

BRA Guide for Risk Assessments and Method Statements (RAMS)

British Refrigeration Association



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BRA Guide for Risk Assessments and Method Statements

This fully updated edition of the BRA Risk Assessments and Method Statements has been produced in line with current requirements and nomenclature. The latter is also reflected in the title of the document as Risk Assessments and Method Statements (RAMS) .

It is also acknowledged that individual companies will prepare their RAMS in their own particular format. This document, therefore, outlines the content for the method Statements and Risk Assessments that should be utilised as the minimum content within individual company RAMS. A company may not reference this BRA document unless this rule is adhered to, eg utilising part of the content only will negate any reference being made to the BRA source document.

The HSE also has guidance on risk assessments and formats and examples can be found on their website www.hse.gov.uk under Risk Management. The link <http://www.hse.gov.uk/risk/casestudies/index.htm> provides many examples.

There are four sections to this Guide:

Building Procedures “B”

Electrical “E”

General Maintenance Operations “G”

Refrigeration “R”

Risk Assessment is very much a thought process carried by a person experienced in the task to be completed. Risk assessing must take into consideration the site conditions at the time the task is to be carried out, the task itself, the hazards and the control measures put in place to mitigate the risks.

The most important control measure that applies to all assessments is that the task is carried in accordance with the health and safety regulations and any other regulations that are relevant to the task, and site conditions.

At the beginning of each assessment health and safety and environmental regulations have been noted that are considered relevant to the particular assessment. Also referenced where applicable is a list of health and safety bulletins, guidance notes, good practice guides, and any other relevant publications that can assist the person in carrying out the task safely

Most procedures carried out by refrigeration engineers do not alter greatly from one company to another. The BRA, therefore, considered that a common method of assessment would be useful to companies and their employees within the industry.

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Note: where maintenance procedures are involved, the manual is not to be used as a substitute for a maintenance manual.

It is difficult to assess the hazards and associated risks of a process unless the detailed steps within that process are fully understood. The model risk assessments are therefore divided into two parts:

Part 1 – Method Statement

These give a brief description of the task that is to be assessed.

Part 2 – Risk Assessment

This describes the type of hazards that can occur, how to control them (and thereby reduce the associated risks) and what to do in the event of an accident or imminent danger occurring.

The Method Statements should not be considered as definitive methods of instruction in how to carry out the tasks concerned. They are a brief description only.

All procedures must be carried out by competent individuals, or, if the individual is undergoing training, they must be supervised by a competent person.

In some instances the Method Statement and Risk Assessments can be used as statements relating to the procedure carried out in a particular process. In others, the hazards and risks relating to a certain process will be different depending on the conditions encountered. Some clients or situations may also require a more detailed assessment and may also require a quantifiable analysis to be provided.

With all the information available within this document, competent personnel should be able to perform a comprehensive assessment of the risks of the tasks they have to undertake.

This manual should not be considered to be a Health and Safety Manual – that is a separate document that comprehensively covers and gives guidance on all relevant health & safety legislation. It should be used in conjunction with the information contained within this booklet.

It is assumed that a person referring to the information within this manual is also acquainted with all Health and Safety, Environmental and other regulations that will ensure the person carrying out the tasks as part of his/her duties does so without harm to themselves or other persons or property .

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Note: A large number of instruments are used for testing various parts of refrigeration systems and this equipment is mentioned often in this document. All test instruments should be calibrated before use.

Acknowledgements

Prepared and published by the British Refrigeration Association.
The competent people who have contributed to this publication have many years experience in the refrigeration industry.

Building

B1 WORKING AT HEIGHTS

Method Statement: WORKING AT HEIGHTS

Risk Rating: MEDIUM/HIGH

This task is subject to the following and any related amendments:

Health and Safety Regulations

Working at Height Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Provision and Use of Work Equipment Regulations 1998.

Manual Handling Operations Regulations 1992.

Institute of Refrigeration Good Practice Guide 22 "Working at Height on Commercial Display Cases"

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

Working at heights presents many problems. It is important that the correct equipment is used so that the potential for accidents is reduced as far as is reasonably practicable. (See also B9 'The Use of Step Ladders' and B10 'The Use of Leaning Ladders').

Tower Scaffolds

Tower scaffold erectors must be qualified to PASMA standard and are required to do the following:-

1. Ensure an adequate instruction manual is available on site.
2. Shall be erected and maintained by a competent person.
3. Ensure tower remains stable in all weather conditions.
4. The instruction manual must notify you of the maximum height the tower can be erected or for free standing towers the maximum height to at least base ratio.

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5. The platform must have a safe means of internal access on the narrowest side of the tower.
6. Do not climb the tower frame unless a ladder is incorporated.
7. The guard rails should be a minimum of 950mm above the platform and additional protection should be provided (e.g. intermediate rails) so that the gap does not exceed 470mm.
8. The base of the Tower must rest on firm level ground.
9. Do not attempt to move the tower by pushing on permanent objects within the vicinity of the Tower from the Tower Platform.
10. Do not climb the outside of the Tower, use the correct ladder access.
11. Before moving the tower, make sure there are no obstructions at high level, and all personnel, tools and equipment have been removed from the platform.
12. Push tower from base only.
13. Check the tower daily / prior to use for defects etc. (or if moved, knocked or subject to adverse weather conditions). This check may need to be recorded.

Mobile Elevated Work Platforms (MEWP's)

MEWP operators must be qualified to IPAF standard applicable to the type of equipment being used and are required to :

1. Check the equipment before each day/shift (eg. oils, coolants, all fluids, fuels, battery charged, wheels, emergency lowering, lights, horn, controls etc. – wear the necessary PPE when checking the battery). This check is to be made by a qualified MEWP operator and needs to be recorded.
2. Wipe up any spilt oil or fluids.
3. Ensure the model selected is adequate for the chosen task in accordance with the manufacturer's recommendations.
4. Be aware of any overhead obstructions, pedestrians and uneven or unstable ground hazards.
5. Check all around before moving off and look in direction of travel.
6. Avoid sudden stops or starts and travel at speeds consistent with the work

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conditions; slow down to corner.

7. Ensure the working position is based on firm and level ground.

During operation, stay inside the unit, and maintain a firm hold of the handrails and controls.
8. Observe the broad principles of the Highway Code, eg. keep to the left where possible.
9. Carry loads and tools evenly distributed on the platform.
10. Ensure that all practical steps are made to protect other (contractors, client staff and members of the public) from out MEWP operation
11. Report all accidents and near misses immediately to your supervisor / manager.
12. Ensure any battery operated MEWP's are recharged when not to use by arranging for connection to a suitable power supply according to the manufacturer's instruction.
13. Work restraint equipment consisting of harness and lanyard must be used in 'boom' type MEWPs. The use of work restraint equipment in 'scissor lift' type MEWPs may be mandatory as a site rule.
14. Ensure stabilisers are used (if fitted) do not extend into an area where they can become a hazard to other vehicle users or members of the public etc.
15. Do not lean out of the working platform and when handling awkward pieces of material take care not to lose balance and fall.

DO NOT:

1. Use work equipment if you are not trained to do so
2. Exceed the MEWP's rated carrying capacity.
3. Lean outside the MEWP's confines.
4. Use any form of extension or ladder from the platform.
5. Allow anyone to stand or walk under the vehicle.
6. Park near exits, fire points, or first-aid points.

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7. Carry out repairs to the MEWP. Report all faults to your supervisor / manager.
8. Leave keys in unattended vehicles

MAINTENANCE:

As well as following the manufacturer's instructions as to inspection, maintenance and servicing; the above checks should be made together with weekly maintenance (after 8 hours running). A competent person (eg Insurance inspector) should examine all working parts at least once every six months.

Site staff have a responsibility to ensure the above is enforced. This includes ensuring certification is in place for any hired equipment.

Roof Works (May be subject to a specific Risk Assessment)

1. Ensure you are aware of the roof construction before attempting to walk on the roof etc.
2. Crawling ladders / boards to be used on the roofs with slopes of more than 10".
3. Ensure there are enough barriers or other edge protection to stop personnel or materials falling from sloping / flat roofs.
4. Ensure crawling boards are provided where people work on fragile materials such as asbestos cement sheets or glass. Ensure warning notices are posted.
5. Ensure suitable guard-rails, covers etc. are provided where people pass or work near fragile material.
6. Ensure roof lights are properly covered or provided with barriers.
7. Ensure precautions are taken to stop debris falling onto others working under the roof work.

Safety Belts, Lines, Harnesses and Fall Arrest Equipment

All such equipment should conform to BS EN345, 355, 358, and 360 to 365 appropriate.

1. The equipment should be adjusted correctly to allow it to be worn in comfort and to give general freedom of movement.
2. Harnesses should be used in preference to belts due to their ability to give greater protection against injury should a fall occur.

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3. Harnesses should be attached to suitable anchorage points which should be properly maintained and inspected daily before use in accordance with BS5845
4. The equipment should only be installed and/or worn by competent and adequately trained personnel.
5. All equipment should be inspected on a regular basis to ensure its integrity is maintained.

The requirement for inspection is different for small towers under 2M and for towers 2M and above.

If the working platform is less than 2M in height, the tower must be inspected:-

- After assembly in any position.
- After any event liable to have affected its stability.
- At suitable intervals depending on frequency and conditions of use.

If the working platform is 2M or more in height, it must be inspected:-

- After assembly in any position.
- After any event liable to have affected its stability.
- At intervals not exceeding seven days.

A new inspection and report is not required every time a mobile access tower is moved to a new location on the same site. However, if guard rails or other components have to be removed to enable the tower to be moved past an obstruction, then a pre-use check should be undertaken by a trained and competent user to make sure the tower has been reinstated correctly.

Stop work if the inspection shows it is not safe to continue, and put right any faults.

The result of an inspection should be recorded and kept until the next inspection is recorded. The use of a visible tag system (which can be updated each time a check is carried out) to supplement inspection records is acceptable.

However, if the tower is 2M or more in height and the inspection is undertaken after installation or assembly, or to comply with the seven-day inspection regime:-

- The competent person must:
 - Complete the inspection report before the end of the working period.
 - Provide a copy of the report to the person the inspection was carried out for, within 24 hours.

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- The person receiving the report must:
 - Keep it at the site where the inspection was carried out, until construction work was carried out, until construction work is completed.
 - Thereafter, keep it at an office for three months.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **WORKING AT HEIGHTS**

Risk Rating: **HIGH**

Hazards

1. Falling.
2. Electric shock.
3. Burns.
4. Refrigerant leakage.
5. Explosion.
6. Entrapment

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Use correct method of access and safe system of work.
5. Check routing of all cables, gas pipes etc.
6. Use correct fixing and tools, etc.
7. Ensure access equipment is positioned so that it does not cause a hazard to other vehicle users or members of the public.
8. Seek specialist advice for the selection of the correct fixing arrangement when equipment is to be fitted to a structure

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Emergency Procedure:

1. Move away from or off the access equipment as soon as possible.
- 2, Call the emergency services if required
3. Isolate equipment.
4. Isolate services.
5. Clear area of all Personnel.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B2 WORKING IN CONFINED SPACES

Method Statement: WORKING IN CONFINED SPACES

Risk Rating: HIGH

This task will be subject to the following Health and Safety Regulations
Confined Spaces Regulations 1997.

See also HSE Bulletin "Safe Work in Confined Spaces (L101)
And HSE Guidance Note GS5 Entry into Confined Spaces

NB. This task is usually subject to a permit to work system and reference to the company or client's working procedures shall be made before commencement of work. All activities must also conform to the Confined Spaces Regulations.

These require the employer to:

- avoid entry to confined spaces, for example, by doing the work from outside
- follow a safe system of work if entry into a confined space is unavoidable, and
- put in place adequate emergency arrangements before work starts, which will also safeguard rescuers.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

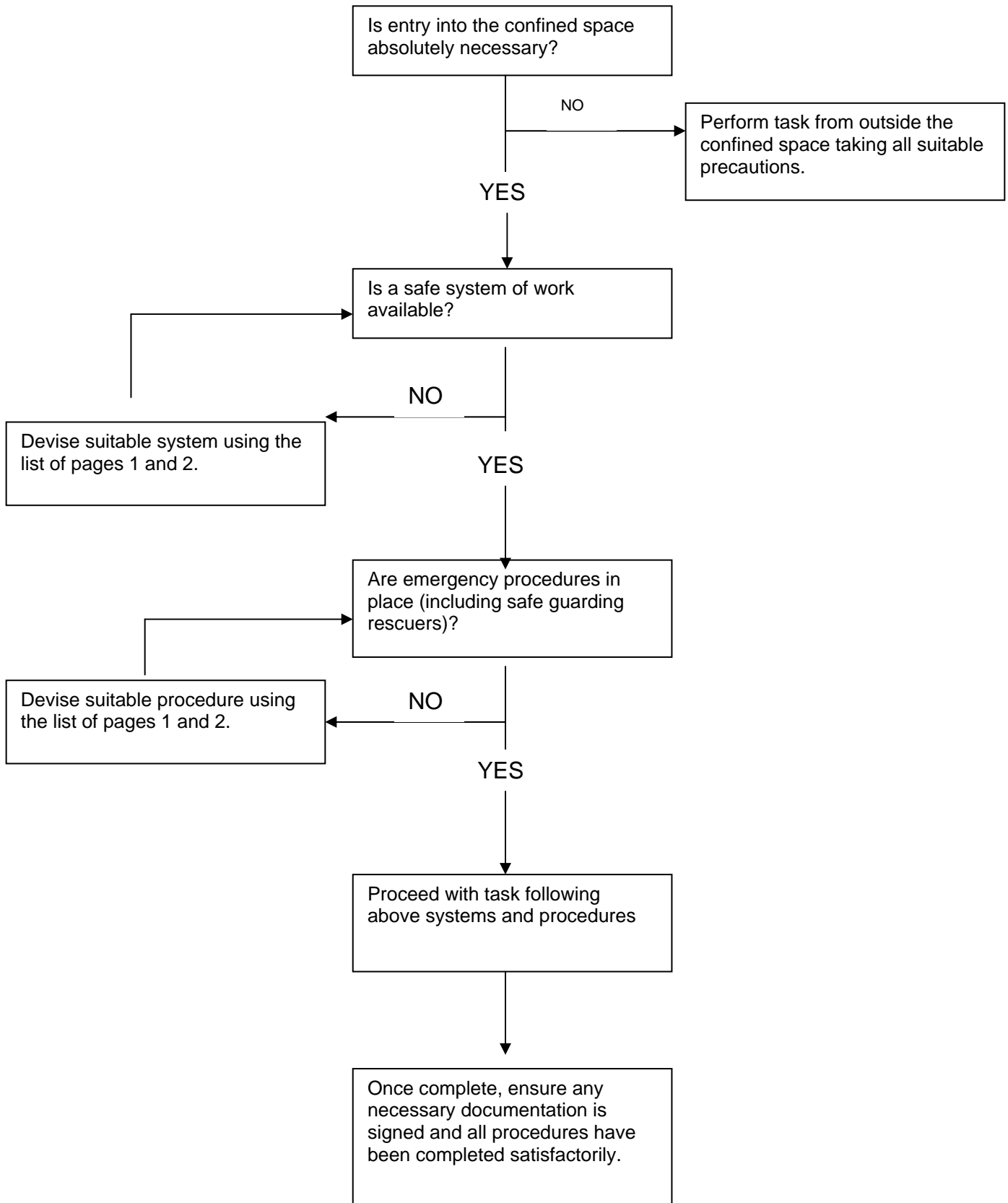
1. "Work in a confined space" can be described as work to be carried out inside any chamber, tank, vat, silo, pit, trench, pipe, sewer, flue, well, or other similar confined space (eg. coldroom) in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk.
2. The first consideration should be to assess if the task can be completed without the need for entry into the confined space, eg. by the use of mechanical or electronic equipment.
3. If it is determined that the work cannot be successfully completed without entry into the confined space, then the task must be assessed in terms of:
 - the confined space

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- the work to be carried out
 - the hazards that may arise, and
 - the need for emergency rescue that may occur at each stage.
4. These may include but not limited to:
- details of any previous contents of the confined space and any subsequent purging or removal;
 - contents of pipes or vessels within the area;
 - substances to be taken into the area;
 - COSHH information, hazard data sheets (on all of the above);
 - monitoring/testing of the environment prior to, during, and after the work has been completed;
 - isolation (electrical and/or physical);
 - communication systems with those outside the confined space;
 - forced ventilation requirements;
 - competence of the individuals involved;
 - the degree of supervision necessary;
 - supply of PPE; (eg. harness, safety line, RPE etc.)
 - possible supply of additional lighting;
 - advice on fire safety precautions and measures;
 - methods used to raise the alarm;
 - emergency shutdown procedures for services or plant;
 - limiting the time individuals are allowed to spend in the confined space;
 - checking access arrangements are suitable for rescuers (wearing full SCBA);
 - provision and maintenance of additional safety equipment (safety harnesses, lines, exhaust ventilation etc. with appropriate test certificates and examination records);
 - provision and maintenance of resuscitation equipment and other first-aid;
 - information and training (on the above);
 - a detailed permit-to-work system etc.
5. In addition to placing a duty on every employer to ensure compliance with the provisions of the regulations in respect of any work carried out by his or her employees, the CSR goes further by requiring the employer to ensure compliance, so far as is reasonably practicable, with the provisions in respect of any work carried out by persons other than his employees in so far as the provisions relate to matters within his control. Similar requirements are also made of the self-employed in respect of their own work and also other persons. Frequently, work requiring entry into confined spaces involves an employer, sub-contractors and self-employed persons and this regulation makes it clear that all are covered and must comply.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **WORKING IN CONFINED SPACES**

Risk Rating: **HIGH**

Hazards (Risk Element in Task Procedure):

1. Fire / Explosion.
2. Asphyxiation.
3. Electric Shock.
4. Injury from use of repair equipment e.g. oxy - acetylene equipment.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Use correct plant and equipment (specified and maintained) and trained Personnel.
5. Assess the work and the conditions thoroughly before commencing. (COSHH Assessments and Codes of Practice). Issue Permit to Work if required.
6. Ensure emergency procedures (inc. means of escape) are detailed and known in advance.

Emergency Procedure:

1. Follow specified emergency procedures.
2. Isolate plant/electrical systems if appropriate.
3. Call emergency services.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B3 FIXINGS AND STRUCTURES

Method Statement: FIXING AND STRUCTURES

Risk Rating: HIGH

This task is subject to the following and any related amendments:

Working at Height Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Provision and Use of Work Equipment Regulations 1998.

Manual Handling Operations Regulations 1992.

Lifting Operations and Lifting Equipment Regulations 1998

Working Height Regulations 2005

The Electricity at Work Regulations 1989

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

ACOP-245502 Approved Code of Practice Guidance Rider Operated Fork Lift Trucks

Safety in Working with Lift Trucks.

Institute of Refrigeration Good Practice Guide 15 Erection and Dismantling of Equipment and Insulated Structures

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure the suitability (e.g. load bearing or material properties) of the structure that you are either going to –
 - (a) gain access to
 - (b) fix equipment to
 - (c) fix pipework on

2. If in doubt, request information from a specialist -
 - (a) supervisor
 - (b) architect
 - (c) customer
 - (d) site agent
 - (e) foreman
 - (f) structural engineer

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3. See Risk Assessment B1 - Working at Heights, in particular, roof works

Fixings

1. Use correct equipment for carrying out the task. Portable electrical equipment should conform the Electricity At Work Regulations and local rules (eg. 110V).
2. Ensure you are familiar with the material properties of the structure and the position of services, (ie. check drawings)
3. Use the correct type of access equipment. See Risk Assessment B1 (Working at Heights)
4. Use the correct method of fixing as instructed by the fixing manufacturer, structural engineer or other specialist in this subject
5. Ensure that approval has been given by the client / his representative that the equipment etc. can be fixed in the area designated
6. Ensure that the equipment being fixed will not cause a hazard or danger to personnel working in the area where it is to be located, also ensure that equipment will not create a hazard to person(s) needing to maintain it at a future time.

Safe access for maintenance

Structure capable of accepting the weight and size of the equipment complete with access equipment and persons maintaining it

7. Use safe lifting procedures See Risk Assessment R11 (Positioning of Packs, AHU'S, Evaporators, Condensers etc)

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Risk Assessment: **FIXINGS AND STRUCTURES**

Risk Rating: **HIGH**

Hazard (Risk Element in Task Procedure):

1. Falling.
2. Electric Shock.
3. Burns.
4. Refrigerant Leak.
5. Explosion.

Control Measures (Method of Eliminating / Reducing Risk):

1. Check routing of all cables, gas pipes etc.
2. Switch of electricity supply.
3. Use correct fixing and tools, etc.
4. Use correct protective equipment.

Emergency Procedure:

1. Isolate equipment.
2. Isolate services.
3. Clear area of all Personnel.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B4 WORKING WITH COMPRESSED GASES

Method Statement: WORKING WITH COMPRESSED GASES

Risk Rating: MEDIUM

This task is subject to the following any related amendments:

The Regulatory Reform (Fire Safety) Order

Fire (Scotland) Act 2005

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

The Dangerous Substances and Explosive Atmosphere Regulations 2002

Note

The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)

Approved Carriage List (ACL)

Institute of Refrigeration Guidance Note 19 November 2009

Institute of Refrigeration "Hints and Tips for the Refrigeration Service Engineer June 2001 Section 4.0 Transport of Gas Cylinders' in Cars and Closed Vans"

Institute of Refrigeration Service Engineers Section Data Sheet 19 "ADR Regulations" (Carriage of dangerous goods by road)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure that personnel working with compressed gases have been trained in the use of the gases and the appropriate equipment.
2. Ensure that all personnel are aware of the hazards of using such substances and or equipment.
3. Gas material safety data sheets should be available at all times and should be carried in all vehicles carrying such substances.
4. All cylinders should be stored in an upright position and suitably secured.
5. Small cylinders should not be stacked more than 2 high.

