

F.S.S. 8 : 2025
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FINGAL COUNTY COUNCIL
STANDARD SPECIFICATION

SPECIFICATION FOR
INSTALLATION OF
AIR TO WATER
HEAT PUMP CENTRAL HEATING SYSTEMS
IN NEW / EXISTING DWELLINGS

F.S.S. 8 : 2025

**SPECIFICATION FOR INSTALLATION OF HEAT PUMP CENTRAL HEATING SYSTEMS
IN NEW/EXISTING DWELLINGS**

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SPECIFICATION FOR INSTALLATION OF HEAT PUMP CENTRAL HEATING SYSTEMS IN NEW/EXISTING DWELLINGS

1. General

This specification covers the requirements and conditions for the installation of heat pump central heating systems into occupied or new build council dwellings. It should be read and construed together with drawings indicating layout of emitters and design of heating systems generally.

Heat pumps in new dwellings will be installed with underfloor heating and night rate electric meters. In existing dwellings, where it is impossible or impractical to install underfloor heating, properly designed and sized radiator circuits may be used.

System design must be in compliance with NSAI S.R.50-4. All system to be designed to a maximum flow temperature of 45°C

The system design will be as indicated on the Diagram 1 'Schematic Layout' appended, and with the heating and plumbing layouts.

All motorised valves, thermostats and programmers will be included to achieve maximum control and energy efficiency as specified. Samples of all materials will be supplied for approval by Fingal County Council before any installation work commences.

A twelve-month maintenance period applies to this contract. The true meaning and intent of all clauses of the F.C.C. General Housing Specification applies as do all clauses of the **current Capital Works Management Framework (CWMF) Public Works Contracts (PW-CF6 and any relevant sub-contract such as PW-CF11, where applicable to the works).**

2. Compliance with Regulations

The installation of heat pump central heating will be carried out by suitably qualified and competent tradesmen and in accordance with the Building Regulations. The contractor will be required to hold appropriate Certification to work on heat pump heating systems for Fingal County Council and evidence of this certification will be required before installation work commences. All installations must be tested, commissioned and certified in accordance with requirements.

3. Safety Statement

The contractor will be required to produce a current Health and Safety Statement in accordance with the Health and Safety at Work Act 2005

4. Equipment to be installed in each Dwelling

The central heating system shall comprise of a new air to water heat pump serving space heating zone(s) and a domestic hot water cylinder. Mono bloc heat pumps are to be installed with considerations on system volume as to rule out need for buffer tank.

The heat pumps in general are to be installed either floor mounted on ground level via a plinth on anti-vibration feet, or wall mounted on cantilever arm (with F.C.C approval) with integrated drip tray and condensate pipe fitted to drain.

The heating and hot water service shall be controlled automatically and independently by time and temperature. Dwellings above 100m² in floor area shall have independent control in sleeping and living areas. Ability to have set back temperature on space heating

Electrical check meters installed to monitor energy usage of heat pump system:

Digital DIN Rail-Mounted Meter

Feature	Specification
Standards	IEC 62052-11, IEC 62053-21
Voltage Input	230V AC (±20%)
Current Rating	Direct connection up to 100A
Display	Backlit LCD screen showing kW, kWh, Hz
Mounting	1-module DIN rail
Use Case	Heat pump & immersion heater monitoring in residential settings

Installation Notes:

- The number of meters (e.g., separate for heat pump & immersion) should be based on:
 - Heat pump manufacturer's recommendation, and
 - Final system layout, to ensure full capture of all dedicated circuit loads.
- If the digital meter cannot be accommodated in the existing consumer unit, an external enclosure configuration must be proposed and agreed with the Fingal Electrical Inspector in advance.

Frost protection installed to protect the outdoor unit from power outages.

