



Risktopics

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Gas and Oil Fired Space Heating

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Section 1 – Fixed Installations

Introduction

Gas and oil fired space heaters are identical in appearance and both comprise a burner combustion chamber, heat exchanger and a fan. These appliances operate by drawing air in at the base which is warmed via the heat exchanger. The clean warm air is vented into the building from outlets on the top of the appliance or from ductwork circulating the hot air around the building. Gases from the combustion are removed through a vent pipe (flue) to the atmosphere.

In order to minimise any potential fire risk, careful consideration should be given to the installation of these appliances and subsequent servicing which is of paramount importance.

As both gas and oil fired space heaters provide heating by the same means (delivery of warm air), there are a number of safety precautions common to both, as summarised:

1. Location of Heater

- The heater should be installed in accordance with the manufacturer's recommendations and, ideally, be housed within an enclosure providing a minimum 60 minutes fire resistance.
- Where it is not practicable to enclose the heater, protect the heater with a substantial metal guard rail, providing a minimum 1 metre clearance in order to prevent contact with combustible materials and the potential risk of impact damage from the use of mobile plant, i.e. fork lift trucks.
- Where a flue pipe passes through a roof, floor, ceiling, wall or partition containing combustible material, the flue pipe should be separated from the combustible material by a non-combustible sleeve enclosing an air space of not less than 25mm around the flue pipe.
- Where the flue passes through an insulated composite panel incorporating a readily combustible core such as polystyrene, or polyurethane, more stringent measures will be necessary.

2. Automatic Controls

- A flame failure device should be fitted which is designed to automatically isolate the fuel supply in the event of flame failure.
- The most common type of fire valve is the drop arm or spring loaded device connected by wire to a fusible link located above the burner. Other forms of fire valves include the solenoid stem valve, thermal or electro-mechanical devices, (i.e. solenoid).

3. Fuel Supply – Gas Fired Installations

In the majority of cases gas will be supplied to the premises from a towns main supply via rigid pipe line connections. However, in rural areas where a mains gas supply is not available, a Liquefied Petroleum Gas (LPG) tank may be used. As a general guide the following aspects will need to be observed:

- Site the storage tanks above ground.
- Provide a suitable concrete base for the storage tank as recommended by the supplier.

- Avoid storing tanks on top of other tanks.
- Enclose the storage tanks with suitable fencing (e.g. palisade) where the public may have uncontrolled access.
- Keep the area around storage tanks free from vegetation or any combustible materials.
- Where damage to a storage tank from vehicular traffic is a possibility, take precautions against such damage. The degree of protection required will depend on the actual site condition and the nature of the traffic, including the overhang or reach of the vehicles. Strategically located motorway-type crash barriers, concrete or steel bollards will be suitable in most installations.
- Only allow authorised and competent personnel to use, adjust, modify, extend or service the installation.
- Take out a suitable maintenance contract with an approved installer to cover inspection of the tank, pumps, and dispensing meters at least once every 12 months.
- During filling operations to the tank, electrically bond the road tanker to the storage tank before any LPG transfer is carried out.
- Prohibit smoking or the use of naked lights in close proximity to the storage tank and clearly display notices to this effect.

4. Fuel Supply – Oil Fired Installations

The provision of suitable containment measures for fuel spillages is an important aspect of fire safety. A fuel which leaks from storage tanks and catches fire, if uncontained, can flow through a building or premises, causing rapid fire spread and making a fire more difficult to extinguish. Storage tanks should preferably be installed in the open but where this is not practicable, they can be installed within a tank chamber in the building. The following measures provide guidance on good containment measures, both for installations in the open and within buildings.

Installation in the Open.