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6. All valves should be protected by valve caps etc.
7. Do not roll cylinders or treat roughly.
8. Use a cylinder trolley where possible.
9. Store cylinders away from heat sources and out of direct sunlight.
10. Store full and empty cylinders separately.
11. Cylinders should be transported in such a way that if the vehicle swerves or brakes sharply the cylinder will not move.
12. Do not smoke when transporting cylinders. If the vehicle does not have a permanent ventilation system, then a window should be open for ventilation.
13. Hoses and regulators should be removed for transportation.
14. As a means of alerting the Emergency Services as to the possible contents of a vehicle involved in an accident a 100 mm diamond shall be affixed to the rear of the vehicle in accordance with the information supplied in the "European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)"
15. Use gauges and valves that are accurate and do not leak.

Use correct personal protective equipment i.e. safety shoes, gloves and eye protection.
16. Use hoses that have a low leakage rate.
17. Do not use a naked flame or any form of electrical heat to raise the pressure of the cylinders.
18. Use only heat produced from hot water
19. Refer to Task Procedure, Risk Assessment R5 Refrigerant Removal & Handling, R6 Refrigerant Charging, R10 Pressure Testing and R14 Leak Testing.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: WORKING WITH COMPRESSED GASES

Risk Rating: MEDIUM

Hazard:

1. Explosion.
2. Asphyxiation
3. Injury when moving cylinders (manual handling).

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Use of correct plant and trained personnel.
5. Read COSHH information on substances before proceeding with work.
6. Use the correct cylinders and make sure they are not damaged.
7. Use correct mechanical handling equipment.
8. Eliminate all heat sources or naked flames.

Emergency Procedure:

1. Shut off leak, if without risk.
2. Switch off electrical supply.
3. Evacuate area.
4. Recover cylinders that have been damaged.
5. Handle refrigerant and treat any injuries in accordance with COSHH Assessment Sheet.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B5 WORKING WITH FLAMMABLE GASES

Method Statement: WORKING WITH FLAMMABLE GASES

Risk Rating: HIGH

This task is be subject to the following and any related amendments

The Regulatory Reform (Fire Safety) Order

Fire (Scotland) Act 2005

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

The Dangerous Substances and Explosive Atmosphere Regulations 2002

The following documents should also be referred to when using this assessment

The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)

Approved Carriage List (ACL)

Institute of Refrigeration Guidance Note 19 November 2009

Institute of Refrigeration "Hints and Tips for the Refrigeration Service Engineer June 2001Section 4.0 Transport of Gas Cylinders' in Cars and Closed Vans"

Institute of Refrigeration Data Sheet 19 "ADR Regulations" (Carriage of dangerous goods by road)

Institute of Refrigeration Good Practice Guide 17 "Carriage of Cylinders Frequently Asked Questions"

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure that personnel working with flammable gases have been trained in the use of the gases and the appropriate equipment including Fire Extinguishers.
2. Ensure that all personnel are aware of the hazards of using such substances and or equipment.
3. Gas material safety data sheets should be available at all times and should be carried in all vehicles carrying such substances.

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Transportation

1. Cylinders should be transported in an upright position and should be suitably secured.
2. Never transport cylinders with hoses and equipment fitted in place.
3. As a means of alerting the Emergency Services as to the possible contents of a vehicle involved in an accident a 100 mm diamond shall be affixed to the rear of the vehicle in accordance with the information supplied in the “European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)”
4. If the vehicle does not have a permanent ventilation system, then a window should be open for ventilation.
5. When carrying flammable gas cylinders no smoking is allowed in the vehicle.
6. Carry a suitable fire extinguisher 2.0 Kg dry powder multi purpose.

Storage

1. All cylinders shall be secured in the upright position by chains or partitions.
2. The chains or partitions being secured to the wall or structure of the building.
3. Use proper cylinder trolleys, do not roll or handle cylinders roughly, (do not drop).
4. Store cylinders in the open if possible.
5. Separate flammable gas cylinders from oxygen/oxidants by at least 3M.
6. Store LPG cylinders separately from acetylene.
7. Store full and empty cylinders separately.
8. Protect cylinders that are stored in the open from rusting and extremes of weather.
9. Periodically check cylinders in store for leakage using the current leak testing agent obtainable from the cylinder supplier.

General

1. Never use a flame or direct heating to raise the pressure of the cylinder.
2. Never re-compress or decant a flammable gas.

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3. Never permit oil, grease or other combustible material to come into contact with a cylinder particularly the cylinder valve.
4. Keep the valve outlets free from contaminants particularly oil, water and particulate matter.
5. Close the cylinder valve when gas is not required or when the cylinder is empty.
6. When closing the valve use only sufficient force to make a gas tight seal.
7. Use good quality hoses and check them every day for signs of wear.
8. If there are signs of wear replace at once, do not tape over holes or wear.
9. Keep the hose length as short as possible, 5m for welding/brazing.
10. Use the correct hoses for the correct gas.
11. Make sure tools and nozzles are in good working order and that they do not leak and control properly. Use the correct nozzle for the correct application.
12. Do not use oxy-acetylene equipment unless reliable flash back arresters are fitted to the hoses.
13. Gauges and valves should be accurate and in good condition, replace immediately if they are not.
14. See Task Procedure - Risk Assessment R3 Brazing and Soldering of Refrigerant Pipework and R4 welding of steel pipe.
15. Use Correct PPE: Gloves, Clean Overalls, Safety Footwear, Eye Protection.

Fire Precautions

1.
 - (a) The area in which the work is to be carried out must be adequately cleaned and [moveable] combustible materials removed to a distance of not less than 20 feet (6M) from the work.
 - (b) If work is to be carried out overhead the area beneath must be similarly cleaned and [moveable] combustible material removed.
 - (c) Immovable combustible materials, floors and other structures within or near to the segregated area must be protected by a 12" x 12" (300 mm x 300 mm) fire resistant blanket or similar material.

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- (d) Before heat is applied to material built into or projecting through one side of a wall or partition an inspection shall be made of the other side of the wall or partition to ensure that no combustible materials are in danger of ignition by direct or conducted heat.
2.
 - (a) There shall be available for immediate use near to the work 2 Kg capacity fire extinguisher(s) or other equivalent means of fire extinguishment of a type suitable for the combustible material and the premises. Extinguisher to be charged with dry powder.
 - (b) Nearby hydrants and hoses, if any, must be connected up in readiness for immediate use and tested prior to commencement of the work.
 3. At all times when the equipment is in use at least one other responsible adult must be in attendance to see that there is no outbreak of fire.
 4. Blow lamps or blow torches shall be lighted as short a time as possible before use, extinguished immediately after use and while lighted shall not be left unattended.
 5. A thorough examination must be made in the area in which work has been undertaken half an hour after the termination of each period of work.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment:

WORKING WITH FLAMMABLE GASES

Risk Rating:

HIGH

Hazard:

1. Spread of fire.
2. Exposure to fumes
3. Eye or injury.
4. Burn injury.
5. Danger to third parties.
6. False alarm trips.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3.
 - a) Use of heat shields.
 - b) Removal of combustibles.
 - c) Check area after a 30 minute interval after completion of work.
 - d) Fire extinguisher present.
 - e) Second person present
4.
 - a) Ventilate work area.
 - b) Removal of refrigerant gas.
 - c) The use of a respirator
 - d) Second person present.
5. Wear eye protection
6. Wear fire retardant clothing, heat resistant gloves and suitable safety shoes. and head protection
7. Effectively cordon off working area.

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8. Isolation or protection of sensors.

Emergency Procedure:

1. Isolate the flammable gas
2. Remove the injured person (if without risk to all parties)
3. Render first aid (if trained) or summon trained first aid assistance.
4. Call the emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B6 FIBROUS MATERIAL INCLUDING FIBREGLASS, STRAWBOARD AND OTHER INSULATION MATERIALS

Method Statement: **FIBROUS MATERIALS INCLUDING FIBREGLASS, STRAWBOARD
AND OTHER INSULATION MATERIALS**

Risk Rating: **MEDIUM**

This task is subject to the following and any related amendments:

The Electricity at Work Regulations 1989

Provision and Use of Work Equipment Regulations 1998.

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

The Environmental Act 1990

The Hazardous Waste Regulations 2005

Working at Height Regulations 2005

Confined Spaces Regulations 1997.

See also HSE Bulletin "Safe Work in Confined Spaces (L101)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Before attempting to carry out the task it is important that all COSHH assessments and material data sheets are available.
2. Be aware of the exposure level of the substance if worked upon by manual or mechanical equipment. These should be indicated in the COSHH assessments and material data sheets
3. Use the correct PPE as indicated in the COSHH assessments and material data sheets
4. Use correct type and size of extraction equipment if applicable as indicated in the COSHH assessments and material data sheets
5. Use correct type of face mask or respirator for the exposure level/risk.
6. Take correct measures for the flammability of the material used.

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7. If working in confined spaces refer to Risk Assessment B2.
8. If working at heights refer to Risk Assessment B1.
9. If applicable before starting work, ensure fire extinguisher of the correct size available.
10. Remove waste substance/product from site in suitable sealed containers. Complete waste transfer notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste regulations may apply)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: FIBROUS MATERIALS INCLUDING FIBREGLASS, STRAWBOARD AND OTHER INSULATION MATERIALS

Risk Rating: MEDIUM

Hazard:

1. Exposure to substance 'dust'.
2. Respiratory problems.
3. Eye and skin injury.
4. Spread of fire.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Ventilate area.
4. Wear personal protective equipment to the degree of risk present, (ie, goggles, gloves, face mask etc).
(This should be indicated in the COSHH assessments and material data sheets for the materials being used
5. Eliminate all heat sources

Emergency Procedure:

1. Isolate work equipment from power supply if without risk.
2. Remove affected persons from area if without risk.
3. Render first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B7 ASBESTOS

Method Statement: ASBESTOS

Risk Rating: HIGH

This task is subject to the following and any related amendments:

The Control of Asbestos Regulations 2006

Hazardous Waste Regulations 2005.

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Working at Height Regulations 2005

Manual Handling Operations Regulations 1992.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Asbestos will not occur when new works are being carried out. It is normally in retrofit situations where asbestos can be located.

When attending site meetings, ask if asbestos has been located on the site or if an asbestos survey has been carried out. Request copies of the asbestos survey and ensure the areas where company personnel are working have been covered.

From 21 May 2004 all premises are required to have an asbestos register. This will give the location and the type of asbestos. When attending premises to carry out work make sure you are able to check via the register that asbestos is not in the area where you will be working. In some instances asbestos information for some clients will be kept at the branch office and this information should be available to all relevant employees.

Occasionally during work asbestos is located. If this occurs then the site manager/employer should be notified and the asbestos should not be disturbed.

The regulations covering work which is carried out in a controlled environment are clear and specific.

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If these conditions apply they are controlled by the Health & Safety Executive.

Full protective equipment will be issued with instructions in their use.

If asbestos is discovered inform your manager immediately and under no circumstances disturb, drill or grind the material.

Fixed materials can be worked around so long as they are not disturbed.

Be diligent towards disturbance by other trades, if you believe the regulations are being contravened, remove yourself from the area, report to the site manager for instructions and notify your manager.

Where work is being carried out in a controlled environment you must fully comply with the instructions.

General

1. Do not remove or disturb asbestos based products unless under the control of the Health & Safety Executive.
2. Do not work in a condition that you believe is contaminated by other trades until management clearance is given.
3. Do not cause sub-contractors to contravene any regulation relating to work with asbestos.
4. Do not allow any employee under 18 years of age to work in any contaminated situation with or without protection.
5. On each and every occasion there is a reason to believe that you may have been exposed to contamination. For whatever reason complete any entry in the Site Accident Book, the Company Accident Book
6. Work with asbestos will require a licence unless a risk assessment shows that the work will be sporadic and of low intensity and that personal exposure will not exceed the control limit of 0.1f/ml averaged over four hours. This applies to white, brown or blue asbestos.
7. Modern building materials may have a look similar to asbestos, and may be difficult to differentiate. If in any doubt seek advice prior to removal cutting drilling or grinding.

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8. The regulations and guidelines are for your protection. Please make sure you are familiar with them and comply in full. If you have any doubts contact the management prior to commencing work.

Stiple Glazed/Granitone Asbestos Lined Coldrooms

- (a) In the 1950's and 1960's and early 1970's coldrooms were lined to the walls and ceiling internally with stiple glazed/granitone asbestos sheeting.
- (b) Stiple glazed/granitone asbestos sheeting may contain between 10% and 15% white asbestos. White asbestos is not the most harmful, but must be treated with respect.
- (c) Coldrooms that need to be moved or removed which contain the above named substance cannot be carried out by an Insulation Contractor unless he knows the special processes for carrying out the removal of such substance.
- (d) A competent insulation contractor must be used who is capable of carrying out such work.
- (e) The process for carrying out the removal of such coldrooms containing such substance as previously described is as follows:-
 - 1. Take a sample of stiple glaze to an Analytical Chemist. The Chemist must be working to EN45001 and accredited to UKAS (United Kingdom Accreditation) Service and NEMAS.
 - 2. Remove waste substance/product from site in suitable sealed containers. Complete waste transfer notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. This substance is termed Hazardous Waste and must be disposed of under the Hazardous Waste Regulations 2005.
 - 3. Contact the Local Environment Waste Office who will advise on the site location for disposal of the waste. Not all waste disposal sites will accept asbestos-based products.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ASBESTOS
Risk Rating: HIGH

Hazard:

1. Asbestosis and other related lung diseases.
2. Electric shock.
3. Ensure that other hazards are not forgotten because of the urgency attached to the asbestos situation.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Check asbestos register before starting work.
4. If a re-fit is being carried out check for asbestos survey and check for asbestos in the areas of work.
5. Do not disturb asbestos.
6. Work in accordance with professional advice and instructions.
7. Use correct PPE at all times. (Overalls, footwear, gloves, glasses. head protection and face mask of the correct type if considered necessary for the task in hand) (See note 6 under General heading)
8. Keep dust levels below exposure level (damp down).
9. Use correct equipment at all times. (High filtration vacuum cleaning equipment)

Emergency Procedure:

If exposed to asbestos:-

1. Stop work immediately.

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2. Evacuate from the area of contamination immediately.
3. Check yourself for any asbestos dust or debris on skin or clothing.
4. Remove clothing and place in a plastic bag.
5. If possible take a shower, otherwise wash thoroughly.
6. Ensure that washing facilities are left in a clean condition.
7. Report the problem to the site contact and your supervisor.
8. Complete note 5 in the Task Procedure.
9. It is the site owner's responsibility to carry out any further work to ensure the area is decontaminated and safe.
10. Safely dispose of contaminated clothing (Must be double bagged)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B8 WORKING ON TOP OF DISPLAY CASES

Method Statement: **WORKING ON THE TOP OF DISPLAY CASES**
Risk Rating: **MEDIUM**

This task is subject to the following and any related amendments:

The Electricity at Work Regulations 1989

Provision and Use of Work Equipment Regulations 1998.

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working at Height Regulations 2005

See also HSE Bulletin "Safe Work in Confined Spaces (L101)

Institute of Refrigeration Good Practice Guide 22 "Working at Height on Commercial Display Cases"

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Where there is a requirement to work on the top of display cases a platform or secure ladder arrangement must be used. Operators should only climb in areas which are designed for these purposes.

Where there is a requirement to work on the top of display cases a platform or secure ladder arrangement must be used. is absolutely necessary. All equipment shall be erected by persons who have attained a PASMA certificate.

- 1a. During construction work, Installation work on the top of display cases can be carried out using specifically designed tower arrangements which can be hired from specialist scaffold tower companies, these tower arrangements will extends over the top of the cabinet to give full access to the top of the display case. It should be noted that the access area to the top of the display case is not a working platform and care must be taken when working in this area. The full access area should be complete with guard rails and toe boards and access to the platform should be from within the tower arrangement

This arrangement will be subject to the entire requirements described in Risk Assessment B1 Working at Heights

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- 1b. An alternative to 1a would be a platform to give arms length access to the top of the case to carry out work to top of the case without actually putting weight onto the case structure.

The platform arrangement should be enclosed with guard rails and toe boards will be required and access and egress should be via gate arrangement

This arrangement will be subject to the entire requirements described in Risk Assessment B1 Working at Heights

Note: The use of restraining harnesses is mandatory when carrying out this work.

2. For momentary access to the top of a refrigerated display case for adjustment and service a suitable set of platform steps. The steps are to be complete with hand rails which extend to the full height of the platform steps

This arrangement will be subject to the entire requirements described in Risk Assessment B9 The use of step ladders

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: WORK ON THE TOP OF DISPLAY CASES
Risk Rating: MEDIUM

Hazards:

1. Falling.
2. Objects falling.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Use correct method of access and safe system of work.
5. Ensure tow boards and guardrails are fitted to the structure where
5. The user of the equipment must have received full training on how to use it safely and correctly
6. Ensure that the correct training is given in the use of the restraining harness and also ensure that the harness is in a good in a safe condition

Emergency Procedure:

1. Move away from, or off, the access equipment as soon as possible.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B9 THE USE OF STEP LADDERS

Method Statement: THE USE OF STEP LADDERS
Risk Rating: HIGH

This task is subject to the following and any related amendments:

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

Working at Height Regulations 2005

See also HSE Bulletin "Safe Work in Confined Spaces (L101)

Institute of Refrigeration Good Practice Guide 22 "Working at Height on Commercial Display Cases"

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Using step ladders for access or as a work place for carrying out refrigeration activities.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE USE OF STEP LADDERS
Risk Rating: HIGH

Hazards:

1. Overreaching
2. Step ladder becomes unstable.
3. Tools fall from step ladder and strike person below.
4. Sideways loading e.g. drilling.
5. User pushes him/herself of steps and falls.
6. Losing balance.
7. Whilst user is losing balance grabs step ladder and step ladder becomes unstable.

Control Measures

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. One person only to use the step ladder.
5. Ground conditions must be firm, level and stable.
6. Use the step ladder under the correct weather conditions.
7. Do not use the step ladder under the following weather conditions.
 - a. Lightning
 - b. High winds
 - c. Snow
 - d. Ice
8. Do not work on the step ladder for more than 30minutes without a break.
9. Under all circumstances a hand is always to hold the step ladder when climbing and working.

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10. The step ladder should be so positioned that overreaching to carrying out the work does not occur.
11. The step ladder should be so positioned that sideways-on loading is avoided.
12. If there is a need to protect personnel at ground level from falling tools and the step ladder from being knocked or pushed then the step ladder should be segregated at floor level by a barrier.
13. If sudden and unexpected movement may cause the user to fall how serious would be the consequences of falling.
14. Are the step ladder manufacturer's instructions available and have they been read and understood by the user
15. Is the step ladder strong enough for the task?
16. With the step ladder can you reach the correct working height?
17. Has the step ladder been checked before use for wear and damage affecting safety:-

Hinges
Rivets
Dents.

If in doubt do not use the step ladder.

18. Is there a need for a non-conducting step ladder for working on live electrical systems?
19. Can the step ladder be carried to the work task position safely without the risk of encountering slips trips and falls?
20. Do not work off the top step of the step ladder as this action may cause the step ladder to become unstable.

Emergency Procedure

1. Move away from or off the step ladder as soon as possible.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B10 THE USE OF LEANING LADDERS

Method Statement: THE USE OF LEANING LADDERS
Risk Rating: HIGH

This task is subject to the following and any related amendments:

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

Working at Height Regulations 2005

See also HSE Bulletin "Safe Work in Confined Spaces (L101)

Institute of Refrigeration Good Practice Guide 22 "Working at Height on Commercial Display Cases"

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Using leaning ladder for access or as a work place for carrying out refrigeration activities.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE USE OF LEANING LADDERS
Risk Rating: HIGH

Hazards:

1. Overreaching
2. ladder becomes unstable
3. Tools fall from ladder and strike person below
4. Sideways loading e.g. drilling
5. User pushes him/herself off the ladder and falls
6. Losing balance
7. Whilst user is losing balance grabs ladder and ladder become unstable

Control Measures

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. One person only to use the ladder.
5. Ground conditions must be firm, level and stable.
6. Ladder should be footed at the bottom or tied off at the top.
7. Use the ladder under the correct weather conditions.
8. Do not use the ladder under the following weather conditions
 - e. Lightning
 - f. High winds
 - g. Snow
 - h. Ice.
9. Do not work on the ladder for more than 30 minutes without a break.
10. Under all circumstances a hand is always to hold the step ladder when climbing and working.

