**5.0 SPECIFICATION**

* 1. **GENERAL**

All works to be carried out are expected to be in accordance with the most current regulations, standard and working practices. Manufacturer’s instructions and recommendations are to be followed in full for all components, materials and appliances.

Copper tubing to BS EN 1057 and fittings must be used for all heating flow and return pipe work / domestic plumbing pipe work and gas supply pipe work which will be installed and used in accordance with appropriate specifications and codes of practice (e.g.BS 6700 as amended). All schedules of rates items are composite items deemed to be inclusive of all necessary works to complete the task in normal circumstances and will always include making good to an acceptable standard.

* 1. **CENTRAL HEATING INSTALLATION DESCRIPTION**

The work shall comprise the whole of the labour and, unless otherwise indicated, all the materials necessary to form a complete installation and such tests and commissioning as prescribed and deemed necessary. The design of the system is the responsibility of the Contractor and should be done to achieve an upgraded system that will operate and perform to best practices and guidelines currently established in the market with emphasis given to quality products and energy efficiency.

* 1. **BOILER INSTALLATION DESCRIPTION**

The work shall comprise the whole of the labour and, unless otherwise indicated, all the materials necessary to replace an existing boiler and as necessary upgrade the controls. The method and extent of the replacement boiler and controls is the responsibility of the Contractor and should be done to achieve an upgraded system that will operate and perform to best practices and guidelines currently established in the market with emphasis given to quality products and energy efficiency.

* 1. **SYSTEM DESIGN**

The Contractor shall design the system using the best and most suitable components and materials available (in addition to those already specified within this contract) in order to provide the most efficient central heating system and assist with the reduction of carbon emissions. The installation shall be designed to consider future maintenance requirements and parts and components should therefore be accessible and easily repaired and replaced. To assist with future maintenance and warranty works all new boilers should include an adhesive label detailing the Company name, engineer’s name, Gas Safe membership number and date of commissioning/installation. The design of the label should be approved by the CA prior to use.

The design of the system whether new or adapted or improved must take into account the need to provide ‘Thermal Comfort’ levels providing satisfaction for the tenant with their surrounding or thermal environment. Examples of minimum design temperatures from BS 5449:1990 are given but for full details refer to the British Standard:

Living rooms and dining rooms - 21°c

Bedrooms - 18°c

Halls and landings - 18°c

Kitchens and toilets - 18°c

Bathrooms and shower rooms - 21°c

Consideration should also be given to likely temperature extremes, property location and exposure, humidity conditions etc. As a general rule 10% likely heat loss should be added where these conditions occur and the design adjusted accordingly.

* 1. **GAS SUPPLY PIPEWORK**

New gas supply pipe work is to be run internally or externally in the most suitable location with a mind to both safety and aesthetic appearance. External pipe work is to the run at a height where accidental damage from the occupants or public is unlikely given normal use. Consideration should also be given to using the existing features of the property to lessen the visual impact of a new supply pipe.

* 1. **LOCATIONS OF APPLIANCES, PIPEWORK, FLUES AND RADIATORS**

The Contractor will be responsible for agreeing with each tenant the location of the key aspects of the installation including the boiler, controls and the radiators. The Contractor will be expected to recommend the most practical solutions available with a regard for the tenant’s own requirements and circumstances and to consider reducing disruption and maintaining aesthetic appearance.

The preferred and recommended location of radiators is below windows and not back-to-back for ease of installation. This must be adhered to unless otherwise agreed with the CA for each occasion that the Contractor wants to install radiators in alternative locations.

The Contractor however must take into account that the property may not always be occupied by the same tenant and individual requests or solutions may not always be universally acceptable. Any decision therefore to vary from a standard installation either at the tenant’s or engineer’s request must be agreed with the CA prior to commencement.

Wherever possible the pipework should be run below timber floors with rises/drops to appliances/radiators as necessary. Surface mounted pipework runs are to be plumb, straight and parallel or perpendicular to other runs, walls, floors and ceilings as appropriate to produce a neat appearance. Hot pipes are to be run above cold pipes when run together horizontally. Pipe work should at no time run through electrical enclosures, above switch gear, distribution boards etc.

Boilers should be located with consideration given to the most appropriate location and not necessarily in the same location of any existing boiler or water heater. Space within kitchens, particularly in flats, can be restrictive so the Contractor is encouraged to consider alternatives such as existing cupboards. Boilers fitted in kitchens above worktops should be sited to allow a minimum 300mm clearance between the bottom of the boiler casing and any surface.

Pluming of condensing boiler flue gases is becoming a recognised nuisance to both the occupiers and their neighbours. Careful consideration must therefore be given to the location of any powered flue and the Contractor shall install where appropriate a vertical flue to negate such nuisance. On occasion the use of a purpose made flue extension to direct the plume effects away from a window may be necessary and will be done at the Contractor’s expense.

