out within the time specified, attendance by others operating on a representative basis for the Contractor will be acceptable but the standard and performance of the representative is entirely the responsibility of the contractor

In the event of failure by the Contractor to respond to the call out within the time stipulated, the Client reserves the right to employ and pay others to carry out the work involved, and the costs incurred will be deducted by the Client from any monies due to the Contractor under this contract or will be recoverable from the Contractor by the Client as a debt.

This latter action will in no way invalidate the guarantee inherent in the defects liability period implicit in the terms of the contract.

The cost to the Contractor of putting the equipment and associated Systems into working order will be at the contractor's expense and at no cost to the Client unless the work involved, or the fault attended to is deemed by the Client to be outside the terms of the contract.

To facilitate the call out procedure the Installer **upon** placing of an order with him for the contract works will be required to give a Call Out telephone number or numbers where 24 hour contact will be available, and the Client will give corresponding 24 hour Call Out contact numbers for the relay of information.

Included in this Emergency Call out Procedure is the attendance to any operational fault or breakdown to any temporary plant that may be installed as part of the contract.

B.18 COMPLIANCE WITH REGULATIONS

The whole of the installation carried out under this contract must comply with the following regulations and requirements, together with the latest revisions and amendments or substitutes, which apply at the time of installation.

- Building Regulations.
- Local Authority Bye-Laws, Regulations and Notices.
- The local Fire Authorities requirements.
- The relevant C.I.B.S.E. requirements.
- British, Irish and EU Standards, whether applicable in part or whole.
- Relevant British Standard Codes of Practice. BS 7671: 2008, Requirements for Mechanical, Electrical and Lift Installations
- ETCI: National Rules for Electrical Installations: IS10101
- ISEN62305: 2006 Code of Protection against lightning
- BS 848 Method of testing performance.
- Fire tests on building materials and structures
- BS 5274 Requirements for fire hose reels in fixed installations.
- BS 5432 Specification for portable metal bodies fire extinguishers.
- I.C.P 3 & 4 Codes of Practice for piped natural gas installations in buildings.
- DW 144.2 Codes of Practice for low pressure ventilation ducting and fittings
- DW 172 Codes for Kitchen Ventilation Systems
- BS 5750 Specification for design, manufacture, installation, final inspection
- BS 848 Method of testing performance.
- CIBSE CC A Air Distribution Systems - CIBSE Commissioning Code A. 199
- CIBSE CC B Boilers - CIBSE Commissioning Code B. 2
- CIBSE CC C Automatic Controls - CIBSE Commissioning Code C.
- CIBSE CC M Commissioning Management - CIBSE Commissioning Code M.
- CIBSE CC R Refrigeration Systems - CIBSE Commissioning Code R.
- CIBSE CC W Water Distribution Systems - CIBSE Commissioning Code W
- TM 13 CIBSE TM13 Minimizing The Risk of Legionnaires' Disease.
- CIBSE C CIBSE Guide C - Reference Data 2007
- Non domestic Gas Installations: I.S.820:2000
- Domestic Gas Installations: I.S.813:2000
- F-Gas Regulations

C GENERAL CONDITIONS OF CONTRACT

C.1 EXTENT OF WORK

Scope of Works

The works involve the refurbishment of the existing heating facilities at the Irish Wheelchair Association Finance Office in Clontarf with a more energy efficient and modern system. Existing heating services in the building to be stripped out and removed from site.

The contractor is required to visit the existing site during the tender period to determine the full extent of services already installed.

C.2 FREEDOM OF INFORMATION

Information in relation to this tender may be made available on demand in accordance with Freedom of Information Act 2003. You are asked to consider if any of the information supplied by you in the tender should not be disclosed because of its sensitivity. If this is the case, you should, when providing the information, identify same and specify the reasons for its sensitivity. The Client will consult with you about sensitive information before making a decision on any Freedom of Information request received.

If you consider none of the information supplied by you as sensitive, please make a statement to that effect. Such information may be released in response to a "Freedom of Information Request.

C.3 DEFINITIONS

In reading this Specification, or any other tender documentation including drawings, the following terms shall have the accompanying meanings assigned to them:

Throughout this document the term "Client" shall be deemed to refer to:

Name: Irish Wheelchair Association

Address: Áras Cúchulainn, Blackheath Drive, Clontarf, Dublin 3, D03 AW62

Throughout this document the term "Engineer" shall be deemed to refer to:

Name: Moloney Fox Consulting,

Consultant Address: 46 O'Connell Street, Limerick

C.4 CONTRACT TYPE - RIAI

RIAI Form of Contract

The Form of Contract shall be the Agreement and Conditions of Contract 2002 edition issued by

R.I.A.I. (Yellow Form) for use where Quantities form part of the Contract as published by the Royal Institute of the Architects of Ireland with the Agreement of the Department of Finance.

Submission of a tender shall be taken as acceptance of the proposed contract form.

C.5 AWARD OF CONTRACT

Contractors will not be remunerated for any trouble or expenses they may incur in making up their tenders. It is the responsibility of prospective tenderers to obtain for themselves, at their own expense, any additional information necessary for the preparation of their tender.

The award of contract will be made at the discretion of the client and will be made to the contractor whose tender has determined to be the most economically advantageous tender and who meets the required standards capability and financial responsibility.

C.6 BILL OF QUANTITIES

The completed Bill of quantities shall be furnished by the successful tenderer within 7 days. The bill shall list separately the material costs and labour costs.

C.7 CHANGE ORDERS / CHANGE OF REQUESTS

No addition will be made to the Contract Sum if the tenderer has failed to ascertain, before tendering, all the requirements for carrying out the works, which inspection of the Site or of the Specification and Tender Drawings would have disclosed.

No change will be made to the Contract sum unless the variation is authorized by an instruction from the Client's Representative.

Within 14 days of the date of issue by the Client's Representative of any instructions varying the content of the Contract works, submit such pricing information to the Consultant M & E Engineer as he requires. Variations shall be valued in accordance with the Valuation Rules of the Contract, excepting that, where work is omitted, it shall be fully measured, and the quantities priced at the unit rates included in the Schedule of Rates or Tender Summary, as appropriate.

The Contractor's price is lump sum fixed price, there will be no variations to the Contract Sum, unless additional works are instructed by the Employer's Representative

C.8 VALUATIONS FOR INTERIM CERTIFICATES

At the time of every valuation of the works for interim certificates, submit to the Consultant Engineer a statement showing:

- a. The gross amount (including retention) claimed in the current application.
- b. A detailed breakdown of the amounts allocated to each section of the contract Works as detailed in the Tender Summary, and the relevant amount claimed for each section.
- c. The amount certified to date by the Clients Representative. Statements shall not include any equipment or material stored off site.

- d. Amounts in terms of valuations shall not be included unless these statements are issued by the Contractor.

C.9 LOCAL LABOUR

The contractor shall insofar as practicable and without affecting the efficiency of the work employ locally as deemed necessary.

C.10 PHASING OF WORKS

The contractors shall co-ordinate their programme of works in line with the main contractor's programme. The sub-contractors shall produce a sub contractor's programme in line with the main contractor's programme.

D STANDARDS, REGULATIONS & DIRECTIVES

D.1 STANDARDS

The whole of the installation carried out under this contract must comply with the following regulations and requirements, together with the latest revisions and amendments or substitutes, which apply at the time of installation.

General:

- Current Building Regulations, Ireland (Dept. of Housing, Local Govt & Heritage)
- Local Authority Bye-Laws, Regulations and Notices.
- The local Fire Authorities requirements.
- All relevant C.I.B.S.E. requirements including CIBSE Guides, Application Manuals, Commissioning Codes, and Technical Memoranda
- Irish, EU, & British Standards, whether applicable in part or whole.
- NSAI National Rules for Electrical Installations, IS10101.
- Construction Products Regulation (CE Marking)

Water Services:

- Irish Water Code of Practice for Water Infrastructure
- IS EN 806-1 Water for Human Consumption
- BS 8558 Domestic Water Services in Buildings
- WRAS Water Regulations Approval Scheme
- HSPC National Guidelines for the Control of Legionellosis in Ireland
- CIBSE TM13 Minimizing The Risk of Legionnaires' Disease.
- CIBSE Commissioning Code W: Water Distribution

Ventilation & A/C (Refrigeration):

- BESA DW144 Sheet Metal Ductwork
- BESA DW143 Ductwork Testing
- BESA DW145 Installation for Fire and Smoke Dampers
- BESA DW172 Kitchen Ventilation Systems
- BESA RAC80 DX Airconditioning & Heat Pump Equipment
- BS9999 2017-Fire Safety in the design management and use of buildings COP
- BS5588-9 Code of Practice for ventilation & A/C Ductwork
- IS EN 15650-2010 Ventilation for Buildings - Fire Dampers
- IS EN 15423:2008 Fire precautions for air distribution systems in buildings
- F-Gas Regulations
- CIBSE Commissioning Code A: Air Distribution Systems
- CIBSE Commissioning Code R: Refrigerating Systems

Gas/Oil

- Non domestic Gas Installations: I.S.820:2019
- Domestic Gas Installations: I.S.813:2014 + A1 2017
- Registered Gas Installers of Ireland (RGI) Technical Guidance Document
- Institute of Gas Engineers & Managers (IGEM) UP Series Guidance

Protective Services

- IS EN 671: Fixed Fire-Fighting Systems (Hose Reels)
- IS 291: Selection, Commissioning, Installation of Portable Fire extinguishers
- IS EN 12845: Fixed firefighting systems. Automatic sprinkler systems.