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11. The ladder should be so positioned that overreaching to carrying out the work does not occur.
12. The ladder should be so positioned that sideways-on loading is avoided.
13. If there is a need to protect personnel at ground level from falling tools and the ladder from being knocked or pushed then the step ladder should be segregated at floor level by a barrier.
14. Could sudden and unexpected movement cause the user to fall and if so how serious would be the consequences of falling.
15. Are the ladder manufacturer's instructions available and have they been read and understood by the user?
16. Is the ladder strong enough for the task?
17. With the ladder can you reach the correct working height?
18. The ladder must be in good condition and
 - a. Free from paint and mud
 - b. No rungs missing or loose
 - c. No stiles damaged or bent
 - d. No warping and splitting (wood)
 - e. No corrosion (metal)
 - f. No sharp edges or dents (metal)
 - g. No rungs bent (metal)
 - h. Foot pads sound
 - i. Caps/rubber fittings sound.
19. Is there a need for a non-conducting ladder for working on live electrical systems?
20. Can the ladder be carried to the work task position safely without the risk of encountering slips trips and falls?
21. Use correct PPE at all times. (Overalls, footwear, gloves, glasses.)
22. The ladders must be inspected every six months to ensure they are in good working order. The check must be documented and any defects found should be rectified before the ladder is put back into service.
23. The ladder must be correctly and securely fixed at the top. If not, then footed, but only if they are under 5m in height.

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24. The ladder must extend 1.05 m above the landing place (5 Rungs).
25. The ladder must be in a good state of repair and free from grease on the stiles etc.
26. Should be placed at a suitable angle 1 m out for every 4 m height.

Emergency Procedure

1. Move away from or off the ladder as soon as possible.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Building

B11 ACCESSING VIA A FIXED VERTICAL LADDER

Method Statement: ACCESSING VIA FIXED VERTICAL LADDER

Risk Rating: MEDIUM

This task is subject to the following and any related amendments:

The Electricity at Work Regulations 1989

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

Working at Height Regulations 2005

See also HSE Bulletin "Safe Work in Confined Spaces (L101)

Institute of Refrigeration Good Practice Guide 22 "Working at Height on Commercial Display Cases"

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Most refrigeration personnel will be conversant with similar access from experience and training in the use of accessing scaffold towers. However this type of access is not easy and full concentration needs to be used at all times.

The general procedure to be followed being:-

1. Ensure clear unobstructed access to area around access ladder.
2. Check security of ladder and fixing.
3. Wear suitable non-slip footwear with a heel.
4. Ensure footwear is not wet and that rungs of the ladder are clean and free from grease or dirt.
5. Wear hard hat for protection from overhead objects.
6. Ascend facing the ladder and ensure three points of contact at all times whilst

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ascending/descending the ladder.

7. Do not attempt to carry tools or materials in hand whilst ascending/descending the ladder, use a tool belt for the carrying of hand tools to the work area.
8. Refrigerant cylinders should be kept at ground level and an extended charging line used if the refrigerant cylinder needs to be taken to the plant area. Use specialist lifting equipment.
9. In the event of compressor failure, replacements would require specialist lifting equipment.
10. Restrict personnel access at the access point to the vertical ladder during maintenance works.
11. If hot works are required, the operation would require two operatives; the oxy-acetylene cylinders should be kept in their trolley at ground level and manned. Fire extinguishers should be available at both locations. All combustibles should be used from the plant area.

Do not:-

1. Attempt to carry heavy objects whilst accessing the plant area via the ladder.
2. Lean outside the mezzanine handrail confines.
3. Attempt to hoist heavy objects to the plant area by hand rope.
4. Do not jump off the ladder from lower rungs.
5. Do not rush an ascent or descent of the ladder.
6. Do not slide down hand rails.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ACCESSING VIA A FIXED VERTICAL LADDER
Risk Rating: MEDIUM

Hazard:

1. Fall from height.
2. Objects falling from working platform.
3. Danger to third parties.
4. Manual handling.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Use correct method of access/egress.
5. Ensure access ladder is secure.
6. Ensure access area is clear from obstruction.
7. Follow procedure guidance for taking equipment to and from plant area.
8. Restrict access to area whilst work is in progress.

Emergency Procedure:

1. Move away from or off the access equipment as soon as possible.
2. Remove injured person (if safe to do so) and administer first aid - if qualified to do so.
3. Summon assistance and/or call emergency services - if necessary.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E1 ELECTRICAL ISOLATION PRIOR TO WORKING ON EQUIPMENT

Method Statement: ELECTRICAL ISOLATION PRIOR TO WORKING ON EQUIPMENT

Risk Rating: HIGH

This task is subject to the following and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 13 EWR 1989)

Precautions to be taken to ensure that once equipment is isolated so that work can be carried on it, it cannot become electrically charged again whilst work is in progress

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Contact customer's management to gain permission and to advise of work to be carried out.
2. Where required, complete Permit to Work and adhere to any rules printed thereon, over and above these procedures.
3. All health and safety rules must be obeyed.
4. Arrange for cancellation of any plant alarms, if they are likely to be affected by the isolation requirement.
5. Cordon off area within which work is being carried out to prevent the entrance of unauthorised persons should 'live testing' be a requirement. This is not required when the equipment is connected to the permanent electricity supply by a plug and

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- socket unless covers are removed from electrical connections that are accessible by the unauthorised persons. Ensuring safe access is maintained to the isolation equipment.
6. Ensure adequate access to isolator/plug and socket has been provided.
 7. Post safety hazard notices adjacent to isolator and/or fit 'locking off' device to warn other personnel that electrical circuits are switched off for the repairs to be undertaken.
 8. Ensure that by isolating any equipment 'danger' is not caused to others as a result.
 9. .Ensure that any tools required for the task in hand are in good condition and suitable for the purpose.
 10. Prior to testing, the testing equipment should be tried on a known 'live' circuit to establish correct working.
 11. If a plug and socket is the means of isolation, remove the plug from the socket, switch off the socket and tape up the connections so that no person can interfere with the socket. Remove the fuse from the plug so that in the event of a person putting a plug into the socket the equipment will not become live. On the socket put a notice '**do not connect plug to socket - equipment under repair**'.
 12. After isolation, checks should be made using a mains-tester or voltage meter to establish that equipment has been disconnected properly. (The test equipment in question must comply with Health and Safety Regulation guidelines).
 13. To allow safe-working isolators when switched off should be 'locked off' and suitably labelled. If the removal of fuse links is the only available safe method of isolation, then personnel must ensure that the links stay in their possession until the work is completed. (This will not be required if the isolation point is a plug and socket. It is sufficient to remove the fuse from the plug and refer to point 10 of this Safe System of Work).
 14. On completion of works, personnel must ensure that any shields or protection guards removed from isolator during any repairs are replaced in a correct manner. On plug and socket connections remove tape and notice from socket, insert fuse into plug.
 15. On completion of work, check all items isolated are operating and warning notices are removed.
 16. Ensure work area is clear of any obsolete equipment, fuses, contactors, etc.

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17. Complete Permit to Work if required.
18. Report back to customer's management.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ELECTRICAL ISOLATION PRIOR TO WORKING ON EQUIPMENT
Risk Rating: HIGH

Hazards

1. Exposure to the danger of electrical shock.
2. Eye injury.
3. Burn injury (electrical).
4. Danger to third parties.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of the Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of the Method Statement
3.
 - a) Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.
 - b) Adequate training to assess risk.
 - c) Second person present if risk assessment requires.
4. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection ear protection.
5. Effectively cordon off working area and post warning notices. (This will not apply if the connection to the electricity supply is a simple plug and socket) (See point 5 of Safe Systems of Work procedure).

Emergency Procedure:

1. Switch off and isolate electrical supply.
2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E2 ELECTRICAL CIRCUITS - FAULT DIAGNOSIS AND TROUBLE SHOOTING

Method Statement: ELECTRICAL CIRCUITS - FAULT DIAGNOSIS AND TROUBLE SHOOTING

Risk Rating: HIGH

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 14 EWR 1989)

Requires that "live working only occurs when it is unavoidable and after suitable protective equipment has been provided

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Be familiar with the system before attempting any work.
2. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.
3. Be familiar with all safety and operating controls such as:-
 - Pressure switches
 - Thermostats
 - Motor starters
 - Thermistor circuits.
 - Oil differential switches
 - Time delay relay
 - Motor overloads

Remember that an Emergency Stop is not an isolation switch

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4. If the fault can only be diagnosed with the electrical supply switched on, then proceed with extreme caution.
5. Check for faults in a planned and logical manner.
6. When the fault has been located, or the fault can be diagnosed with the electrical supply switched off, isolate the supply, withdraw fuses, and lock off isolators and test before proceeding.
7. Post safety hazard notices adjacent to isolator and/or fit 'locking off' device to warn other personnel that electrical circuits are switched off for the repairs to be undertaken.
8. Start testing from the source of the supply, and work by a process of elimination.
9. Make sure a warning notice is placed on the equipment stating the electricity supply has been switched off.
10. Before replacing faulty component, test to make sure circuit is dead.
11. After replacement of component, switch on electricity supply to the control circuit and test.
12. Switch on power circuits and test, and then remove warning notice from electricity source.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ELECTRICAL CIRCUITS - FAULT DIAGNOSIS AND TROUBLE SHOOTING

Risk Rating: HIGH

Hazards:

1. Electrocution.
2. Electric shock.
3. Fire.
4. Explosion.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection.
4. Always ensure that section(s) of electrical system being worked on are satisfactorily isolated.
5. Safe systems of work (permits to work).
6. Ensure satisfactory working space. It is recommended that this should be a minimum of 1metre.

Emergency Procedure:

1. Switch off and isolate electrical supply.
2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E3 REPLACEMENT OF ELECTRICAL COMPONENTS

Method Statement: REPLACEMENT OF ELECTRICAL COMPONENTS

Risk Rating: HIGH

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 12 EWR 1989)

All electrical equipment must have secure and safe means of isolation from all sources of electrical energy

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure that the electrical system to be worked on is effectively earthed, and there is continuity on the earth connection Circuit Protective Conductor (CPC).
2. Switch off and isolate the section of the electrical system from which the components are to be replaced (see Method Statement E1).
3. Post safety hazard notices adjacent to isolator and/or fit 'locking off' device to warn other personnel that electrical circuits are switched off for the repairs to be undertaken.
4. With a suitable and proven test instrument (see HSE Guidance Note GS38). Check there is no secondary voltage or current applied to all the terminals or connections of the component(s) to be replaced/or worked on.

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5. Replace component(s) as required ensuring that all connections are fully tightened and cables correctly positioned and are secure.
6. Carry out a visual and manual check on the operation of the replacement component(s) (if applicable) i.e. contactors etc.
7. Reconnect and switch on electrical supply and check for satisfactory operation of components and system (as required) and monitor voltage and current as applicable.
8. On completion of work, ensure all items isolated are operational (unless unsafe) and all notices and locking off devices removed.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment:

REPLACEMENT OF ELECTRICAL COMPONENTS

Risk Rating:

HIGH

Hazards:

1. Electrocution.
2. Electric shock.
3. Fire.
4. Explosion.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection.
4. When working in isolated area(s) ensure other persons are available to render assistance if required.
5. Always ensure that section(s) of electrical system being worked on are satisfactorily isolated.
6. Safe systems of work (permits to work).
7. Ensure satisfactory working space. It is recommended that this should be a minimum of 1 metre.
8. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

1. Switch off and isolate electrical supply.

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2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E4 THE INSPECTION AND TESTING OF TERMINALS, CIRCUIT BREAKERS AND OVERLOADS

Method Statement: THE INSPECTION AND TESTING OF TERMINALS,
CIRCUIT BREAKERS AND OVERLOADS

Risk Rating: HIGH

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

These procedures are usually carried out within the scope of a Planned Maintenance Inspection.

Caution

Before proceeding with any inspection and testing of the equipment, ensure there is adequate access working space available to the equipment (Regulation 15 EWR 1989) with the equipment isolated electrically.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. A physical inspection of the equipment should be made to ensure that the mechanical joints in conduit, trunking and armoured cables are correctly made to ensure there is earth continuity, and this has been tested. Other items to be included in the checks are:
 - a) All connections are tight.
 - b) That all circuits can be electrically isolated.
 - c) That all removable barriers are in place.

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- d) That a wiring diagram is included and labels identifying purpose of switchgear, control gear and safety devices have been installed where confusion would occur as to which item controlled which equipment.
- e) That warning notices have been fixed to the equipment to indicate the highest voltage present within the equipment.
- f) That the equipment is protected against corrosion, vibration and any other form of environmental conditions within the surrounding area, eg, flammable gases.

2 Testing.

Having completed a physical check of the electrical equipment and components, the following tests should be carried out :-

- a) Continuity of live conductors (including the neutral, if present).
- b) Continuity of protective conductors including equipotential bonding conductors.
- c) Insulation resistance of all live conductors to earth (including the neutral, if present).
- d) Insulation resistance between live conductors on different phases.
- e) Polarity to ensure all switches are connected in the phase conductor and not the neutrals.
- f) Phase earth loop impedance tests.
- g) Operation of MCCB & RCD devices where fitted.

To enable these tests to be carried out, the operator needs to be competent in application and use of the following instruments:-

- a) Insulation tester minimum voltage 500 volts.
- b) Phase earth loop impedance tester.
- c) RCD tester.
- d) MCCB tester.
- e) Continuity tester.
- f) Polarity tester.

A safe code of practice is required to ensure that:

- (i) The equipment is fully isolated before work commences (see Method Statement E1);
- (ii) Wiring diagrams are available;
- (iii) The proper instruments are used and;
- (iv) That they are maintained to comply with Regulation 4 of the Electricity at Work Regulations.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE INSPECTION AND TESTING OF TERMINALS,
CIRCUITBREAKERS AND OVERLOADS

Risk Rating: HIGH

Hazards:

1. Electrocution
2. Electric Shock.
3. Fire.
4. Explosion.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection
4. When working in isolated area(s) ensure other persons are available to render assistance if required.
5. Always ensure that section(s) of electrical system being worked on are satisfactorily isolated.
6. Safe systems of work (permits to work).
7. Ensure satisfactory working space. It is recommended that this should be a minimum of 1 metre.
8. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

1. Switch off and isolate electrical supply.

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2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E5 CABLE SIZING

Method Statement: CABLE SIZING

Risk Rating: MEDIUM

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 5 EWR 1989)

No electrical equipment should be connected into a system if there is a risk that its strength and capability may be exceeded in such a way as to cause danger

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Check the current carrying capacity of a cable for the continuous use, under the particular installation conditions.
2. Check the relevant IEE cable tables for the type of cable and installation method concerned, for a single circuit in an ambient temperature of 30 degrees centigrade.
3. Check the design current of the circuit, i.e., the total current intended to be carried under normal use.
4. Check the nominal current or current setting of the device protecting the circuit against over current, i.e., overload, MCB etc.
5. Check the operating current, i.e., the fusing current or tripping current for the conventional operating time of the device protecting the circuit against overload, i.e. fuse, MCB, etc. (Use manufacturers' tables to establish data values).
6. Apply the following correction factors where the installation conditions differ from those for which the values of current carrying capacity are listed in IEE tables.

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- Ambient Temperature
 - Thermal Insulation (of cable)
 - Grouping (Number of cables running together)
 - Operating temperature of conductors
7. Ensure the current carrying capacity of a cable is not less than the design current of the circuit.
 8. Ensure the rated current setting device, which protects the circuit against over current, is not less than the design current of the circuit.
 9. Ensure where cables are being replaced in an existing installation or control panel, which they are of a suitable current capacity i.e; normally equal to those being replaced. Unless the equipment has changed (and hence the current requirement), cables of a lower current capacity must not be used.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: CABLE SIZING

Risk Rating: MEDIUM

Hazards:

1. Overheating of cables and electrical equipment due to overloading of conductors.
2. Leakage currents due to poor or inadequate insulation.
3. Exposure to the danger of electrical shock.
4. Danger to third parties.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
- 3
 - (a) Use of IEE Regulating cable tables and Manufacturer's specification.
 - (b) Adequate training to assess risk.
4. Verification of choice by qualified third party if deemed necessary.
5. Adequate training to assess risk.
6. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

This is a design function and is not considered to give rise to any imminent danger.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E6 ELECTRICAL CONNECTION

Method Statement: ELECTRICAL CONNECTION

Risk Rating: MEDIUM

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 10 EWR 1989)

Where necessary, to prevent danger, every joint and connection in a system shall be mechanically and electrically suitable for use.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure that the electrical system to be worked on is effectively earthed, and there is continuity on the earth connection Circuit Protective Conductor (CPC).
2. Establish what type of joint is required.
3. Check the system voltage.
4. Check that the connection is suitable for the environment.
5. Check that the connection chosen is suitable for the equipment.
6. Check the current carrying capacity of the connection.

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7. Special attention should be given to joints required for portable equipment since these may be handled whilst alive.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ELECTRICAL CONNECTION

Risk Rating: MEDIUM

Hazards:

1. Exposure to the danger of electrical shock.
2. Risk of fire due to overheating and overloading of joint.
3. Danger to third parties.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection
4. Adequate training to assess risk.
5. Proper use of manufacturer's specification tables
6. Ensuring that joints are situated and / or covered to ensure safe usage.

Emergency Procedure:

1. Switch off and isolate electrical supply.
2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.
5. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E7 ELECTRICAL COMMISSIONING AND TESTING

Method Statement: ELECTRICAL COMMISSIONING AND TESTING

Risk Rating: HIGH

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 16 EWR 1989)

Requires that anyone working on an electrical system where technical knowledge or experience is necessary must have the required knowledge and/or experience or be under suitable supervision

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure proper documentation is available to record results of checks and tests.
2. Complete Permit to Work where required, and adhere to any rules thereon over and above these procedures.
3. Obey all Health and Safety rules.
4. Ensure that any tools required for the test in hand have been calibrated and certified to the latest standards are in good condition and suitable for the purpose.

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5. Ensure that correct instrumentation is available and in good working order. Any test equipment used for work carried out under this procedure must comply with current Health and Safety guidelines.
6. Cordon off areas within which work is being carried out to prevent the entrance of unauthorised Personnel where 'live testing' is necessary.
7. Exercise care and use protective barriers or covers where appropriate if it is necessary to work in a 'live' situation.
8. Carry out commissioning in an orderly manner on an item to item basis. Data sheets should be filled in as the commissioning task progresses and not at the end of the commissioning period.
9. Carry out appropriate tests in accordance to that detailed in Method Statement E4 prior to connection of electricity supplies.
10. Ensure that on completion of works, any shields or protective guards removed from control panels during commissioning and / or testing are replaced in a correct manner.
11. Check on completion of work all equipment is operating and warning notices are removed.
12. Ensure work area is clear of any installation equipment, cables, trays etc.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: ELECTRICAL COMMISSIONING AND TESTING
Risk Rating: HIGH

Hazards:

1. Exposure to the danger of electrical shock.
2. Risk of fire due to overheating and overloading of joint.
3. Danger to third parties.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection and ear protection.
4. (a) Use of proper test equipment suitably maintained.
(b) Adequate training to assess risk.
5. Ensure that all connections are inspected and checked.
6. Cordon off the area to non-authorized personnel.
7. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

- 1 Switch off and isolate electrical supply.
- 2 Remove injured person(s) from danger area (if without risk to all parties).
- 3 Either summon or render (if trained) first aid.
- 4 Call emergency services if necessary.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E8 CHECK OUT AND/OR CHANGE AN ELECTRIC MOTOR/MOTOR COMPRESSOR

Method Statement: CHECK OUT AND/OR CHANGE AN ELECTRIC MOTOR/MOTOR COMPRESSOR

Risk Rating: HIGH

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Become familiar with the equipment and electrical circuits.
2. Make sure all electrical supplies are isolated and Post safety hazard notices adjacent to isolator and/or fit 'locking off' device to warn other personnel that electrical circuits are switched off for the repairs to be undertaken. If it is not possible to Lock Off isolators, remove the fuses that feed the motor from the panel.
3. Test electrical wiring connections at terminal box to make sure all is isolated.
4. Remove wiring and test motor with correct test equipment.
5. Remove motor and replace if faulty, ensuring correct method statement and handling procedures are adopted.
6. Re-connect electrics using correct test equipment making sure it is wired correctly.
7. Ensure safety guards, if applicable, are fitted correctly.

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8. Check out circuit(s), and, if correct, switch on and test.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: CHECK OUT AND/OR CHANGE AN ELECTRIC
MOTOR/MOTOR COMPRESSOR

Risk Rating: HIGH

Hazards:

1. Electric shock.
2. Handling. (See Risk Assessment R11)

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection
4. Always use correct tools and equipment.
5. Always isolate supply.
6. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

1. Switch off and isolate electrical supply.
2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E9 TO PROVIDE AN ELECTRICAL SUPPLY

Method Statement: TO PROVIDE AN ELECTRICAL SUPPLY

Risk Rating: MEDIUM

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures.

