GEANEY
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PROFESSIONAL BUILDING SERVICES & ENERGY REDUCTION CONSULTANTS

# MECHANICAL EQUIPMENT SCHEDULE

***PROJECT NAME: Emergency Works Scheme Heating Upgrade at Bridgetown College, Bridgetown, Co. Wexford.***

***PROJECT REFERENCE: 0862***

***PROJECT STAGE: Tender***

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**1.1 GENERAL REQUIREMENTS**

All equipment shall be supplied by manufacturers and suppliers who meet the following minimum requirements:

1. **References and Proven Performance**
    - Suppliers shall provide, on request, a minimum of ten satisfactory references for previous installations utilising the same or similar equipment.
2. **Fitness for Purpose and Environmental Suitability**
    - All equipment shall be demonstrably suitable for its intended function and capable of reliable operation under the environmental and weather conditions prevailing at the project site.
3. **Regulatory and Standards Compliance**
    - All equipment and associated systems shall comply with all relevant statutory regulations, including the current Irish Building Regulations, associated Technical Guidance Documents and all applicable DoEY TGD/SDG Documents, EU directives and industry standards.
    - All plant and equipment shall bear the CE mark or equivalent approved certification where applicable.
4. **Technical Support**
    - Suppliers shall provide a technically competent representative who is fully knowledgeable in the design, installation, commissioning, and operation of the proposed equipment.
5. **Triple E Scheme Compliance**
    - Where applicable, equipment falling under a Triple E technology category shall be listed on the Triple E Register or shall meet all criteria defined for that technology.

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**WARRANTIES**

- The contractor shall provide manufacturer warranties or extended warranties for all equipment for a minimum period of 15 months beyond Practical Completion.
- Warranty documents shall be submitted as part of the handover documentation.

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**NOTES**

- Schedules must be read in conjunction with relevant parts of the Mechanical Specification.
- The contractor shall ensure all proposed equipment fully complies with this specification before procurement.
- Any equipment installed that does not comply with the specification shall be removed and replaced at the contractor’s cost.
- References to "equipment" include all plant, components, accessories, and materials.
- All required as-built documentation, commissioning sheets, and certification shall be submitted.
- Alternative products must be submitted for approval with full datasheets. No substitutions may be installed without prior written approval from the Engineer.

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# 1. GAS FIRED BOILERS

| | |
|---|---|
| **Reference** | B-N1 & B-EX1 |
| **Quantity** | 1 (new) & 1 (changed burner) |
| **Description** | New Floor-standing, low-temperature, pressurised cast iron boiler for heating applications, complete with control panel and suitable for operation with a LPG burner. Existing floor-standing, low-temperature, pressurised cast iron boiler with replacement LPG burner. |
| **Specification** | De Dietrich GT 430-9 or equivalent |
| **Fuel** | LPG |
| **Gas Valve** | Complete LPG gas train incorporating automatic safety shut-off valves, pressure regulator, gas filter and required control/safety devices, sized to suit the selected burner and boiler |
| **Burner Type** | Fully modulating LPG pressure-jet burner, suitable for De Dietrich GT 430-9, complete with automatic burner management, ignition and flame supervision. |
| **Combustion Chamber** | Pressurised combustion chamber, suitable for LPG firing; 530 mm diameter × 1343 mm depth, approximately 0.354 m³ volume. |
| **Heat Exchanger** | Eutectic cast-iron sectional heat exchanger with three-pass flue gas arrangement, designed for low-temperature operation. |
| **Flue Fan** | 4No Variable-speed premix fan |
| **Hydraulic Unit** | Integral primary hydraulic manifold complete with sensors and condensate system; External INAIL hydraulic safety kit comprising stainless steel plate heat exchanger, circulation pump, expansion vessel, safety valve assembly, Pressure switches, Flow switch, Pressure gauge, Temperature gauge, Automatic air vent, Isolation valves and drain valves. |
| **Safety Devices** | High-limit thermostat, pressure sensors, safety valve, flame supervision, condensate safety controls |
| **Control Panel** | Burner to be fully modulating and controlled via the BMS system. |
| **Max. Nominal Heat Input (kW)** | 450.0 kW |
| **Min. Nominal Heat Input (kW)** | 22.0 kW |
| **Max. Useful Heat Output (80/60°C) (kW)** | 390 kW |
| **Min. Nominal Heat Output (80/60°C) (kW)** | 20.6kW |
| **Efficiency at 100% Pn (80/60°C)** | 98.21% |
| **Efficiency at 30% of the load (80/60°C)** | 96.60% |
| **Casing losses with burner on (100% Pn) (80/60°C)** | 0.10% |
| **Casing losses with burner on (P min) (80/60°C)** | 5.04% |
| **Casing losses with burner off** | 0.10% |
| **Adjustable central heating temp.** | 40-85°C |
| **High Limit Set Point °C** | 90°C |
| **Max. Operating Pressure** | 6bar |
| **Boiler Water Content** | 409L |
| **Net - gross boiler weight** | 2072kg |
| **Electrical** | 230/1/50Hz |
| **Maximum absorbed electric power** | 626W |
| **Minimum absorbed electric power** | 54W |
| **Gas flow rate at Methane Burner** | 2.33 - 45.68 m3/hr |
| **Ambient operating range** | 0 to 40°C |
| **CO2 at the Max. Heat Input** | 9.1% |
| **CO2 at the Min. Heat Input** | 9.1% |
| **CO at Maximum Heat Input** | 93.1mg/kWh |
| **CO at Minimum Heat Input** | 1.4mg/kWh |
| **Nox at the Maximum Heat Input** | 68mg/kWh |