Strainer and isolation valves

Weather compensator

Cage for outdoor unit:

Protective Cages

- **General:** Contractor to supply and fit mild steel protective cages to all ground-floor external heat pump units to provide protection against impact and vandalism.
- **Clearance:** The cage must provide a minimum clearance of 300mm (or greater if specified by the Heat Pump Manufacturer) on all air-intake and discharge sides to prevent air recirculation and performance loss.
- **Airflow:** The mesh design must provide a minimum 75% open area to ensure zero restriction to airflow.
- **Materials & Construction:** Frame: 50x50x3mm Mild Steel RSA (Rolled Steel Angle) frame with fully welded joints. All sharp edges/burrs to be removed.
- **Infill:** 3mm steel weld-mesh with a 25mm x 25mm aperture (or similar approved) welded to the frame.
- **Finish:** Hot Dipped Galvanised to IS EN ISO 1461 (Post-fabrication).
- **Fixings:** Cage to be mechanically fixed to the concrete plinth using chemical anchors or stainless-steel masonry bolts. Where wall fixing is required for stability, rubber isolation washers must be used to prevent vibration transfer. All external fixings to be Tamper Proof.
- **Foundations:** The concrete plinth must be extended sufficiently to accommodate the cage footprint while maintaining the required 300mm clearance from the unit.

The Contractor must ensure that the heat pump is securely fixed on an approved floor mounted fixing system. Where the background material or structure is inadequate to support the heat pump, the Contractor must install, or arrange to have installed, an appropriate support system to safely support the heat pump.

The Contractor must also ensure that adequate space is provided for the removal of all access panels to allow proper maintenance. Any structure built around the heat pump or indoor unit must not interfere in any way with the correct operation of, or access to the heat pump and all ancillary equipment, including isolation valves and electrical accessories or for maintenance.

The location of the heat pump drain discharge point must be installed fully in accordance with the recommendations of the manufacturer and as agreed with the Client.

A sleeve must be provided where the pipe work exits through the external wall and with bezels fitted to the internal and external face of the wall. The pipe work must not contain any joints within the wall sleeve.

5. Heat Pump

Minimum requirements: The heat pump must meet the following minimum requirements:

Monobloc heat pumps are to be installed unless agreed upon prior to design.

Coastal protection should be installed where a heat pump manufacturer state there a risk of coastal erosion.

The heat pump unit must be registered on the SEAI Triple-E database or be confirmed to have similar technical requirements.

The new heat pump should be inverter driven (allowing maximum efficiency at part load and full load) and have a rated seasonal coefficient of performance @35°C flow of at least 4.2 (420% efficiency), and a rated seasonal coefficient of performance @55°C flow of at least 3.2 (320% efficiency).

The heat pump must not incorporate a buffer tank.

The heat pump shall be compatible with third party programmable room thermostats.

The new heat pump system shall be capable of being connected and operated through the internet or GSM remote maintenance alarm facility.

The heat pump shall have the ability to internally monitor electrical usage and the heat output and provide an up-to-date C.O.P

The heat pump should be of sufficient capacity to satisfy the heating load at -3°C outdoor temperature (to be met by the heat pump's compressor only).

There should be time & temperature functions for each heating and hot water zone.

There should be automatic operation via weather compensation for space heating temperatures.

There should be a backup immersion (minimum 3kW) should be present.

There should be the ability to disable and lock cooling mode on the main controller.

The heat pump installed shall have an operating sound power level of no greater than 45dBA from the external unit in operation at full load / speed or alternatively a sound pressure level of no greater than 40dBA from the external unit in operation at full load / speed when measured at the nearest dwelling wall / window / opening.

The heat pump shall be capable of carrying out a legionella thermal disinfection of the hot water cylinder weekly, maintaining the temperature in the cylinder at least 60°C for a minimum of 60 minutes.

The heat pump should have a minimum **seven-year warranty**.

System Operation

Efficient operation of the system is essential, and the main requirements are:

Always maintain a space heating flow temperature as low as possible to maximise the efficiency of the system.

Achieve an optimum cycling rate, which is not excessive.

Expansion and contraction to be taken up by the use of a sealed system with filling loop and expansion vessel.

Pipes shall be joined according to approved standard methods to B.S. / I.S. Codes of Practice.

Flow and return pipework from the heat pump shall have a minimum diameter of 28mm to the first radiator outlet of each circuit or further as appropriate to achieve the satisfactory flow rate.

No joints shall be used on pipework within the concrete slab between radiator outlets, as this will allow for easy withdrawal and replacement.

The heat pump system shall operate at 230 Volts 50 Hz single phase. It shall be suitable for operation with, and connection to a sealed system.

Where a heat pump unit is enclosed in a cupboard or compartment, particular attention shall be given to its ventilation requirements in accordance with the Building Regulations 2014 Part J.

6. Domestic Hot Water Cylinder

Unless otherwise advised by F.C.C., all heat pump retrofits will require the hot water cylinder in the dwelling to be replaced.