Caution

Particular attention should be paid to (Regulation 5 EWR 1989)

No electrical equipment should be connected into a system if there is a risk that its strength and capability may be exceeded in such a way as to cause danger

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Calculate total working current, and ensure appropriate.
2. Ensure that an appropriate and adequate supply is available, (eg. three-phase and a neutral for control circuits) and a Circuit Protective Conductor (CPC) earth wire.
3. Calculate cable sizes as per IEE Wiring Regulations (BS 7671).
4. Install equipment and cables in accordance with IEE Regulations (BS 7671).
5. Carry out necessary electrical tests, and rectify faults if necessary, see Method Statement Procedure E6 and E7.
6. Switch on the supply, run equipment and check for correct operation.
7. Hand-over project, to client after completing all testing and relevant documentation.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: TO PROVIDE AN ELECTRICAL SUPPLY
Risk Rating: MEDIUM

Hazards:

1. Electric shock.
2. Injury whilst installing equipment and cables.
3. Danger to third parties.

Control Measures (Method of Eliminating / Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection
4. Correct plant and tools are used throughout the project.
5. Correct safety precautions are used / followed.
6. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

- 1 Switch off and isolate electrical supply.
- 2 Remove injured person(s) from danger area (if without risk to all parties).
- 3 Either summon or render (if trained) first aid.
- 4 Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E10 PORTABLE APPLIANCE ELECTRICAL TESTING PRIOR TO AND AFTER REPAIR/SERVICE

Method Statement: PORTABLE APPLIANCE ELECTRICAL TESTING PRIOR TO AND AFTER REPAIR/SERVICE

Risk Rating: MEDIUM

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Reference should be made to the IEE Regulations (now BS 7671 and amendments) before implementing these procedures

Caution

Particular attention should be paid to (Regulation 4 EWR 1989)

Requires that all electrical systems should so far as reasonably practical, be of a safe construction and maintained in that state

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Before using any type of portable appliance, check visually the plug top and the condition of the flexible cable. If any defects are found Do not use this Appliance , repair if competent to do so or remove and send for repair.
2. Once a repair/service has been completed, a safety test on the electrical system should be repeated as per items (5, 6, 7, 8, & 9).
3. All electrical appliances need to be tested periodically to ensure they are free from defects as defined under the Electricity at Work Regulations. Look for evidence of this in the form of a label fixed to the appliance.

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4. If there is no evidence, and the appliance is over 1 year old, check with client if an electrical test has been carried out, proceed with caution.
5. Switch off the electricity supply, unplug the appliance and visibly check the mains flexible cable from the plug socket to the point where it enters machine for damage or connections.
6. Remove the plug top and check that all connections are in the correct position, are secure and that no damage has occurred.
7. Check the fuse size and replace if not correct.
8. Inspect and check all connections where cable has been joined for damage, security, general safety and correctness of connection ie. Does connection method conform to the I.E.E. Regulations? If it doesn't, replace it or inform client.
9. With an appropriate portable appliance tester, carry out an earth loop impedance test, polarity test, continuity test, and insulation resistance and flash test on the appliance.
10. Repeat all electrical checks after the work has been completed.
11. Prior to using the portable appliance tester, it should be tried on a known "live" circuit to establish its correct working.
12. Report back to customer management and complete the appropriate paperwork.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: PORTABLE APPLIANCE ELECTRICAL TESTING PRIOR TO AND AFTER REPAIR/SERVICE

Risk Rating: MEDIUM

Hazards:

1. Exposure to the danger of electrical shock.
2. Eye injury.
3. Burn injury (electrical)
4. Danger to third parties.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement).
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection.
4. Use of proper test equipment suitably maintained.
5. Follow the recommendation of (HSE Guidance Notes GS 38) regarding test equipment i.e. test lamp, multimeter etc.

Emergency Procedure:

- 1 Switch off and isolate electrical supply.
- 2 Remove injured person(s) from danger area (if without risk to all parties).
- 3 Either summon or render (if trained) first aid.
- 4 Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Electrical

E11 THE USE OF ELECTRICALLY OPERATED POWERED TOOLS

Method Statement: THE USE OF ELECTRICALLY OPERATED POWERED TOOLS

Risk Rating: LOW

This task is subject to the following Health and Safety Regulation and any related amendments:

The Electricity at Work Regulations 1989

This task may be subject to the following Health and Safety Regulations and any related amendments:

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

There are many types of electrically operated tools and before use of any type; the operator should be fully trained and familiar with the operation of the particular tool he/ she is to use. The equipment to be used should be currently Potable Appliance Tested and in good working order.

The operator should not use the equipment if he/she is not confident in using the equipment and/ or is not confident in any of the equipments safety aspects.

See also Hazards Identified, Control Measures and Emergency procedure paragraphs of this document.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE USE OF ELECTRICALLY OPERATED POWERED TOOLS
Risk Rating: LOW

Hazards Identified

1. Exposure to the danger of electrical shock.
2. Burn injury (electrical).
3. Danger to third parties.
4. Trips caused by material on the floor of the work area.
5. Slips caused by lack of control of the power tool/equipment.
6. Cuts/lacerations.
7. Duct.
8. Noise.
9. Vibration white finger.
10. Fire

Control Measures

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this risk assessment (See Page 1 of this Method Statement)
2. There may be other Health and Safety Regulations and relevant information that may apply to this risk assessment other than that provided on Page 1 of this Method Statement.
3. Use personal protective equipment. Wear correct personal protective equipment associated with the operation of the specific tool; overalls, footwear, face mask, gloves, glasses, head protection, and ear protection.
4. Ensure that the power tool/equipment to be used is suitable for the task in hand and is also suitable for the area and environment that it is to be operated in.
5. The power tool/equipment should be operated from 110V electricity supply through a transformer which is centre tapped to earth.
6. If mains voltage has to be used then an RCD (residual current device) rated at 30 mA with no time delay must be used.
7. Ensure that training from a competent person has been carried out before operating the power tool/equipment.
8. Ensure that there is available an instruction book and power tool/equipment.

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9. If there is no evidence of a portable appliance test, and the power tool/equipment is over one year old, then the power tool/equipment should be taken out of service, and the lack of portable appliance test evidence should be reported to a supervisor.
10. If a portable appliance test has been carried out a label on the equipment should identify the date it was carried out and a unique reference number relating to the power tool/equipment should be described on the label.
11. Before using the power tool/equipment and before connecting the equipment to the electricity supply, visually check the mains flexible cable from the plug socket to the point where it enters the machine for damage or connections.
12. Check that the plug is in good condition and the pins are not bent or damaged and that the plug top is correctly fitted and not loose.
13. Check that there are no overheating or burn marks on the plug, cable or the power tool/equipment.
14. Check that the outer case of the power tool/equipment is not damaged or loose and all screws are in place.
15. Ensure there are no taped joints in cable lead.
16. Ensure that the outer covering of the cable is gripped where it enters the plug of the power tool/equipment. The coloured insulation of the internal conductors should not be visible.
17. The trip devices (RCDs) should be checked every day by pressing the red button to ensure it is working effectively.
18. If damage is found to the power tool/equipment it should be taken out of service immediately and reported to a supervisor.
19. Ensure that the cable lead is protected if it is subject to a harsh environment.
20. If noise levels are high use ear defenders.
21. Ensure that vibration is kept to a minimum and short breaks are taken.
22. If there is a large amount of dust produced use correct face mask.
23. Adequate training in site hazards and risks.
24. Ensure that the area where the power tool/equipment is to be used is clear of debris and rubbish.

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25. Check vibration level of electrically operated tool.

Emergency Procedure

1. Switch off and isolate electrical supply.
2. Remove injured person(s) from danger area (if without risk to all parties).
3. Either summon or render (if trained) first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

General

G1 - SERVICING AND MAINTENANCE OF AIR HANDLING UNITS AND AIR TREATMENT PLANT

Risk Assessment: **SERVICING AND MAINTENANCE OF AIR HANDLING UNITS
AND AIR TREATMENT PLANT**

Risk Rating: **HIGH**

Note

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

The Hazardous Waste Regulations 2005

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

F Gas Regulations (If a refrigeration system is to be examined internally this task must be carried out by a suitably qualified person)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

Air entering a building or room through a comfort conditioning system may be filtered, cooled, heated, re-humidified before distribution to the required area. The following procedure identifies the recommended methods of servicing or maintaining some of the main components of these systems:

1.0 General

- 1.1 Ensure isolation of equipment before attempting to work on any part of the equipment or system.
- 1.2 Always use safe working methods in gaining access to any parts of the equipment i.e. working at heights, working in confined spaces, see Task Procedure/Risk Assessment B1 and B2, E1, E2, E3.
- 1.3 On completion of the maintenance or repair operation restore power supply to air handling unit. Check for satisfactory operation, ensure all cover plates guards access doors are refitted.

2.0 Air Filters

- 2.1 Types of filters found in air handling equipment include carbon, cyclonic, wet and dry dust collectors, and filters, associated with fume cupboards, radioactive, biological and clinical areas.
- 2.2 In normal use air filters do not present a Health & Safety hazard, however, used filters do contain quantities of dust which unless precautions are taken may expose service or maintenance personnel to a "Dust" hazard (see C.O.S.H.H. Assessments) operatives must wear relevant P.E.E. i.e., face mask, goggles, overalls etc.
- 2.3 When removing or replacing filters ensure trapped dust remains in the filter medium, carry out the maintenance procedure to the manufacturers' instructions.

"Used filters should be sealed in plastic bags for disposal".

3.0 Fans & Fan Motors

- 3.1 Types of fan found in air handling equipment include centrifugal, axial, propeller.
- 3.2 Where fans and motors operate in a corrosive atmosphere the rotating parts must be inspected, at regular intervals as indicated by the manufacturers' instructions.
- 3.3 Clean and ensure impellers and motors are free of dirt build-up. Check and lubricate the bearings with the recommended lubricant as required.
- 3.4 Check the drive belts for correct tension and wear. Replace as necessary, also security of fixing of motors, impellers etc.
- 3.5 Check electrical connections for soundness and that all terminals are secure.
- 3.6 Carry out electrical checks, voltage, current, and resistance, as necessary.

4.0 Cooling Equipment

- 4.1 Cooling and dehumidification equipment is usually the responsibility of a refrigeration technician, see Refrigeration Task Procedure/Risk Assessments. However visual inspection of the cooling heat transfer coil should be made to ensure fins are clean and there is a good airflow through coil block, ensure condensate will drain away freely. Visually check for signs of refrigerant leaks i.e., oil around joints on connections.
- 4.2 Only registered handlers of refrigerants are allowed to break into and work on refrigeration systems.

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5.0 Heating

- 5.1 Heating may be by means of electric resistance heaters, low pressure hot water heat transfer coils, indirect gas fired, reverse cycle heat pump (see section 4.0).
- 5.2 Electric resistance heaters, inspect condition and check resistance of elements, also check continuity. Inspect and check connections for security.
- 5.3 Low pressure hot water coils, reverse cycle heat pump coils. Ensure fin surfaces are clean and that there is a good airflow through the heat transfer coil block.
- 5.4 Indirect gas fired to air heating. As with section 4.0, this equipment should only be inspected serviced and maintained by a competent and certificated gas technician.

6.0 Humidifiers

- 6.1 Certain types of humidifier require special maintenance procedures, which because of the high risk to health need to be agreed with the client. These include spinning disc atomising types, those incorporating a spray with air washers, heated pan vaporisers and infra red systems; refer to C.O.S.H.H Assessments, BS6700, and HSG70.

7.0 Corrosion Control Treatment External Casings

- 7.1 Locate corroded area clean back to base metal using abrasive emery sheets. Apply zinc-based primer 30% content, leave to cure to manufacturers' recommendation, apply undercoat, and finally apply topcoat finish. Refer to C.O.S.H.H. Assessments for these substances.
- 7.2 The work will be carried out with operative required ventilation and protective clothing.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **SERVICING AND MAINTENANCE OF AIR HANDLING UNITS
AND AIR TREATMENT PLANT**
Risk Rating: **HIGH**

Hazards:

1. Exposure to dust and particles (eyes & respiratory)
2. Exposure to moving parts.
3. Asphyxiation
4. Electrocutation
5. Explosion
6. Leakage of refrigerant to atmosphere

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Reference to safe systems of work and C.O.S.H.H assessments.

Emergency Procedure:

1. Isolate equipment from power supply }
2. Close Relevant Isolation Valves } If without Risk
3. Remove injured person(s) from area. }
- 4, Call emergency services if required.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

General

G2 – THE ERECTION, MAINTENANCE AND DISMANTLING OF COLDROOM/COLDSTORE INSULATED STRUCTURES

Risk Assessment: THE ERECTION, MAINTENANCE AND DISMANTLING OF COLDROOM/COLDSTORE INSULATED STRUCTURES
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH) The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

The Control of Asbestos Regulations 2006

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Institute of Refrigeration Good Practice Guide 21 "Good Maintenance of Commercial Refrigerated Display Cabinets"

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

The present day practice of using "factory" made modular panels for coldroom or coldstore structures does not present the same problems from a Health & Safety point of view, as are found with some of the older structures which can still be encountered to the present day. A general description of each of the various types of structure follows in this procedure.

1.0 General

1.1 Erecting Insulated Structures

- a) Ensure site where structure is to be erected is fit for purpose e.g. floors are level and dry and there is sufficient space and clearance to allow for safe assembly.

- b) Ensure work equipment for use in assembling the structure is in safe working order.
- c) Operatives to be aware of the hazards of lifting and moving the insulated panels (safe manual handling methods, see Health & Safety Procedures Manual).
- d) Operatives to wear appropriate P.P.E. i.e. overalls, safety footwear, gloves etc as necessary.
- e) Cordon off work area and restrict access to others.
- f) Coldroom - coldstore structures to be firmly fixed in a safe manner following the manufacturers' instructions and recommendations.
- g) Operatives to be aware of the hazardous properties of any solvents or sealers used for cleaning purposes or sealing joints in the structure (see appropriate C.O.S.H.H. Assessment and Hazard Data Sheet).
- h) When working at height ensure access equipment used is secured and suitable for purpose, see procedure Risk Assessment **B1**.
- i) Carry out the necessary work in a safe and competent manner ensuring any materials removed from the structure, or off cuts from materials used are disposed of in a safe and correct manner.

1.2 Maintenance Work on Insulated Structures

Maintenance work usually consists of minor repairs to such items as damaged doors - frames, anti-condensation heaters, door furniture and light fittings etc. Usually these repairs have to be carried out whilst the coldroom - coldstore is operating and the space inside is at a lower than ambient temperature, often sub-zero temperatures, therefore greater care needs to be exercised when carrying out this type of work.

- a) Arrange with client a suitable time for repairs to be carried out (without too much disruption for the client and the person carrying out the repairs).
- b) Ensure work equipment to be used is in safe working order.
- c) Wear appropriate P.P.E. for the work being done and for the conditions encountered i.e. overalls, gloves, safety footwear, safety glasses etc., extra clothing for sub-zero temperatures.

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- d) Cordon off work area and restrict access to others.
- e) If work involves access to electrical systems ensure appropriate circuits are isolated before commencing work (see Task Procedure - Risk Assessment E1).
- f) Carry out the necessary work in a safe and competent manner ensuring any materials removed from the structure, or off-cuts from materials used are disposed of in a safe and correct manner.
- g) On completion remove any barriers erected to cordon off the work area and inform client that the work is completed. (Any electrical circuits isolated must be tested and reconnected by a competent person).

1.3 Dismantling of Insulated Structures

The dismantling of a coldroom - coldstore structure is a similar operation to that of erecting a structure, obviously the operations are in reverse order, but all safety precautions as listed in section 1.1. of this procedure apply. In addition to these the following also apply.

- a) Ensure a thorough site survey is carried out, with arrangements made with the client as to the time, date, period for the work to be carried out.
- b) Ensure adequate working area, access to and from work area (sufficient for panels, sections to be removed from area).

2.0 Insulated Structures using Factory Manufactured Modular Panels

These structures usually consist of a number of uniform panels of a standard size and thickness of insulation (made from expanded polystyrene or polyurethane) interlocked together by means of "Cam Lock" fittings on the outer edges of each panel. This system lends itself to ease of construction and dismantling and is the preferred type for the modern age.

Stiple Glazed/Granitone Asbestos Lined Coldrooms

- a) In the 1950's and 1960's and early 1970's coldrooms were lined to the walls and ceiling internally with stiple glazed/granitone asbestos sheeting.
- b) Stiple glazed/granitone asbestos sheeting may contain between 10% and 15% white asbestos. White asbestos is not the most harmful, but must be treated with respect.
- c) Under "The Control of Asbestos Regulation 2006" the vast Majority of cases if you are working with Asbestos Insulation, Insulation board or Asbestos coating

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you will need to hold a licence.

- d) Works on Coldrooms that need to be moved or removed which contain the above named substance should be carried out by a competent / qualified contractor.
- e) The process for carrying out the removal of such coldrooms containing such substance as previously described is as follows:-
 - 1. Take a sample of stiple glaze to an Analytical Chemist. The Chemist must be working to EN45001 and accredited to UKAS (United Kingdom Accreditation) Service and NEMAS.
 - 2. Remove waste substance/product from site in suitable sealed containers. Treat as hazardous waste. Complete consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company.

3.0 Insulated Structures Using Cork, Rockwool or Polystyrene Insulation

These structures consist of a framework of timber with the respective insulation material secured in between the framework. The internal and external surfaces can be lined with a variety of sheet materials (galvanised or coated steels, aluminium, cementone and possibly asbestos). The sections are held together by means of internal bolts and screws usually accessible by removal of the cover plates.

Although these structures are not in common production today, there are still a large number in use. Consequently companies may find that they are called in to dismantle, remove, or dispose of them. Management and operatives should be aware of the hazards in handling certain of the materials used in the construction i.e. Asbestos and Rockwool (fibreglass).

3.1 Generally the procedure for dismantling and erecting of these types of structure is as set out in section 1.0 of this procedure, with the addition of the following points.

- a) Be aware of the materials from which the structure is made and assess if hazardous materials are involved.
- b) Where Asbestos linings are found halt all work on the structures and proceed as set down in Task Procedure - Risk Assessment B7.
- c) If the insulation material consists of Rockwool or Fibreglass, additional P.P.E. will be required to be worn i.e. glasses, face mask, overalls, etc. It is important to avoid contact between the insulation materials and the skin.

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d) If requested by the client to dispose of any of these materials (not asbestos) ensure the respective waste transfer notes are completed and a record of notes kept for a minimum of two years.

4.0 (Hazardous Waste Regulations may apply to the transfer or destruction of waste products produced by this task)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE ERECTION, MAINTENANCE AND DISMANTLING OF
COLDROOM/COLDSTORE INSULATED STRUCTURES

Risk Rating: MEDIUM

Hazards:

1. Manual Handling Injuries.
2. Exposure to Dust and Particles (Eyes & Respiratory)
3. Electrocution (Electrical Systems & Work Equipment)
4. Asbestos (white).

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Reference to Safe Systems of Work and C.O.S.H.H. Assessments.
5. Asbestos work to be carried out by competent personnel.

Emergency Procedure:

1. Isolate work equipment from power supply, if without risk.
2. If Asbestos is discovered, halt work, clear area, and advise management.
3. Remove injured person(s) from area, if without risk.
4. Call emergency services if required.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

General

G3 - DELIVERY, ERECTION, MAINTENANCE AND DISMANTLING OF CHILLED OR FROZEN DISPLAY CASES

Method Statement: DELIVERY, ERECTION, MAINTENANCE AND DISMANTLING OF CHILLED OR FROZEN DISPLAY CASES

Risk Rating: MEDIUM

Note

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Working at Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

Manual Handling Operations Regulations 1992.

F Gas Regulations (If a refrigeration system is to be examined internally this task must be carried out by a suitably qualified person

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

Refrigerated cabinets are normally delivered to site as individual units that require to be jointed together (multiplexed), structurally, electrically and via their refrigeration pipework. The following procedure identifies the recommended methods of handling these units when they are delivered, multiplexed, serviced and subsequently dismantled.

1.0 Delivery

- a. Ensure site is capable (ready) to take delivery of cabinets, i.e. an even surface exists, capable of taking the weight of the delivery and off-loading vehicles, and facilitates the off-loading and subsequent manoeuvring of the cabinets.
- b. Ensure the equipment used to off-load the cabinets has the necessary certificates of "worthiness" (e.g. lifting gear) and the drivers have the appropriate training certificates (e.g. forklift truck).

- c. Ensure the correct PPE is worn (e.g. overalls, gloves, safety footwear as necessary).
- d. When using automated off-loading equipment (e.g. tail lifts, cranes etc.) ensure all appropriate safety precautions are followed in order to prevent personal injury.
- e. If there is a need to work at height (e.g. on top of the cabinets when attaching lifting straps) ensure the necessary precautions are taken (see also Risk Assessment B1).
- f. When manually handling the cabinets, always minimise the risk of personal injury by the use of auxiliary equipment where possible (e.g. pallet trucks, pinch bars, spiders, skates etc).

2.0 Multiplexing/Erecting Cabinets

- a. Ensure the equipment used for assembling the cabinets is in good working order. Any hand tools must comply with the portable appliance legislation. (See also Risk Assessment E10).
- b. Operatives to be aware of the hazards of moving and lifting cabinets (as in 1.0 (f) of this procedure).
- c. Ensure the correct PPE is worn (e.g. overalls, gloves, safety footwear as necessary).
- d. Operatives to be aware of the hazardous properties of any glues, solvents or sealers used for joining either the cabinets or their drainage systems or insulating the refrigeration pipework or sealing the services entry points. (See appropriate C.O.S.H.H. assessment and hazard data sheet).
- e) When working on the refrigeration pipework, ensure the necessary precautions are taken as described in the relevant Risk Assessment when brazing (see R3), pressure testing (R10) leak testing (R14), refrigerant charging (R6) and commissioning (R12).
- f) When working at height, ensure the access equipment is secured and suitable for the purpose (see Risk Assessment B1).
- g) When working on and connecting up the electrical systems of the cabinets, ensure the necessary precautions are taken as described in the relevant Risk Assessment when connecting (E6) providing the supply (E9), and commissioning and testing (E7).

