



## **Air Conditioning and Refrigeration Maintenance Tender Specification**

**Tender Ref: UOR/EST/018/111**

Estates and Facilities  
University of Reading  
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Whiteknights  
Reading  
Berkshire  
RG6 6UR

# University of Reading Air Conditioning, Refrigeration and Ventilation Maintenance Contract Specification

## 1. SCOPE

The University of Reading (UoR) requires a cost effective service for the maintenance and breakdown repair of its air conditioning, refrigeration and ventilation systems.

A full asset list will be provided for tendering purposes, however it is the Contractors responsibility to maintain the asset list and make sure that it is fully up to date at all times.

The Contractor will make sure that the UoR is fully compliant with current F-Gas Regulations, utilising a fully integrated electronic management system.

The UoR requires the Contractor to supply a fully trained and experienced refrigeration engineer to site Mondays to Fridays 8 am to 4pm, unless otherwise agreed with the UoR Contract Manager.

The UoR requires 24 hour 365 days a year emergency callout to all equipment covered by this Contract.

## 2. SITE INFORMATION

The equipment to be maintained is located at the following locations:-

Whiteknights campus, London Road campus, Greenlands, Thames Valley Science Park and The University farms located at Aborfield and Sonning.

Maps and equipment locations will be provided at the Contract implementation stage.

## 3. DEFINITIONS OF TASKS

The UoR currently has in the region of 1350 individual pieces of equipment that are to be covered by this Contract, the most common types of equipment covered by this contract are:-

- Single split A/C units
- Multi split A/C units
- VRV/VRF A/C unit
- Chillers
- Cold rooms, freezer rooms, constant temperature rooms and associated controls and alarms.
- DX Units
- Heat pumps (air and ground source)
- Air Handling Units
- Fan coil units
- Heat recovery units
- VAV boxes
- A/C controls (including BMS interface)

Note:

The number of assets may be subject to change through the life of the Contract.

The maintenance visits will include but not limited to:-

### Major Service

- Carry out maintenance as per manufacturers annual service instructions, inclusive but not limited to:-
  - **Compressor** - Check for undue noise and vibration. Check discharge and suction pressure and check superheat under load conditions.
  - **Compressor suction** – Check for symptoms of `wet` operation or excessive superheat.
  - **Refrigerant** - Check level in receiver and/or liquid line sight glass.
  - **Condenser and evaporator fins** – Check for damage and/or dust accumulation. Clean as necessary.
  - **Fans, motors and damper drive motors (if fitted)** – Check bearings and lubricate as necessary. Inspect and check on fan guard covers and inspection plates.
  - **Evaporator and drains, dip tray and pump** – Check and clean. Check condensate drain is clear and clean.
  - **Compressor capacity control and unloaded start valves (if fitted)** – Check for correct operation. Check motor current against commissioning data.
  - **Refrigerant pipework** – Check for vibration and rectify any loose or inadequate support/fixing.
  - **Filters** – Check condition and replace as necessary.
  - **Insulation** – Check condition repair/reseal as necessary.
  - **General cleanliness** – Clean surfaces of compressor and components of condensing unit.
  - **Electrical** – Check for damage to flexible conduits. Tighten all terminal connections. Isolate local control panel and inspect for sign of overheating. Check integrity of electrical insulation.
  - **System operation** – Confirm that it is in accordance with design parameters, where they are available.
- Carry out refrigerant leak test as per F-Gas regulations where applicable.
- Check all controls including BMS interface, check with BMS engineers that equipment is operating as normal.
- Check any alarms are functioning correctly, where alarm is received remotely, check that alarm is being received.
- Leave area clean and tidy.

### Minor Service

- Carry out maintenance as per manufacturers 6 monthly service instructions.
- Carry out refrigerant leak test as per F-Gas regulations where applicable.
- Check all controls including BMS interface, check with BMS engineers that equipment is operating as normal.
- Check any alarms are functioning correctly, where alarm is received remotely, check that alarm is being received.
- Clean unit, clean or replace any filter where applicable.
- Leave area clean and tidy.