The new cylinder may be integrated into the indoor unit of the heat pump system (in the case of certain split combination systems), or it may be a stand-alone cylinder as part of a traditional split system or monobloc heat pump system.

The cylinder shall be a fully factory insulated floor-mounted type complete with flow and return primary pipework connections including HWS flow, control thermostat, high limit thermostat, drain cock and thermometer, and should come complete with a temperature & pressure combined relief valve. **The new cylinder shall be approved by the heat pump manufacturer or confirmed as heat-pump compatible.**

The unit shall be thermally insulated to ensure compliance with TGD Part L and be either ErP B rated or have a standing loss of less than 2kWh/day when measured as per **IS EN 12897:2016 for standing loss measurement.**

The unit should be minimum 150-litre capacity and a heating coil capable of recovering the DHW to 50°C from cold in less than 1 hour.

The cylinder shall be stainless steel, copper or enamelled (glass lined) type.

The Contractor must obtain from the manufacturer a test certificate for the cylinder that must include the material thickness for the cylinder shell and domes together with the grade and surface area of pipework used for the heating coil.

Ability to override back up immersion as to provide hot water in cases of system failure.

7. Heating Circulation Pumps

The Contractor must select a suitable pump to match the system pressure and flow characteristics. The heat pump manufacturer recommendations must also be adhered to and taken into account when selecting a suitable pump. The Contractor must ensure that the pump selected is sufficiently rated to correspond with the pressure and flow requirements of the system. If a separate circulating pump is installed, then separate pipework mounted isolating valves must be fitted. In order to ensure a properly integrated system of control for the pump, the heat pump controls system must be capable to power and control the operation of the external circulation pump.

8. Radiators

When radiators need to be installed, the radiators shall be as detailed in the schedule or similar in output and physical dimensions. A copy of the radiator size schedule shall be provided from the relevant radiator manufacturer before any heating pipework is installed. Each radiator shall be a set height locating the bottom of the radiator between 150mm and 175mm from the finished floor level. All pipework above ground to radiators and fixtures shall be either fully vertical or horizontal and in line with the intended position of the appliance. Where pipework is boxed in underneath radiators, a gap of 75mm must be maintained underneath the radiator to allow for air circulation around the radiator. The radiators shall be steel plate, roll top, convector type. The contractor is to include for removing and refitting the radiators for painting purposes. Each radiator shall be capable of producing their stated output. The radiators shall be hung distributing the weight evenly in their brackets and using any noise reducing devices supplied. The lowest radiator, or one of the radiators fitted on the ground floor shall be fitted with a drain tail 15mm min outlet or similar suitably located to allow for flushing and future draining of the system.

All brackets and supports must be secured to the wall with suitable fixings to ensure adequate support for each radiator. The Contractor must ensure that the background on to which radiators are to be securely fixed, is adequate to take the weight of each radiator and robust enough to accept the fixing devices.

All new or replacement radiators must be sized on the new design temperatures and shall be sized on a maximum adjustment factor of a 22°C mean water temperature difference, as per EN standard.

Radiator Positioning

The final exact location for each radiator within each room, will be agreed prior to installation. Following installation, the protective cover shall be replaced to protect the enamel finish during the remaining period before hand over. All solder flux residue must be removed, and pipework cleaned when cool immediately after soldering is complete. All areas (including hot press) where soldering is intended, must be properly protected from scorching using appropriate protection mats or cool gel liquid.

Radiator Valves

EPH, Danfoss - thermostatic radiator valve, or equal approved, fitted to each bedroom radiator (except for the radiator located in the same proximity of the room thermostat) this radiator shall be fitted with a lock-shield valve at both ends. All thermostatic radiator valves shall be fitted to the flow pipe in a vertical position.

9. Sealed System and Expansion Vessel

Where the existing system is a sealed type, the Contractor shall supply and install a filling loop and expansion vessel adjacent to the heat pump. The filling loop shall be a flexible stainless-steel hose with union connections at each end and incorporate a 0 - 4 bar pressure gauge, dual non-return valves and quarter-turn isolation valves. Any fill line fed from a boosted supply or any supply with inlet pressure greater than 1.3 Bar shall be fitted with a pressure reducing valve.

The Contractor must ensure that the expansion vessel is securely fixed to the wall and set at the correct initial cold fill pressure. The expansion vessel and filling loop must be connected to the system in accordance with the manufacturer's requirements and be located in conveniently accessible positions to allow easy operation, setting, refilling and maintenance.