Heating Systems & Controls

- I.S. EN 15450 – Design of Heat Pump Heating Systems
- BS 6880-1:1988 Code of practice for LTHW heating systems >45kW
- IS EN 12098 Control equipment for hot water heating systems
- IS EN 442-1 2014-Radiators and convectors
- CIBSE Commissioning Code B: Boilers
- CIBSE Commissioning Code C: Automatic Controls
-

D.2 HEALTH & SAFETY

The Contractor shall take account of the general principles of prevention as stated below:

- Safety Health and Welfare at Work (Construction) Regulations, 2013
- Health and Safety Authority: "Guidelines to the Safety Health and Welfare at Work (Construction) Regulations, 2005".
- Architects Council of Europe: "Memorandum on Council Directive 92/57/EEC", January 1994.
- Construction Industry Research and Information Association: "Control of Risk: A Guide to the Systematic Management of Risk from Construction", Report FR/CP/32, 1995.

D.3 WORK SAFETY PROTOCOL (COVID 19)

The project will be subject to the requirements of the Work Safely Protocol (the "Protocol"), published jointly by the Department of Business, Enterprise and Innovation and the Department of Health in consultation with the Labour Employer Economic Forum on 9th May 2020

The contractor shall include in their tender for the following in their tender:

- Augmenting site infrastructure and welfare facilities such as toilets, canteen, isolation spaces, and access, egress, and circulation routes to meet the standards set out in the Protocol.
- Cleaning to the standard required in the Protocol.
- Covid-19 supervisor role(s) as necessary to meet the requirements of the Protocol.
- Covid-19 Personal Protective Equipment (PPE) to meet the requirements of the Protocol.
- Social distancing to meet the requirements of the Protocol.

The contractor shall include realistic prices in their tender against these items. The contract sum will be deemed to include for the implementation of all measures - including hygiene, access management, materials procurement and delivery, work sequencing and work practices - required to construct the work safely and to minimise the risk of disease contagion for the Contractor's Personnel, the Employer's Representative, Employer's Personnel and third parties visiting the site.

Should there be a reason to impose greater restrictions on movement to combat any significant increases in the spread of the virus to the extent that construction activities cease in the manner imposed between 28 March 2020 and 18 May 2020, the contractor is entitled to an extension of time in accordance with the form of tender and schedule, part 1K (PW-CF1 to PW-CF5, or sub-clause 2.7 of CW-PF6), but no financial recompense.



Where the project involves an extension and/or alterations to an existing building, additional precautions will be required in relation to Covid-19 to ensure the safety of occupants of the existing building. Such precautions would involve, at a minimum, maintaining social distancing between Contractor's personnel and other personnel, wearing of appropriate PPE and sanitizing any work areas in the existing building on a daily basis.

E MECHANICAL TENDER SPECIFICATION

E.1 HOT & COLD WATER SERVICES INSTALLATION

E.1.1 GENERAL DESCRIPTION

- Isolation, draining, disconnection and strip out of the existing water services as indicated on the drawings.
- Supply and installation of new internal MWS, CWS, HWS pipework and fittings as indicated on the drawings
- Final water services connections to all sanitary ware including fitting all ware and ware fittings and accessories complete
- Supply and installation of new CWS storage tank as indicated on the drawings
- Supply and installation of new elec undersink water heaters as indicated on the drawings
- Testing and commissioning of the new Water Services installation complete

E.1.2 WATER SUPPLY (WATER FITTINGS) REGULATIONS

The Mechanical Services Installer is to give the Local Water Authority reasonable access to inspect the installations as it proceeds to ensure that current Water Supply regulations are complied with.

The whole of the work shall be carried out in accordance with the Water Supply Authority requirements and the installer shall include the cost of the testing, stamping or other charges which the Water Authority may request.

E.1.3 MAINS & COLD WATER

All new Mains water and hot and cold water services pipework internally shall be copper. Contractor is to connect to the existing pipework as indicated.

E.1.4 COLD WATER STORAGE TANKS

The Mechanical Services Installer shall supply, deliver, and install cold water storage tanks of the type and capacity indicated on the drawing(s) and/or Part F of the Specification Document, with secure cover.

The tanks shall be constructed in accordance with the appropriate Irish, European & British Standard Specification and Local Water Authority Requirements.

All connections to the tanks shall be made by means of screwed bosses or flanges welded on. Each tank provided shall comply with BS 4213:1991 and BS EN 13280:2001 and shall be fitted with a drain cock and ball valve suitable for the available water pressure, together with an overflow discharging outside the building. The overflow discharge shall be fitted with a wire guard or hinge flap to prevent the entry of birds, insects, vermin, etc.

The Mechanical Services Installer's attention is drawn to the Water Authority's requirements regarding the relative levels of the overflow and ball valve in order to avoid contamination of the mains water supply.

Unless otherwise stated, all tank supports, and bearers will be supplied and fixed by the Main Contractor.

E.1.5 THERMOSTATIC MIXING VALVES & ASSOCIATED EQUIPMENT

The Mechanical Services Installer shall supply, deliver, and install thermostatic mixing valves and associated equipment in accordance with Part F of the Specification Document and design drawing(s).

Mixed water outlet temperatures from thermostatic mixing valves shall be set by the installer in accordance with the following table: -

Fitting	Location	Draw-off Temperature
Basin (Standard)	Staff W.C.'s	42°C
Sinks	Kitchen & staff area	60°C

The valves shall have chromium plated finish and be complete with non-return valves and strainers on the hot and cold inlet connections when required.

Mixing valves shall have lockable temperature controls and shall be provided with loose keys, which shall be handed to the Contract Administrator upon contract completion.

The mixing valves and associated equipment shall be securely fixed to the fabric of the building and care must be taken to fix them in such a manner that they do not constitute a danger to the occupants.

Mixing valves must be type TMV 3 conforming to Building Regulations Part M unaffected by fluctuations in water pressure and shall 'fail safe' if the cold water supply fails.

E.1.6 THERMOSTATIC TAPS

The Contractor shall supply and install thermostatic taps as indicated on the drawings. They shall be chrome finish unless indicated otherwise on the drawings.

Thermostatic taps shall be factory set to a maximum temperature of 42°C. The taps shall be suitable for either high or low pressure (between 0.1 to 5 bar).

Controls shall be by means of a combined flow and temperature handle. Supply and install flow limiters for use in cases of high or unequal pressures.

The taps shall be fitted with dirt strainers and non-return valves

E.1.7 COPPER PIPE & FITTINGS

All copper pipes and fittings shall be in accordance with BS EN 1057:2006 + A1 2010, BS EN 12449:1999; and B S EN 12451:1999. Fittings for copper pipes shall be in accordance with BS EN 1254-1- 5:1998 and all amendments.

When used for external underground mains, copper tube shall be fitted in straight lengths only not exceeding 6 metres and care taken that the ends are not distorted prior to fittings being attached.

All copper pipes in the boiler house shall be flanged on sizes 65mm and greater and including smaller sizes where indicated on the drawing.

Copper pipes above ground shall be to BS EN 1057:2006 + A1 2010 type R250 (Half Hard) with a Tensile Strength of 250MPa

Soft Copper pipes below ground (where indicated) shall be to BS EN 1057:2006 type R200 (Annealed) and be supplied as PVC covered coils

Generally above ground levels where pipes are visible in rooms and appearance is of utmost importance, the fittings to be used on light gauge copper tubing shall be Yorkshire capillary type copper fittings and shall be of a single manufacture throughout the installation.

Fittings shall be made up using the correct Tin / Silver solder and flux with both tube and fitting clean both before and after soldering.

Fittings shall be in accordance with BS EN 1254-1: 1998; BS EN 1254-2: 1998, AMD 5097, 1986, AMD 5651, 1987, AMD 7067, 1992 and installed as detailed above in the General Clause. 'End feed' copper fittings installed in strict accordance with the manufacturer's recommendations are also acceptable. All fittings to be Local Water Authority approved and carry the appropriate Kite mark.

Cold water mains and tank where fitted in ducts, trenches voids or ceiling voids in proximity to heating or domestic hot water services, must be insulated to clauses relating to insulation in order to obviate condensation.

All cold water pipework must be insulated as indicated in this tender Specification Document and thoroughly protected against possible frost damage.

All external mains to be laid to minimum depth of 750mm and maximum 1,350mm on graded bed with graded backfill of inert material.

E.1.8 MULTILAYER PEX/ALU/PEX PIPE & FITTINGS

Multilayer PEX/ALU/PEX pipe shall be of Polytherm "Presstite" manufacture, multilayer cross-linked polyethylene/aluminium barrier pipe unless stated otherwise or equal and prior approved.

The pipework and fittings manufacturer shall be ISO 9001 certified. Multilayer piping systems shall be in accordance with ISO 21003 2008, Parts 1,2,3,5 and 7.

The pipe shall have the following layers (inside to out): PE-Xc, Adhesive, Aluminium, Adhesive, PE-X external coating. The internal aluminum band shall be butt welded, not overlapped, and provide a 100% oxygen tight barrier.