### Chiller Service

- All Water chillers to be maintained as per manufactures instructions inclusive but not limited to:-

#### Quarterly

- **Status** – Check operating status.
- **Refrigeration circuits** - Check circuit pressures and superheat temperatures. Check alarm and run lights and remote alarm lights associated with packs.
- **Refrigerant** - Check for refrigerant and any leaks.
- **Leak detection system** - Check operation where fitted.
- **Expansion valves** - Adjust if necessary.
- **Chilled water supply** - Check flow and return water temperature under full and part load conditions.
- **Glycol** - Check glycol concentration in chilled water.
- **Chilled water flow rate** – Check that this is in accordance with the manufacturer's recommended figure.
- **Leakage** - Check all pumps and pipework for leaks and rectify.
- **Refrigerant pipework** - Inspect and check for vibration, chaffing and leakage.
- **Standby circuits** - Check operation.
- **Flood alarm** - Check operation.
- **Digital readouts** - Check operation.
- **Controls** - Check operation of temperature control thermostats. Inspect electrical panels and components for wear especially the compressor contacts. Check operation of safety thermostats and timers.
- **Hours run meter** - Check and record.
- **Insulation** - Check condition and make good and defects.

#### **Annually**

- **Electrical** - Check for damage to flexible conduits. Tighten all terminal connections. Isolate control panel and inspect for signs of overheating. Check integrity of electrical insulation.
- **Safety cut-outs** - Check all safety cut-outs including high and low pressure safety cut-outs and the antifreeze thermostat cut-out for operation and correct calibration.
- **Pump strainers** - Check condition and clean.

#### **Quarterly Filter Inspection**

- Clean or replace any filter where applicable, clean unit.
- Leave area clean and tidy.

#### **Air Handling Units (AHU) (additional requirements)**

- Check AHU housing for condition
- Check motors and bearings for correct operation
- Check drive belts, replace where necessary
- Check heat exchangers for blockages, corrosion or leaks
- Check/clean condensate drain where applicable
- Check damper operation where applicable

#### **Fan Coil Units (FCU)**

- Check general condition of unit
- Check and clean fan where applicable
- Clean filter
- Check operation of controls
- Be aware that a large proportion of FCU maintenance will need to be carried out outside of normal working hours.

### **Weekly Server Room Inspections**

- Inspect A/C in University server rooms for correct operation. Report any faults immediately.

### **F-Gas leak checks**

- F-Gas leak checks to be carried out as per F-Gas regulations.

## **4. SERVICE DELIVERY**

- The Contractor will attend site in a sign written van wearing a company uniform, preferably with an i.d badge.
- The normal hours of work of which all planned maintenance should be carried out are Monday to Friday 8am to 4pm.
- The UoR requires a 24 hour 365 days a year callout response for all equipment covered by this contract. The response time should be no more than 4 hours.
- Any Engineer attending site should be appropriately trained and experienced in the work they are undertaking. Any Engineer working on systems containing a refrigerant gas will have completed and passed a City and Guilds NVQ level 3 in Refrigeration and Air Conditioning (6187) Service and Maintenance Route and a Category 1 certificate in Stationary Refrigeration and Air Conditioning (SRAC) systems, including heat pump systems, awarded by an accredited organisation.
- The Contractor must be certified to handle fluorinated greenhouse gasses (F-Gases) regulated by the EU. The certification will be by one of the following organisations:-
  - Bureau Veritas
  - Quidos
  - Refcom

The certification must be renewed every 3 years and must not be allowed to expire.

- The Contractor will undertake an initial dilapidation report on all equipment in the first year of the Contract. The report will include the age, condition, type of gas and estimated life expectancy of equipment.
- The Contractor will transfer The University's asset list, F-Gal logs and service history to their own system.
- The University of Reading would like to reduce unplanned failures of its ventilation/refrigeration equipment. The Contractor will produce a strategy to manage unplanned failures, this will be reported to the Contract Manager at the monthly Contract meetings.
- The Contractor will keep the UoR Contract Manager up to date on all ongoing works via email, telephone call or in person on a regular basis.