The make-up water for the heating system will in general be supplied from the incoming mains water pipework. The mains water supply pipework must incorporate a stopcock. On completion of the installation, and after the completion of satisfactory tests, the filling loop must be isolated and disconnected from the incoming mains water supply.

If the existing system is an open system or semi-sealed system, it should be converted to a sealed system as described above.

10. Heating Controls

The Contractor must ensure that the heating / DHW system controls systems fully comply with the requirements of the Building Regulations Technical Guidance Documents TGD 'L'.

The control systems must be configured to ensure that the heat pump does not operate or cycle when there is no demand for heating or domestic hot water. However, the strategy should ensure that cycling should be kept to a minimum to encourage optimum heat pump performance and efficiency.

Time and temperature control room stats to be installed to allow for operation of set back temperatures. Time and temperature control room stats, Heatmiser Neo V2 or similar, shall have a minimum of four on / off times and four different temperature settings.

All room thermostats to be installed in locations agreed with the Client prior to installation. The main room thermostat will normally be fitted in the hallway or living area and should be located in areas not affected by direct solar gain or adjacent radiators and be mounted at a height of 1,500mm above floor level in accordance with manufacturer's instructions.

The controls strategy should generally be configured on a DHW priority basis, with the system reverting to space heating once the DHW cylinder setpoint is satisfied. This can be achieved via a 3-way valve arrangement.

The number of space heating zones should be kept to the minimum and agreed in advance.

A thermostat shall be installed to control the output of the heating system (radiators) in conjunction with thermostatic radiator valves. If the house is in excess of 100m², then the living areas must be controlled separately from the bedrooms.

All thermostats shall be hardwired only. All thermostats shall be mains powered and no batteries shall be required for any thermostats or programmers.

The heat pump operation must be automatically interlocked to ensure that it switches off when there is no time or temperature requirement for heating or domestic hot water.

Space heating shall be set to operate at a particular temperature / weather compensation setting, with a maximum flow temperature of 45°C (depending on radiator sizes in the dwelling).

Domestic hot water shall be set to operate at a typical cylinder setpoint of 48°C with a 10°C hysteresis i.e. the heat pump will heat the cylinder to 48°C then allow it to cool to 40°C before switching over the DHW circuit again.

All items of control equipment, thermostats and motorised valves, must be wired in accordance with the manufacturer's specific control equipment requirements and instructions to suit the configuration of the particular system.

The heat pump system shall be capable of being connected and operated through the internet via mobile phone, pc or laptop. Remote access would be preferred where presence and quality of Wi-Fi allows.

The heat pump controller must have a built-in memory function with a minimum memory capacity of two weeks.

The heat pump controller must have the ability to service/installer lock the control panel and set individual access codes for unlock.

11. Pipework

Retrofits:

The pipework connecting to the heat pump, cylinder and filling loop shall be copper tube to **IS EN 1057**. Where copper pipework has to run in a concrete slab or in a chase in a floor it shall be insulated with approved flexible polyethylene pipe insulation and further covered with polyisobutylene and shall have a minimum cover of 50mm from the top of the insulation. All joints on the insulation and covering shall be tight and taped. Care should be taken to ensure no gaps are left. At no point shall the copper come in contact with concrete, plaster or masonry. Copper pipework under floor joists or floor boards shall be insulated along its full length with approved flexible polyethylene pipe insulation between joists to prevent any contact with electrical wiring.

Where pipes are buried or concealed under floors the heating contractor shall plan to ensure that the minimum possible number of joints is made and pipes shall be joined by use of pre-soldered capillary fittings. All soldered joints shall be cleaned of all excess flux residues when cool as the installation progress.

ALL PIPEWORK TO BE BURIED SHALL BE PRESSURE TESTED SEPARATELY TO THE REST OF THE SYSTEM. IT SHALL BE SUBJECT TO A TEST 3bar AND REMAIN DROP TIGHT FOR A PERIOD OF 2 HOURS.

Radiator circuit flow and return pipework must be a minimum of 22mm diameter to the second last radiator to include pipe drops to accommodate ground floor radiators.

