

Oil Central Heating Specification

Special Conditions

The Contractor shall design, supply, deliver, install, test and commission the oil boiler in accordance with the manufacturer's instructions. An allowance should be made by the Contractor for any scaffold/roof access in their price.

Should anything be omitted from the specification or schedules which are necessary for the execution and completion of the work, the Contractor shall include for the supply and execution of whatever is wanting.

The contractor shall be OFTEC approved. All operatives, engineers and technicians shall be ACS and City and Guilds certified in Part L1 of the Building Regulations. The works shall comply with the OFTEC Guidelines.

The Contractor shall provide a full list of the operatives who will be involved in the contract prior to the commencement date. This list shall include the operatives' names, career history, qualifications etc. All operatives, engineers and technicians shall have undertaken Asbestos Skills Training and should provide copies of their records. This information shall be updated as and when required throughout the duration of the contract.

Part 1- Description of the works

EXTENT OF THE WORKS

The works covered by this specification is for the supply, delivery, testing, erection and commissioning of the entire works described thereon, together with the stripping out of redundant equipment and making good as associated with the above properties.

The properties may have existing partial heating systems connected as a one or two pipe arrangement. There are some properties, however with existing electric storage heating system. The Contractor shall ensure that he allows for the complete removal of the existing heating systems, apart from properties otherwise stated in the installation schedules.

The work shall comprise of:-

1. Removal of existing heating system.
2. Inspection of chimney.
3. Oil fuelled boiler.
4. Oil supply (including tank and base).
5. 5 Radiators
6. Pipework and fittings
7. Control Equipment
8. Electrical Spurs.
9. Carbon Monoxide Detector (battery operated) 7 year warranty

1. Removal of existing Heating System

The Contractor shall allow for the complete removal of the existing heating system to include the following:-

- Heating appliance complete with back boiler. (where applicable)
- Hot water storage tank. (cylinder)
- Cold water storage, feed and expansion tank.
- All redundant pipework and brackets associated with the removal of the above
- All control equipment.

Any part of the existing heating and hot water system removed in the course of the installation shall become the property of the Contractor. This shall however exclude room heaters, surrounds and any other equipment that is identified to be kept by homeowner. The Contractor shall check beforehand if any items are to remain.

2. Oil fuelled Boiler

The Contractor shall price for one oil appliance, namely a **Worcester Greenstar Heatslave II** 12/18 condensing combination boiler, internally sited. (or equivalent" and set out the details/criteria e.g. warranty provision etc)

The Contractor shall install the freestanding boiler in a suitable position externally or internally, decision to be agreed with homeowner and NPTC/CBC.

The Contractor shall allow for any fire proofing or alterations to accommodate the new boiler.

The Contractor shall include for flue arrangements for all condensing combination boilers.

3. Oil Supply

The Contractor shall supply and install a Titan 1000L Eco-safe horizontal Bunded oil storage tank (or equivalent" and set out the details/criteria e.g. warranty provision etc) including all necessary tank accessories in accordance with BS799: part 5, the installation shall include an oil watchman kit or equal approved.

The Contractor shall be responsible for constructing a suitable concrete base and for determining its size, height and suitability all in accordance with OFTEC guidelines.

The Contractor shall supply and install all the oil supply pipework commencing at the oil storage tank and terminating at the oil boiler, all in accordance with BS799 all parts in accordance with manufacturer's instruction and OFTEC guidelines.

The Contractor shall be responsible for determining the diameter of the oil supply pipe and whether or not a tiger loop oil de-aerator is required.

The Contractor shall also be responsible for advising the homeowner/tenant to order oil prior to installation so as to minimise any delay in testing and commissioning the boiler.