The pipework and jointing system shall be WRAS approved, and suitable for potable water, heating, and sanitary installations.

Fittings shall be from the same manufacturer as the pipework itself. Fittings shall be dezincified brass bodied with a stainless steel sleeve and shall be compressed onto the pipe using an electric powered press-fit tool approved by the pipe & fittings manufacturer. Fittings shall have a viewing window to facilitate control of pipe depth. All materials in contact with water shall comply with DVGW W 534 and DVGW W 270.

Internal pipe surface roughness shall be no greater than 1.5 micrometres. Maximum operating temperature of the pipework & fittings shall be 95°C, and maximum operating pressure 10 bar.

Install pipework and fittings in accordance with manufacturer's instructions to allow for linear expansion. Pipes must not be installed directly in plastered walls but must be fitted with a sleeve.

Maximum distances between pipe fixings/supports for multilayer pipes shall be as per the manufacturer's recommendations, but in any event no greater than 1m for pipes up to 32mm diameter. Pipes should be fixed within 300mm either side of a 90° bend.

Install expansion loops at intervals where recommended by the manufacturers instructions.

When making connections between pipes or fittings, ensure the following:

- Pipe ends are cut square
- Pipe ends are deburred using a deburring tool and bevelled

- Ensure the fitting is clean and push in pipe into the end
- Close the press-fit jaw and activate the gun in accordance with manufacturer's instructions

Ensure that all personnel making press-fit connections are adequately trained. Ensure that press-fit tools are calibrated as per manufacturers recommendations.

E.1.9 THERMAL BALANCING VALVES

Where indicated on the drawings, thermal balancing valves shall comply with the following:
The valve shall be capable of carrying out the following functions: -

Hydronic balancing of the DHW secondary circulation:

The valve shall be supplied with a regulation device with visible markings.

Automatic thermal regulation & balancing of the DHW secondary circulation

The valve shall be set to control the temperature of the DHW secondary return water at 57 degrees. The function of the valve will automatically increase or decrease the flow in proportion with the water temperature being sensed by the thermostat contained within the valve. The valve will always maintain a minimum nominal flow rate to ensure that no "dead legs" are present in the installation. A lockshield cap with sealing wire shall be fitted to prevent unwanted adjustment.

Automatic system pasteurisation

The valve shall allow automatic system pasteurisation to be periodically carried out. To achieve this, the hot water stored temperature must be elevated. Once the thermostatic regulation device senses that the temperature of water flow is 6k above the valve set point, the valve will open further to allow the flow rate to increase and allow elevated water temperatures around the DHW secondary circulation pipework. When the water temperature reaches 73 degrees the valve will return back to its thermal regulation mode and reduce the flow of water back to the minimum flow rate thereby allowing other points of the system to be pasteurised.

Isolation

Isolation is to be achieved by use of a DRV facility

Temperature measurement

The valve shall be equipped with a thermometer to show the water temperature.

Drain

The valve shall be equipped with a drain point with a hose union connection.

Insulation

The valve shall be supplied complete with a purpose made pre-formed thermal insulation lagging jacket.

Manufacturer: Oventrop GmbH & Co. KG
Model Ref's: - Aquastrom T Plus

E.1.10 POSITIONS OF MAINS IN DUCTS

The positioning and arrangements of pipework in ducts, chases, false ceilings, and roof spaces shall be in accordance with the Contract Drawings.

E.1.11 PIPE SUPPORTS

The whole of the pipework shall be supported on non-ferrous rings or similar pipe brackets as detailed on the Contract Drawings or as indicated in Part F of the Specification Document, rigidly fixed to the fabric of the building but allowing the pipework to move under conditions of expansion and contraction. These brackets shall be fitted in accordance with the appropriate drawing and table indicated elsewhere.

It must be noted that ferrous supports, thimbles or sleeves shall not be in contact with the water supply installation. Where screw-on brackets are required, brass back plate male together with single pipe ring by Yorkshire or approved equal are to be used.

The spacing of pipe supports shall not exceed the centres given in the table below:

Pipe Supports - Copper Pipework

Size	Uncovered	Insulated
15mm	1.200 m	1.200 m
22mm	1.800 m	1.500 m
28mm	2.400 m	1.800 m
35mm	2.400 m	1.800 m
42mm	3.000 m	2.400 m
54mm	3.000 m	3.000 m
76mm and over	3.600 m	3.600 m

Where plastic pipelines incorporate metal valves of other heavy fittings it is essential to support and valves directly rather than allow their weight to be carried by the plastic pipe. For the same reason it is usually advisable to fix pipe supports on either side of flanged connections, especially where metal backing plates are used. Moulded plastic fittings should also be supported.

Pipe Supports – Plastic Pipework

Maximum recommended horizontal support distance for Plastic pipes in above ground installation: -

Nominal Bore All Classes 20°C.

15mm	0.600 m
20mm	0.680 m
25mm	0.762 m
32mm	0.840 m
40mm	0.9 m
50mm	1.07 m
65mm	1.22 m

80mm 1.37 m

For vertical installation of plastic pipes, the above support distances may be doubled.

NOTE: Where normal ambient or working temperature exceeds 20°C the support distances should be reduced. Continuous support is required where temperatures approach 60°C.

E.1.12 VALVES & STOP COCKS

Valves and Stop Cocks shall be provided in the positions shown on the drawings. Stop Cocks must be provided on all the branches to sanitary fittings etc. Valves to single sinks to be ballfix with screwhead, or Pegler ref: 808.

Where a header is provided to supply a range of sanitary fittings, a stop cock shall be fitted on the branch feeding header.

Isolation Valves:

Full flow 1/4 turn lever ball valves up to and including 50mm. DZR body, chrome plated full bore ball, PTFE seats and stem seal. BS EN 13828. BSP ended.
OVENTROP REF: 107 90. (Or equal and prior approved)

Regulating Valves:

"Hydrocontrol VTR" Double regulating valves up to and including 50mm. Bronze body & bonnet, DZR stem & disc, PTFE disc seal. BS 7350. BSP Ended
OVENTROP REF: 106 01. (Or equal and prior approved)

Strainers:

Bronze 'Y' type strainer up to and including 80mm. BSP Ended
OVENTROP REF: 112 00. (Or equal and prior approved)

Drain Cocks:

All low points which will not automatically drain through draw off points shall be fitted with screw down drain cocks.

Specification: "Y" type drain valve.

OVENTROP REF: 168 52 04 (or equal and prior approved)

E.1.13 CHECK VALVES

The Mechanical Services Installer should note that to comply with the Water Supply (Water Fittings) Regulations 1999, check valves must be installed in the supply pipe connection serving all Equilibrium Ball Valves.

The valve shall be installed between the Equilibrium Ball Valve and isolating stop cock and must be fitted strictly in accordance with the manufacturer's instructions.

E.1.14 UNIONS

Sufficient unions must be inserted in the pipework to facilitate the easy disconnection of any section of the pipework without disturbance to the fabric of the building.

E.1.15 SLEEVES

Where copper pipes pass through floors, walls, partitions, etc., non-ferrous metal sleeves must be provided with ends neatly finished off flush with the surface so that the tubes may be withdrawn without disturbance to the fabric of the building with cover plates, as directed.

Where pipes pass through Fire Compartment Walls, fire stop precautions shall be required as denoted in Building Regulation B3 Section 11 and BS 476 Part 20

E.1.16 DEZINCIFICATION

All fittings used in conjunction with the hot and cold water services shall be manufactured from a "non-dezincification" alloy.

E.1.17 TERMINATION POINTS

The installation shall be connected direct to all outlet points unless stated otherwise on the Contract Drawings.

E.1.18 CHLORINATION

In accordance with BS 6700, when the installation is completed, it shall be thoroughly flushed out and then filled with water dosed with 10 parts per million of chlorine. This water shall be allowed to stand in the system for a period of not less than 4 hours when tests for residual chlorine will be made at selected points including terminal points and wash out positions.

The tests must show at least 0.2 parts per million of residual chlorine. On successful completion of this test, the main must be well flushed out with clean water and left filled.

Results of analysis of water samples for hot and cold water systems shall be forwarded to Contract Administrator prior to practical completion.

The Mechanical Services Installer is at liberty to have this work carried out by a specialist contractor, but its costs must be included in the tender and Certificate that it has been done must be supplied.

E.1.19 TESTING ON COMPLETION

On completion of the installation, and before the issue of the Certificate of Practical Completion the Mechanical Services Installer shall carry out time and temperature draw off tests to ensure all risks of legionnaire's disease are eliminated.

GENERAL TESTING & COMMISSIONING OF WATER SYSTEMS

Testing

Pressure test all water services pipework

Operating gauge pressure less than 3.5 bar, test gauge one and a half times operating pressure.

Operating gauge pressure 3.5 - 7.0 bar, test gauge pressure twice operating pressure.

For below ground pipework test to 7 bar or twice the working pressure (whichever is the greater) for 4 hours.

Comply with procedures given in the HVCA Guide to Good Practice for Site Pressure Testing of Pipework. Ensure safety precautions detailed in HSE Guidance Note GS4 Safety in Pressure Testing are adopted.