Pipe runs in as far as is practicable, shall be either horizontal or vertical. All pipework shall be supported clear of the supporting surface. Pipe clips screw fixed pipework brackets as designed for use with copper tube to **IS EN 1057** shall be used throughout and shall be placed at spaces no exceeding intervals outlined in table below. Pipe clips shall be of a type, which will ensure no contact between the pipe and the surrounding surface. Single nail clips & Galvo band are not acceptable for this purpose.

All components fitted to the heating system should be accessible for maintenance and replacement purposes.

Pipework for New Heating Systems:

All heating pipework installed shall be copper pipework **IS EN 1057** or pre-approved PEX 'Pipe-in-Pipe' using hydraulic crimp / compression type fittings secured to the pipework using a press tool, connecting the radiators to dedicated manifolds located in an appropriate position on the ground floor and hot-press on the 1st floor (if applicable) to include independent isolation valves for all primary circuit connections, and all branch points. Isolation valves shall be installed on the primary flow and return pipes at the outdoor unit to allow for maintenance and removal. Isolation valves, in all cases, shall be ball type, lever action units clearly indicating the status of the valve. Push type fittings will not be acceptable for this purpose in any part of the installation.

The Contractor shall be responsible to ensure that the full installation in its entirety is coordinated in advance with other contractors and trades to avoid clashing with other services.

Each pipe connecting the radiators shall be contained within a sleeve from the manifold and shall be continuous without any joints allowing for easy withdrawal and replacement. The Contractor can be requested to demonstrate the removal and re-instatement of the PEX pipework at selected locations.

All pipework passing through walls or concrete floors shall be sleeved.

All pipework installations shall be in accordance with best practice, the relevant methods and appropriate I.S. and B.S. standards and Codes of Practice.

The heating circuit shall be a two-piped system using copper pipework to I.S. 283 I.S.EN 1254-1, I.S. EN 1254-2, I.S. EN 1254-3, I.S. EN 1254-4 and I.S. EN 1254-5.

Lead free solder and flux shall be used for copper jointing or press fittings. No compression fittings are to be used bar valves, strainers zone valves etc.

To avoid reverse circulation all radiator returns should be commoned together before the final connection to the boiler and the DHW return connection should be positioned as the first connection on the return pipe to the boiler.

Pipework insulation

The Contractor shall allow for the removal of **all** existing pipework insulation around the boiler and other locations depending on the system type being installed. Existing gas pipework to be removed and terminated at gas meter when no other gas supply to house is needed e.g. cooker.

New thermal insulation must be applied to all new and existing heating pipework, the only exception being where the pipework within the space or room can contribute to the useful heat of that area.

All heating services pipework shall be insulated throughout all concealed runs as appropriate to the duty in accordance with current good practice for the purposes of energy conservation and prevention of heat transfer and condensation. Pipework installations shall be insulated with close cell Armaflex insulation, standard BS: 3958 Part 4, Class O.

All pipework in ducts shall be properly lagged along their full length with approved flexible polyethylene pipe insulation and have a wall thickness of at least **19mm**.

All piping in attic spaces to be lagged with approved flexible polyethylene pipe insulation having a minimum wall thickness of 22mm. Pipes, all joints fully sealed with a suitable insulating tape. Insulation should be neatly fitted with formed mitred joints at elbows and tees and should cover all valves and fittings. The manufacturer's approved adhesives should be used on all butt and seam joints.

Pipework run externally shall be encased and routed as per refrigeration copper. The thickness of the insulation on the external pipework shall be as per above and requirements of TGD-L.

In general all external pipework shall be enclosed in a galvanised steel box trunking with a removable cover.

All pipework insulation external or in direct sunlight shall be UV rated and resistant.

All valves and fittings are to be insulated as per adjacent pipe work.

All insulating material used shall comply fully with the requirements of EN5442 & BS 476, Parts 6 & 7.

Refrigeration pipework insulation shall have a thermal conductivity of 0.035W/mK and be to the thickness as follows:

- Pipe outer diameter $\leq 5/8"$ & run under 5m; Insulation thickness = 10mm minimum
- Pipe outer diameter $\leq 5/8"$ & run over 5m; Insulation thickness = Pipe outer diameter
- Pipe outer diameter $\geq 5/8"$, any length; Insulation Thickness = Pipe outer diameter

All refrigeration pipework insulation external or in direct sunlight shall be UV rated and weather resistant.