- It is the Contractors responsibility to arrange access to carry out the intended works via the relevant building contact. A list of building contacts will be supplied to the Contractor at the implementation stage.
- The Contractor must supply Risk Assessments/Method Statements for all planned, reactive and quoted maintenance work.
- It is the Contractors responsibility to ensure the management of the equipment containing refrigerant gases will be fully compliant with the current EU fluorinated greenhouse gas regulations and compliant with ISO 14001.
- The Contractor will assist the UoR in environmental audits where required, e.g. ISO14001 audit by demonstrating how records are stored and updated on their electronic system.
- The Contractor will use an electronic system to plan and log jobs, this system will also store the University's asset list and F-Gas logs. This system should be live i.e. constantly updated. F-Gas logs should be easily obtainable from the asset list, i.e. one or two clicks away.
- Every unit on the asset list shall have a work and cost history stored on the electronic system. i.e. the UoR shall be able to see all work and costs on any individual asset. The cost history will be broken down into materials and labour.
- It is the Contractors responsibility to ensure the asset list and F-Gas logs are up to date. F-Gas logs should be updated within 1 hour of job completion.
- The electronic system will be able to produce an excel spreadsheet of the asset list, F-Gas logs and refrigerant gas usage in a useable form that will be provided to the UoR on a monthly basis.
- The UoR will have access to the Contractors electronic system to view asset lists, F-Gas logs, work reports, current job status and future planned jobs.
- Contract performance will be measured by the Contractor and reported the UoR Contractor Manager at the monthly Contract meetings. The parameters to be measured are listed in section 8 KPI's.
- The UoR require all works to be performed directly by the Contractor except in certain circumstances which may require a specialist Contractor or the equipment manufacturer, such as works on ground source heat pumps or chillers. This will only be allowed by UoR approval.
- The Contractor must ensure that any sub-contractor working their behalf will have the necessary tools, equipment and software to complete the task fully and to the satisfaction of the University of Reading.
- The Contractor will produce a monthly report detailing the type and amount of refrigerant gas used/removed or reclaimed from site as well as the amount of gas that has escaped to atmosphere. The Contractor will provide this information in both kilograms and CO2 tonnes equivalence.

## 5. PREVENTATIVE MAINTENANCE (PPM)

### Equipment Servicing Requirements

- The equipment will be maintained in accordance with the manufacturer's instructions and to the F-Gas Regulations.
- The equipment service interval shall be determined by the following schedule:-

Type of Equipment	Frequency per annum
Equipment containing refrigerant gas (with the exception of chillers)	1 Major service  1 Minor service (where equipment contains more than 50CO <sub>2</sub> tonnes equivalence),  Quarterly filter inspection where required (identified on asset list).
Chillers	Quarterly, unless alternative maintenance strategy produced and agreed by UoR.
Air Handling Units	1 major service  4 quarterly filter inspections
Fan Coil Units, Heat recovery units, VAV Boxes	1 major service,  1 minor service (TVSP only)
Server Room A/C equipment	Weekly server room inspections

- The equipment will be serviced by building to a schedule agreed with the UoR Contract Manager.
- A maintenance service report will be completed for each piece of equipment. It will be acceptable to complete a service report per building, however the report will list all equipment serviced and the work carried out.
- Work reports will be electronic and available to view via a live system within 24 hours of job completion.
- Filter inspections – A photo of filter condition before and after replacement to be attached to work report.
- Spare parts required for the ppm service such as filters and drive belts are to be included in the cost of the annual maintenance. Spares parts required are shown on the asset register. This is to be shown as a separate cost.
- F-Gas leak checks and equipment maintenance will occur at the same visit.
- Faults found during maintenance that contravene any regulations shall be treated accordingly. The UoR Contract Manager should immediately be made aware and a quote for repair shall be produced and received by the University no later than 24 hours after the fault identification.

- Remedial faults found during servicing shall be quoted for and presented to the University no later than one week after servicing.
- Where lab and/or roof permits are required to complete the planned maintenance the Contractor must give at least 1 months' notice of the work. Where no permits are required 2 weeks' notice is sufficient.
- Where hot work permits are required the Contractor must give at least 3 day's notice of the work.

**F-Gas**

- Systems containing refrigerant gas will be leak checked as per the following schedule.