Test concealed or buried pipework before any permanent covering is applied.
Advise appropriate personnel, in advance, of the time pressure tests may be witnessed.

Carry out Hydraulic Pressure Testing as described in HVCA Guide to good Practice for Site Pressure Testing of Pipework. Test section by section for one hour, as the work proceeds and prior to application of thermal insulation.

Keep record of pressure tests and issue them to the Employer's Representative and include them within the handover documentation.

Commissioning

Commissioning codes

Carry out commissioning of installations in accordance with the procedures, checks and tolerances given in the HTM technical memorandums, (HTM:04-01 The control of Legionella hygiene, "safe" hot water, cold water and drinking water systems, Part A), BSRIA Application Guides for water systems and air systems to achieve the standards set in the CIBSE Commissioning Codes.

Preliminary checks

Carry out checks and procedures as detailed in CIBSE Commissioning Code W, Section W1. Ensure system is statically complete as defined in section B4 of BSRIA Application Guide 2/89 Commissioning of water systems in buildings.

Use pre-commissioning checklist from BSRIA Application guide 2/89.

Setting to work and regulation

Set to work and regulate water distribution systems in accordance with CIBSE Commissioning Code W, Sections W2 and W3, and sections C3 and C4 in BSRIA Application Guide 2/89.

Measurement

Use instruments for measurement detailed in BSRIA Application Guide 2/89.

Test all outlets in groups to determine that appropriate flow rates and temperatures are achieved.

Performance test records

Keep a systematic record of tests. Include the test record with the O & M's

Flushing

Carry out flushing of water systems in accordance with BSRIA Application Guide 1/2001 Pre-commission cleaning of pipework systems.

All water used for pressure testing, flushing and system filling is of good quality.

Leave remaining pipework sections full and treated after pressure testing.

Install all necessary pipework ancillaries to enable a Specialist to carry out flushing, inspection and witnessing of water systems in accordance with BSRIA Application Guide AG 1/2001. Pre-commission cleaning of water systems.

Temporary connection from the mains must be in compliance with the Water Supply Regulations, or by installation of a temporary tank and pump arrangement.
Domestic water systems are to be flushed and disinfected in accordance with the requirements of BS 6700, and to the satisfaction of the local water supply authority.
Flush systems using mains water until the water is clear.

Witnessing

When the system has been cleaned, obtain written confirmation from the Employers Representative that the system, including water storage tanks has been inspected. If the system is found to be dirty at any stage after the cleaning has taken place, then the Contractor shall re-clean and sterilise the system unless a signed witnessing certificate is produced.

Chemical cleaning and solids removal

Carry out chemical cleaning procedure in accordance with BSRIA Application Guide 1/2001 *Pre-commission cleaning of pipework systems*.

Sterilization – General

After flushing process, carry out sterilization in accordance with BS 6700.
Prior to sterilization ensure each system is flushed, cleaned and drained.
Provide temporary connections to system terminal points suitable for introduction of sterilization chemicals and fluids and 22mm minimum valved drain connection on incoming main immediately downstream of mains isolating valve.
Fill system with clean, fresh water.

Sterilization - Mains Water System

Carry out the following operations in accordance with BS 6700.
Flush system and introduce sterilisation chemical.
Take samples from all sentinel points to ensure correct chlorine concentration.
Leave system to stand for period of time indicated.
Repeatedly flush system with clean water until all traces of chlorine have been removed - leave system filled.
Submit samples to registered laboratory for microbiological analysis and report.
Immediately prior to handover, retake samples and submit for analysis and report.

Sterilization - Water Storage Systems:

Carry out the following operations in accordance with BS 6700 and Health and Safety Executive Approved Code of Practice and Guidance - Legionnaires' disease - control of legionella bacteria in water systems.

Carry out operations on all water storage tanks and cisterns, cold and hot.
Carry out procedures as for mains water systems.

Documentation:

Within handover documentation include the following:

Certificate confirming that the water systems have been cleaned, sterilised and tested
Details of routine cleaning and sterilisation required that will be required by the end user

E.2 HEATING SERVICES INSTALLATION

Scope of Works

- Remove existing heating services and plant as indicated on the contract drawings.
- Install new plant, pipework and ancillaries as per the contract drawings including:
 - New Heatpumps
 - Pipework and headers
 - Pumps
 - Pressurization unit
 - Buffer Vessel
 - Valves, motorized valves and ancillaries
 - Water pressurization set
- Supply and install new LPHW distribution pipework as per contract drawings.
- Supply and install any controls associated with the heat pumps, pressurization unit, etc.
- Supply and install radiators and radiator control valves as specified throughout
- Test and commission and certify the new system
- Supply and install new heating control panels and field devices and test and commission system

The contractor shall liaise with the client to agree time schedules for heating system and set point temperatures for the system temperature stats.

The contractor shall include for a full demonstration of the system to the consultant and the client.

E.2.1 BUFFER VESSEL

Supply and install new buffer vessel(s) as scheduled and indicated on the drawings.

Install buffer vessel in accordance with manufacturers instructions

Ensure a solid, level base is provided for the buffer vessel. The floor must be of sufficient strength to support the weight of the vessel when filled with water.

Material: S235JR in accordance with EN 10025-2

External Finish: Painted

Internal Treatment: Not Required

Working Pressure: 4 Bar

Test Pressure: 6 Bar

Insulation: 100mm thick Polyester + PVC Ral 9006

E.2.2 PUMPS

Supply and Install new LPHW pumps as scheduled and indicated on the drawings, complete with flexible connections.

Applicable Standards

- I.S. EN 12828: Design and installation of water-based heating systems
- S.R. 50-1:2021: Water-based heating systems in dwellings
- Manufacturer's Installation Instructions: Specific guidelines provided by the pump manufacturer

Site Preparation

- Location: The pump should be installed in a location that allows for easy access for maintenance and inspection. It should be protected from freezing temperatures and excessive heat.
- Foundation: Ensure a solid, level base for the pump. Mounting brackets or vibration dampers may be required to minimize noise and vibration.

Installation Requirements

- Pipework: Use pipes that are compatible with the heating system and the pump. Ensure all connections are secure and leak-free. Follow the manufacturer's guidelines for pipe sizing and layout.
- Electrical Connections: Follow the manufacturer's instructions for electrical wiring. Ensure all connections are secure and comply with local electrical codes. Install a dedicated circuit breaker for the pump.
- Isolation Valves: Install isolation valves on either side of the pump to allow for easy maintenance and replacement without draining the entire system.
- Bypass Valve: In systems with multiple pumps or zones, install a bypass valve to maintain proper flow and pressure.

Safety Measures

- System Flushing: Flush the system to remove any debris or contaminants before installing the pump. This helps prevent damage and ensures efficient operation.

Commissioning

- System Testing: Perform thorough testing of the system to ensure there are no leaks and that the pump operates efficiently. Check for proper flow rates and pressure.
- Balancing: Balance the system to ensure even distribution of heat and efficient operation of the pump.
- Documentation: Provide detailed documentation of the installation, including system diagrams, test results, and maintenance schedules.

E.2.3 RADIATORS

The Mechanical Services Installer shall supply and install where indicated on the Contract Drawings, radiators of the manufacture specified which shall comply in all details as laid down in the schedule on heating equipment and complete with airlet plug as incorporated in top return end.

Each radiator shall be supplied without feet unless specified otherwise on the Contract Drawings. Unless otherwise directed, radiators shall be arranged centrally below windows and fitted so as not to project above the window sill.

Radiators shall be tested at works in accordance with BS EN 442- 1:1997 to a hydraulic pressure of 6.89 BAR before dispatch. The Mechanical Services Installer shall allow for disconnecting removing and re-fixing all radiators **twice** for convenience of other trades.

Details of type of connection e.g., T.B.O.E., B.B.O.E. will be found on the relevant drawing and / or Part F of the Specification Document.

Prior to ordering the specified radiators, the Mechanical Services Installer shall ensure that each individual radiator will fit into the position allocated on the drawings and that changes to building fabric design have not taken place.

E.2.4 RADIATOR VALVES – GENERAL

Each radiator shall be complete with two valves as per radiator manufactures recommendations and as specified on the drawings.

Radiator controls are to be via TRV's, Zone valves, or manual control valves as indicated on the drawings

E.2.5 RADIATOR VALVES – THERMOSTATIC

Unless indicated otherwise, Thermostatic Radiator Valves shall be as follows:

2 Pipe System (Mild Steel installations) [Flow rates up to 0.054l/s]

Thermostatic radiator valve body with 9 pre-setting Kv values. Valve inserts replaceable under working pressures and temperatures with aid of inline service tool. Nickel plated bronze/brass. Max pressure rating PN10. Maximum temperature 120°C. Maximum differential pressure 1bar.

OVENTROP REF: AV9 – Angle, straight, reversed angle to suit, complete with setting key (or equal and prior approved)

2 Pipe System (Mild Steel installations) [Flow rates between 10 and 170 l/h]

Thermostatic radiator valve body including automatic flow regulator and visible flow indicator markings for hydronic balancing. The valve will have an internal differential pressure control arrangement to maintain flow control and valve authority. Valve inserts replaceable under working pressures and temperatures with aid of inline service tool. Nickel plated bronze/brass. Max pressure rating PN10. Maximum temperature 110°C. Maximum differential pressure 1.5bar.