12. Safety Valve

The heating safety valve discharge pipe shall be of 15mm copper tube, and the discharge should terminate at low level to a visible position outside the building facing downwards. The discharge pipe from the safety valve should incorporate an inline tundish to allow visual indication and observation of the safety valve operation. The tundish must always be fitted inside the house and never externally or in areas at risk of freezing.

The heating system to be fitted with a heating safety valve, either pressure only or temperature and pressure type.

The DHW system to be fitted with a temperature and pressure combined safety valve on the cylinder. All pressurised cold-water supplies shall have a pressure relief valve fitted on the inlet.

13. Frost protection

The heat pump and heating system shall be protected from frost. In general this is to achieved by the use of an anti-freeze valve. Glycol is only to be used if agreed in advance and is stated by the manufacturer.

14. Automatic Bypass

An automatic bypass valve shall be fitted between the primary flow and return pipework and set to give the minimum flow rate required for the correct operation of the heat pump when all other circuits are closed. The bypass shall be fitted in an accessible position for setting and maintenance purposes. Alternatively, an approved low loss header should be installed, complete with drain-off valve and air vent, to guarantee adequate flow through the heat pump.

15. Magnetic Filtration Unit

A magnetic filter unit shall be installed on the primary heat pump circulation pipework in a convenient position on the return pipework, near the heat pump, and in accordance with manufacturer's instructions. The unit must be easily accessible for maintenance. The unit must also incorporate integral isolation valves on the inlet and outlet connections.

16. Condense Discharge

A plastic drainpipe must be installed to discharge the condense defrost water from the heat pump evaporator to the disposal discharge point. A hard plastic overflow pipe with a fall of at least 2.5 degrees, fixed with brackets spaced at 0.5m intervals, shall be used to discharge the condense water from the heat pump.

Where possible the condense water should discharge into an internal sink waste pipe, waste stack or soil stack. A condense drain should not discharge into copper pipe or cast-iron water pipe.

Where the condense pipe terminates outside, the pipework size will increase to 32mm in diameter and terminate to a nearby gully. The pipe run should be kept as short as possible, ideally less than 3m. Where a gully is not available an external soak pit will be provided complying with the required heat pump manufacturer specifications, and SEAI requirements.

17. Valves & Stopcocks

Isolation and regulating valves, drain cocks, stop cocks and safety valves, shall be installed in the positions noted in this specification, and in locations as required to comply with good practice guidelines. Isolation valves on both flow and return within 1m of the outdoor unit.

Drain cocks shall be provided on all low points of the system and as noted in this specification. Drain cocks shall be installed complete with hose union and blank cap secured to the body of the valve and must be in easily accessible locations to allow maintenance.

18. Air Vents

Automatic air vents must be installed on all separate sections of high-level pipework. Each vent must be complete with an isolation valve. All vents and valves must be adequately supported. They must have a gradual rise and be accessible for maintenance purposes.

19. Brackets & Supports

All copper pipework must be adequately supported using brass or copper brackets securely fixed to the wall or ceiling with non-ferrous fixing devices, galvanised steel brackets must have a suitable rubber gasket to prevent direct contact between pipe work and galvanised steel bracket. Plastic brackets or galvanised steel bands shall not be used.

Pipework shall be supported at a change in direction unless other agreed with the Client. Pipework supports shall be arranged as near as possible to the joints, and the distance between pipe supports measured along straight runs shall not exceed the following:

Pipe Bore (mm) Support Centres (m)

Nominal size (mm)	Interval for vertical runs (m)	Interval for horizontal runs (m)

Up to 15	1	1
22	1	1
28	2	1

20. Flushing of system

After completion of all the distribution pipework the Contractor must flush out the heating pipework and radiators with a suitable cleanser. All items of equipment such as the new air to water heat pump, circulating pump, hot water heater and magnetic system cleaner installed on the system pipework, must be removed or isolated during the pipework flushing activity.

A written log detailing the chemical(s) used for this activity must be included in the record documentation. All dirty water removed from the system after the flushing process, must be properly disposed of safely and in accordance with good practice.

21. System water treatment

When the flushing is completed and the flushing liquid completely drained down, the system must then be filled with clean water treated with the correct concentration of corrosion inhibitor to protect against scale and corrosion. The corrosion inhibitor must be as recommended by the heat pump manufacturer, be suitable for systems with mixed metals, non-hazardous, non-toxic and environmentally friendly.