- h) Any cabinets that contain glass panels or mirrors present and additional safety hazard, large items should be carried by two persons, and if appropriate suction pads should be used.
- i) If during the assembly, the exterior of the cabinets have been damaged to such an extent that re-painting is required ensure the operatives are aware of the hazardous properties of the paints and solvents used (see appropriate C.O.S.H.H. assessment and Hazard Data Sheet). Any spraying should be performed electrostatically to prevent drifting of the paint spray. Any paint used on interior surfaces should be "Food Safe" (see BS7557).

3.0 Maintenance/Serviceing of Cabinets

In addition to the relevant precautions are stated above:

- a) Ensure the operator is aware of any hazards associated with the fault diagnosis of the electrical system and refrigeration system as described in the Risk Assessments E2 and R18 respectively.
- b) Ensure that the cabinet is isolated from the electrical supply if the case is being either cleaned, or electrical components, terminals or fuses are being replaced (see R19, E1, E3 & E4) respectively.
- c) If the integrity of the refrigeration pipework is to be breached, ensure the cabinet/stub is isolated from the refrigerant supply and the pipework pumped down. (See R2 & R19).
- d) Ensure the area is cordoned off and the appropriate safety signs are displayed.
- e) Ensure the case is de-merchandised as necessary prior to servicing in order to prevent the possibility of contaminating its contents or of injury to the engineer.
- f) If the task involves working on cabinets that may contain food residues, ensure the necessary precautions are taken against possible contamination of adjacent cases or infection of the engineer.
- g) Operators to be aware of the hazardous properties of any cleaning solvents or degreasing agents used when cleaning the cabinets (see appropriate C.O.S.H.H. assessment and Hazard Data Sheet)

4.0 Dismantling of Cabinets

The dismantling of the cabinets generally tends to be a reverse of the procedures used during multiplexing/erection of the cabinets (see 2.0). However additional procedures may need to be followed due to the length of time the installed cabinets have been on site.

- a) Ensure the cabinet is emptied of its original contents, and that the refrigerant gas and the oil have been removed (See R2, R13 & R16), prior to beginning the operation. See also 3.0 (f) above.
- b) If additional lifting equipment (e.g. A-frames) are needed to lift the cabinets, ensure the operatives are aware of the hazards associated with such equipment.
- c) If abrasive wheels are needed to assist in breaking down the cabinets, ensure any operators have the necessary training certificates and are aware of the Abrasive Wheels Regulations.

- 5.0 (Hazardous Waste Regulations may apply to the transfer or destruction of waste products produced by this task)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: DELIVERY, ERECTION, MAINTENANCE AND DISMANTLING OF CHILLED OR FROZEN DISPLAY CASES

Risk Rating: MEDIUM

Hazards:

1. Manual handling and other physical injuries.
2. Electrocutation.
3. Escape of refrigerants to atmosphere.
4. Refrigerant burns.
5. Falling from a height.
6. Microbiological contamination from food residues

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection
4. Ensure electrical system fully isolated.
5. Use safe and approved working procedures.
6. Ensure access equipment secured from movement or slippage.
7. Follow good personal hygiene practices.

Emergency Procedure:

1. Isolate equipment.
2. Evacuate area (if necessary)

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3. Remove injured persons from area if without risk.
4. Call emergency services if necessary.

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General

G4 – REPLACEMENT OF LAMPS AND LIGHTING COMPONENTS

Method Statement: REPLACEMENT OF LAMPS AND LIGHTING COMPONENTS
Risk Rating: HIGH

Note

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working at Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

NB. Reference should be made to the IEE Regulations (now BS 7671) & the Electricity at Work Act 1989 prior to implementing these procedures.

1. If a permit to work system is in place, obtain the relevant permit.
2. If the task requires the person carrying it out to work at heights or confined spaces, the individual must be familiar with risk assessments B1, B2 & B3 prior to commencing the task.
3. Switch off and isolate the section of lighting to be worked on, (see risk assessment E1).
4. Place safety hazard notices adjacent to the isolator or locking off device to warn others that the circuit are switched off for repairs and are not to be switched on (see risk assessment E3).

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5. With a suitable and proven test instrument, check there is no secondary voltage or current to the lighting component being replaced or maintained.
6. Replace the lighting component ensuring all connections are tight.
7. Reconnect and switch on the electricity supply ensuring all the isolated items are operational.
8. Remove all warning notices and locking off devices.
9. Complete any necessary documentation (including the permit to work if relevant).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **REPLACEMENT OF LAMPS AND LIGHTING COMPONENTS**

Risk Rating: **HIGH**

Hazards (Risk Element in Task Procedure):

1. Electrocution
2. Electric Shock
3. Fire
4. Explosion
5. Working at heights / confined spaces / lone working

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection
4. Always ensure that sections of electric systems being worked on are satisfactorily isolated.
5. Safe systems of work (i.e. permit to work system to be considered)
6. Ensure satisfactory working space
7. When working in isolated areas ensure regular contact is made with store reception.

Emergency Procedure:

1. Switch off and isolate electric supply.
2. Remove injured person from danger area (if with out risk to all parties).

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3. Inform Store management and first-aider (if person injured)
4. Call emergency services (if necessary)

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General

G5 - GENERAL USE OF CHEMICALS

Method Statement: GENERAL USE OF CHEMICALS
Risk Rating: MEDIUM

Note

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
The Hazardous Waste Regulations 2005
Provision and Use of Work Equipment Regulations 1998
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Chemicals (Hazard Information and Packaging for Supply) Regulations 1994

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

1. When using any chemical /substance always refer to the COSHH assessment sheets and material safety data sheets.
2. Be aware of the frequency, duration and number of staff, contractors and customers potentially exposed to the chemical/ substance in question.
3. Be aware of any constraints relating to the area within which the chemical/substance is going to be used.
4. Never use chemicals /substances in confined space (see risk assessment **B2**) with out proper ventilation or RPE (if required).
5. Always use the correct PPE as outlined in the COSHH assessments.

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Risk Assessment: GENERAL USE OF CHEMICALS
Risk Rating: MEDIUM

Hazards:

1. Exposure to Chemicals.
2. Eye, skin and Inhalation injuries.
3. Risk of Fire or Explosion.
4. Risk of contamination of the drains or watercourse.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Training and familiarisation in the correct use of approved chemicals
4. Always read the instructions, material safety data sheets and COSHH assessments.
5. Training in the use of PPE and RPE indicated by COSHH assessment and material data
6. Practice good personal hygiene.
7. (Hazardous Waste Regulations may apply to the transfer or destruction of waste products produced by this task)

Emergency Procedure:

1. Remove the injured person if without risk to others
2. Refer to material safety data sheets and COSHH assessments for advice.
3. Inform Store management and first-aider (if person injured)
4. Call the emergency services (if necessary)

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General

G6 - ENTERING AND WORKING IN RETURN AIR DUCTS

Method Statement: ENTERING AND WORKING IN RETURN AIR DUCTS
Risk Rating: HIGH

Note.

Refrigerant Leak testing should be carried out by a suitably qualified person in accordance with the British Refrigeration Associations document entitled “Code of Practice for refrigerant leak tightness in compliance with the F gas regulations” and the Institute of refrigeration Refrigerant Emissions and leakage ZERO Project

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Confined Spaces Regulations 1997.

Working at Height Regulations 2005

Confined Spaces Regulations 1997

See also HSE Bulletin “Safe Work in Confined Spaces (L101)

HSE Guidance Note GS5 Entry into Confined Spaces

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer’s guide INDG 402

IST = Instore Technician

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

This task involves personnel working in **RETURN AIR DUCTS** for maintenance purposes. All activities must conform to the risk assessment B2.

1. Prior to entering the Return Air Duct, complete a Permit to work document. If there is no Permit system in place, the procedure outlined below must be strictly adhered to in accordance with B2.
2. Inform the Duty Manager that work needs to be performed in the Return Air Duct and agree a safe system of work (including emergency procedures).

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3. Obtain the relevant keys.
4. Prior to entering the Return Air Duct Isolate the Main Air Handling Unit (seeM1) as per the manufacturer's instructions.
5. Place the appropriate warning notices outside the Return Air Duct and at the Main Air Handling Unit. These notices should warn people that personnel are working in the Return Air Duct.
6. Once the fans have stopped running, allow the air movement to settle. Carefully open the door of the Return Air Duct and if refrigeration leak detection of the air duct is not present and working, test the air for refrigerant leaks (see R14).
7. If no leaks are found enter the duct, if refrigerant leaks are found, contact the refrigeration contractor for advice prior to proceeding.
8. Take any necessary precautions if there is a need to enter the duct in which refrigerant may be leaking (eg. the wearing of RPE (if competent), having systems in place to remove the individual safely should the need arise etc).
9. After entering the Return Air Duct test the Duct Emergency Alarm and check with reception to confirm that the alarm is working.
10. Take care when working down the Return Air Duct and periodically report back to Reception at pre-arranged times
11. When the work has been completed, leave the duct, lock the door, remove notices, restart the AHU, return the keys to reception and complete any necessary paperwork.

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Risk Assessment: ENTERING AND WORKING IN RETURN AIR DUCTS
Risk Rating: HIGH

Hazards:

1. Entrapment from access door to the Return Air Duct.
2. Trips, Slips and Falls.
3. Lone working
4. Refrigerant Leakage
5. Restricted height / width of duct

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, gloves, glasses. head protection
4. Agree safe system of work (consider permit to work system0
5. Isolate the AHU (Air Handling Unit) before entering duct
6. Inform Appointed Person prior to entering the duct
7. Test for refrigerant leaks prior to entering the duct
8. Place warning notices on AHU (Air Handling Unit) and at the entrance to the duct
9. Test panic alarm in duct
10. Wear appropriate RPE if trained and qualified to do so, when an assessment is carried out and the results require it to be worn

Emergency Procedure:

1. Isolate work equipment from power supply if without risk.
2. Remove affected persons from area if without risk to all parties.

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3. Inform Store management and first-aider (if person injured).
4. Call emergency services if necessary.

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General

G7 - WORKING ON ROOFS

Method Statement: WORKING ON ROOFS

Risk Rating: MEDIUM

Note

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working at Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, preventing slips and trips at work INDG 225

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

Certain tasks require the operative to work on roof areas to complete some of their duties.

Below is a guide to safe working methods whilst working on roofs. This should be read in conjunction with risk assessment B1 – working at height – before proceeding.

- 1 Prior to considering working on the roof and whilst working on the roof, check and be aware of the local weather conditions.
- 2 If a permit of work system is in place, obtain the relevant permit.
- 3 If a permit of work system is not in place, once you obtain the key (if required) from the key holder, inform the relevant persons of: the intention to work on the roof area; the anticipated time the task will take; and the equipment to be worked on.
- 4 Whilst on the roof and moving to the area of work, always keep to the designated walkways.
- 5 Once the tasks have been completed, report back to the relevant persons and return

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keys.

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Risk Assessment: **WORKING ON ROOFS**
Risk Rating: **MEDIUM**

Hazards:

- 1 Falls from heights
- 2 Slips ,trips and falls
- 3 Adverse weather conditions
- 4 Objects falling from the roof
5. Lone Working

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. head protection
4. Lone working, use a safe system of work (consider permit to work system)
5. Be vigilant at all times (i.e. be aware of adverse weather conditions)

Emergency Procedure:

- 1 Isolate equipment
- 2 Remove the injured person if without risk to others
- 3 Inform Store management and first-aider (if person injured)
- 4 Call the emergency services if necessary

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

General

G8 - WORKING WITH HAND TOOLS

Method Statement: **WORKING WITH HAND TOOLS**
Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations
Provision and Use of Work Equipment Regulations 1998
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safety Method of Work Description:

There are many types of hand tools and before use of any type; the operator should be fully trained and familiar with the operation of the particular tool he/ she is to use
The equipment to be used should be in good working order, free from any defects and have been regularly checked

The operator should not use the equipment if he/she is not confident in using the equipment and/ or is not confident in any of the equipments safety aspects

See also Hazards Identified, Control Measures and Emergency procedure paragraphs of this document

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Risk Assessment: **WORKING WITH HAND TOOLS**
Risk Rating: **HIGH**

Hazards Identified

1. Impact injury caused by slipping tool or incorrect size of tool.
2. Danger to third parties.
3. Trips caused by material on the floor of the work area.
4. Slips caused by lack of control of the power tool/equipment.
5. Cuts/lacerations.
6. Noise.

Control Measures

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection
4. Ensure that the tool to be used is suitable for the task in hand and is of the correct size and also suitable for use in the area and environment that it is to be used in.
5. Use the correct tool for the job:-
 - (a) Spanners: Must be the right size or else are automatically not suitable. Ring spanners are better than open ended spanners. Open ended spanners are generally better than adjustable spanners.
 - (b) Adjustable Spanners: Although very convenient, these can very quickly become dangerous due to wear on the jaws and adjusting mechanism. If the jaws are no longer more or less parallel, or the sliding jaw is wobbly, report the tool as "unsuitable".
 - (c) Stillsons: These also suffer in time from wear on the mechanism. The spring will take up a certain amount of wear, but if the spring is exhausted, or the gripper teeth on the jaws are worn out, report the tool as "unsuitable".

NEVER attempt to gain extra leverage by using pipe over the handle. If the temptation arises, obviously the tool is too small and therefore "unsuitable".

- (d) Files: The handle is part of the tool. Without a handle the tool is "unsuitable" and the tang extremely dangerous. Files are very brittle and must not be used as levers or chisels. If a file breaks, fragments of sharp metal are likely to fly off.
 - (e) Cold Chisels and Punches: When the head turns over after prolonged use, forming a 'mushroom', grind it off, to prevent flying fragments. Keeping chisels sharp reduces the tendency for 'mushrooming'.
 - (f) Hammers: Use the right weight hammer for the job. ('Suitably' again). Ensure hammerheads are secure, with proper wedges (good order). Never shorten a hammer shaft as this spoils the balance and could strain the wrist.
 - (g) Screwdrivers: These should fit the slot in the screw head, so use the correct size. The point should be 'cross ground' to minimise the risk of slipping. Do not use them as chisels. Cross point (Phillips) screwdrivers are not generally re-sharpenable, so discard when wear makes them unsuitable.
 - (h) Knives: Retractable knives (Stanley) are commendable, but do not abuse them where a preferable alternative exists, e.g. cable stripping. Use a purpose made cable stripper.
6. Ensure that training in the correct technique of using the tool is undertaken.
 7. Use the correct personal protective equipment (PPE) (gloves and other PPE considered to be required to reduce the risks associated with the operation of the specific tool).
 8. If there is a large amount of dust produced use correct face mask.
 9. Adequate training in site hazards and risks.
 10. Ensure that the area where the tool is to be used is clear of debris and rubbish.
 11. Keep all tools in good working condition.

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12. Do not use faulty tools.
14. Report defective tools immediately.

Emergency Procedure

1. Remove injured person(s) from danger area (if without risk to all parties).
2. Either summon or render (if trained) first aid.
3. Call emergency services if necessary.

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Refrigeration

R1 – REPLACEMENT OF REFRIGERANT LIVE COMPONENTS

Method Statement: REPLACEMENT OF REFRIGERANT LINE COMPONENTS
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulations)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

Before any component is removed or replaced within a refrigeration system, the refrigerant must be evacuated from the section of the system concerned.

This can be achieved by the following methods.

See Risk Assessment R2 (Pump down of refrigerant procedure)

See Risk Assessment R5 Refrigerant Removal and Handling)

1. Ensure that there is no refrigerant in component to be removed.
2. Switch off electrically if required (See Risk Assessment E1 Electrical Isolation).
3. Change component and evacuate system to eliminate moisture and non condensables.
4. Re-commission equipment.

Where component is situated in a system and no shut off valves are present. (See R5 Refrigerant Removal and Handling)

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On larger systems with multiple circuits, it may be possible to isolate the section in which the components are situated.

1. Isolate component by shutting the isolation valves.
2. Remove refrigerant of pipe work isolated (See R5 Refrigerant removal and Handling)
3. When process complete and component changed, evacuated the refrigerant from section of pipe work. (See R9 Evacuation of Systems)

Where component is situated in a system and no shut off vales are present. (See R5 Refrigerant Removal and Handling).

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Risk Assessment: **REPLACEMENT OF REFRIGERANT LINE COMPONENTS**
Risk Rating: **MEDIUM**

Hazards :

1. Asphyxiation
2. Explosion
3. Refrigerant Leakage

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Do not attempt to use brazing equipment if refrigerant is present in the atmosphere. (See also Risk Assessment R3)
4. Do not isolate pipe work that may contain liquid refrigerant which is below ambient temperature.
5. Make sure all refrigerant has been removed from the section of the system before breaking into the system.
6. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, Safety glasses, head protection, Respirator in enclosed space (if required)

Emergency Procedure:

1. Shut off leak if without risk.
2. Switch off electrical supply.
3. Evacuate Area.
4. Handle refrigerant in accordance with COSHH Assessment Sheet.
5. Treat injuries in accordance with COSHH Assessment Sheet.
6. Remove cylinders from heat source, keep cylinders cool.

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7. Call Emergency Services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R2 – PUMP DOWN OF REFRIGERANT PROCEDURE

Method Statement: PUMP DOWN OF REFRIGERANT PROCEDURE
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulations)

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

Before a component can be replaced in a refrigeration system, the plant, in most instances, will need to be pumped down, or where this is not possible, the refrigerant should be recovered from the system. See Risk Assessment R5 (Refrigerant Removal and Handling).

PROCESS

1. Fit suction and discharge gauges.
2. Switch off electricity supply to the system.
3. Re-calibrate low pressure switch to 0 psig.
4. Close off the shut off valve at the outlet of the liquid receiver/condenser.
5. Switch on compressor and when the suction gauge reaches 0 psig switch off, continually check discharge pressure gauge for excessive discharge pressure.
6. It is important to wait for a short period of time before attempting the next part of the process because the system may not have fully pumped down and time will be

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required to see if the suction pressure rises. If the suction pressure does rise then item no 5 should be repeated until there is no rise in suction pressure. Note very few systems fully pump down on the first attempt.

7. Front seat compressor suction valve.
8. Isolate system electrically.
9. Front set compressor discharge shut off valve.
10. When plant is put back into operation (Normal), do not forget to re-adjust low pressure switch setting.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: PUMP DOWN OF REFRIGERANT PROCEDURE

Risk Rating: MEDIUM

Hazards:

1. Refrigerant leakage to atmosphere.
2. Explosion.

Control Methods (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Check and ensure pressure relief valves or other forms of pressure relieving devices are fitted to liquid receiver
4. Check operation of high-pressure switch and ensure it is at the correct cut out setting. Refer to pressure-temperature scales for other refrigerants.
5. Fit discharge gauge, if excessive discharge pressure is indicated, this would suggest inadequate liquid receiver size.
6. Ensure that there is an adequate wait period after pump down to ensure that all the refrigerant is removed from the system (observe suction gauge during this period for any rise in pressure).

See Risk Assessment R5 (Refrigerant Removal and Handling).

7. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, safety footwear, face mask, gloves, safety glasses, head protection.

Emergency Procedure:

1. If discharge pressure is excessive, switch off plant and isolate.
See Risk Assessment R5 (Refrigerant Removal and Handling).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R3 – BRAZING OF COPPER PIPE

Method Statement: BRAZING OF COPPER PIPE

Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Regulatory Reform (Fire Safety) Order
Fire (Scotland) Act 2005
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Provision and Use of Work Equipment Regulations 1998.
The Dangerous Substances and Explosive Atmosphere Regulations 2002
Refer to the Institute of Refrigeration Service Matters document No7 December 2005
Refer to the Institute of Refrigeration Guidance Note 19 November 2009

This is one of the most common methods of joining non-ferrous material and involves heating the components with the naked flame and applying brazing material to form a sound joint. When two dissimilar metals are joined then the process usually requires the application of a suitable flux.

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

1. Contact customer's management to gain permission and to advise of work to be carried out.
2. Where required, complete Hot Work Permit and adhere to any rules printed thereon, over and above these procedures.
3. All Health and Safety rules must be obeyed.
4. A fire extinguisher of the correct type must be present and within reach.
5. Arrange for isolation of any fire alarms, i.e., smoke detectors, and heat sensors if in the vicinity of the working area.
6. Cordon off area within which work is being carried out to prevent the entrance of unauthorised personnel.

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7. If work is to be carried out in a confined space, then adequate ventilation must be made.
8. If there is a possibility of refrigerant gas being present or flux is being used when joining dissimilar metals in a confined space, then a respirator must be used or adequate ventilation provided.
9. Eye protection must be used at all times.
10. Flame resistant clothing should be worn.
11. Heat resistant gloves should be worn.
12. Before commencing work, check all brazing equipment is in a safe and useable condition.
13. A second person should be present at all times whilst carrying out brazing (see task procedure B5 Working with Flammable Gases).
14. Ensure work area is clear of any combustibles, etc, oil, lagging, paper, etc.
15. Heat shields should be used to protect any combustibles, e.g., oil, lagging, paper that cannot be moved.
16. The preparation of the materials being joined, and the actual brazing process itself, should be carried out in accordance with any specified standards. If no standards are specified, then the work should be carried out in accordance with good refrigeration practice.
17. A thorough examination must be made in the area in which the work has been undertaken 30 minutes after termination of each period of work.
18. Complete Hot Work Permit if required.
19. Report back to customer's management.
20. Arrange to reinstate fire alarms.