OVENTROP REF: AQ – Angle, straight, reversed angle to suit (or equal and prior approved)

Single Pipe Pumped System & 2 Pipe System (Mild Steel installations) [Flow rates above 0.083l/s]

Thermostatic radiator valve body with fixed kv for single pipe pumped circuits and higher flow rate 2 pipe circuits. Valve inserts replaceable under working pressures and temperatures with aid of inline service tool. Nickel plated bronze/brass. Max pressure rating PN10. Maximum temperature 120°C. Maximum differential pressure 1bar.

OVENTROP REF: A – Angle, straight, reversed angle to suit (or equal and prior approved)

District Heating Schemes

Thermostatic radiator valve body with infinitely adjustable fine flow pre-setting for high temperature differentials and low flow rates. Valve inserts replaceable under working pressures and temperatures with aid of inline service tool. Nickel plated bronze/brass. Max pressure rating PN10. Maximum temperature 120°C.

Maximum differential pressure 1bar.

OVENTROP REF: AF (or equal and prior approved)

Thermostats for Radiator Valves

Thermostatic liquid filled sensor with temperature limiting and locking @ 7-28°C and graduation 0* 1-5. Position 3 equates to 20°C

OVENTROP REF: Uni LGH (or equal and prior approved)

E.2.6 RADIATOR VALVES – LOCKSHIELD VALVES

Unless indicated otherwise, Radiator Lockshield Valves shall be as follows:

2 Pipe System (Mild Steel installations) [Flow rates up to 0.083l/s]

Lockshield valve with regulating, isolating, filling, and draining functions. Connection for draining tool for draining of radiator without alteration of regulated setting.

Nickel plated bronze/brass. Valve disk with EPDM O-ring seal.

OVENTROP REF: Combi 4 (or equal and prior approved)

Single Pipe Pumped System (Mild Steel installations) [Flow rates up to 0.083l/s]

High Kv Lockshield valve with isolating and regulating functions.

Nickel plated bronze/brass. Valve disk with EPDM O-ring seal.

OVENTROP REF: Combi LR (or equal and prior approved)

E.2.7 RADIATOR VALVES – MANUAL VALVES

Unless indicated otherwise, Radiator manual Valves shall be as follows:

Nickel plated, manual radiator valve with white handwheel. Suitable for subsequent conversion to thermostatic control.

OVENTROP REF: HRV (or equal and prior approved)

E.2.8 STEEL RADIATORS

Radiators to BS EN 442-1:1996 shall be as indicated on the Contract Drawings or / and in Part F of the Specification Document and supported on manufacturer's concealed brackets secured permanently to the fabric, in accordance with the manufacturer's instruction.

E.2.9 LPHW STEEL TUBES AND FITTINGS

All above ground pipework associated with the LPHW system on this project shall be carried out in black steel pipework class B medium Gauge Schedule 2 to BS 1387 with pipe fittings up to 65mm of malleable banded iron.

All tubes shall be mild steel medium class quality unless otherwise specified with pipe fittings up to 65mm of malleable banded iron.

All pipework and fittings are to be in accordance with BS 1387:1985, AMD 5830:1989, BS 21:1985, AMD 6653:1990, BS 1821:1982, BS 2633:1987, BS 2640:1982, BS 2971:1991, BS 4677:1984 and BS EN 12732:2000. Pipe fittings 80mm and above are to be cast iron flanged or mild steel welded type fitting with flanges fitted for easy disconnection.

Easy sweep fittings shall be used throughout with the exception of vent, draw-off and thermometer positions where square tees shall be used. In all cases connections shall be of the same size as the pipework connection them. Bushings and long screw connectors shall not be used.

On no account will joints be permitted within the thickness of walls or floors. In cases where the application of this rule is impracticable (e.g., with sweep fittings or bends) the Contract Administrator may permit the use of square tees or elbows by special permission, if necessary, on site.

All pipes shall be screwed in accordance with B.S.S. and shall have sufficient unions or flanges to allow for the disconnection of any pipe without disturbance of the fabric of the building.

Pipes up to and including 65mm diameter shall have malleable iron unions with brass to iron seats. No connectors will be allowed. Pipes 80mm diameter and above shall have flanged joints and be made with approved expanded jointing rings and jointing compound. Pipes shall be expanded into the flanges after screwing or before welding is required.

All surplus jointing materials shall be cleaned off at the time the joints are made. Non-compliance will involve the Mechanical Services Installer in redecorating costs.

It is essential that after cutting of pipes the full bore shall be restored by reamer and shall be free from rust, scale and free from other defects and shall be thoroughly cleaned before erection.

If further faulty workmanship is found, i.e., pipe burrs, etc., then the Mechanical Services Installer shall dismantle and remove part of whole of the installation and replace all at his own expense. All pipes shall be laid with a rise toward the point of venting and fall towards the point of drain. All pipes shall follow the line of walls both vertically and horizontally and where covered shall be spaced sufficiently apart to allow each pipe to be lagged separately and/or to facilitate the fitting of floor or wall plates.

Where a pipe increases its size for the purpose of providing additional heating surface, the increase shall be made by means of an eccentric reducing socket so fitted to prevent an air lock, on the return side the socket shall be fitted to allow the larger pipe to drain.

In all cases pipes where pipes are exposed in rooms pipes shall be run with a minimum clearance of 100mm between the underside of pipe and finished floor and 40mm clearance between finished walls or piers and back side of pipes.

All open ends, i.e., for radiator connections, continuation of pipe runs etc., shall have plugs or screwed caps inserts until such time as all open ends are finally connected.

Every effort has been made to show the runs of pipework as accurately as possible on the Contract Drawings, yet, if any such runs require any special fittings, sets, fire-bends, pillar-bends, etc., to complete the work to the satisfaction of the Contract Administrator they shall be included whether herein specified and/or shown upon drawings or not.

All connections to cylinders, tanks, boilers and all other items of plant or equipment shall be made with unions of the appliance for repair or replacement.

All adaptations to existing services shall be carried out in a neat and approved manner.

Flanges on flanged pipework, malleable iron unions on steel pipes and straight connections on copper pipes shall be fitted where required for erection but must not exceed 6 metres and also where their presence would facilitate dismantling, maintenance, etc., also on all pipes immediately under the access covers of ducts or trenches and as directed by the Contract Administrator.

Where practicable all springs and off-sets shall be made in one piece without the use of fittings. Defective joints shall be taken down and re-made. The caulking of defective joints is not allowed.

E.2.10 EXPANSION

Full allowance shall be made for expansion and contraction.

Where expansion joints are indicated on the drawings, these shall be of the stainless steel bellows type having flanged or screwed ends. Care must be taken when installing these joints

that pipework is erected in true alignment and bolt holes on counter flanges lined up correctly with joint flanges.

Suitable pipe guides must be installed to ensure correct function of these expansion joints. Anchor brackets shall be provided where indicated or required, specially fabricated to suit conditions and to the approval of the Contract Administrator.

E.2.11 AIR VENTS

All high points are to be vented adequately. Where automatic air vents are called for these are to be of Winn's manufacture or equal and approved, incorporating Lockshield shut-off valve and with copper drip pipe carried to discharge outside the building in each case. These drip pipes shall not be connected.

In all cases where air vents are taken off, an air bottle shall be formed of the full-bore of the main, surmounted by a cap suitably tapped to take the auto vent or air cock. Where air bottles are fitted at high level, a bleed pipe shall be brought down to a convenient level (generally 1800mm above F.F.L.) in 10mm copper tube, bracketed by means of copper saddle clips with brass screws at 250mm centres and terminating in a 15mm back-plate elbow with radiator type air vent.

All vents and release pipes installed in exposed positions shall be insulated to prevent freezing.

E.2.12 PIPE SUPPORTS

Pipes in Boiler Room/Plant Room areas shall be supported on purpose made wrought iron brackets made up to tee iron or flat bar fabricated to the pipe diameter and rigidly fixed to the fabric of the building.

Flamco (or equal and approved) brackets may be used.

Pipes in roof spaces / ceiling spaces shall generally be supported from 'Flamco' (or equal and approved) pipe clips.

Pipes, where they are exposed to view within the building shall be supported on split ring brackets with screw-on back plates or build-in tails as required and where installed at low level shall be bracketed alternatively off walls and floors at 1200mm centres.

In addition, pipe supports must also be provided on exposed low level pipework **within 150mm** either side of any change of direction.

Pipes in ducts shall be supported on split ring pattern brackets with screw-on back plates or build-in tails as required.

There are various types of proprietary brackets on the market similar in operation to the standard brackets and these generally are acceptable but prior approval must be obtained from the Consultant before use.

Where intermediate floors are constructed from precast hollow beams the 'support rail' shall be secured by means of galvanized / sheradized long steel screws taken through the centre of these precast hollow beams and attached to galvanized fishplates with locknuts. The fishplate assembly will be covered by the floor screed after the installation has been completed.

Where intermediate floors are constructed from reinforced concrete slabs, the 'support rail' shall be secured by means of 10mm wedge type anchor bolts fixed into the soffit of the slab with a minimum embedment of 75mm.

The 'support rail' together with the long screws, drop rods, clips, fixings, etc., shall be supplied and fixed by the Mechanical Services Installer.