- Provide each tank with a separate bund wall or catchpit. Where this is not practicable, provide low separation kerbs for each tank within the bund wall or catchpit.
- To make allowances for accumulated rainwater, increase the capacity of the bund or catchpit to 110% capacity of the largest tank within the bund or 25% of their aggregate storage capacities, whichever is the greater. In addition, make arrangements for accumulated rainwater and liquid spillages to be removed from the bund/catchpit.
- Construct the bund/catchpit with a material impermeable to the fuel oil stored.
- Locate the tanks away from buildings and perimeter fences.

Installation within a Tank Chamber

- Locate the tank chamber against an outer wall of the building and provide a capacity of 110% of the storage tank.

- Construct the tank chamber of brickwork, blockwork or concrete to have a four hour fire resistance, with any opening fitted with a door commensurate with the level of fire resistance. If a separate bund/catchpit is not provided containment can be achieved by raised door sills.
- Provide adequate ventilation for the tank, preferably by natural means with an inlet and outlet direct to the open air.
- Provide adequate lighting in the tank chamber enclosing wiring in screwed metal conduit or mineral insulated metal sheathing. Locate lighting switches outside the chamber and ensure that light fittings are of the bulkhead or well glass type.
- Locate pumps outside the tank chamber or bund/catchpit.

5. Pipework Fittings – Oil Installations

- Oil supply lines should be non-combustible and protected against mechanical damage.
- Provide all oil storage tanks with an oil level indicator clearly visible at the filling point.
- Provide a drain valve at the lowest part of the underside of the tank with a screw-down gate valve being either “plugged” or “blanked off”.
- Fit a vent pipe at the top of the tank, the cross sectional area of the pipe being at least equal to the cross sectional area of the filling pipe. Avoid sharp bends in the vent pipe and terminate in the open atmosphere.
- Provide an overflow pipe to service tanks and any ancillary tanks capable of returning oil to the storage tank.
- Permanently fix filling pipes, constructed of non-combustible material. Filling points to be preferably in the open air and the connecting thread fitted with a screwed cap capable of being locked on.

6. General

- Where liquefied petroleum gas in cylinders is used to start up oil-fired space heaters, locate the cylinders outside in the open air and, with exception of the torch end, ensure the gas supply to be by fixed metal piping.
- Cleanliness in all parts of an oil-fired installation is essential. Clean up oil leakages immediately, preferably using non-combustible absorbent materials and have the source of the oil leak rectified.
- When it is necessary to lag tanks and / or pipework, use non-combustible materials. Protect lagging against contamination by oil or other flammable liquids.
- Both gas and oil fired installations should be regularly serviced by an authorised contractor as recommended by the manufacturers.
- Prominently display signs at the oil fuel filling point which clearly specify the grade of fuel to be used and, capacity of the storage tank.

Section 2 – Transportable Gas and Liquid Fuelled Heaters

Introduction

Portable heating appliances present additional, avoidable, fire risks as these may accidentally - or otherwise - be placed too close to combustible goods and materials. Increased risks may also arise if appliances are damaged in transit, from fuel supplies, and re-fuelling operations associated with their use.

The three common types of portable heating appliances are;

- Cabinet heaters - a form of radiant heating with either a propane or butane gas cylinder located inside the metal casing or cabinet.
- Patio heaters, a form of radiant heating with a mushroom shaped reflector at the top of the appliance and propane or butane cylinder housed in the base.
- Transportable fan assisted space heaters whereby a flame from a liquid or gaseous fuel is subjected to a fan to intensify the heat and distribute it over a wide area. These can be fuelled by diesel, paraffin, liquefied petroleum gas or natural gas.

It is recommended that you check your Insurance Policy terms and conditions before considering use of these appliances as Zurich discourages the use of portable heaters and a warranty, prohibiting or restricting the use of these appliances, may be included in your policy.

Alternative forms of heating, such as fixed heaters with a remote fuel source, should always be considered before using portable heaters. Where the use of portable and transportable heating appliances is unavoidable and acceptable within the terms and conditions of your policy, the following recommendations are provided as guidance.