4. Radiators

The Contractor shall supply and install 5 number “Stelrad Elite” high performance convector steel panel radiators (or acceptable equivalent) capable of heating applicable rooms up to temperature of 21°C with an outside temperature of minus 3°C. The radiators shall be completed with air vents and suitable support brackets. All radiators except the hall shall be provided with one “Pegler type TRV Terrier II” thermostatic valve on the flow and one “Peglers type 367/DLS Terrier” lock shield valve with drain off facilities and be fixed 150mm above floor. The hall radiator shall be provided with a “Peglers type 367/WH Terrier” wheel head valve on the flow. On systems where some or all radiators are to be re-utilised, all radiator valves shall be renewed as above.

The Contractor shall include for providing “Peglers type 833 or 838” 15mm hose union drain cocks at all low points on the system.

A radiator schedule shall be provided by the Contractor to NPTCBC for each installation.

Radiators shall normally be located under windows, however, if through a request by the homeowner where applicable, a radiator position is not suitable, then permission to re-site the radiator must be sought.

Special attention must be taken at design stage to make allowance that where existing radiators are replaced, the replacement/new radiator must be at least the same length/width/height as the original radiator so as to eliminate the requirement for redecoration. However if this is not possible the Contractor must seek advice from the homeowner.

5. Pipe work and Fittings

All heating pipe work shall be connected to a “2 pipe” ring system in (Table “X”) copper tube with capillary fittings in accordance with this Specification.

Where pipe work is run in the floor screed, it shall be carried out in Yorkshire Kutorlux plus plastic or Denso PPS tape covered copper tube – no joints will be allowed in the depth of the floor screed. A maximum length of 1.8m will be allowed.

All pipe work in the roof space shall be insulated with 25mm “Armaflex” pipe lagging.

The Contractor shall supply and install all the necessary pipe work as appropriate associated with the new boiler installation.

- i. Cold water mains to the boiler via a service valve. The cold main shall incorporate a suitable expansion vessel.
- ii. Hot water supply to the existing taps from the new boiler.
- iii. Heating flow and return pipes to radiators.
- iv. Oil fuelled boiler to have a conventional filling loop, as manufactured by Pegler type FL1 kit.
- v. A condensate drain installed (i.e. 1¼" waste from boiler to a suitable drain with washing machine trap at boiler). Every effort will be made to terminate the condensate pipe work internally to reduce the possibility of freezing. The Contractor shall also allow for a suitable condensate syphon to be installed.
- vi. Pressure/ temperature relief pipe to be run to outside, terminating at low level in a safe manner.

The Contractor shall ensure that bends, not elbows, are used on the flow and return pipes.

The Contractor shall include for providing at all low points on the system, Pegler 15mm hose union drain cocks type 838 or 833.

Generally, heating flow and return pipes to radiators shall be run horizontally. Vertical runs shall be kept to a minimum. No pipe work shall be fixed in direct contact with the inside surface of any external wall.

On installations where radiators are re-utilized and where the system has a "heat leak" radiator, the Contractor shall alter the pipe work to incorporate into the heating circuit.

6. Control Equipment

The central heating system shall be controlled by means of a wireless Worcester comfort 1 RF in accordance with manufacturers installation instructions.

7. Electrical

The Contractor shall provide for all the necessary wiring associated with the installation and shall ensure that the whole of the electrical installation is carried out in accordance with the 17th Edition of the IEE Regulations. In this respect it is imperative that all electrical work be undertaken by an NICEIC approved Contractor.

The Contractor shall make provision for the following electrical circuits:-

- i. A double pole switched fused spur outlet be located alongside the boiler complete with surface pattress.
- ii. 1.00mm² 3 core heat resistant flexible cable from the fused spur to the boiler.
- iii. 1.50mm² 5 core pvc cable from the boiler to the programmer located in the kitchen, via the room stat.

All PVCu cables shall be run in surface mounted white plastic trunking other than in between floors or attic spaces. The mini trunking shall be run either horizontally or vertically.

The whole of the wiring shall be carried out using pvc insulated and sheathed, flat twin cable with cpc to BS 6004.