* 1. **WATER TREATMENT**

Included in the installation process of the new boiler and its associated system must be the chemical flushing with the appropriate Fernox cleanser or similar on approval of the C.A. After thoroughly flushing the system the necessary checks and tests should be undertaken to ensure the effectiveness of the flushing procedure then an appropriate Fernox inhibitor or similar on approval of the C.A. shall be used to protect the system. Fernox products must be used strictly in accordance with their recommendations and dosage levels correctly applied. Upon completion test and balance the system. All water treatment to be in accordance with BS 7593 (as amended).

Supply and the installation of a Magna Clean Micro 22mm are required for all boiler installations.

* 1. **WATER SAMPLING**

The Contractor shall include for every new system or replacement boiler to have water samples taken by using the Fernox Protector Test Kit or similar on approval of the C.A. for analysis which will show whether systems have been suitably flushed and inhibited correctly. Where results of the analysis fail, the Contractor shall be responsible for all necessary remedial works, re-flushing and re-testing until the water quality is found to be acceptable. The outcome of the Fernox analysis shall be submitted to the CA via the Benchmark and commissioning documentation

* 1. **MAIN EARTH BONDING**

Any new or existing main earth bonding is to be installed in accordance with BS 7671 (as amended), as near to the point of entry of the gas pipe to the property as is practical, before any branch pipe, and within 600mm of the meter outlet union or the point of entry to the building is the meter is external. The Contractor should check and undertake any necessary works to the bonding if the gas pipework is worked upon or amended in any way.

* 1. **MATERIALS AND MAKING GOOD**

FACING BRICKWORK

When bricking up flue openings and other such openings use facing bricks to match existing and mortar mix 1:1:6 also to match existing. Brick courses to line up with existing work in the same plane tooth bonded together at every course. No other fill material will be accepted in facing brick elevations.

FLOORBOARDS

All boards lifted to facilitate access shall be done so with due care and attention so as not to cause damage to the boards. All lifted boards will be securely fixed down on completion using timber woodscrews only. Cut boards will need to edge protection by the installation or timber noggins fitted between joists to provide suitable support. Boards damaged beyond repair should be replaced with flooring grade timber of same face width and depth to match existing. On completion flooring should be secure, flat and true.

PLASTER

Where plastering internally prepare background and apply one coat Gypsum plaster base coat fully bonded, allowed to dry and scratched for adhesion to the Gypsum plaster finishing coat fully bonded to a true plane with a smooth finish flush and feathered into adjacent existing plaster finish. In small making good patches one coat plaster will be accepted but the same finish must be achieved.

GLOSS PAINT

Ensure the pipework is dry and free of dirt and grease before applying evenly with uniform colour and free from brush marks, sags and runs, and one coat white gloss.

PIPE SLEEVES

Sleeves must be used whenever a pipe run passes through a solid wall, partition wall. Holes made to the smallest practical size to reduce damage and the strength of the structure. Pipe sleeves are to be of a material to match the pipe material and should extend the full depth of the opening. Pipe sleeves to be bedded in place with mortar and annular space between the sleeve and the pipe sealed with mastic.

TIMBER NOTCHES

Timber notches on joists should be avoided wherever possible and not permitted in roof timbers at any time. Where timber joists must be notched, the minimum depth should be cut out not affecting the stability or performance of that timber. In any zone joist no two holes or chases should be within 100mm of each other horizontally. Where possible pipes should be fitted clear of timber joists, floorboards etc. Where this is not possible suitable rot proof pads should be fitted between the pipe and the structure to minimise noise caused by expansion and contraction.

SUPPORTS

Pipe work shall be supported in a manner as to prevent free movement due to expansion and contraction. Pipes should be supported to prevent sagging and the formation of high points. Suitable nylon clips that totally encircle the pipe shall be used throughout. Pipework should be supported at bends, tees, valves, pumps etc. and at intervals not exceeding those given below:

|  |  |  |
| --- | --- | --- |
| Pipe OD | Horizontal run intervals | Vertical run intervals |
| 15 mm | 1.2 m | 2.0 m |
| 22 mm and over | 1.8 m | 2.0 m |

INSULATION

To be flexible closed cell expanded polythene pipe insulation with a minimum wall thickness of 25mm for 15mm pipe and 19mm to all other pipe types. The insulation is to be closely fitted with all cut edges and joints fitted together with 25mm p.v.c. adhesive tape. Insulation to be fitted to all exposed pipework where freezing could occur, pipework carrying hot water in circulation, pipework in spaces prone to condensation and externally run condensate pipes.