1. Location

- Use and position the portable heaters in accordance with the manufacturer's instructions.
- Stand the heaters on a non-combustible, level dry surface where they are not liable to be subjected to mechanical damage or be overturned.
- Avoid locating the heaters on escape routes, in confined spaces or passages.
- Avoid locating the heaters where there is a risk of being struck by passing or manoeuvring vehicles such as fork lift trucks.
- Avoid using the heaters in areas where flammable gases, vapours or combustible dusts are present.
- Locate the heaters in areas free of combustible material and not in warehouses. Where there is the possibility of combustible material coming into contact with the heater, provide a metal guard to maintain a clear space of at least one metre around it. Increase the distance to a minimum of two metres for the fan assisted heaters.

2. Propane and Butane Gas (Liquefied Petroleum / LPG) Fuelled Heaters

- It is recommended that heaters selected for use should carry the 'CE' mark.
- Fuel piping should be as short as possible but not under tension. Check flexible hoses for mechanical damage when cylinders are changed over.

- Care should be taken when cylinders are changed over. Propane and butane gas cylinders must not be interchanged. Ensure that the cylinder valve is closed before disconnecting from the heater.
- In the event of suspected leakage, identify the position of the leak by brushing soapy water on the connections. Do not use a naked flame. If the leak is not eliminated by tightening connections, remove the cylinder and label it as unfit for use until repaired.
- In the case of fan assisted heaters being fuelled from a 47kg propane cylinder, chain the cylinder to an outside wall or to a trolley.
- Keep the number of spare cylinders to a minimum and stored in an upright position as far from the building as possible. As the gas is heavier than air, avoid storing in a basement, adjacent to drains or in proximity of electric meters.

3. Liquid Fuelled Heaters

- It is recommended that heaters selected for use should carry the 'CE' mark.
- Use the correct liquid fuel for which the heater was designed.
- Avoid refuelling of paraffin fuelled appliances whilst the heater is in operation. Allow the appliance to cool before refuelling and, where possible, undertake refuelling outside the premises. Clear any spillages immediately.
- Keep the amount of spare fuel to a minimum, stored ideally outside the premises in purpose made containers and away from sources of heat or ignition.

4. Fire Fighting

- Provide a suitable number of fire extinguishers to fight a fire appropriate for the heater in use. Zurich recommends that the extinguishers provided be made subject to an annual maintenance agreement with a company that is approved by a trade body, such as the Fire Industry Association (FIA) or which is certified to BS EN ISO 9002 or is a member of the Fire Protection Association (FPA).
- In the event of an outbreak of fire from a gas fuelled appliance, turn the fuel supply off at the valve before attempting to extinguish the fire.
- Call out the fire brigade to all fires involving heaters and gas cylinders.

5. General

- Use and maintain the heaters in accordance with manufacturer's instructions.
- Provide adequate ventilation in the area where the heaters are to be used.
- Nominate a responsible person to oversee use of these heaters.
- Avoid covering the heaters in any way, using as shelves or use for drying clothes.
- Do not handle or move the heaters while alight, switched on or while hot.
- Avoid leaving the heaters unattended for long periods of time.

- Turn off and unplug the heaters when the premises are unattended.
- After use, allow the heaters to cool before being stored away.

Summary

Gas and oil fired heating appliances and their associated fuel sources can introduce additional fire risks to premises. By incorporating the recommendations and guidance within this document, fire risks can be managed and controlled, providing not only a warm environment but also a safe environment for staff to work in. The recommendations within this Risktopic are designed to be practical, low cost control measures which can be easily implemented and can assist in the completion of a fire risk assessment.

Useful References

- RC8 - RISC Authority Recommendations for the Storage, Use and Handling of Common Industrial Gases in Cylinders including LPG
- RC9 - RISC Authority Recommendations for Oil Fired Heating Installations
- RC15 - RISC Authority Recommendations for the Use of Portable and Transportable Heaters in Commercial and Industrial Premises
- RC27 - RISC Authority Recommendations for Space Heating: Hazard Classification

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