All phase cables shall be coloured brown and neutrals blue.

Where cables are installed under floors or above ceilings, they shall run in such positions that they are not liable to be damaged by contact with the floor or the ceiling or their fixings.

Wood joists shall in no circumstances be notched or sawn. All cables must run on and be parallel or at right angles to the joists and when passing through them, must do so through small holes drilled through the neutral axis.

Cables shall drop vertically to accessories.

The contractors shall be responsible for the professional lifting and refitting of all types of floor coverings in order to fulfil the cable installation requirement.

All cables within the attic space are to be clipped at intervals not exceeding 250mm.

Where roof insulation is encountered and has to be moved to accommodate the electrical installation it is to be carefully moved to one side and on completion of the electrical work be replaced to its original position.

Care shall be taken not to cover lengths of cable with insulation to ensure rating of the cables is not unduly altered.

All fused spur outlets shall be labelled accordingly.

8. Carbon Monoxide Detector

The Contractor shall supply and install battery operated carbon monoxide alarm. 7 year warranty to be included.

Electrical Bonding

The Contractor shall make provision for the following:

- i. A 10mm square single core PVC cable coloured green/yellow shall be run from the tenant's consumer unit earth terminal to the supply pipe at the point where the pipe enters the dwelling. Connection to the service shall be made using an earthing clamp and labelled "Safety Electrical Connection – Do Not Remove" legible type not less than 4.7m high permanently fixed in a visible position.
- ii. A similar 10mm square cable shall also be connected to the flow and return pipe work preferably adjacent to the boiler.
- iii. The above bonding conductors can be looped between each termination but must be in a continuous length and not cut or joined.
- iv. The installation a 4mm square core pvc cable coloured green/ yellow supplementary bond at the boiler position linking the cold water services to hot water service to the central heating pipes.

The cables shall be run in surface mounted white plastic trunking other than in between floors or attic spaces. The trunking shall be run either horizontally and vertically.

Ventilation

The Contractor shall supply and install the necessary room ventilators and compartment ventilation to comply with the Boiler Manufacturer's instructions.

Where ventilation is required, the Contractor shall supply and install a Stadium BM418 Multi-size Core Drill Ventilator to comply with Manufacturer's instructions.

The air vent cross sectional area should not be less than 14 square inches and in passing through the cavity wall should include a continuous duct from the inner to the outer leaf of the wall, installed so as not to impair the weather resistance of the cavity.

Builders Work

The Contractor shall make provision for all builders work associated with the work described in this specification such as:-

- i. Cutting away and making good all surfaces and woodwork.
- ii. Bricking up and re-plastering of disused fire openings.

- iii. Removal and replacement of floor boards (any previously damaged or loose floorboards shall immediately be brought to the attention of the NPTCBC representative.)
- iv. drilling of holes to accommodate installation of the works
- v. Chasing of floors
- vi. Capping off the redundant flue with a suitable weatherproof finish at chimney level
- vii. Making good of all flue exits including felting, flashings and tiles/slates.

Commissioning

On systems where the heating circuit and radiators are re-utilized, the systems shall be 'de-sludged' using "Sentinel X400" as per manufacturer's instructions and complying with BS 7593:1992. Following all installations, the whole system shall be filled, flushed out and filled again, given a heat test, flushed out and filled again, check for leaks and suitably balanced. The Contractor shall include for all necessary emptying down and refilling of the new and existing system in connecting up with the new installation and plants, as many times as proves necessary.

Following a minimum of 12 hours under working conditions the whole system shall again be drained and "Sentinel X100" inhibitor introduced into the system. The Sentinel 'DO NOT DRAIN sticker' shall be completed and displayed within the airing cupboard/ boiler compartment.

A sticker is to be displayed on the boiler compartment, stating the date of the heating installation and any daytime/ emergency contact numbers. All boilers shall be commissioned by the Contractor, including the setting of manifold pressures, limit and thermostat settings and controls etc. The whole of the system shall be set up and left ready for switching on. The Contractor shall include for instructing on the correct operating and maintenance of the whole system.