Refrigerant Gases	Frequency of Leak Checks	
	No leakage Detection System	Leakage Detection System
5 tonnes CO2-equivalent	12 Months	24 Months
50 tonnes CO2-equivalent	6 Months	12 Months
500 tonnes CO2-equivalent	N/A	6 Months

- All equipment/systems containing a refrigerant gas will have its own F/Gas log.
- Any work on equipment that relates to the refrigerant gas must be entered into the F-Gas log.
- It is the Contractors responsibility to ensure that any F-Gases held on site are stored and managed in accordance with the current F-Gas regulations.

**6. REACTIVE MAINTENANCE**

- The Contractor will respond to reactive calls as per the following schedule.

**Priority 1 (Emergencies)**

Response time: Within 4 hours  
 Completion: 28 hours from issue

Incidents that are likely to:

- Endanger life or represent a serious health & safety risk
- Cause serious disruption to the operation of a building
- Cause extensive damage to property

**Priority 2 (Urgent)**



Response time: 2 working days from issue  
Completion: 4 working days from issue

Incidents that:

- Represent a lesser health & safety risk
- Cause disruption to the operation of the building/business
- Cause minor damage to property

### **Priority 3 (Routine)**

Response time: 7 working days from issue  
Completion time: 14 working days from issue

Incidents that:

- Are routine or non-essential in nature and can normally be undertaken at any time.
- The University of Reading will set the priority of the call out and will clearly state this to the Contractor at the time of issuing the call.
- The UoR will issue reactive work to the Contractor in one of two ways:-
  - Priority 1 work will be phoned through to the Contractor directly, this will be followed by emailing the work request sheet through to a nominated email address.
  - Priority 2 & 3 work will be emailed to the Contractors nominated email address.
  - All out of hours callouts will be treated as Priority 1 and will be phoned through directly to the Contractor.
  - The Contractor will acknowledge they have received all work requests.
- If the fault cannot be fixed during the initial call out, a quote shall be produced by the Contractor and sent to the University of Reading within 48 hours of the visit. On acceptance of the quote the Contractor shall make its best endeavours to procure any parts needed and fit them as soon as possible. It is of vital importance that the Contractor keeps both the Contract manager and the building users informed of the status of the fault and likely repair date.
- The University of Reading reserves the right to use other suitable qualified suppliers for reactive and remedial works where deemed necessary or where additional quotes are required.

## **7. PROJECT WORK**

There will be a requirement to provide quotations for new installations and modifications to existing air conditioning and refrigeration systems as part of the site development programme. The Contractor will be required to have the capability to carry out this work using directly employed resource. The University reserves the right to obtain alternative quotations, which may result in the employment of other Contractors to carry out the work.

## **8. CONTRACT MANAGEMENT**

- The Contract will be for a period of 6 years.
- The Contractor will be issued a purchase order covering the cost of the preventative maintenance for a period of one year at a time. Separate purchase orders will be raised for reactive call outs and remedial works during the Contract period when required.
- The Contractor will invoice monthly for both reactive and planned work. Planned work invoices will include a breakdown of where the equipment was maintained. Reactive invoices will be per job. Invoicing will be in line with the UoR terms and conditions.
- A Contract meeting between the Contractor and UoR Contract Manager will take place on a monthly basis, unless otherwise agreed with UoR contract Manager. This meeting will be to discuss preventative maintenance, remedial & reactive work, health & safety, KPI's and general contract performance. Additional meetings may be called when and if required.
- Minutes and actions will be recorded at the monthly Contract meeting. The Contractor must ensure that any actions attributed to them must be completed within the agreed timeframe.
- An implementation meeting will be arranged before the Contract starts.

## **9. KPI's**

A number of KPI's will be required to accurately measure and monitor the performance and delivery of the service. The Contractor will be measured on the following as a minimum:-

KPI's		
Description	How is it measured?	Target
Completion of planned work schedule	By Contractor against agreed schedule	100%
Call out response time and completion	By Contractor against UoR priority's	97%
Turnaround time for producing quotes for remedial works	By Contractor against guidelines set out in this specification	90%
F-Gas log update (within 1 hour of work)	10% audit carried out by UoR Contract Manager	90%
Asset List Accuracy	Checked against F-Gas logs by UoR Contract Manager	100%
Work Backlog (outstanding Jobs)	By Contractor against target.	Planned – No greater than 30 days. Reactive – No greater than 60 days.