GAS SUPPLY PIPEWORK

All new and existing gas supply pipework is to be a minimum 22mm but in all cases suitably sized to allow for the maximum anticipated demand. At each appliance provide and fit a service valve to permit easy removal of the appliance. All gas supply pipework to be installed and tested in accordance with the Gas Safety (Installation and Use) Regulations 1998.

BOILER MANUFACTURER’S SYSTEM / COMBINATION

The C.A. has a preferred boiler manufacturer; however alternative manufacturers shall be considered pending comparisons to cost, quality and warranties.

SYSTEM BOILERS

Wall-mounted RSF gas fired condensing Worcester Bosch Greenstar 15i or similar on approval of the C.A. up to 24i ERP to be installed in properties with 3 bedrooms or more.

Boiler to be fitted in accordance with manufacturers recommendations and relevant British Standards must be followed. All boilers are to be fitted with a Magna Clean Micro 22mm, or similar on approval of the C.A.

Where it is discovered that a larger heat output is required a suitable sized Worcester Bosch system boiler or similar on approval of the C.A., The C.A will confirm in writing of the approval for the installation.

COMBINATION BOILERS

Wall-mounted RSF gas fired condensing Worcester Bosch Greenstar 25i ERP or 30 Si ERP or similar on approval of the C.A. to be installed in properties with 2 bedrooms or less.

Boiler to be fitted in accordance with manufacturers recommendations and relevant British Standards must be followed.

FERNOX PRODUCTS (Or similar on approval of the C.A.)

Cleanser F3 and Protector F1 to be used in accordance with BS7593 and manufacturer’s instructions.

Protector F1 to dose the central heating system adequately to protect against deterioration of the system

All newly installed boilers or replacements / systems will require an analysis using the Fernox Protector Test Kit.

INSTALLATION LABELS

To assist with future maintenance and warranty works all new boilers should include an adhesive label detailing the company name, engineer’s name, Gas Safe membership number and date of commissioning/ installation. The design of the label should be approved by the CA prior to use.

CONDENSATE PIPEWORK

To be u.p.v.c and connected to the existing sink waste pipe in an approved manner. Where the existing kitchen sink waste is inaccessible then the condensate pipe can be run externally to discharge into a suitable gulley protected externally with insulation described above. In cases where no other discharge alternative is available a purpose made condensate soak away can be installed in accordance with manufacturer’s recommendations and to the approval of the CA.

Where condense pipe is run externally the size must be increased to 32mm u.p.v.c. immediately after exiting the building wall.

RADIATORS

To be pressed steel panel white stove enamelled Stelrad Elite or similar on approval of the C.A. to BS EN 442 fitted with manufacturer’s concealed fabricated steel wall brackets fixed with an offset of between 25mm and 50mm of the wall surface. Height of radiators to be 150mm above finished floor level wherever possible and positioned below windows. Any exceptions should be agreed with the CA prior to installation.

THERMOSTATIC RADIATOR AND LOCKSHIELD VALVES

TRVs to be chrome plated Honeywell VT117 or similar on approval of the C.A. with matching lock shield valves fitted in the vertical position to BS 2767:10 (as amended) and in accordance with the guidance provided by the Energy Saving Trust. T.R.V.’s to be fitted to all radiators except in the room that contains the room thermostat (normally the hall).

PIPEWORK AND JOINTS

Pipework to be copper which is kite marked and certified to BS EN 1057. The sockets of all fittings to be thoroughly cleaned to promote solder flow and bonding and should at all times be kept free from dirt, oxide, films, residue, grease and oil. All prepared joints to be fitted on the same day as preparation; otherwise they should be parted and reassembled.

6.1 CENTRAL HEATING SYSTEM TO A 1 BEDROOM FLAT OR BUNGALOW

Drain down and remove existing redundant heating system or appliances where applicable install new designated Worcester Bosch combination condensing boiler ( appendix 8 tender sum (a) or similar on approval of the C.A. tender sum (b)) with appropriate flue, include for any building alterations to accommodate the boiler all system controls including programmable room stat, suitably sized radiators to all rooms, thermostatic radiator valves to all radiators except hallway, all flow and return pipe work, gas pipe work and any necessary alteration an extension to the electrical installation including supplementary earth bonding.

System to be suitably cleansed and refilled as per boiler manufacturer’s instructions using Fernox products in accordance with BS 7593

Test, balance, commission and instruct tenant on correct use of boiler and system controls.

All works disturbed to be fully ‘made good’, exposed internal pipe work to be painted, if tenant requested at time of original survey details of which should be noted at time of survey, all rubbish / debris to be removed.

The installation must fully comply with all regulations, manufacturer’s instructions and good working practices.