NB Cadmium based materials shall not be used.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: BRAZING OF COPPER PIPE
Risk Rating: HIGH

Hazards (Risk Element in Task Procedure):

1. Spread of fire.
2. Exposure to fumes.
3. Eye injury.
4. Burn injury.
5. Danger to third parties.
6. False alarm trips.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3.
 - a) Use of heat shields.
 - b) Removal of combustibles.
 - c) Check area after a 30 minute interval at the end of the operation.
 - d) Fire extinguisher present.
 - e) Second person present.
4.
 - a) Ventilate work area.
 - b) Removal of refrigerant gas.
 - c) The use of respirator
 - d) Second person present.
5. Wear eye protection.
6. Wear fire retardant clothing, heat resistant gloves and suitable safety shoes.
7. Effectively cordon off working area.
8. Isolation of protection of sensors.
9. See Task Procedure and Risk Examination B5 'Working with Flammable Gases' (fire precautions).

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Emergency Procedure:

1. Turn off and isolate welding equipment (if without risk).
2. Attempt to extinguish fire if appropriate.
3. Evacuate personnel from area.
4. Render first aid (if required).
5. Call emergency services (if necessary)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R4 – WELDING OF STEEL PIPE

Method Statement: **WELDING OF STEEL PIPE**
Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations

The Regulatory Reform (Fire Safety) Order

Fire (Scotland) Act 2005

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

This is one of the most common methods of joining steel pipe and involves the use of an electric arc to cause localised melting of the steel pipe and the electrode rod, thereby forming an integral joint, by the process of fusion. Please note, when using this process, check that it will not interfere electrically with any electronic equipment installed in the building.

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

1. Contact customer's management to gain permission and to advise of work to be carried out.
2. Where required, complete Hot Work Permit and adhere to any rules printed thereon, over and above these procedures.
3. All Health and Safety rules must be obeyed.
4. A fire extinguisher of the correct type must be present and within reach.
5. Arrange for isolation of any fire alarms, i.e., smoke detectors, and heat sensors if in the vicinity of the working area.
6. Cordon off area within which work is being carried out to prevent the entrance of unauthorised personnel.

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7. If work is to be carried out in a confined space, then adequate ventilation must be made and a suitable respirator should be used.
8. Suitable screening should be provided to protect other personnel from the effects of the rays produced from the electric arc.
9. Eye protection must be used at all times.
10. Flame resistant clothing should be worn.
11. Heat resistant gloves should be worn.
12. Before commencing work, check all welding equipment is in a safe and useable condition.
13. A second person should be present at all times whilst carrying out welding (see Task Procedure B5 'Working with Flammable Gases').
14. Heat shields should be used to protect any surrounding material.
15. Ensure work area is clear of any combustibles, e.g., oil, lagging, paper etc.
16. The preparation of the materials being joined, and the actual welding process itself, should be carried out in accordance with any specified standards. If no standards are specified, then the work should be carried out in accordance with good refrigeration practice.
17. A thorough examination must be made in the area in which work has been undertaken 30 minutes after the termination of each period of work.
18. Re-check for smoldering after 30 minutes.
19. Complete Hot Work Permit if required.
20. Report back to customer's management.
21. Arrange to reinstate fire alarms.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **WELDING OF STEEL PIPE**

Risk Rating: **HIGH**

Hazards (Risk Element in Task Procedure):

1. Spread of fire.
2. Exposure to fumes.
3. Eye injury.
4. Burn injury.
5. Electrocution.
6. Danger to third party.
7. False alarm trips

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3.
 - a) Use of heat shields
 - b) Removal of combustibles
 - c) Check area after a 30 minute interval at the end of the operation
 - d) Fire extinguisher present.
 - e) Second person present.
4.
 - a) Ventilate work area.
 - b) Removal of refrigerant gas.
 - c) The use of a respirator
 - d) Second person present
5. Wear eye protection.
6. Wear fire retardant clothing, heat resistant gloves and suitable safety shoes.
7. Check all electrical equipment to ensure that it has been connected correctly and that all earth connections are appropriate.
8. Effectively cordon off working area.
9. Isolation or protection of sensors.

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10. See Task Procedure and Risk Examination B5 'Working with Flammable Gases' (fire precautions).

Emergency Procedure:

1. Switch off and isolate welding equipment.
2. Attempt to extinguish fire if appropriate.
3. Evacuate personnel from area.
4. Render first aid if required.
5. Call emergency services (if necessary)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R5 – Refrigerant Removal and Handling

Method Statement: REFRIGERANT REMOVAL AND HANDLING

Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer’s guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614
Institute of Refrigeration Data Sheet 22 “Recovered Refrigerants and Recycling under Hazardous Waste Regulations”
Institute of Refrigeration Data Sheet 6 “Recovery and re-use”
Institute of Refrigeration Good Practice Guide 11 “Recovery of Refrigerant”

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F- Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Become familiar with the equipment and its operation.
2. Establish refrigerant type to be removed. If no identification, Pressure Temperature Relationship may have to be used.
3. Before attempting the procedure ensure that:-
 - a) That there are sufficient recovery cylinders available.
 - b) The cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant.

- c) All necessary paperwork such as labels and waste transfer notes are to hand.
 - d) The recovery equipment is in working order and a set of instructions concerning the equipment is at hand.
 - e) A set of weighing scales is available (preferably electronic and calibrated) and are in good working order.
 - f) All hoses are complete with leak free disconnect coupling and are all in good order.
 - g) Wear correct personal protective equipment; e.g. overalls, safety footwear, face mask, gloves, safety glasses, head protection.
 - h) Mechanical Handling equipment is available if required for handling refrigerant cylinders.
 - i) The recovery cylinder is complete with Pressure Relief Valve and the cylinder and associated shut off valves are in good working order.
 - j) The empty recovery cylinders are evacuated and if possible cooled before recovery occurs.
4. If the procedure is being carried out where unauthorised personnel/public are present, cordon off the area.
 5. Pump down refrigeration system if possible. See Risk Assessment R2 (Pump Down Procedure).
 6. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
 7. Make sure that cylinder is situated on the scales before recovery takes place.
 8. A competent person should supervise the recovery at all times.
 9. Start the recovery machine and operate in accordance with manufacturer's instructions.
 10. Take into account that refrigerant/oil mixtures have a lower density than pure refrigerant and will consequently reduce cylinder capacity.

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11. Do not overfill cylinders. (No more than 80% volume liquid charge).
12. Do not exceed the maximum working pressure of the cylinder, even temporarily.
13. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly. Ensure that the Hazardous waste documentation is completed.
14. Recovered refrigerant should not be charged into any other refrigeration system unless it has been cleaned and checked.
15. If the refrigerant is being recharged into the same system it was removed from. See Risk Assessment R6 Refrigerant Charging.
16. If the equipment is being decommissioned and label the equipment stating that it has been decommissioned and emptied of refrigerant, the label should be dated and signed by the operative.
17. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of refrigerant)
18. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: REFRIGERANT REMOVAL AND HANDLING
Risk Rating: HIGH

Hazards:

1. Explosion
2. Asphyxiation
3. Refrigerant Burns
4. Injury when moving cylinder and plant.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Read and understand COSHH information on substances before proceeding.
4. Use the correct recovery cylinders and make sure they are not damaged.
5. Use accurate weighing scales, preferably electronic.
6. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection.
7. Use correct mechanical handling equipment.
8. No smoking, heat source or naked flames.
9. Cordon off the area to unauthorised personnel/public.

Emergency Procedure:

1. Shut off leak if without risk.
2. Switch off electrical supply.
3. Evacuate area.
4. Handle refrigerant in accordance with COSHH Assessment Sheet.

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5. Treat injuries in accordance with COSHH Assessment Sheet.
6. Remove cylinders from heat source, keep cylinders cool.
7. Call Emergency Services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R6 – REFRIGERANT CHARGING (INCLUDING NEW REFRIGERANTS AND BLENDS)

Method Statement: REFRIGERANT CHARGING (INCLUDING NEW REFRIGERANTS AND BLENDS)

Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
The Control of Asbestos Regulations 2006
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F- Gas regulations.)

Before starting this task, carry out a site specific risk assessment to determine all the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Transfer of refrigerants from storage cylinder to plant.

1. If working in an area where unauthorised personnel/public are present, cordon off the area.
2. Check for correct refrigerant.
3. Check plant has been evacuated or holds a positive pressure of the same refrigerant.
4. Connect manifold to storage cylinder and to the high and low side of the plant.

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5. No refrigerant must be allowed to escape into the atmosphere. A decanting machine must be used when evacuating part of/or the whole system.
6. Check system control circuit and safety devices.
7. Check system is ready to run.
8. Ensure air and moisture in charging line is kept to an absolute minimum.
9. Run system and charge refrigerant.
10. Leak test.
11. Fixed charged systems: - It is advisable the charge is weighed in using suitable scales or charging apparatus.
12. Certain refrigerants are mixtures and as such will need to be charged in liquid form.
13. When charging with new refrigerants or blends the correct lubricant should be used in accordance with compressor manufacturer/suppliers recommendations.
14. Ensure components are compatible, e.g. filter drier/expansion valve when using new refrigerants or blends.
15. Do not mix refrigerants.
16. For charging plant on retrofits, depending upon the refrigerant or blend that is used, checks must be made with manufacturer in connection with the acceptable level of residual quantities of the original oil within the system.
17. Separate devices, fittings and components, (e.g. specialist flexible hoses), should be used for new refrigerant and blends.
18. Due to the molecular structure of the new blends, leakage is more prevalent, therefore mechanical joints should be kept to an absolute minimum.
19. Pressurisation: - Refer to Risk Assessment R10 (Pressure Testing).
20. Refer to COSHH Assessment Sheets and refrigerant handling information.
21. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: REFRIGERANT CHARGING (INCLUDING NEW REFRIGERANTS AND BLENDS)

Risk Rating: HIGH

Hazards:

1. Explosion
2. Asphyxiation
3. Refrigerant burns
4. Injury when moving cylinder and plant.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always use correct tools and equipment for the purpose of charging.
4. Use mechanical handling equipment for cylinders when possible.
5. Ensure adequate ventilation of area.
6. Trained personnel only.
7. Labels prominently displayed to state refrigerant in system and warning against charging any other gas into system. Where an ester lubricant is being used, this should be clearly indicated.
8. No smoking, heat source or naked flame(s).
9. Cordon off the area from unauthorised personnel/public.
10. Use personal protective equipment. Wear correct personal protective e.g. equipment; overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

1. Shut off leak if without risk.
2. Switch off electrical supply.

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3. Evacuate area.
4. Handle refrigerant in accordance with COSHH Assessment Sheet.
5. Treat Injuries in accordance with COSHH Assessment Sheet.
6. Remove cylinders from heat source, keep cylinders cool.
7. Call Emergency Services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R7 – INSTALLATION OF COPPER PIPEWORK AT HIGH AND LOW LEVEL

Method Statement: **INSTALLATION OF COPPER PIPEWORK AT
HIGH AND LOW LEVEL**

Risk Rating: **MEDIUM**

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

The Dangerous Substances and Explosive Atmosphere Regulations 2002

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Refer to the Institute of Refrigeration Service Matters document No7 December 2005

Refer to the Institute of Refrigeration Guidance Note 19 November 2009

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Note: The person carrying out the task should be familiar with Risk Assessment B2, should the brazing need to be carried out in a confined space.

1. All works to be carried out as per client's specification (where applicable)
2. Ensure sufficient clearance is allowed for expansion and contraction of pipe work during operation of the system.
3. Remove all debris from pipe ducts before commencing work.
4. All pipe supports are to be firmly fixed, following the manufacturer's instructions and recommendations.
5. All fittings and pipes are to have brazed connections, unless mechanical joints have exceptionally been specified.

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6. Low pressure Dry Nitrogen (OFN) should be passed through sections of pipe work while brazing operations are carried out to prevent scale formed by oxidation. Refer to Task Procedure R10 (Pressure Testing).
7. Keep the site tidy and clean of debris at all times.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **INSTALLATION OF COPPER PIPEWORK AT
HIGH AND LOW LEVEL**

Risk Rating: **MEDIUM**

Hazards:

1. Fire caused by flame from welding torch.
2. Danger to personnel falling into pipe ducts or from scaffolding.
3. Refer to Risk Assessment R3 (Brazing and Welding).

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. All gas bottles are to be secured in a bottle trolley.
4. Flash back arrestors are to be fitted to welding equipment gas lines.
5. A suitable fire extinguisher and fire blanket to be at hand.
4. A competent person must erect all scaffolding, and have safety rails and kick boards fitted.
6. All scaffolding to be held firmly in position and scaffolding towers is to be fitted with out-riggers. Refer to Task Procedure B1 (Working at heights).
7. All works areas to be cordoned off with suitable safety barriers.
8. All Dry Nitrogen bottles must be fitted with a pressure reducing regulator and gauge, see Task Procedure R10 (Pressure Testing).
9. Brazing to be carried out in accordance with COSHH Assessment information.
10. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, glasses, head protection.

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11. Safety harnesses should be worn, where appropriate, when working at high level. A rescue plan should be in place prior to any work taking place.

Emergency Procedure:

1. Isolate equipment and services
2. Have rescue plan available.
3. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
4. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R8 – SYSTEM CLEAN UP AFTER COMPRESSOR MOTOR BURN OUT

Method Statement: **SYSTEM CLEAN UP AFTER
COMPRESSOR MOTOR BURN OUT**

Risk Rating: **MEDIUM**

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Heat generated by a hermetic system burn out causes a percentage of the oil and refrigerant to break down and form acids and sludge, which contaminate the system.

These contaminates must be removed from the system or they will probably attack the replacement compressor motor windings and another burn out will result.

The suction line filter method of clean up has been tested both in the laboratory and in the field. It has been found that it works very well. A filter drier in the suction line not only filters out sludge but the desiccant removes acid.

The suction line filter drier method is, in reality, a flushing method. The agent used for flushing the system is the refrigerant in the system. The pump used is the compressor. All that the suction line filter drier does is collect the sludge and acid that has been flushed from the system.

The following is the recommended procedure for servicing a hermetic refrigeration unit that has had a motor burn out.

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1. No refrigerant must be allowed to escape into the atmosphere. A decanting machine must be used when evacuating part of/or the whole system. (See Risk Assessment R5).
2. Remove the burned out motor compressor and replace.
3. Install a suitable suction line filter drier.
4. Renew liquid line drier cores or where applicable, the liquid line drier.
5. When replacing a motor compressor it is advisable to replace the contactor and overloads, (if applicable).
6. Re-commission plant.
7. At the end of 48 hours the system should be shut down and the suction line drier should be removed and the liquid line drier cores or drier should be replaced.
8. Where applicable an oil sample should be taken and the oil should be checked for acid using an appropriate acid test kit.
9. This procedure should be carried out in accordance with the appropriate COSHH Assessment information and with reference to the Environment Protection Act 1990.
10. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of refrigerant)
11. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: SYSTEM CLEAN UP AFTER
COMPRESSOR MOTOR BURN OUT

Risk Rating: MEDIUM

Hazards:

1. Contaminated refrigerant and oil may contain dangerous acid that can cause burns to exposed eyes and skin.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always use a recovery machine to remove refrigerant from systems.
4. Ensure that contaminated oil is placed into marked containers. (See Risk Assessment R16).
5. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

1. If without personal risk, isolate all equipment both electrically and mechanically by closing shut off valves and by isolating the electrical supply.
2. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
3. Summon assistance or call emergency services (if necessary)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R9 – EVACUATION OF REFRIGERATION SYSTEMS UTILISING CFC'S, HCFC'S AND HFC'S

Method Statement: EVACUATION OF REFRIGERATION SYSTEMS
UTILISING CFC'S, HCFC'S AND HFC'S

Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Refer to Institute of Refrigeration Technical Bulletin No1 "System Evacuation"

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. The purpose of the evacuation is to remove all moisture, air and other non condensables from the system, leaving it in a clean and dry condition, prior to charging the system with refrigerant.
2. On the successful completion of a pressure test or leak test (see Risk Assessment R10 and R14), the inert gases should be released from the system through a suitable vent to a safe place, and preparations made to evacuate and dehydrate the system. A vacuum pump of the gas ballast type should be selected for the size of system to be evacuated.
3. The vacuum pump should be tested for effective operation and then connected to both the high and low-pressure sides of the system. In order to achieve the best efficiency from the vacuum pump, the connecting pipe or hose from the pump to the system should be the largest size possible and kept to a minimum length.
4. A suitable vacuum gauge should be connected to the system at the furthest point from the vacuum pump. Do not use a standard compound pressure gauge, as this will not be sufficiently accurate.

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5. Before commencing the evacuation of the system, checks should be made to ensure there are no isolated areas of the system and any vulnerable components are sealed off, e.g., pressure switches.
6. To ensure a satisfactory evacuation of the system, a vacuum of at least 2 mm HG needs to be observed on the remote sited vacuum gauge.
7. On satisfactorily obtaining the required vacuum, isolate the pump from the system and switch off, break the vacuum on the system with the refrigerant to be used.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: EVACUATION OF REFRIGERATION SYSTEMS
UTILISING CFC'S, HCFC'S AND HFC'S

Risk Rating: MEDIUM

Hazards:

1. Electric shocks from connection of electrical equipment or damage to trailing electrical leads.
2. Uncontrolled escape of OFN/refrigerant.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use only 110v electrical equipment or 240 v equipment fitted with residual current circuit device, protect trailing leads.
4. Use only equipment that is in a safe working order.
5. Operator(s) to wear correct personal protective equipment.
6. Ensure refrigerant cylinder(s) are secured.
7. Use personal protective equipment. Wear correct personal protective e.g. equipment; overalls, footwear, face mask, gloves, safety glasses and head protection

Emergency Procedure:

1. Electric shock - Switch off and disconnect electrical equipment from supply.
2. Escaping Refrigerant - Isolate leak if without risk, ventilate area.
3. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
4. Summon assistance or call emergency services (if necessary).

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R10 - PRESSURE TESTING OF REFRIGERATION PIPEWORK SYSTEMS

Method Statement: PRESSURE TESTING OF
REFRIGERATION PIPEWORK SYSTEMS
Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Institute of Refrigeration Good Practice Guide 24 “Pressurising installed systems with Oxygen Free Nitrogen to find Leaks”
Institute of Refrigeration Good Practice Guide 28 “Safe use of Service Manifolds”
Institute of Refrigeration Guidance Note 16 EN378:2008 “Review of Key Provisions
HSE bulletin GN4 Safety in Pressure Testing
EN378-2 (2008) Refrigerating and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine all the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

The European Standard EN 378 – 2 describes the requirements for pressure testing of refrigeration systems and the information contained within the standard is the basis of this risk assessment

There are two pressure tests to be carried out on newly installed systems before they are put into operation

A **Strength test** to prove the integrity of the system

A **Tightness test** to ensure the system is leak tight

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The **Strength test** is performed on the system at the system allowable pressure (PS) x 1.43

The allowable pressure (PS) is the pressure, which shall not be exceeded within the refrigeration system either in operation or at rest.

Specified design temperatures

| Ambient Conditions | <32°C | <38°C | <43°C | <55°C |
|--|--|-------|-------|-------|
| High pressure side with air cooled condenser | 55°C | 59°C | 63°C | 67°C |
| High pressure side with water cooled condenser or water heat pump | Maximum leaving water temperature + 8K | | | |
| High pressure side with evaporative condenser | 43°C | 43°C | 43°C | 55°C |
| Low pressure side with heat exchanger exposed to the outdoor ambient temperature | 32°C | 38°C | 43°C | 55°C |
| Low pressure side with heat exchanger exposed to the indoor ambient temperature | 27°C | 33°C | 38°C | 38°C |
| <p>NOTE 1 For the high pressure side, the specified temperatures are considered the maximum which will occur during operation. This temperature is higher than the temperature during compressor shut down (standstill). For the low pressure side and /or intermediate pressure side, it is sufficient to base the calculation of pressure on the expected temperature during compressor standstill period. These temperatures are minimum temperatures and thus determine that the system will not be designed for maximum allowable pressure lower than the saturated pressure corresponding to these minimum temperatures</p> <p>Note 2 The use of specified temperatures does not always result in saturated refrigerant pressure within the system. e.g. a limited charge system or a system working at or above critical temperature CO2 in particular</p> <p>Note 3 For zeotropic blends the maximum allowable pressure (PS) is the pressure at bubble point</p> | | | | |

Note 1 The system can be subdivided into several parts (e.g. Low and high pressure sides) for each of which there might be different maximum allowable pressure

Note 2 The pressure at which the system or part of the system normally operates will be lower than the maximum allowable pressure PS

Therefore having established the allowable pressure (Ps) test pressures can be applied to the relevant system or parts of system as below.

- a) **Strength pressure test** shall be carried out at a pressure between 1 and 1.43 times

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the allowable pressure (Ps) for the system.