The correct inhibitor concentration must be checked with an appropriate test kit to ensure that the minimum level for proper protection has been achieved and is in full compliance with the requirements of the heat pump manufacturer. A written log of this result and the chemical(s) used, must be included in the record documentation.

A post installation water quality test report shall be submitted as part of each installation.

22. Testing and commissioning

The heat pumps shall be commissioned according to the manufacturer's instructions. The Client shall be informed in good time as to when the commissioning will take place.

Commissioning must be carried out by the manufacturer or a 3rd party engineer certified and trained by the manufacturer.

The Contractor must test and record the electrical usage and operation parameters of the heat pump during commissioning in heating and hot water mode separately when on full load.

The Contractor shall ensure that the air to water heat pumps are set for weather compensation using an external sensor directly connected to the heat pump controls. The weather compensated control must be commissioned at the same time the air to water heat pump is being commissioned and recorded on Appendix A

The pipework circulation circuits must be of a two-pipe configuration with all heat emitter flow rates balanced to provide their correct output and temperature drop.

The air to water heat pump water flow rate must also be set to ensure a temperature differential as required by the manufacturer.

All actual settings input on the air to water heat pump are to be fully recorded and submitted i.e. temperature bands, hot water hysteresis, temperatures, times etc.

The completed heating circuit pipework must be pneumatically or hydraulically pressure tested to 3.0 bar for a period of at least 2 hours. No appreciable drop in pressure must be observed at the conclusion of each test.

All pressure tests must be undertaken and satisfactorily completed before the full operational commissioning of the system takes place. The system shall be flushed prior to being pressure tested.

Correct operation of the programmer, motorised valves, room thermostat, cylinder thermostat and all T.R.V.s shall be checked and recorded.

Expansion vessel charge shall be adjusted to suit the static head pressure available.

Heat recovery time for the DHW cylinder shall be checked.

Anti legionella operation to be checked at time of commissioning, ensuring set temperature is reached. This test must be recorded on commissioning sheet.

When all the necessary tests are completed, all commissioning has taken place, and the system is made operational and it is operating in accordance with the specified parameters, then the normal operation of the system and controls, where requested, must be fully demonstrated to the Client.

Submit relevant documentation to the Client showing test results.

19.Cages

All heat pumps must have cages installed where heat pumps are located at ground level. **Cage types to be submitted to client and approved ahead of install.**

20.Testing heating system and balancing radiators

Ensure all external controls and programmers are calling for heat.

Fully open all radiator valves on the heating circuit and vent as required.

Balance the radiators as required to give the required system differential.

Correct operation and balancing of all radiators shall be checked for correct operation and heat on full load. Flow and return temperatures recorded via temperature sensor or radiator temperature recorded via thermal imaging camera and recorded.

21.Testing domestic hot water

Open hot water taps and check that the temperature and flow are compliant with the relevant regulations and with the settings on the boiler and cylinder. Recorded findings.

23. Labelling and identification

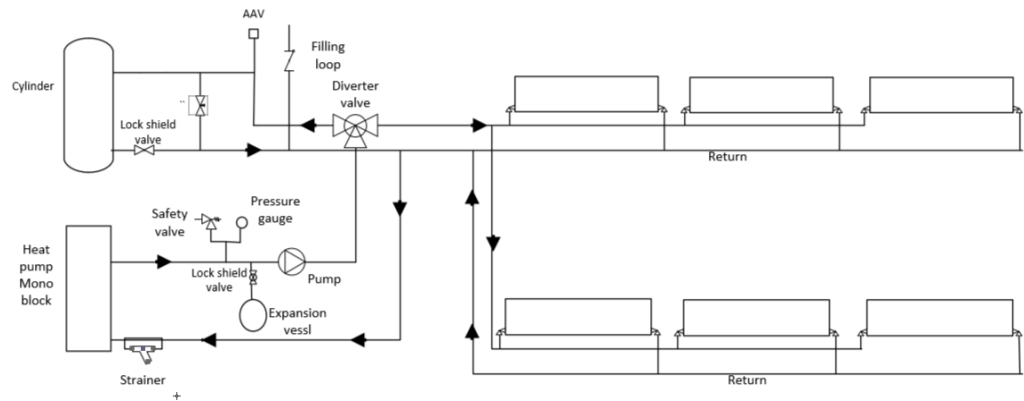
Labelling and identification must be completed in accordance with the following requirements. The Contractor must label all isolation and control valves with a numbered label. A printed schedule of all valves, and their function must be fixed, in a prominent position, to the wall or door of the heat pump compartment. The schedule must be enclosed in a protective plastic cover and a copy also included in the submission of the recorded documentation.