6.2 CENTRAL HEATING SYSTEMS TO A 2 BEDROOM HOUSE

Installation to be as described above at 6.1 but to a two bedroom house

6.3 CENTRAL HEATING SYSTEMS TO A 2 BEDROOM FLAT OR BUNGALOW

Installation to be as described above at 6.1 but to two bedroom flat or bungalow

6.4 CENTRAL HEATING SYSTEM TO A 3 BEDROOM HOUSE

Drain down and remove existing redundant heating system and appliances where applicable install new designated Worcester Bosch or similar on approval of the C.A. system boiler with appropriate flue include for any building alterations to accommodate the boiler, all system controls Honeywell ‘S’ Plan to be ‘hard wired’ consisting of a ST9400A programmer / cylinder stat and room stat

Suitably sized radiators to all rooms, thermostatic radiator valves to all radiators (except hallway) all flow and return pipe work, gas pipe work and any necessary alteration or extension to the electrical installation including supplementary earth bonding to comply with current electrical regulations

An automatic by-pass using a Honeywell DU145 22mm or similar on approval of the C.A. will be incorporated in the installation pipe work and located within the airing cupboard containing the hot water cylinder.

System to be suitably cleansed and refilled as per boiler manufacturer’s instructions using Fernox products in accordance with BS7593

Test, balance, commission and instruct tenant on correct use of boiler and system controls.

All works disturbed to be fully ‘made good’, exposed internal pipe work to be painted if tenant requested at time of original survey details of which should be noted at time of survey, all rubbish / debris to be removed from site.

The system boiler will be used in conjunction with an open vented indirect hot water cylinder which will be, Part L compliant, Grade 3 and to comply with BS1566 (e.g. 900mm x 450mm 117 litre capacity).

Occasional “torpedo” hot water cylinders or high recovery cylinders are required; this is to be approved by the C.A. before installation takes place.

A cold water storage tank with a capacity of 114 litres to be supported on 18mm plywood base using 75mm x 50mm bearers

The cold water tank will supply the feed for the hot water cylinder, a full bore 22mm lever valve will be used to isolate the feed to the cylinder a Scale master (electrolytic) or similar on approval of the C.A. to be installed in-line between lever valve and cylinder

The C.A. must be notified if it is found that the property relies on a cold water feed to the bathroom draw-off points (i.e. bath taps / basin taps)

An immersion heater of 685mm length (i.e. 27” Supaloy or equivalent) and thermostat to suit will be installed and ‘hard wired’ to comply with current electrical regulations.

The C.A. must be informed if a site condition does not allow the system boiler and hot water cylinder installation.

6.5 CENTRAL HEATING SYSTEM TO A 3 BEDROOMS FLAT OR BUNGALOW

Installation to be as described above at 6.4 but to a three bedroom flat or bungalow

The C.A. must be informed if a site condition does not allow the system boiler and hot water cylinder installation

In all cases the installation must fully comply with all current regulations and be installed as per manufacturer’s instructions and to good working practices.

6.6 CENTRAL HEATING SYSTEM TO A 4 BED PROPERTY

Installation to be as described above at 6.4 but to four bed House.

6.8 GAS COOKER POINTS

 Provision of a gas cooker point which terminates with a back plate elbow / plugged will be installed to the position of the existing cooker location providing a ‘live’ gas supply.

6.9 VERTICAL FLUE KIT

Provide and install a vertical flue kit fitted in accordance with the manufacturer’s recommendations. Include for all making good with particular attention where flue passes through walls, floors and roof coverings. Ensure complete weatherproofing at junction with roof covering.

6.10 BOILER

 Identify the most appropriate location for its installation allowing for any building design to accommodate the boiler. Install new Worcester Bosch or similar on approval of the C.A. condensing boiler with appropriate flue connected to the existing system. Include any necessary alteration and extension to the electrical installation. System to be suitably flushed, cleansed and refilled including Fernox additive. Test, balance, commission and instruct tenant on correct use. All works disturbed to be fully made good and all rubbish to be removed. Installation to fully comply with all regulations, manufacturer’s instructions and good working practices.

6.11 INSTALLATION OF MAIN EARTH BONDING

 Supply and fix 10mm copper core PVC insulated earth conductor to gas pipes and connect to an earth terminal, installed to BS 7671. (as amended)

6.12 BLOCKING AND VENTING of CHIMNEY OPENING

On the removal of a gas fire and / or back boiler unit, the builders opening is to be blocked and vented, the hearth and mantle is to remain as is, unless otherwise directed by the C.A.

Blocking up of the opening will be means of Thermalite or similar blocks, using the appropriate mortar mix, which will then be coated by bonding and then skimmed with plaster to a smooth finish.

The opening is to be vented at low level by means of a white plastic louvered grill, screwed to the wall to cover a pre-made aperture of 150mm x 225mm.

If there is no existing hearth, allowance must be made to supply and install a section of matching skirting board to that room.