- b) **Tightness test** shall be carried out at the allowable pressure (Ps) for the system.
1. Only oxygen free nitrogen (OFN) shall be used as the test fluid. Prior to testing, sensitive gauges, controls and instruments that may be damaged, by excess pressure must be isolated from the system. Relief valves shall be removed and the openings capped and plugged. Solenoid valves, pressure regulating valves and other control valves should be opened as necessary and the circuit(s) checked to ensure all relevant parts of the system can be pressurised.
 2. Ensure that the correct nitrogen regulator is used for the pressure within the system. The regulator should have been calibrated and checked in accordance with a regular maintenance management routine and in accordance with current health and safety regulations
 3. Test pressure shall not exceed that applied to the components by the manufacturer of the particular components.
 4. Before carrying out the pressure test, precautions shall be taken to evacuate all personnel from the area where the potential hazard exists and to post notices within the area advising that the system or equipment is under pressure. Pipe work under pressure shall be suitably labelled whilst the test is in progress.
 5. The pressure in the system should be built up gradually and monitored by a remote gauge located in a safe place. Once the test pressure is reached, the nitrogen cylinder(s) shall be closed off and isolated from the system under test.
 6. The test pressure applied to the system should be held for at least 15mins. A longer period may be appropriate for larger systems or a fall in pressure due to leaks may not be detected.
 7. Listen for audible indication of pressure loss as the pressure is built up
Any fall in pressure indicates a leak, which should be traced - see Risk Assessment R 14
 8. Reduce the pressure to the **Tightness test** pressure. Test each joint with leak detection spray or soapy water. If any leaks are present, the fault(s) should be corrected and the system re-tested. (Repairs involving welding, or brazing shall not be carried out on any system, part of the system or component while it is still under pressure).
 9. Vent nitrogen in a well ventilated area

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10. Equipment to be used for pressure testing:-

- a) A pressure regulator set for the correct output pressure and complete with gauges with range 0-4500 psi on the cylinder side of nitrogen cylinder and a maximum pressure as indicated on the table below range on the outlet side of regulator.
- b) A 1/4" steel braided hose complete with a range of 1/4" flare fittings plus a pressure relief valve for protection purposes
- c) A high pressure gauge well within the range of the systems strength test pressure connected by 1/4" OD. copper tube at safe viewing point in the system

Maximum allowable pressure and suitable regulator maximum pressures

| Refrigerant | Maximum Pressure Discharge Pressure | Maximum Pressure Discharge Pressure | Suitable Regulator |
|-------------|-------------------------------------|-------------------------------------|-----------------------|
| R134a | 7.1 bar | 13.7 bar | Maximum output 26 bar |
| R407C | 13.2 bar | 23.6 bar | Maximum output 33 bar |
| R404A | 14.1 bar | 24.8 bar | Maximum output 33 bar |
| R410A | 18.8 | 33 bar | Maximum output 40 bar |

It is recommended that Service Manifolds are not used for this process. There are specific Nitrogen Pressure test kits on the market which contain braided steel hoses and the use of these kits is considered safer to use than a standard manifold arrangement

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: PRESSURE TESTING OF
REFRIGERATION PIPEWORK SYSTEMS
Risk Rating: HIGH

Hazards (Risk Element In Task Procedure):

1. Uncontrolled release of energy (explosion).

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Ensure all non-essential personnel are clear of the area of risk.
4. Operator(s) to wear correct protective personal equipment, i.e., overalls, safety goggles, gloves, safety shoes and safety hat.
5. It is mandatory that nitrogen cylinders are properly secured to prevent them from being knocked over and when not in use the cylinder valve is closed off
6. Equipment used for testing is to be regularly checked and maintained as set down in accordance with the relevant Safety Regulations.

Emergency Procedure:

1. Close off cylinder(s) at isolating valve.
2. Clear area.
3. Isolate leak if without risk.
4. Release pressure from system slowly and safely.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R11 – POSITIONING OF PACKS, AHU'S, EVAPORATORS, CONDENSERS ETC

Method Statement: **POSITIONING OF PACKS, AHU'S,
EVAPORATORS, CONDENSERS ETC.**

Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Lifting Operations and Lifting Equipment Regulations 1998

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

ACOP-245502 Approved Code of Practice Guidance Rider Operated Fork Lift Trucks

Safety in Working with Lift Trucks.

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Craneage of plant - when items are being lifted by crane the following should be carried out:

Please note the task described below should be undertaken by a competent person.

Regulations 3 and 8 of the Lifting Operations and Lifting Equipment Regulations 1998 apply.

Unless a competent person is employed by the employer, the work of planning the lift, employing banks man, checking the site, insurance, should be undertaken by a reputable crane hire company under their contract lift arrangements.

- (a) The crane should be positioned in a pre-determined position.
- (b) The out-riggers should be placed on sleeper pads, to spread the static load.
- (c) It should be observed that the crane jib is not obstructed when turning through 360°.
- (d) A competent banks man should be in attendance at ground level and another at the level to which the load is to be lifted or lowered.
- (e) Hand held guidelines should be attached to the load to prevent it spinning throughout the lifting operation.
- (f) The driver has a clear view.
- (g) The crane is away from excavations and overhead power lines.

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- (h) Check that there are no voids such as drains or basements which could collapse suddenly.
- (i) The load is properly slung.
- (j) There is adequate clearance so that personnel will not be struck or hit by the load.
- (k) The crane and lifting tackle has been checked and maintained in accordance with manufacturer's instructions.

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Risk Assessment: **POSITIONING OF PACKS, AHU'S
EVAPORATORS, CONDENSERS ETC.**

Risk Rating: **HIGH**

Hazards:

1. Risk of injury to personnel due to plant moving unexpectedly.
2. Uneven terrain or ground with excavations.
3. Overhead electrical lines.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Crane selection, sitting and lift planning by competent person.
4. Observe and follow client's Health and Safety statement, use safety (warning) signs and barriers.
5. Manual handling regulations apply to these operations.
6. Large items of plant should only be moved by suitably trained personnel, using the appropriate equipment.
7. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

1. Clear area of all personnel.
2. If without risk, secure or make safe all plant and equipment.
3. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.

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4. Summon assistance or call emergency services (if necessary).

Note: It is the responsibility of the hirer of the crane to inspect all relevant test certificates appertaining to the crane and any slings which are to be used.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R12 – COMMISSIONING/RE-COMMISSIONING

Method Statement: COMMISSIONING/RE-COMMISSIONING
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
The Hazardous Waste Regulations 2005
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulations

Before starting this task, carry out a site specific risk assessment to determine all the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

The procedure for evacuating and charging the system with refrigerant should be carried out in conjunction with this procedure, see Risk Assessment R9 (Evacuation of system) and Risk Assessment R6 (Refrigerant Charging) and observe "live" working procedures as detailed in Task Procedure E7 (Commissioning and testing).

Where appropriate, this work should be carried out in conjunction with a competent electrician.

1. Check compressor oil level is correct.
2. Check installation wiring is correct.

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3. Do a dry run on the electrical control circuit with the compressor fuses removed to ensure the controls are set to the correct values and are connected in the correct sequence.
4. Check for correct rotation of all motors/compressors.
5. Operate the compressor and monitor suction and discharge pressure suction return, temperature oil level, and pressure, and amperage above.
6. Regularly check oil level in compressor crankcase.
7. Do not allow suction and discharge pressure to rise or fall outside the application range.
8. Check electrical current at regular intervals to make sure plant is operating within application limits.
9. Check expansion valve superheats.
10. Adjust finally all safety pressure and temperature controls.
11. Final leak test.
12. Log all final settings of controls. Log all final amperage of electrical equipment.
13. Instruct personnel in the operation of the equipment.
14. Make sure Service Manual is left on site.
15. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: COMMISSIONING/RE-COMMISSIONING
Risk Rating: MEDIUM

Hazards (Risk Element In Task Procedure):

1. Refrigerant Leakage.
2. Electrocutation
3. Explosion
4. Asphyxiation.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
- 3, Ensure that all documentation and drawings are available and be familiar with the equipment
4. Isolate all electrical equipment before adjustment or investigation.
5. Make sure all safety controls are set and proved before plant is operational.
6. Make sure all hand shut off valves are open before plant is switched on electrically.
7. Use personal protective equipment. Wear correct personal protective equipment; e.g.overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

See Risk Assessment R5 (Refrigerant removal and handling)

1. Ventilate area.
2. Extinguish all naked flames
3. Isolate all electrical systems.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R13 – DE-COMMISSIONING

Method Statement: DE-COMMISSIONING

Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

The Control of Asbestos Regulations 2006

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulations

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Before carrying out this procedure, it is essential that an engineer is completely familiar with the plant and all its detail.

Prior to the task being carried out, an oil and refrigerant sample should be taken in case analysis is required prior to re-use of reclaimed refrigerant.

It is essential that electrical power is available before the task is commenced.

1. Isolate system electrically.
2. Remove refrigerant, see Risk Assessment R5 (Refrigerant removal and handling).
3. Close off all isolation valves.

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4. Label equipment stating that it has been decommissioned and emptied of refrigerant. The label should be dated and signed.
5. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of refrigerant)
6. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: DE-COMMISSIONING

Risk Rating: MEDIUM

Hazards:

1. Leakage of refrigerant and oil to atmosphere
2. Explosion
3. Asphyxiation

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
- 3, Ensure that all documentation and drawings are available and be familiar with the equipment
4. See Risk Assessment R5 (Refrigerant removal and handling)
5. Isolate electrical equipment.
6. Use personal protective equipment. Wear correct personal protective equipment; e.g.overalls, footwear, face mask, gloves, safety glasses, head protection.

Emergency Procedure:

1. Ventilate area.
2. Isolate electrical system.
3. See Risk Assessment R5 (Refrigerant removal and handling).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R14 – LEAK TESTING

Method Statement: LEAK TESTING

Risk Rating: LOW

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Institute of Refrigeration Data Sheet 28 "Leak checking and Record Keeping under the F Gas Regulations"

Institute of Refrigeration Good Practice Guide 24 "Pressurising installed systems with nitrogen to find Leaks"

Institute of Refrigeration Good Practice Guide 23 "Refrigerant Leakage new Legal Obligations of the Operator"

Institute of Refrigeration Good Practice Guide 30 "Indirect Leak Detection"

Leak testing should be carried out in accordance with the British Refrigeration Associations document entitled "Code of Practice for refrigerant leak tightness in compliance with the F gas regulations" and the Institute of refrigeration Refrigerant Emissions and leakage ZERO Project

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

If pressure testing is required to locate a leak refer to assessment R10 Pressure Testing of Refrigeration Pipe work

A pressure test of 10 bar is normally sufficient to locate a refrigerant leak using a leak detection spray or soap solution

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There are currently four methods employed for leak testing and they are as follows:-

1. An electronic leak detection unit.
2. A chemical dye in the lubricating oil (subject to manufacturer's approval).
3. Fluid either brushed or sprayed on.
4. Halide lamp (non-preferred method).

Electronic Unit

1. There are no foreseeable risks involved in using this type of unit for leak detecting purposes, but all Health and Safety rules must be applied when using it.

Chemical Dye

1. There are no foreseeable risks involved in using this type of unit for leak detection purposes, but all Health and Safety rules must be applied when using it.
2. Before handling the chemical dye, read the manufacturers COSHH assessment data and employ whatever recommendations are specified with regard to handling and inhalation.

Fluid either brushed or sprayed on.

1. There are no foreseeable risks involved in using this type of unit for leak detection purposes, but all Health and Safety rules must be applied when using it.
2. Before handling the chemical dye, read the manufacturers COSHH assessment data and employ whatever recommendations are specified with regard to handling and inhalation.

Halide Lamp

1. Contact customer's management to gain permission and to advise of work to be carried out.
2. When required, complete Hot Works Permit and adhere to any rules printed thereon, over and above these procedures.
3. All Health and Safety rules must be obeyed.
4. A fire extinguisher of the correct type must be present and within reach.

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5. Arrange for isolation of any fire alarms, i.e., smoke detectors, and heat sensors if in the vicinity of the working area.
6. If work is to be carried out in a confined space, (see risk assessment B2) then adequate ventilation must be made.
7. Use correct personal protective equipment.
8. Ensure work area is clear of any combustibles, e.g., oil, lagging, paper etc.
9. On completion of work check surrounding area for smouldering.
10. Re-check for smouldering after 30 minutes.
11. Complete Hot Work Permit if required.
12. Report back to customer's management.
13. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: LEAK TESTING

Risk Rating: LOW

Hazards (Risk Element In Task Procedure):

1. Spread of Fire.
2. Exposure of fumes.
3. Eye injury.
4. Burn injury.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3.
 - a) Use of heat shields.
 - b) Removal of combustibles
 - c) Check area after a 30 minute interval at the end of the operation.
4. Ventilate work area.
5. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

1. Isolate test lamp
2. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
3. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R15 – OIL CHARGING INTO A SYSTEM OR COMPRESSOR

Method Statement: OIL CHARGING INTO A SYSTEM OR COMPRESSOR

Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F- Gas regulations.)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Before adding oil to an operational system or compressor, the reasons for any loss of oil should be investigated. The individual should also be familiar with the relevant COSHH and material safety data sheets.

There are three main procedures:-

- a) Charge oil into a compressor through oil filler port.
 1. Carry out a pump down. See Risk Assessment R2
 2. Allow compressor to stand for short time to allow any refrigerant to boil out of the oil (ensure suction pressure is at 0 psig).
 3. Remove oil filler plug from compressor.

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4. Charge required amount of oil using clean dry receptacles, i.e., oil can or funnel.
 5. Refit oil plug and evacuate air from compressor See Risk Assessment R9.
 6. Re-commission the system. See Risk Assessment R12.
- b) Charge oil by means of vacuum (Hermetic units only).
1. Carry out pump down. See Risk Assessment R2.
 2. Fit length of tube with 1/4" flare fitting and in-line SOV to suction service valve.
 3. Insert other end of tube into can of clean refrigeration oil.
 4. Draw vacuum on compressor.
 5. Open SOV in oil line, drawing required amount of oil into compressor.
 6. Allow compressor suction pressure to balance at 0 psig.
 7. Remove oil-charging line from compressor.
 8. Purge air from compressor or carry out evacuation. See Risk Assessment R9.
 9. Re-commission the system. See Risk Assessment R12.
- c) Charge oil into a system or compressor by use of a hand pump. (This method is usually used for larger compressor or multi-compressor packs using oil control systems).
1. Connect flexible line from hand pump to oil inlet SOV of oil reservoir or appropriate port on compressor. See Risk Assessment R2.
 2. Connect inlet connection of hand pump into the oil can and purge air from lines.
 3. Open inlet SOV on oil reservoir and pump in required amount of oil.
 4. Backseat oil inlet SOV and disconnect hand pump etc.
 5. Monitor condition and operation of system.

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

BRA Guide for Risk Assessments and Method Statements

Risk Assessment:

OIL CHARGING INTO A SYSTEM OR COMPRESSOR

Risk Rating:

MEDIUM

Hazards:

1. Asphyxiation
2. Oil Leakage
3. Refrigerant Leakage

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Make sure all the refrigerant has been removed from the particular section of system before breaking into it.
2. Make sure suction and crank case pressures are at balance (0 psig) before breaking into compressor.
3. Clear up any spillage of oil immediately.
5. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, safety glasses, head protection.

Emergency Procedure:

1. Isolate leakage if without risk.
2. Ventilate area.
3. Extinguish any naked flames.
4. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
5. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R16 – THE REMOVAL AND DISPOSAL OF OIL FROM REFRIGERATION SYSTEMS

Method Statement: THE REMOVAL AND DISPOSAL OF OIL FROM REFRIGERATION SYSTEMS

Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

The carriage and disposal of waste refrigeration oil should only be undertaken after reference to all current legislation and COSHH regulations. Personnel should ensure they are working within these regulations.

- a) Removal of oil from compressor or plant.
 1. Pump down system and isolate compressor or component (See Risk Assessment R2).
 2. Allow short time for refrigerant to boil out of oil.
 3. Discharge waste oil into suitable sealable container. Do not fill over 80% volume.

BRA Guide for Risk Assessments and Method Statements

- b) Disposal of waste oil.
1. Ensure containers are adequately sealed.
 2. Arrange for waste transfer notes to be made out.
 3. Arrange delivery of waste oil to registered waste company.
 4. Keep records of transfer notes for at least three years.
 5. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of waste oil)
 6. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE REMOVAL AND DISPOSAL OF OIL FROM REFRIGERATION SYSTEMS

Risk Rating: MEDIUM

Hazards:

1. Asphyxiation
2. Oil Leakage
3. Refrigerant Leakage

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Make sure all refrigerant has been removed from the particular section of system before breaking into it.
4. Make sure suction and crank case pressures are at balance (0 psig) before breaking into compressor.
4. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, safety glasses, head protection.

Emergency Procedure:

1. Isolate leakage if without risk.
2. Ventilate area.
3. Extinguish any naked flames.
4. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
5. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R17 – THE USE AND MAINTENANCE OF SECONDARY COOLANTS

Method Statement: THE USE AND MAINTENANCE OF SECONDARY COOLANTS

Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
The Dangerous Substances and Explosive Atmosphere Regulations 2002
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Refer to the Institute of Refrigeration Guidance Note 19 November 2009

Task: The Use and Maintenance of Secondary Coolants

N.B. Before attempting to work on any secondary coolants system, operative(s) should refer to the relevant COSHH sheets and be aware of the hazards involved in handling the substances.

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. In many refrigeration applications heat is transferred to a secondary coolant (any liquid cooled by refrigerant and used to transmit heat without changing its state). This procedure describes the use and maintenance of the more commonly employed ones listed in the following table:

BRA Guide for Risk Assessments and Method Statements

| Secondary Refrigerant | Concentration In Aqueous Solution % by Weight | Freezing Point °F | Lowest Useful Temperature °F | Heat Capacity BTU/Gallon °F |
|---------------------------|--|-------------------------|------------------------------------|--------------------------------|
| Water | - | 32 | 35 | 10 |
| Calcium Chloride Brine | 29 | -52 | -40 | 8.3 |
| Sodium Chloride Brine | 22.5 | -5 | 15 | 9.2 |
| Dimethyl Polysiloxane | -- | -150 | -90 | 6.3 |
| Aqueous Methyl Alcohol | 47 | -60 | -40 | 7.3 |
| Aqueous Ethyl Alcohol | 72 | -60 | -40 | 5.9 |
| Aqueous Ethylene Glycol | 56 | -60 | -40 | 7.8 |
| Aqueous Propylene Glycol | 60 | -99 | -60 | 8 |
| Methyl Alcohol (Methanol) | - | -142 | -120 | 4.6 |
| Ethyl Alcohol (Ethanol) | - | -179 | -120 | 4 |
| Methylene chloride | - | -142 | -120 | 1.5 |

2. The decision of which secondary refrigerant to use in any application will be made initially upon the temperature at which it is required to operate, but other factors need to be considered chiefly from the Health and Safety point of view. These are as follow:-

a) Health & Safety Hazards

- 1) Methyl and ethyl alcohol fumes are flammable.
- 2) Methylene chloride decomposes in the presence of a flame or ultra violet light, giving off highly toxic fumes as a result of this decomposition. At normal temperature (10°C to 25°C) methylene chloride is slightly toxic by inhalation of the vapour or swallowing. Methyl alcohol (known as methanol) and ethylene glycol are both toxic.
- 3) Dimethyl Polysiloxane (Syltherm XLT) has a flash point of 47°C and gives off toxic fumes when burnt.

b. Corrosion: Water and all aqueous solutions are corrosive to some extent. It is possible to give protection by the use of inhibitors, but providing that the solution concentrations are maintained in slightly alkaline conditions (pH8 to pH9) and that air is eliminated from the solution, then the corrosive effects can be minimised by the inhibitors.

c. Weak solutions at low temperature: If the solution mix is too weak for the working temperature, then water will freeze out on the evaporator surface, reducing the heat transfer effect, and thereby the efficiency of the plant.

3. Corrosion Inhibitors

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To limit the corrosive tendency of brine solutions as much as possible the solution should be kept slightly alkaline (pH value between 8.0 and 9.0). This will not entirely eliminate corrosion and the addition of a suitable corrosion inhibitor may be necessary (sodium chromate or sodium dichromate). Frequent testing of the brine using cresol red test papers is required to maintain the required levels of alkalinity.

4. Storage and Handling

- A. Always follow the manufacturer's recommendations for the storage and use of each particular chemical.
- B. Inhibited glycol concentrates are stable, relatively non corrosive materials but decompose when heated above normal temperatures forming nitrogen oxide fumes extremely hazardous.
- C. Before charging a system with a coolant, ensure residual contaminants are removed such as sludge, rust and oil and ensure complete removal of any cleaning agents used.

5. Remove waste substance/product from site in suitable sealed containers.

Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of these substances)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE USE AND MAINTENANCE OF SECONDARY COOLANTS
Risk Rating: MEDIUM

Hazards:

1. Poisoning from the inhalation or ingestion of the substance.
2. Irritation of skin or eyes from splashes of the substance.
3. Leakage from the system.
4. Fire (certain coolants used are flammable also give off toxic fumes).

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use appropriate personal protective equipment when handling the product (Refer to COSHH assessment sheets and Material data sheets for the product being used
4. Refer to appropriate COSHH sheets before handling.
5. If using brazing process for repairs to pipe work etc., ensure that joint and surrounding area does not bear traces of the fluid. Purge pipe work with dry nitrogen during brazing process.

Emergency Procedure:

1. Switch off plant or circulating pumps (if without personal risk).
2. Contain any spillage with sand or earth.
3. Wear suitable breathing apparatus if fighting a fire where refrigerants and coolants are involved.
4. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
5. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R18 – REFRIGERATION SYSTEM FAULT DIAGNOSIS (MECHANICAL)

Method Statement: REFRIGERATION SYSTEM FAULT DIAGNOSIS (MECHANICAL)
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Fault diagnosis must follow a certain pattern at all times.