The labelling must also include the relevant Irish and European statutory equipment labelling requirements such as the ErP labels on heat pump, cylinders, etc. ErP system labels and information shall be supplied fully completed by the contractor for each individual installation.

Each heat pump shall have an identification sticker affixed to the front casing of the indoor and outdoor unit stating the installation date and name of contractor.

As part of the performance specification and performance-based equipment schedules reference should be made to the requirement that equipment proposed is either Triple E Registered or satisfies the same criteria required for Triple E Registration and evidence of same should be provided prior to installation stage to verify same.

24. Diagram



25. APPENDIX A

Fingal County Council

Completed project form

Property Address	
Eircode	

Heatpump electrical energy usage	
Tenant meter reading	
Check meter 1	
Check meter 2	
Date of recordings.	

KWH
KWH
KWH

Name of Instraller	
Responsible person	
Signature	

Checklist hand over	
---------------------	--

Tenant Induction hand over	
----------------------------	--

Date of install	
-----------------	--

Heat Pump manufacturer	
---------------------------	--

Heat Pump model	
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Heat Pump output		KW
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Haet Pump serial No	
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Date of commissioning	
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Heat Pump Serial No:
Cylinder Serial No:
Indoor Unit Serial No:
Room Stat Manufacturer

Check List		
	Notes	
	Notes	
	Notes	
	Notes	

Location of room stat or stats
 Anti vibration feet fitted
 Condense line connected to drain
 Anti-Freeze Valves fitted
 Lagging completed
 Cage fitted
 Filter fitted
 Filter manufacturer
 Auto bypass fitted
 Bypass valve flow rate
 Expansion vessel fitted
 Expansion vessel charge
 Safety valve fitted
 Safety valve pressure setting
 Immersion tested
 Inhibitor used
 Manufacturer of inhibitor
 Radiators Installed
 Radiator manufacturer
 Radiator Valve manufacturer
 3 Port valve fitted
 3 port manufacturers
 2 Port valve fitted
 2 port manufacturers
 KWH check meter installed
 KWH check meter manufacturer

				Notes	
Yes		No		Notes	
Yes		No		Notes	
Yes		No		Notes	
Yes		No		Notes	
Yes		No		Notes	
Yes		No		Notes	
				Notes	
Yes		No		Notes	
			Bar	Notes	
Yes		No		Notes	
Yes		No		Notes	
Yes		No		Notes	
			Bar	Notes	
Yes		No		Notes	
Yes		No		Notes	
				Notes	
Yes		No		Notes	
				Notes	
				Notes	
Yes		No		Notes	
				Notes	
Yes		No		Notes	
				Notes	
Yes		No		Notes	
				Notes	

Weather Compensation
 External temperature upper setting
 External temperature lower setting
 Heat Pump flow temp upper setting
 Heat Pump flow temp lower setting
 Heat Pump heating mode Hysteresis
 Hot water setting
 Hot water temperature setting
 Heat Pump hot water mode hysteresis

	°C	Notes	
	°C	Notes	
	°C	Notes	
	°C	Notes	
	°C	Notes	
	°C	Notes	
	°C	Notes	
	°C	Notes	

Living Room rad size	
Living room rad output	Watts
Flow temperature	°C
Return Temperature	°C
Kitchen rad size	
Kitchen rad output	Watts
Flow temperature	°C
Return Temperature	°C
Hall rad size	
Hall rad output	Watts
Flow temperature	°C
Return Temperature	°C
Landing rad size	
Landing rad output	Watts
Flow temperature	°C
Return Temperature	°C
Bed 1 rad size	
Bed 1 rad output	Watts
Flow temperature	°C
Return Temperature	°C
Bed 2 rad size	
Bed 2 rad output	Watts
Flow temperature	°C
Return Temperature	°C
Bed 3 rad size	
Bed 3 rad output	Watts
Flow temperature	°C
Return Temperature	°C
_____ rad size	
_____ rad output	Watts
Flow temperature	°C
Return Temperature	°C
_____ rad size	
_____ rad output	Watts
Flow temperature	°C
Return Temperature	°C