## 10. COMPETENCY

The Contractor and any subcontractor working on their behalf will send suitably qualified and experienced engineers to site, capable of carrying out the works detailed in this specification to the satisfaction of the UoR. Any Engineer attending site should be appropriately trained and experienced in the work they are undertaking. Any Engineer working on systems containing a refrigerant gas will have completed and passed a City and Guilds NVQ level 3 in Refrigeration and Air Conditioning (6187) Service and Maintenance Route and a Category 1 certificate in Stationary Refrigeration and Air Conditioning (SRAC) systems, including heat pump systems, awarded by an accredited organisation.

The Contractor itself must be certified to handle fluorinated greenhouse gasses (F-Gases) regulated by the EU. The certification will be by one of the following organisations:-

- Bureau Veritas
- Quidos
- Refcom

## 11. HEALTH AND SAFETY

Prior to the start of the Contract risk assessments and method statements covering every aspect of the work specified in the Contract should be submitted for approval to the UoR Contract Manager.

All of the Contractor's employees that are intended to work on site shall do so in accordance with The University of Reading's Site Rules for Working on University Premises for Contractors and Consultants. Contractors shall undergo a site induction before carrying out any work on the University.

Before any work is carried out all Contractors employees shall confirm in writing using the Declaration of Compliance form at Appendix A (The University of Reading's Site Rules For Working on University Premises For Contractors and Consultants) to confirm that the Site rules have been read and understood.

Prior to undertaking any works on site the engineer must liaise directly with the Appointed Person responsible for the specific building, inspect the relevant entries within the University Asbestos Register and undertake an appropriate pre-start risk assessment.

If the work will involve intrusive works the University of Reading Asbestos Coordinator must be contacted for advice before proceeding with the task.

Intrusive work will include any dismantling of system components that could disturb gasket materials. Intrusive work includes all demolition or breaking out, forming openings (of any size) in walls, floors and ceilings, opening up of ducts, boxing or voids, lifting of coverings etc.

## 12. WASTE MANAGEMENT

The University will need to be given appropriate details of how any waste will be treated. The information must include details of the registered waste carrier confirming that they are licensed to carry the category of waste. A copy of the licence must be sent to the University for their records. The Contractor needs to provide details of the Waste Disposal business the waste is being transported to, providing confirmation that the business is registered to process that category of waste. A copy of the licence must be sent to the University for their records. The Contractor should ensure that the appropriate sections of the waste transfer note have been completed recording the details of the waste that has been transported.

## 13. PRICING

Costs are to include all management and administration works that would be required for this Contract to perform as detailed in this specification. An engineer will be required to be on site during normal working days 8am – 4pm.

- The Contractor will submit a cost for the annual planned preventative maintenance and F-Gas leak checks of all the appliances listed in the asset list. The cost will be split by building, i.e. every building covered by this contract will have an individual price. The asset register lists the frequency of the maintenance visits and F-Gas checks required and the spare parts which are to be included in the annual ppm cost. **Please note, UoR annual budget for planned preventative maintenance is £125,000. Any bids at 10% or more over budget will not be considered and the bidder will be excluded from the process.**
- The Contractor will submit an hourly rate for working hours fault investigation/repair work.
- The Contractor will submit an hourly rate for out of hours fault investigation/repair work where the work has been planned.
- The contractor will submit an hourly rate for out of hours callout fault investigation/repair work.
- The Contractor will submit a percentage mark up on all parts required.
- The Contractor will submit a percentage mark up on refrigerant gasses required.

- The Contractor will submit a percentage mark up on specialised labour required.

Annual price increase will be linked to RPI but capped at 3% and subject to UoR approval.

There is a requirement for this contract to have open book accounts for parts and specialised labour. All cost incurred by the contractor for materials, parts, sub-contractors etc shall be made available to the University on request.

### **Historical data**

The following historical data is available:-

Number of reactive Callouts (in normal working hours) per year:-

2015 - 176

2016 - 181

2017 - 194

Number of follow on quotes raised per year:-

2015 - 96

2016 - 74

2017 - 66

A detailed list of the remedial repairs that have occurred over the last 3 years are listed on a separate spreadsheet.