Should any special support steelwork be required, in addition to the items mentioned above, this will be indicated on the relevant design drawing(s).

The spacing of pipe supports shall not exceed the centres given in the table below:

A - Mild Steel Pipework

Size	Uncovered	Insulated
15mm	2.400 m	2.400 m
20mm	2.400 m	2.400 m
25mm	2.500 m	2.400 m
32mm	3.600 m	3.000 m
40mm	3.600 m	3.000 m
50mm	4.800 m	4.200 m
65mm	4.800 m	4.200 m
80mm	4.800 m	4.200 m
100mm	4.800 m	4.400 m
Over 100mm	6.000 m	5.400 m

B - Copper Pipework

Size	Uncovered	Insulated
15mm	1.200 m	1.200 m
22mm	1.800 m	1.500 m
28mm	2.400 m	1.800 m
35mm	2.400 m	1.800 m
42mm	3.000 m	2.400 m
54mm	3.000 m	3.000 m
76mm and over	3.600 m	3.600 m

Where plastic pipelines incorporate metal valves or other heavy fittings it is essential to support and valves directly rather than allow their weight to be carried by the plastic pipe. For the same reason it is usually advisable to fix pipe supports on either side of flanged connections, especially where metal backing plates are used. Moulded plastic fittings should also be supported.

NOTE: Where normal ambient or working temperature exceeds 20°C the support distances should be reduced. Continuous support is required where temperatures approach 60°C.

Sketches of all-purpose made brackets not detailed on standard drawings must be submitted to the consultant and approval must be obtained for the type of supports to be used before the work is put in hand.

E.2.13 VALVES – ISOLATION VALVES

ISOLATION VALVES:

Isolation Valves up to 50mm:

Full flow 1/4 turn lever ball valves up to and including 50mm. DZR body, chrome plated full bore ball, PTFE seats and stem seal. BS EN 13828. BSP ended or Press ended OVENTROP REF: 107 90. (Or equal and prior approved)

OR

Bronze wedge gate valves up to and including 50mm. BS5154 / BS EN 12288 OVENTROP REF: 104 30. (Or equal and prior approved)

Isolation Valves 65mm to 100mm:

Cast iron butterfly valves with lever from 65mm up to and including 100mm. Above 100mm with gearwheel. Nodular iron body, stainless steel shaft, stainless steel disc, EPDM seals. BS 5150 / BS EN 593.

OVENTROP REFS: 104 62. (Semi lugged lever pattern), 104 69. (Semi lugged gearwheel pattern), 104 82. (Fully lugged lever pattern), 104 89. (Fully lugged gearwheel pattern) (or equal and prior approved)

OR

Cast iron wedge gate valves BS5150 / BS EN 1171, 65mm and above. Flanged PN16. OVENTROP REF: 104 52. (Or equal and prior approved)

OR

Cast iron wedge gate valves BS5150 / BS EN 1171, 65mm and above. Flanged PN10. OVENTROP REF: 104 51. (Or equal and prior approved)

E.2.14 VALVES – DOUBLE REGULATING/FLOW MEASUREMENT VALVES**FIXED ORIFICE FLOW MEASUREMENT VALVES****Up to 50mm:**

Hydrocontrol MTR / MPR” Bronze fixed orifice commissioning valve comprising double regulating valve and integrated metering station with test points up to and including 50mm. BS 7350. BSP ended or Press ended. OVENTROP REF: 106 04. (Or equal and prior approved)

65mm and above:

“Hydrocontrol MFC” Cast Iron fixed orifice commissioning valve comprising cast iron double regulating valve and integrated stainless steel orifice plate with test points. 65mm and above. Repositionable handwheel with lead lock anti-tamper device. BS7350. Flanged PN16. OVENTROP REF: 106 58. (Or equal and prior approved)

DOUBLE REGULATING VALVES**Up to 50mm:**

“Hydrocontrol VTR / VPR” Double regulating valves up to and including 50mm. Bronze body & bonnet, DZR stem & disc, PTFE disc seal. BS7350. BSP ended or Press ended OVENTROP REF: 106 01. (Or equal and prior approved)

65mm and above:

“Hydrocontrol VFC” Double regulating valves 65mm and above. Cast iron body, bronze bonnet & disc, DZR stem, EPDM seals. Repositionable handwheel with leadlock anti-tamper device. BS EN 13789. Flanged PN16. OVENTROP REF: 106 26. (Or equal and prior approved)

E.2.15 VALVES – NON RETURN VALVES**Up to 50mm:**

Bronze swing check valve up to and including 50mm. Bronze body, brass bonnet and flap. BS EN 12288. BSP Ended OVENTROP REF:107 50. (Or equal and prior approved)

65mm and above:

Cast Iron swing check valve 65mm and above. Cast Iron body and bonnet. Seat rings of brass, asbestos free gasket. BS EN 1074. Flanged PN16. OVENTROP REF:107 30. (Or equal and prior approved)

E.2.16 VALVES – STRAINERS

Up to 50mm:

Bronze 'Y' type strainer up to and including 50mm. Bronze body, stainless steel mesh. BSP Ended. OVENTROP REF: 112 00. (Or equal and prior approved)

65mm and above:

Cast iron 'Y' type strainer 65 mm and above. Cast Iron body and cover, asbestos free gasket. Stainless steel basket. Flanged PN16. OVENTROP REF: 112 20. (Or equal and prior approved)

E.2.17 VALVES – DRAIN COCKS

Draw off cocks shall be fixed in such positions as are necessary to drain the whole of the installation.

'Optiflex' Lever operated ball drain valve with hose union, self-seal thread & cap. OVENTROP REF: 103 33. (Or equal and prior approved)

E.2.18 VALVES – AUTOMATIC AIR ELIMINATORS

Brass automatic air eliminator with automatic isolation on removal. OVENTROP REF: 108 83. (Or equal and prior approved)

E.2.19 VALVES - DIFFERENTIAL PRESSURE CONTROL VALVES

Where differential pressure control valves are indicated on the drawings, the following specification applies:

The Contractor shall install in positions indicated on the drawings issued, a differential pressure control arrangement. The valve arrangement will comprise of a differential pressure control valve (DPCV), installed on the return pipe, connected via the capillary supplied to a commissioning valve positioned on the flow. The commissioning valve shall be selected to provide a measurement signal across the metering station for flow measurement of between 1.0 and 4.7kPa. The DPCV shall be selected to provide an optimum pressure drop across the unit of between 3 and 10kPa. The DPCV shall control the downstream sub circuit pressure as indicated in the valve selection schedule.

An "Optibal" or "Hydrostop" Isolating valve shall be provided downstream of the DPCV on the return pipe to enable system isolation and maintenance. A T-piece measuring adaptor shall be installed on to the commissioning valve to allow simultaneous flow measurement and differential pressure control.

Manufacturer: - Oventrop GmbH & Co. KG

Model Ref's: -

Hycocn DTZ differential pressure control valve (DPCV) (5-60kPa Low flow)
Hydromat DTR differential pressure control valve (DPCV) (5-70kPa)
Hydromat DFC differential pressure control valve (DPCV) (20-180kPa)
Hydrocontrol MTR commissioning valve
Hydrocontrol MFC commissioning valve (65mm and above)
T-piece measuring adaptor
Optibal ball isolating valve (up to 50mm)
Hydrostop butterfly isolating valve (65mm and above)

E.2.20 VALVES - PRESSURE INDEPENDENT CONTROL VALVES (2-PORT)

Where pressure independent control valves are indicated on the drawings, the following specification applies:

The Contractor shall install in positions indicated on the drawings issued, a pressure independent 2 port control valve set. The valve set will comprise of a "Cocon Q" pressure independent control valve and an associated actuator. The valve shall be installed with the flow direction arrow positioned to ensure correct water flow through the valve. To ensure successful commissioning of the system the pressure independent control valve shall be selected to provide a minimum pressure drop across the unit as indicated in the valve selection schedule.

The valve shall have the following functions: -

- 2 Port Control with actuator (please refer to control strategy for particular actuator specification)
- Automatic (lockable) flow regulator with external, visible flow indicator markings for hydronic balancing
- Internal differential pressure control arrangement to maintain flow control and valve authority
- Pressure measurement test points

Manufacturer: Oventrop GmbH & Co. KG.

Flow Rates up to 4800l/h: Cocon QTZ pressure independent 2 port control valve (PN25)

Flow Rates 1.5 to 14m³/h: Cocon QTR pressure independent 2 port control valve (PN25)

Flow Rates 5 to 190m³/h: Cocon QFC pressure independent 2 port control valve (PN25)

The Contractor shall install in positions indicated on the drawings issued, a fixed orifice metering station to enable the flow rate to be witnessed.

The metering station shall be selected to provide a flow measurement signal of between 1.0 and 4.7 kPa, Manufacturer: Oventrop GmbH & Co. KG.

E.2.21 VALVE LABELLING

All valves in Boiler House and each main circuit control valve shall have black on white 'Traffolyte' labels 25mm in diameter securely wired on, stating valve number, also all pumps, fans, boilers, cylinders, etc., shall be numbered.

The Mechanical Services Installer shall provide and fix a circuit control diagram in accordance with the labeling. This shall be hung in a suitable position in the boiler house and provided with frame and glass protection.