| | |
|---|---|
| **Nox at Minimum Heat Input** | 46mg/kWh |
| **Weighted CO G20** | 26.3mg/kWh |
| **Weighted Nox G20** | 47mg/kWh |
| **Nox Class** | 6 |
| **CO2 at the Maximum Heat Input** | 8.8% |
| **CO2 at Minimum Heat Input** | 8.8% |
| **Design Flow Temp** | 80°C |
| **Design Return Temp** | 60°C |
| **Flue Connection Size** | DN250 |
| **Gas Connection** | DN50 |
| **Condensate Connection** | 40mmØ |
| **System Flow Connection** | DN100 |
| **System Return Connection** | DN100 |

**Notes:**

1. Boiler to be fully automatic.
2. Boiler to be controlled via the BMS system.
3. All boilers to come complete with high temperature cut out.
4. Boiler burners to be fully modulating.

# 2. BOILER FLUE

| Reference | Description |
|---|---|
| B-EX1 & B-N1 | Boiler Flue shall be Type B23 configuration, as defined by European standard EN 1749. Combustion air shall be drawn from the environment where it is installed. The flue gas exhaust shall be ducted directly to external with a 316L Twin wall insulated Flue and Flexible 316L twin wall liner in accordance with EN 1856-2 T200 P1 as indicated on drawings. |

**Notes:**

1. The detailed design, structural stability including all anchoring of the flue arrangement shall be the sole responsibility of the Contractor.
2. All Changes of direction in flues must be limited to a maximum angle of 45°
3. Include for all weathering required for wall and or roof penetrations.

## 3. PUMPS

| | P01 | P02 |
|---|---|---|
| **General** | | |
| Function | Heating Circuit Pump<br>Boiler to Heat Exhanger | Heating Circuit Pump<br>Pump<br>Heat Exhanger to Boiler |
| Location | Plantroom | Plantroom |
| Number/Type | Single Head | Twin Head |
| Sample Manufacturer | Wilo/Grundfos | Wilo/Grundfos |
| Sample Product | Stratos-D/Magna3 | Stratos-D/Magna3 |
| **Duty** | | |
| Flow Rate (kg/s) | 10.77 | 10.77 |
| Pres. Drop Bar | 1.20 | 5 |
| Fluid Temp (°C) | 82 | 82 |
| **Accessories** | | |
| Flexible Connections | Yes | Yes |
| Test Points | Yes | Yes |
| **Electrical** | | |
| Power Supply | 3Phase | 3 Phase |
| Speeds | Variable | Variable |
| **Controls** | | |
| MCC Overrun Control | Yes | Yes |
| MCC Failure Alarm | Yes | Yes |
| BMS Failure Alarm | Yes | Yes |
| BMS Monitoring | Yes | Yes |

## 4. HEAT EXCHANGER

| Reference | Description | Maximum managed power | Primary Flow rate 80°/65° | Secondary Flow rate 70°/60° | Max. Operating Pressure | Connections | |
|---|---|---|---|---|---|---|---|
| | | | | | | Primary | Secondary |
| HEX-01 | 316L Stainless Steel Plate Heat Exchanger c/w EPDM gaskets | 800kW | 26 m3/hr | 38 m3/hr | 10 bar | DN100 | DN100 |

## 5. PRESSURISATION UNIT

| Reference | Description | Top-up Flow Rate | Pressure Range | Connections | Volt Free Contacts | Electrical | Specification |
|---|---|---|---|---|---|---|---|
| PU-01 | Floor mounted Mild Steel CR4 Powder Coated Twin pressurisation unit with 2 Pumps and 18 litre internal Polypropylene break tank (Fluid Protection Category 5) | up to 18 L/min | 1 - 3 bar | 2 x 15mm System<br>15mm Mains Supply<br>22mm Overflow | Comms Alarm<br>High Pressure Alarm<br>Low Pressure Alarm<br>Sensor Health<br>Pump 1 Health<br>Pump 2 Health | 220V-240V/1/50Hz | Flamco Flexfiller Twin System 2x125D or Equivalent |

# 6. EXPANSION VESSELS

| Reference | Description | Capacity | Static Head | Max. Operating Pressure | Max. Operating Temp. | Specification |
|---|---|---|---|---|---|---|
| EV | Expansion Vessels for sealed heating system with Flexible Diaphragm in accordance with EN12828. Expansion Vessel shall be Steel Welded Construction finished in Red epoxy-powder coating | Refer to the drawing | 4m | 6 bar | 110°C | Flamco Flexcon or Equivalent |

**Notes:**

1. Expansion Vessels shall be in accordance with pressure Equipment Directive 2014/68/EU
2. The Contractor shall specify pre-charge when ordering.