Each installation is required to be checked for any defects and any remedial work to be completed by the Contractor before notifying NPTCBC that the installation is complete.

NPTCBC will, when notified, check the installation work carried out by the contractor and if any defects are present, then the contractor will carry out such work as identified without delay and to the satisfaction of NPTCBC.

On completion of each installation, the Contractor shall supply NPTCBC with the following documentation: -

- i. OFTEC Landlord's Safety Record
- ii. NICEIC Electrical Installation Certificate or other such documentation
- iii. Building Regulations Compliance Certificate.
- iv. Inhibitor checks and results
- v. any other documentation required within this specification

Payment will not be issued until all the necessary paperwork has been received by NPTCBC.

All works will be subject to a 12 month defects liability period and 5 year boiler warranty

Part 2- Design

CONTRACTOR DESIGN

The Contractor carries the design responsibilities for the new domestic central heating and hot water services installations. The design of the system shall be in accordance with BS 5499: Practice Specification for forced circulation hot water central heating systems for domestic premises: 1990.

The Contractor is to provide a design warranty for the central heating system.

DESIGN PROCESS

Heating systems shall be designed to achieve and maintain the following minimum room temperatures when the ambient external temperature is -3°C and the air change rate is as detailed below.

Room	Room Temperature	Air Changes per hour
Living Room	21°C	1.5
Hall or Landing	21°C	2
Bathroom	22°C	2
Kitchen	21°C	2
Bedroom	21°C	1.5

Additional radiators will be a private arrangement between homeowner and contractor.

With regard to heat loss calculations, these shall be in accordance with the Chartered Institute of Building Services Engineers Guide and the following factors shall be allowed.

The Contractor shall allow for loft insulation (top up if required) to comply with current building regulations 'u' values. Provision for ventilation requirements must also be addressed. Radiators shall be fitted as specified.

A 10% contingency shall be allowed on the total system design to allow for general heating and pipe losses. It shall be assumed that adjacent properties are heated to 10°C for heat loss calculation purposes. All heat loss calculations shall be forwarded as part of the Design Information to NPTCBC.

INITIAL SURVEY

Following instruction from NPTCBC the Contractor shall include for an initial survey of the property.

The initial survey will be for the purposes of determining the following:-

- i. Information for heat loss calculations, i.e. room/window dimensions, wall construction, number of external walls
- ii. Layout and location of 5 Nr allowed radiators, pipework routes, etc.
- iii. Location of boiler.
- iv. Size and adequacy of incoming water main.
- v. Position of cold water main stopcock.
- vi. Adequacy of electrical bonding.
- vii. Number and location of extract fans, flues and chimneys.
- viii. Window type: frame material, glazing type, and condition also if draught proofed.
- ix. Wall insulation thickness, if any.
- x. Any other roof insulation and its thickness, e.g. flat roofs.

DESIGN INFORMATION

The Contractor shall design the system to confirm with all current regulations.

Part 3 – General Workmanship and Materials

PIPEWORK

The works shall include for arranging runs, both horizontal and vertical to avoid unsightliness and to suit site conditions. Omission to comply with this clause shall not form the basis or part of any claim for extra work. Allowance shall be made for complete drainage and venting of all pipe work.

Clearance shall be provided as follows: -

- Adjacent pipes – 10mm
- Walls – 25mm
- Ceilings – 100mm
- Floors – 25 mm (between finished surfaces including insulation where applicable)

Long sweep fittings shall be employed at all times except where joints resulting from the use of these fittings, would occur within wall or floor thicknesses. In these instances to comply with the spacing stated above, short radius bends or elbows may be employed.

All internal pipe work shall be run in copper to BSS 2871 Table X, jointed by capillary type fittings to BSS 864. Drain points comprising plug cock shall be provided at all low points of the heating pipe work to BS 2879.