E.2.22 SLEEVES

Where pipes pass through walls, floors, partitions, duct walls, etc., metal sleeve pipes shall be provided of Class 'A' Quality tube 2 no. Min. 'A' size larger, with ends neatly finished off to protrude 6mm beyond the finished face of the wall, etc., so that the pipes may be withdrawn from the sleeve if required.

These sleeves must be finished off either with an approved plastic or heavy metal floor plate of the set-screw type that can be fixed securely in position. (Sheet metal sleeves will not be acceptable).

Where pipes pass through suspended ceiling tiles floor/ceiling plates of an approved pattern must be fitted.

Where pipes pass through Fire Compartment Walls, fire stop precautions shall be required as denoted in Building Regulation B3 Section 11 and BS 476 Part 20

E.2.23 MAINTENANCE TOOLS

In addition to the special tools provided by the manufacturer, tools provided by the manufacturer, tools and lubricants as indicated in Part F of the Specification Document shall be supplied.

E.2.24 RETURN HEADERS

Where multiple returns are connected into a common return header each separate return shall be provided with isolating valve, thermometer and drain cock.

E.2.25 SYSTEM FLUSHING

The complete installation is to be treated by the application of 'Fernox' chemical agents or equal and approved as advised by the Boiler manufacturer and the Mechanical Services

Installer shall submit a schedule of such agents for approval by the Contract Administrator.

The complete installation is to be flushed out with cold water and a commercial application of cleaning/flushing agent.

After the application of the flushing agent and the subsequent draining and refilling of the system, in accordance with the manufacturers recommendations, the installation is then to be dosed with protective agent.

The final PH reading for the system water should be between 7.0 and 8.0. Evidence of this reading shall be submitted to the Engineer upon completion of these works.

E.2.26 TESTING AND COMMISSIONING

The Mechanical Services Installer is required to supply, install, and set to work all the previously specified equipment. All pressure testing and thermal testing techniques shall be carried out in accordance with the C.I.B.S.E. Commissioning Guides. Fuel for this purpose shall be provided by the Mechanical Services Installer.

The attention of the Installer is specifically drawn to the 'Training of Operator' clause in Commissioning and Testing Part of the Specification Document.

NOTE: Where alterations and extensions are carried out to existing installations the Installer shall allow in his tender for the filling, dosing, and balancing of the new and existing systems after the installation work has been completed.

E.3 INSULATION

E.3.1 GENERAL DESCRIPTION

NOTE: See Chilled Water Section for insulation of Chilled Water Pipework.
 The Insulation services installation scope of works for this project involves the following:

Supply and install pipework insulation to new hot & cold water pipework systems
 Supply and install pipework insulation to new LPHW pipework systems
 Supply and install refrigeration pipework insulation (see air-conditioning section)

On completion of the hydraulic tests, to be satisfaction of the Contract Administrator, all pipework in the roof spaces, false ceilings, wall chases, etc., including the cold water services and all pipework not required as heating surface shall be thermally insulated in accordance with the following specification.

All pipes and ironwork to be thoroughly wire brushed and cleaned to ensure complete removal of all rust and grease prior to the application of insulation and treated with two coats of red oxide or equal paint.

In all cases where rigid sectional or flexible insulation is used, all care must be taken that its density is not impaired by compression when tie wires or bands are secured in position, or when further layers of materials or enclosures are applied.

The whole of the work is to be carried out in accordance with the manufacturer's installation procedures and in a neat and approved manner to conform with BS 874:1973:1986 (and all amendments), BS 5422:2009, EN 14303:2009+A1:2013 BS EN 12664:2001, BS EN 13467:2001 and all associated standards and codes of practice

E.3.2 PIPE INSULATION SPECIFICATION

All pipework shall be insulated as detailed.

All pipework insulation shall be Thermobreak foil backed insulation. The physical characteristics of the insulating material together with adhesive, fixing, vapour barrier and finishing materials, whether pre-applied or applied on site, shall conform to the following.

Technical Data:

Material:	Irradiation (physically) crosslinked polyolefin foam with factory applied reinforced foil.
Density:	25kg/ m ³ (foam core only)
Thermal Conductivity: (ISO 8302-1991)	0.032 W/mk (@ 23° mean temperature)
Water Vapour Permeability: (ASTM E96)	8.19 x 10 ⁻¹⁵ kg / Pa.sm (0.29 mg.m/Nh)
Water Vapour Permeance:	3.3 x 10 ⁻¹⁴ g/M.N.S

Permeability Resistance Factor:	$\mu > 20,000$
Water Absorption by Volume:	0.8% (after 28 days)
Resistance to Fungi: (ASTM G21)	Zero Growth
Operating Temperature:	-80°C to 100°C
Fire and Smoke Behavior:	
BS 476 Part 6 and 7	Class 0
AS 1530.3 (1999)	
Spread Flam Index:	0
Heat Evolved Index:	0
Ignitability Index:	0
Smoke Develop Index:	0-1
UL94:	HF-1
ASTME 84:	Complies to: Flame Speed Index <25 Smoke Index <50
NFPA 90A & NFPA 90B:	Complies with Requirements
ISO 5659-2 (1994)	

All insulation shall be generally as follows:

Pipe Size:	Insulation Thickness
15-22	19mm
28 and above	25mm
Where frost protection is required:	38mm

All insulation joints both butt joints and horizontal joints shall be neatly finished with all joints being sealed with approved manufacturers adhesive. Insulation shall be neatly mitred at bends, tees, valves etc. end caps shall be installed at all valves, tees, etc.

All insulation work shall be carried out by an approved specialist. all materials delivered to site shall be new and dry, and so maintained throughout the progress of the works.

The engineer will not accept poor quality or badly finished work neither will he accept irregularities in the thickness of insulating materials or in the material covering. All work shall be left smooth, clean, and properly finished.

Pipework shall be insulated separately, and adjacent parallel pipes shall not be married together in one insulation covering.

Where allowance must be made for pipe – duct expansion, and / or contraction, insulation shall be finished in a neat and approve manner permitting easy access and disconnection of removable items without disturbing the surrounding insulation.

Insulation materials and their finishes shall be free from asbestos.

The Engineer will not accept poor quality or badly finished work, neither will he accept irregularities in the thickness of insulating materials or in the material covering. All work shall be left smooth, clean, and properly finished.

All insulating material and associated products shall be applied strictly in accordance with the manufacturer's recommendations and instructions and work failing to comply with these will not be accepted by the Engineer.

All joints, surfaces, edges, and overlaps shall be neatly finished and where possible, overlaps shall be arranged to be on the 'blind' side.

Where allowance must be made for pipe / duct expansion and / or contraction, insulation shall be finished in a neat and approved manner permitting easy access and disconnection of removable items without disturbing the surrounding insulation.

Unless otherwise indicated, all thermal insulating materials used within any building shall, when tested in accordance with B.S. 476, Part 4, be classified non-combustible. Alternatively, all thermal insulating materials used within any building shall be non-combustible with a facing of combustible material providing that the facing is not more than 0.8 mm thick, and it has a Class 0 surface spread of flame when tested in accordance with B.S. 476, Part 7. Thermal insulating materials used within any building shall be free from substances which in the event of a fire would generate appreciable quantities of smoke, noxious or toxic fumes. When requested by the Engineers, evidence of fire classification, obtained from an approved testing laboratory, shall be provided by this Specialist to certify that materials comply with this Clause.

Insulation materials and their finishes shall be free from asbestos.

E.3.3 PIPEWORK IN CEILING VOIDS, VERTICAL DUCTS, FLOOR VOIDS AND ALL OTHER CONCEALED LOCATIONS

All LPHW & water pipework systems to be insulated with "Isover" pre formed mineral wool snap on pipe insulation sections.

Insulation shall be manufactured under quality management standard EN ISO: 9001:2000 and shall comply with the performance requirements and application standards of BS5422:2001 & BS5970:2001.

The base mineral wool of the insulation shall be totally non combustible achieving a Euroclass A2 fire rating.

The aluminium foil face shall comply with the requirements of BS476: Part 6 “Fire propagation” and BS476: Part 7 “Surface spread of Flame” and rated to Class “O” to the building regulations.

The insulation shall be odourless and fully compatible with all standard pipework services and components and shall not accelerate corrosion with steel copper or aluminium.

The water vapour permeance of the applied foil covering the pipe insulation as be 0.00024g/(s.MN) and be suitable for use on pipework operating at temperatures below ambient.

Sections held in position by 3 bands per section are to be close butted and all longitudinal overlaps are to be sealed with a suitable adhesive to the manufacturer's recommendations.

Butt joints are to be sealed with 100mm wide self-adhesive white lacquered dead soft aluminum foil tape, applied over a clean surface and firmly pressed down.

Bends shall be insulated mitred and cut to fit, with joints sealed with adhesive and matching self-adhesive tape.

The installer must be careful not to damage the decorative facing.

Insulation thickness to be as follows:

Pipe Diameter (mm)	Insulation thickness (mm)
15mm-40mm	32mm
50mm-100mm	38mm
150mm-300mm	50mm

E.3.4 VALVE LAGGING JACKETS

Contractor to include for the supply and installation of valve insulation blankets on all new LPHW pipework in the plantroom

The valve lagging jackets shall meet the following specification.

Outer & Inner Face Materials

Satin weave glass coated with specially formulated silicone rubber.