## 7. DOSING POT

| Reference | Description | Capacity | Max. Operating Pressure | Connections | Specification |
|---|---|---|---|---|---|
| DP-01 | Mild steel chemical dosing pot assembly c/w tundish, vessel, air vent, inlet, outlet and drain valves. | 6L | 16 bar | G 3⁄4" F | Flamco or Equivalent |

## 8. AIR DIRT SEPERATOR

| Reference | Description | Capacity | Max. Operating Pressure | Connections | Specification |
|---|---|---|---|---|---|
| ADS-01 | Combined Air/Dirt Separator Constructed from Steel wite Steel Neodymium Super magnets, blow-off valve and drain valve c/w Insulation set | 33L | 10 bar | DN100 | Flamcovent Clean Smart 100 S c/w Flamcovent Clean IsoPlus or Equivalent |

# 9. MOTORISED MIXING VALVES

| Reference | Description | Max. Operating pressure | Max. Operating temperature | Leakage Rate | Valve characteristic, mixing passage | Connections | Electrical | Specification | Control |
|---|---|---|---|---|---|---|---|---|---|
| MMV-01-09 | 3 port Mixing Valve cast iron bodied valve for Weather Compensation, Plugs made of stainless steel with metal-to-metal seal, stainless-steel spindle, Stuffing box made of stainless steel with wiper ring and double O-ring seal made of EPDM, PN16 rated with 24V motorised actuator for mixing control (Actuating power 2000N) | 16 bar | 100°C | Class III as per DIN EN 60534-4 (0.001 x kvs) | Linear | Flange as per EN 1092-2, form B | 24V | Sauter BQE080F300 c/w AVF234SF232 actuator or equivalent | Outside Temperature Sensor/ BMS |

## 10. GAS DETECTION SYSTEM

| Reference | Description | Fuel Type | Gas Slam Shut Valve | Fire Alarm Interface | Key release emergency stop button | Detectors | Electrical | Specification |
|---|---|---|---|---|---|---|---|---|
| GDP-01 | Two Channel Gas Detection Panel with OLED display and integral Emergency Gas Shut off button, mute and reset | LPG | New | Yes | 1 | 1 x CH4 Detector<br>1 x CO Detector | 220V-240V/1/50Hz | Medem AGDS-4 or Equivalent |

**Notes:**

1. This Gas Slam Shut Valve should be the normally closed type, with a manual reset button.
2. The gas slam shut valve shall close shut upon failure of mains supply.
3. The gas slam shut valve shall close shut upon detection of Gas or CO.
4. The gas slam shut valve shall close shut upon activation of Fire Alarm.
5. Upon activation of the gas detection system, the gas slam shut valve shall close. A signal shall be sent via an addressable interface to the fire alarm panel indicating activation. The fire alarm shall not go into alarm at this stage.

# 11. GAS FILTER

| Reference | Description | Nominal Diameter | Max. Operating pressure | Max. Flow Velocity | Pore width of filter element | Connections | Specification |
|---|---|---|---|---|---|---|---|
| FI-01 | Gas Filter as per DIN 3386 with high dust storage capacity. EC approved. It shall be c/w G1/4 screw plug measuring gas connections upstream and downstream of filter element. | DN100 | 4 bar | ≤ 20 m/s | ≤ 50 µm | Flange connection as per DIN EN 1092-1 | Dungs GF 40100/4 or equivalent |

# 12. CONTROLS SYSTEM

| Reference | Location | Description | Panel Construction | Max. Dimension |
|---|---|---|---|---|
| MCC-01 | Existing Boiler Room | Motor Control Centre incorporating BMS with Built-in touchscreen on panel door and c/w 25% spare capacity – refer to drawings schematic | minimum Form 2B | 1200mm Wide x 300mm Deep |

**Time Clock Controls**

All plant items shall be capable of time clock control with separate schedules for heating circuits and plant.

**Fire Alarm Interface**

All panels will be linked via input output modules to the Fire Alarm System. On activation of the Fire Alarm all Boilers and Circulating Pumps shall de-energise

**Remote Panel**

A remote panel will be provided on the wall of the principal's office that will contain the following:

- A heating override timer with an adjustable range of 0 to 4 hours.
- A push button for all existing and new pumped circuits.
- A lamp for each of the existing heating circuits.

If one of the circuit buttons is pressed and the timer is set, then the heating system will provide heat to the selected circuit for the duration of the timer set time. The zone lamps will not be illuminated unless the timer has been set.