External MWS shall be run in one of the following materials unless specifically detailed in the following clauses of this specification: -

- i. Copper to BSS 2871 Table "X" doubly wrapped in "Denso" or similar tape.
- ii. Medium Density Polyethylene to BSS 6572 jointed by Medium Density Polyethylene fittings.
- iii. Rigid pvc to BSS: 3505 Class 'C' unless stated otherwise.
- iv. All services shall generally be run in accordance with BS Code of Practice Cp 310 1965 'Water Supply'.

Pipes shall be arranged so that no joints are buried in the thickness of walls, floors or ceilings.

After completion of all works, the entire system shall be flushed out with clear water; steam and gas systems shall be checked afterwards and thoroughly cleaned out.

All installations for hot or cold water, with pipe work exceeding 40 mm bore whether for drinking purposes or not, shall be sterilised after completion. Sterilisation shall generally be in accordance with BS CP 310 Clause 409, and shall include cisterns etc., connected to the system. After sterilisation, the mains shall be thoroughly flushed out with clear water. Samples of water shall afterwards be taken and arrangements made by the Contractor for these to be tested and official certificate issued to state that the required standard of cleanliness has been attained.

On brickwork, appropriate brackets shall be employed to support pipework. On partition of timber or similar construction, brackets of a screw-to-wood type shall be employed, using fixings of suitable length and type for the construction, and positioned to ensure adequate support.

The spacing of the pipework supports are as provided in the tables below:-

Copper Pipe work (bare or lagged)

Size of Pipes	Intervals for Horizontal Runs	Intervals for Vertical Runs
15 mm bore	1 metre	2 metres
22 mm bore	1 metre	2.5 metres
28 mm bore	1.5 metres	2.5 metres

Pipes shall be run to ensure adequate allowance for expansion and contraction. Expansion loops or bellows shall be fitted between anchor points. Bellows shall be installed to manufacturer's instructions. Pipe work shall be 'cold drawn' to half expansion condition. Guides shall be fitted either side of each bellows or expansion loop.

All radiators shall have two valves fitted and an air vent shall also be provided.

Heater/ Convector and radiator valves are to be one wheel and one lock shield valve and shall be of gunmetal throughout with male unions, complete with wheel or e.c. lock shield head.

Standard Type GM stop cocks where shown on the drawings shall be of the easy clean lock shield type or of the crutch pattern where so stated.

All stopcocks shall comply with BS 1010/1959 and 1973.

Circuit valves (HWS) shall be fitted with lock shields, full way valves to all sizes shall be of gunmetal standard pattern. All valves shall be tested to 13 bars hydraulic pressure at Manufacturer's works. In certain instances crutch type heads shall be fitted, and NPTCBC approval is to be obtained regarding the positioning of these valves.

Oil valves or cocks shall be fitted to all items of plant and on oil installation pipework.

All ball valves shall be of the 'Portsmouth' type BS 1212.

Three keys for each size of lock shield valve throughout the installation shall be supplied.

A clearance of not less than 100 mm shall be maintained between any main and electrical conduits, cables etc.

The Tender shall include for the regulation of all circuits in order to ensure an even circulation throughout the new systems to the satisfaction of NPTCBC.

Care must be taken to prevent dirt or rubbish from entering the pipe work. Any stoppage occurring in the circulation due to the above causes will not be the subject of any extra claim for rectification.

Screwed caps and plugs only shall be used for protecting open ends, and plugs of waste or wood shall not be used for protecting open ends under any circumstances.

Wall plates shall be fitted on all pipes where they pass through floors, walls and ceilings.

Suitable pipe sleeves shall be fitted where pipes pass through walls, floors etc. These shall be of the same material as that passing through the sleeve.