Weight of Cloth: 490 g per sq. m.

Coating: 80 g per sq. m. Silver grey silicone rubber.

Temperature Resistance

Continuous use 36 - 260 degrees C.

Flame Resistance: Complies with BS 476, Part 7, 1971, and Part 6, 1989: Class 'A' and Class 'O'.

Fastenings

Flaps: Velcro sewn onto face material cloth.

Draw Strings: Polyester cord.

Infill Material

Needle and mineral wool.

Sewing Methods: Lock stitch on all seams using glass thread.

Temperature Limit: 480 degrees C

E.3.5 GENERAL PAINTING AND IDENTIFICATION BANDS

Where insulation is enclosed in aluminum cladding it is to be left thoroughly clean and in natural finish. Under no circumstances should the aluminum be painted. PVC identification colour bands shall be provided at 2m intervals in accordance with BS 1710 and applicable to colour chart code. PVC flow direction arrows shall be fitted at 3m intervals.

All pipework, whatever the finish, which is not immediately identifiable must have identity colour bands fitted at 2m intervals in accordance with BS 1710 colour code indicated on chart.

In order to standardize on colour bands for engineering pipework, the following colour chart will be used. This chart is in accordance with the latest B.S.1710:1984 (See also table 15:8 - Part 15 Symbols and Notations).

<u>Pipe Contents</u>	<u>Basic Colour</u>	<u>Colour Code Indication</u>
Drinking Water	Green	Blue
Cooling Water	Green	White
Boiler Feed Water	Green	Crimson/White/Crimson
Condensate Water	Green	Crimson/White/Crimson
Central Heating <100°C	Green	Blue/Crimson/Blue
Central Heating >100°C	Green	Crimson/Blue/Crimson
Cold, down Service	Green	White/Blue/White
Hot Water Supply	Green	White/Crimson/White
Fire Extinguisher	Green	Safety Red
Compressed Air Light	Blue	Light Blue
Steam	Silver Grey	Silver Grey
Natural Gas	Yellow Ochre	Yellow Ochre
Oil (Furnace Fuel)	Brown	Brown

On repair work, or where alterations to existing plant are involved, all covering which is disturbed must be made good and repainted as called for in this specification. Where this work is in an existing boiler house the whole of the equipment, new and existing, is to be repainted in accordance with this specification.

E.3.6 LIAISON

Insulation work must be programmed in such a way as to ensure that no part of the work causes inconvenience or delay, either to other trades or the client, particularly in respect of services situated in ducts or trenches, which if left open for protracted periods of time, whilst awaiting the insulation works, can seriously impede the progress of the Contractor's program of works.

It is the Installer's responsibility to ensure against any such delays or holdups and to arrange the program of his specialist works to comply in full with the requirements of the Contract. Plant room insulation and painting are to be completed in its entirety within a reasonable time of the completion of the plant and pipework installation therein.

E.4 BUILDERS WORKS

E.4.1 GENERAL DESCRIPTION

The Contractor shall allow for and undertake all builders' work required to facilitate the complete mechanical services installation.

Builders' work shall include, but not be limited to, the following:

- Formation of all openings, holes, sleeves, chases, recesses and penetrations through walls, floors, roofs and ceilings for the installation of mechanical services.
- Provision of cast-in sleeves, builder's work openings and block-outs where required.
- Making good all openings following installation of services to match adjacent finishes.
- Fire stopping and fire sealing of all service penetrations through fire-rated walls, floors and compartments using tested and certified fire stopping systems to maintain the required fire resistance.
- Weatherproof sealing of all external penetrations.
- Formation of plinths, housekeeping bases and concrete upstands for mechanical plant where indicated.
- Formation of equipment bases as detailed on the drawings.
- Provision of trenches, ducts, draw pits, backfilling and reinstatement associated with underground mechanical services where shown on the contract documents.
- Provision of access panels and access hatches in ceilings, walls and builders' work finishes to permit maintenance of valves, dampers, fire dampers and concealed mechanical equipment.
- Supply and installation of lintels where required for builder's work openings.
- Making good decorations and finishes disturbed by the builders' work.
- Coordination of all builders' work with the client prior to execution.

Where proprietary supports, channel systems, brackets or secondary steelwork are specifically required for the support of mechanical services, these shall be supplied and installed by the Contractor unless specifically noted otherwise on the contract drawings.

MECHANICAL SCHEDULES

E.5 SCHEDULE OF DOCUMENTS

Drawings

26.3176 Refer to Drawing Register for list of drawings

Drawing Registers

26.3176 Drawing Register

Technical Specifications

26.3176 Mechanical Specification

E SUMMARY OF PRICES - Please complete appendix 2 Bill of Quantities

ELEMENT 1 – CONTRACT PRELIMINARIES

1. Amount for General Preliminaries	€
2. Amount for compliance with Conditions of Contract:	€
3. Amount for compliance with requirements of Building Regulations:	€
4. Amount for compliance with Health, Safety, Welfare at Work Regulations	€
5. Amount for compliance with Work Safety Protocol (Covid 19)	€
6. Amount for coordinated drawings:	€
7. Amount for “as-installed” drawings:	€
8. Amount for marking out builders works requirements:	€
9. Amount for labeling and charts	€
10. Amount for all attendances:	€
11. Amount for attendance at site meetings:	€
12. Amount for O&M Manuals:	€
13. Amount for client instruction:	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 2 – SITE SERVICES:

1. Amount for any ground works (Give details)	€
2. Amount for any item not listed (Give details)	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 3 - PLANTROOM INSTALLATION:

1. Amount for new LPHW pipe work in plantroom	€
2. Amount for new pump, valves and accessories	€
3. Amount for new pipe work insulation in plant room	€
4. Amount for heating system pressurisation unit complete	€
5. Amount for buffer vessel complete	€
6. Amount for identification of services	€
7. Amount for testing and commissioning new installation	€
8. Amount for any item not listed (Give details)	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 4 - HEATING INSTALLATION:

1. Amount for disconnection and strip out works to existing system.	€
2. Amount for LPHW pipework	€
3. Amount for valves and fittings	€
4. Amount for new radiators and valves	€
5. Amount for pipework insulation	€
6. Amount for flushing out entire system and refilling and dosing the system	€
7. Amount for identification of existing services	€
8. Amount for testing and commissioning	€
9. Amount for any item not listed (Give details)	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 5 – WATER SERVICES

1. Amount for draining down existing systems and isolating same	€
2. Amount for connection of new water services pipework into existing systems	€
3. Amount for disconnection and strip out works to existing hot water pipework	€
4. Amount for new CWS pipe work and valve installation	€
5. Amount for new HWS pipe work and valve installation	€
6. Amount for new Undersink water heaters installed	€
7. Amount for new water services fixtures and fittings	€
8. Amount for thermostatic mixing valves at wash hand basins	€
9. Amount for installation of sanitary ware & connecting services to same	€
10. Amount for flushing out, disinfection and chlorination of water services system	€
11. Amount for pipe work insulation	€
12. Amount for labeling and tagging	€
13. Amount for testing and commissioning	€
14. Amount for any item not listed (give details)	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 6 –CONTROLS:

1. Amount for field items (actuators, sensors etc)	€
2. Amount for controllers and control panels	€
3. Amount testing and commissioning	€
4. Amount for any item not listed (give details)	€

TOTAL: (carried forward to Summary of Tender): €

ELEMENT 7 –BUILDERS WORKS:

- | | |
|--|---|
| 1. Amount for all openings holes, sleeves, chases, etc | € |
| 2. Amount for fire sealing of service penetrations | € |
| 3. Amount for plinths | € |
| 4. Amount for trenches | € |
| 5. Amount for any item not listed (give details) | € |

TOTAL: (carried forward to Summary of Tender): €

SUMMARY OF TENDER

- | | |
|-------------------------|---|
| 1. Amount for element 1 | € |
| 2. Amount for element 2 | € |
| 3. Amount for element 3 | € |
| 4. Amount for element 4 | € |
| 5. Amount for element 5 | € |
| 6. Amount for element 6 | € |
| 7. Amount for element 7 | € |

TOTAL MECHANICAL TENDER Ex VAT €

Contractors Signature

.....

Contractor's Address

.....

Date

.....

G FORM OF TENDER

Tender for the:
IWA Finance Building Clontarf

I/We

.....

Hereby tender and undertake to execute and complete all the Service required to be performed in accordance with the Form of Contract, Contract Conditions, Specifications, instructions for tendering and Instructions to Tenderers, and contained in therein and any other documents listed in the Specific Conditions of Contract for the following prices:

Tender Figure exclusive of VAT
(In words)

.....

Tender Figure inclusive of VAT
(In words)

.....

Contractors Signature

.....

Contractor's Address

.....

.....

Date

.....

H DECLARATION OF COMPLIANCE

Tender for the:
IWA Finance Building Clontarf

I/We

.....
.....

Hereby tender and undertake to execute and complete all the Service required to be performed in accordance with the Form of Contract, Contract Conditions and Specifications, instructions for tendering and Instructions to Tenderers.

In addition to this, we hereby confirm that our tender submission is in accordance and in full compliance with tender documents, including all associated specification and drawings.

Contractors Signature

.....

Contractor's Address

.....
.....

Date

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