The Contractor shall include drilling and cutting all ironwork, structural and otherwise. Special application, in writing, with sketch drawing must be made to available to NPTCBC. NPTCBC will need to provide approval before any structural steelwork is cut or drilled.

All electrical work associated with each installation shall be included and the Contractor shall ensure that the electrical work is carried out in accordance with the requirements of the current Edition of the Regulations for the Electrical Equipment of

Buildings as issued by the Institution of Electrical Engineers. An approved Contractor shall carry out all electrical work.

Where ducts and pipes pass through floors and compartment walls, they shall be adequately fire stopped using heat resistant asbestos free type material, which shall be packed around pipes and ducts, with due regard to thermal movement.

Part 4 – Thermal Insulation, Testing and Commissioning

The Contractor shall include for testing and commissioning the whole of the installation as detailed later in this section.

On completion of the tests, all pipe work and tanks in living quarters, roof-space, false ceilings and voids, and all pipe work not required as heating surfaces, shall be thoroughly insulated in accordance with the following specification.

TESTING

Upon completion of each section of the work, the Contractor shall subject the section to a water pressure test and demonstrate to the satisfaction of NPTCBC that the section is sound and watertight. The tests shall be applied by filling the section to be tested with water and raising its pressure to the figure specified below.

The whole of the testing gear required including all plugs, caps, tees, and drain fittings, being supplied by the Contractor.

After the section has been filled and pressurised, the system shall be left for a period of 2 hours during which time all joints shall remain tight. Any fault discovered during tests shall be remedied by the Contractor at his expense and the section re-tested.

Upon completion of the tests the water shall be released and the system shall be thoroughly sluiced through to removal of all dirt and dross before refilling and being put into service.

The Contractor shall take all necessary precautions against freezing of any part of the installation and shall empty down all sections after testing.

All LPHW, HWS and cold water down services shall be tested hydraulically to a pressure of 6.9 bar or such pressure as required by the Local Water Authority, for a period of 2 hours.

All calorifiers, coils, shall be tested to a pressure equal to not less than twice the maximum working pressure. Calorifiers were to be tested to BS 853 or 3274 as appropriate. All storage tanks such as those for cold water storage shall, after erection, be filled with water shall remain filled for at least 24 hours during which time all joints shall be carefully examined. Any defects shall be rectified immediately and the test repeated.

All automatic control apparatus and systems shall be tested to demonstrate that they are capable of meeting the demands specified and shall be adjusted to suit the characteristics of the building and their particular system.

All valves, switches, controls and the like shall be regulated and capable of proper adjustments to conform to the design conditions.

All test certificates issued on site shall be submitted to NPTCBC for his approval and such approval shall be obtained before any paintwork or insulation is applied to the system.

In addition the Contractor shall forward copies of the manufacturer's test certificates for boilers, cylinders, etc. to NPTCBC.

INSULATION

The boiler shall be supplied with factory fitted casing and insulation.

All pipes in boiler house and roof space shall be insulated with Armaflex pipe insulation, 25mm thick. Installation to be carried out as per Armaflex installation manual (glued etc.) All elbows, tees and joints shall be neatly mitred and along with all seams be glued correctly. Coloured identification bands shall be fitted every 2 metres to indicate type of service and direction of flow.

All pipe work in false ceiling voids shall be insulated with Armaflex pipe insulation with 9 mm wall.

All tanks in roof spaces shall be fitted with the correctly sized Byelaw 30 kit comprising of lid, 60mm lagging jacket, and all connections to comply with Water Bye Laws.

Where there is not alternative, and pipe work must be embedded in cement screed, concrete, plaster or ducting the Contractor shall ensure that the pipe work is: -

- i. Adequately protected from damage and corrosion by a suitable plastic.
- ii. Free to move along its entire length to allow for thermal movement of the pipes.

The protection to the pipe shall conform to BS 5449 Part 1, 1977 similar to Denso PPS tape as manufactured by Winn and Coales (Denso) Limited.