1. Inspect the system and its controls.
2. Ensure commissioning information and maintenance records are available.
3. Fit suction and discharge gauges.
4. The pressures indicated on the gauges and the information given by the customer may give some indication of the problem.
5. Symptoms can be categorised as follows:-
 - a) Plant operating but not refrigerating
 - b) Plant not operating
 - c) Plant noisy
 - d) Plant overheating
 - e) System icing up

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6. If the plant has stopped, then this could indicate a control malfunction or an electrical fault.
See Risk Assessment E2 (Control Circuits Fault diagnosis/Trouble Shooting).
7. Pressure/temperature checks at various points on the plant could also indicate a fault.
8. A planned concise method of fault elimination should be adopted.
9. Concentrate at all times - be aware of moving machinery and electrical terminals.
10. If the equipment is complex, make sure a permit to work system is adopted so that plant is not inadvertently switched on.
11. Make sure you are aware of fire exits, main electrical switches, ventilation systems, etc.
12. Once the fault is located, use a planned method of rectification.
13. Check on risk assessments to make sure you are aware of any changes and procedures.
14. Complete equipment record documentation

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment

REFRIGERATION SYSTEM FAULT DIAGNOSIS (MECHANICAL)

Risk Rating:

MEDIUM

Hazards:

1. Leakage of refrigerant and oil to atmosphere.
2. Explosion.
3. Asphyxiation
4. Electrocutation.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. See Risk Assessment appropriate to fault diagnosed.
4. Use personal protective equipment. Wear correct personal protective equipment; e.g. overalls, footwear, face mask, gloves, glasses, head protection.

Emergency Procedure:

1. Ventilate area.
2. Isolate electrical system.
3. Remove any injured person (if safe to do so) and administer first-aid if qualified to do so.
4. Summon assistance or call emergency services (if necessary).

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R19 - THE CLEANING AND MAINTENANCE OF REFRIGERATED DISPLAY CABINETS AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)

Method Statement: THE CLEANING AND MAINTENANCE OF REFRIGERATED DISPLAY CABINETS AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)

Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

NB Before commencing with this task the cabinet or cold room should be emptied, switched off electrically and allowed to come to ambient temperature. In no circumstances will food products be allowed to remain within the cabinet or in the vicinity of the evaporators of a cold room.

If working in an area where there is a number of a person or the general public. Ensure before starting work that the area where work is being carried out is cordoned off (Work on Display Cases on the Sales Floor area

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

1. Ensure cabinet or unit cooler is isolated electrically.
2. Remove base plates, baffles, back plates and fans as necessary.
3. Carry out leak test on all refrigeration line components, coil block, pipe work and repair any leaks as necessary.

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F- Gas regulations.)

4. Carry out visual inspection of evaporator coil block, refrigeration line components and pipe work, fan blades and motors, electrical wiring harness, defrost- heaters, cabinet fabric, and note any damage etc.
5. It is of the utmost importance to prevent dirt and rubbish from entering the drainage system during the cleaning process. The condensate outlet of the cabinet outlet should be sealed to prevent rubbish and dirt from entering the drainage system, this particularly important if the cabinet is to be washed out with hoses or a power wash. Any rubbish which is collected in the drain outlet should be removed along with dirty water by using a wet/dry vacuum cleaner before continuing the clean
6. Clean coil block, cabinet interior, air ducts, fan blades as required with cold water and/or a suitable food safe brand of coil cleaning fluid (where necessary) (refer to appropriate COSHH Sheet). This work must be carried out in a safe manner taking care not to allow water and cleaning agents to enter electrical connections, boxes, motors etc.
7. Allow water to drain and dry off components, plates, fan blades etc as necessary. Ensure drain line is clear and that water drains away freely (use suitable brand of drain cleaner if necessary). Refer to COSHH assessments.
8. Energise the electrical components by switching on the mains isolator and check for satisfactory operation both refrigeration and electrical wise, taking care not to make contact with moving parts or electrical energy. (See Risk Assessments E1, E2, E4, E6)
9. Refit all baffles, fan and motors, deck plates etc and switch on equipment at mains isolator.
10. Check operation and ensure cabinet or cold room reaches satisfactory temperature (design temperature).
11. Clean up any spillage of water etc from floor to prevent any slip hazard.
12. Hand over equipment to customer.
13. Remove waste substance/product from site in suitable sealed containers. Complete waste transfer notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste regulations may apply)

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All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

BRA Guide for Risk Assessments and Method Statements

Risk Assessment: THE CLEANING AND MAINTENANCE OF REFRIGERATED DISPLAY CABINETS AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)

Risk Rating: HIGH

Hazards:

1. Electric shock
2. Asphyxiation
3. Explosion
4. Refrigerant Leakage
5. Laceration to hands
6. Acid burns

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always ensure electrical supply is isolated from equipment.
4. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection.
5. If refrigerant leakage occurs or is found, refer matter to competent refrigerant handler (only competent persons can break into a refrigeration system).

Emergency Procedure:

1. Switch off electrical supply.
2. Shut off refrigerant leak (if without risk) and evacuate area.
3. Neutralise any acid spillage and clean up immediately.
4. Treat injuries in accordance with respective COSHH assessment.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R20 – PIPEWORK INSULATION

Method Statement: PIPEWORK INSULATION

Risk Rating: LOW

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

This usually involves the application of pre-formed insulation material fixed, where necessary, with adhesive.

- 1.0 Most manufacturers of the commonly used insulating materials can provide, free of charge, application manuals for their products. Before applying insulation of pipe-work ensure that personnel are familiar with the recommendations laid out in these manuals.
- 2.0 Always use good quality tools and ensure that cutting tools are sharp.
- 3.0 Always use the correct diameter material.
- 4.0 Do not insulate a system that is in operation. Ensure that pipe-work is clean and dry before application of the insulation.
- 5.0 If work is to be carried out in a confined space then adequate ventilation must be provided especially when using adhesives and cleaners. See Task Procedure B2.

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- 6.0 If the adhesives and cleaners are of a flammable nature than avoid contact with a naked flame and do not smoke. Always refer to the relevant COSHH assessments and data sheets prior to using these substances.
- 7.0 When using adhesives and cleaners appropriate personal protection equipment should be used to prevent contact with the skin and eyes.
- 8.0 Remove waste substance/product from site in suitable sealed containers. Complete waste transfer notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste regulations may apply)

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: PIPEWORK INSULATION

Risk Rating: LOW

Hazards:

1. Exposure to fumes.
2. Spread of fire.
3. Eye and skin injury.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3.
 - a) Ventilate the work area.
 - b) Wear personal protective equipment appropriate to the degree of risk present (i.e. safety goggles, gloves, etc).
4.
 - a) Do not use in the presence of a naked flame.
 - b) Do not smoke.
5. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses. Head protection and other that may be appropriate to the degree of risk present

Emergency Procedure:

1. Isolate work equipment from power supply if without risk.
2. Remove affected persons from are if without risk.
3. Render first aid.
4. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R21 - HANDLING HYDROCARBON (HC) REFRIGERANTS

Method Statement: HANDLING HYDROCARBON (HC) REFRIGERANTS
Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations

The Regulatory Reform (Fire Safety) Order

Fire (Scotland) Act 2005

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Provision and Use of Work Equipment Regulations 1998.

The Dangerous Substances and Explosive Atmosphere Regulations 2002

The following documents should also be referred to when using this assessment

BS EN 378 2008 parts 1-4

The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)

Approved Carriage List (ACL)

Institute of Refrigeration "Hints and Tips for the Refrigeration Service Engineer June 2001 Section 4.0 Transport of Gas Cylinders' in Cars and Closed Vans"

Institute of Refrigeration Data Sheet 19 "ADR Regulations" (Carriage of dangerous goods by road)

Institute of Refrigeration Data Sheet 6 "Safe Handling of Hydrocarbon Refrigerants" Institute of Refrigeration Guidance Note 19 November 2009

Appendix L – IOR code A2/A3 Refrigerants

Work on equipment containing this type of refrigerant should only be carried out by personnel who have received training in the uses of this type of refrigerant

Further information on the application and use of this type of refrigerant can be obtained from the ACRIB publication entitled "Guidelines for the use of hydrocarbons refrigerants in Static Refrigeration and Air Conditioning systems

Before starting this task, carry out a site specific risk assessment to determine the risk that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Generally many of the operations used with the handling of Hydrocarbon refrigerants are the same as the traditional Halocarbon refrigerants, but certain additional requirements need to be observed for safe and effective use.

Safe Method of Work Description:

1. General

Hydrocarbons are, in general, very good refrigerants and are becoming more widely used in many applications, they have the following advantages over Halocarbon type refrigerants.

- Zero Ozone Depletion
- Very Low Global Warming Potential
- Good Performance Characteristics

The table below summarises the HC refrigerants commonly used:-

| Refrigerant | Boiling Point °C at atmos. pressure | Composition | Application |
|--------------------|--|---------------------|--|
| R600a (CARE 10) | -12°C | Iso Butane | New Domestic Equipment |
| R290 (CARE 40) | -42°C | Propane | New High Medium & Low Temperature Equipment |
| R1270 (CARE 45) | -45°C | Propylene (propene) | New High Medium & Low Temperature Equipment |

Hydrocarbon refrigerants are un-stenched, high purity products.

2. General Safety Requirements

- 2.1 Refer to hazard data sheets for the Hydrocarbon refrigerant available from the supplier (eg) BOC.
- 2.2 HC refrigerants are classified as flammable gases and are flammable in concentrations in air of between 2% and 10% by volume.
- 2.3 Small fires should be tackled with dry powder extinguishers, otherwise vacate the area and call the fire brigade.
- 2.4 Accidental releases of large quantities of Hydrocarbon Refrigerant should be dispersed by water spray. The area should be evacuated (except by people dealing with the spillage). Sources of ignition should be isolated (electrical devices must be isolated remotely) and if possible the refrigeration system isolated at the point of leakage.
- 2.5 In other respects safety considerations are the same as for CFC's, HFC's, HCFC's i.e. Frost Burn's Asphyxiation, etc.

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3. Handling of Cylinders

- 3.1 HC refrigerant is available in 420g, 3.5kg, 12kg and 46kg cylinders. A pressure relief valve is fitted to the cylinder to prevent excess pressure build up.
- 3.2 The smallest cylinder is fitted with a valve which requires an adaptor. The three larger cylinders are fitted with liquid off take valves incorporating a non return valve and a 1 ¼" ACME connection. A fitting is available to convert to refrigeration industry standard threaded fittings. The fitting is to be removed from the cylinder when not in use. Note – this is relevant to the BOC cylinders.
- 3.3 There is an automatic excess flow valve within the liquid valve of the three larger cylinders. It will operate and close the valve if the refrigerant flow out of the cylinder is too fast i.e. hoses not connected and refrigerant escaping from cylinder. This valve is reset by closing it and then opening it again slowly.
- 3.4 Safe cylinder handling differs little from other refrigerant cylinders which are as follows:-
 - a. Do not remove or obscure official labeling on a cylinder.
 - b. Always refit the valve cap when the cylinder is not in use.
 - c. Store and use cylinders in dry, well ventilated areas remote from fire risk.
 - d. Do not expose cylinders to direct sources of heat such as steam or electric radiators.
 - e. Do not repair or modify cylinders or cylinder valves.
 - f. Always use a proper trolley for moving cylinders even for a short distance - never roll cylinders along the ground.
 - g. Take precautions to avoid oil, water and foreign matter entering the cylinder.
 - h. If it is necessary to warm the cylinder use only warm water or air, not naked flames or radiant heaters, the temperature of the water or air must not exceed 40°C.
 - i. Always weigh the cylinder to check if it is empty - its pressure is not an accurate indication of the amount of refrigerant remaining in the cylinder.
 - j. HC cylinders cannot be filled by anyone other than the supplier. Use only dedicated recovery cylinders for the recovery of HC refrigerants.

4. Transport of HC Cylinders

The ADR regulations apply to the transportation of HC cylinders. These regulations also apply to the carriage of other compressed gases such as Oxygen, Acetylene and Halocarbon refrigerants failure to comply with the regulations will result in prosecution. Usually you will be below the threshold of the regulation, so to comply you must:-

- a. Carry written information giving the details of the substances carried (either a material data safety sheet or transport emergency card). This information must be available in an emergency, so it should be located in a position where it is visible.

- b. Know and understand the hazards and emergency procedures for handling these substances.
- c. Carry a dry powder fire extinguisher of at least 2kg capacity and which complies with BS21B (the driver of the vehicle must be trained in the practical use of fire extinguishers).
- d. Cylinders must be located in an upright position and be secured.
- e. Ensure adequate ventilation in the vehicle (this may require modifications to a closed van).
- f. Display flammable gas hazard warning signs on the rear of the vehicle.
- i. No naked flames or smoking allowed.
- j. Never leave cylinders in a closed vehicle unsupervised for longer than necessary.

5. Storage of HC Cylinders

Cylinders should be stored outside wherever possible. In residential premises cylinders must be stored outside. Following are guidelines for storage, assuming the cylinders are to be stored inside commercial or industrial premises:-

- a. Quantities stored are to be restricted to no more than 70 (seventy) kg
- b. Access to storage areas restricted to "authorised persons only", and such places shall be marked with notices prohibiting smoking and the use of naked flames.
- c. HC should be stored at ground level, not below it, e.g. in cellars or basements, and cylinders should be readily accessible.
- d. HCs should not be stored near sources of ignition such as naked flames and unsealed electrical devices.
- e. Static electricity build up should be avoided

6. Charging HC Refrigerants

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The charging of refrigeration systems with any of the HC refrigerants remains similar to those using Halocarbon refrigerants (see R5, R9, R10 etc).

Following are the additional requirements to be adhered to:

- a. Use separate charging equipment for HC refrigerants. Hoses or lines are to be as short as possible to minimise the amount of refrigerant contained in them.
- b. Always use the cylinder in the upright position.
- d. There should be no source of ignition such as naked flames or unsealed electrical devices within 3m of the charging area. Display "No Smoking" signs.
- e. Have a dry powder fire extinguisher adjacent to the charging area.
- f. Label the system when charging is complete. The label should state that HC XX has been charged into the system and that it is flammable. Position label in a prominent position on the equipment.

7. Leak Detection of HC Refrigerants

- a. A halide torch (or any other detector using a naked flame) **must not be used**.
- b. Electronic leak detectors may be used to detect Hydrocarbons, but they must be safe for use with HCs and sensitive to HCs.
- c. Leak detection fluids are suitable for use with HC but the use of detergents containing chlorine should be avoided as the chlorine may re-act with the hydrocarbons and corrode the copper pipework.
- d. Oil additives such as Spectrolite fluorescent leak detection system will work with HC refrigerant.
- e. If a leak is suspected from a hydrocarbon filled system all sources of ignition such as naked flames and unsealed electrical devices should be removed/extinguished.
- f. If a leak is found which requires brazing see section 9.

8. HC Refrigerants Evacuation Procedure

When evacuating a system which has been charged with HC refrigerant the following procedure is recommended.

- a) Position the vacuum pump in a well ventilated area.

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- b) Plug the vacuum pump into an extension lead which is at least 3 m long.
- c) Plug the extension lead into a socket at least 3 m away from the system to be evacuated and the vacuum pump.
- d) Put the pump switch in the closed position (energized – on).
- e) When ready to start the vacuum pump, switch it on at the socket. Switch it off using the socket switch as well.

9. Un-brazing and brazing connections:

- a) Remove the HC refrigerant (see next section). When the recovery machine trips on the low pressure switch, run the recovery machine with the low pressure switch bypassed (maximum of 5 minutes) so the system pressure is below atmospheric.
- b) Back fill oxygen free nitrogen into the system to a positive pressure of 0.1 bar g.
- c) Ensure the connections to the system are open to atmosphere.
- d) Monitor the area with a leak detector, ensure the area is well ventilated and unbrazed the connections.
- e) Purge oxygen free nitrogen through the pipe work if possible when re brazing connections, working in a well ventilated area.

10. HC Refrigerant (Recovery & Disposal)

Under the Environmental Protection Act (1990) section 33, it is illegal to dispose of controlled waste in a manner likely to cause a hazard to human health or the environment. Any refrigerants would be classed as a controlled waste if deliberately vented into the atmosphere.

Most recovery machines cannot be used with hydrocarbon refrigerants, the main points to observe are:-

- a. Check before using the recovery machine that it is in satisfactory working order, has been properly maintained, check there are no seals made from silicone or natural rubber and that any associated electrical components are sealed to prevent ignition in the event of a leak.
- b. Dedicated HC recovery cylinders which are marked with the correct safe fill weight. If using recovery cylinders for halocarbon refrigerants, the HC refrigerant safe fill weight is 40% of the halocarbon safe fill weight.

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- c. Do not mix HC refrigerant with any other refrigerants.
- d. Apply all best refrigeration practices as set down in Task Procedures R5.
- e. Follow the advice given previously in this task procedure on general safety and the handling of cylinders.

All method statements and risk assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: **HANDLING HYDROCARBON (HC) REFRIGERANTS**
Risk rating: **HIGH**

Hazard:

1. Refrigerant Leak to Atmosphere.
2. Explosion.
3. Fire.
4. Refrigerant Burns
5. Injury When Moving Cylinders.

Control Measures (Methods of Eliminating/Reducing Risk):

1. Ensure adequate ventilation of area.
2. Monitor area with portable electronic HC detector.
3. Always use correct tools and equipment when handling refrigerant.
4. No smoking, unsealed electrical devices, heat source, or naked flame(s).
5. Use mechanical handling equipment for cylinders when possible.
6. Only trained person to handle refrigerants.
7. Labels prominently displayed to state refrigerant in system and to indicate flammability of substance.

Imminent Danger Procedure:

1. Shut off leak if without risk.
2. Switch off electrical supply, using a remote isolator.
3. Evacuate area.
4. Remove cylinders from heat source, keep cylinders cool.
5. Call emergency services if necessary.

All method statements and risk assessments must be signed and dated and the job title of the author stated.

Refrigeration

R22 – THE HANDLING OF AMMONIA REFRIGERANT

Method Statement: THE HANDLING OF AMMONIA REFRIGERANT
Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Confined Spaces Regulations 1997.
HSE Bulletin "Safe Work in Confined Spaces (L101)
HSE Guidance Note GS5 Entry into Confined Spaces
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
The Dangerous Substances and Explosive Atmosphere Regulations 2002

Note

HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Only personnel who have had specific training in the use of this refrigerant should attempt to carry out work on systems containing this refrigerant.

Users of refrigeration equipment containing ammonia should make arrangement with their nearest emergency services to ensure they are familiar with the equipment and its complexities so that in the event of the emergency services needing to be called that are familiar with the premises

Be familiar with the following publications.

1. The Institute of Refrigeration Safety Code for Compression Refrigeration Systems Utilising Ammonia Parts 1 and 2
2. Health and Safety Executive Publication PM81-Safe Management of Ammonia Refrigeration Systems in Food and Other Work Places
3. BS EN 378 2008 parts 1-4
4. Institute of Refrigeration Datasheet 16 Ammonia Safety
5. Institute of Refrigeration Good Practice Guide 17 Ammonia Systems: Oil Draining
6. Institute of Refrigeration Bulletin 30 "Maintenance of Systems Ammonia"
7. Institute of Refrigeration Guidance Note 19 November 2009

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Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

General

1.0 The term anhydrous ammonia refers to ammonia in Gaseous or liquefied form. It is not to be confused with aqueous ammonia, which is a solution of ammonia in water. Throughout this task procedure and risk assessment anhydrous ammonia is referred to simply as ammonia.

All persons concerned with the handling and storage of ammonia shall be familiar with the following properties.

1.1 At ordinary temperatures and atmospheric pressure ammonia is a gas, but it may be stored in liquid form under pressure. The pressure will depend on storage temperature, i.e. at a ambient temperature of 20°C the pressure will be approximately 7.5 BAR G (119 Psig); at a typical refrigerated storage temperature of 0°C the pressure will be approximately 3.0 BAR G (45 Psig). It may be stored at atmospheric pressure in liquid form by reducing the temperature to its atmospheric boiling point of -33°C.

1.2 Any uncontrolled leakage, especially of liquid, will release large volumes of harmful vapour, which may cause varying degrees of damage to skin, eyes and respiratory tract. Skin contact with liquid causes burns.

1.3 Ammonia gas is pungent and colourless, and serves as its own warning agent, normally it is lighter than air and in, the open, will disperse by virtue of its own buoyancy. Gas produced by cold liquid may mix with air however, and produce heavier than air mixtures, which will stay close to the ground.

1.4 Ammonia will not readily attack carbon steels, but reacts strongly with copper and alloys containing copper. The reaction is accelerated if water is present even in minute quantities. It is therefore, a requirement that only those steels and non-ferrous alloys proved to be suitable for ammonia service be used for fittings and ancillary equipment.
The use of copper and copper alloys used in any adjacent equipment or plant should be carefully scrutinised.

1.5 The flammability limit of ammonia is most prevalent in concentrations of 16-27 % by volume in air with an ignition temperature of 651°C. Explosions can occur if

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flammable mixtures are ignited in confined spaces, although ignition is more difficult than with fuel gases.

1.6 A concentration of 0.25% (2,500ppm v/v) of ammonia in air is rapidly fatal.

2.0 Health Hazards

2.1 At low concentrations in air, ammonia vapour irritates the eyes, nose and throat. Inhalation of high concentrations produces a sensation of suffocation, quickly causes burning of respiratory tracts and may result in death.

2.2 Liquid anhydrous ammonia causes severe burns on contact with the skin, while its effect of being swallowed would be to cause severe corrosive action on the mouth, throat and stomach.

2.3 Severe eye damage can be caused by exposure to high gas concentrations or direct contact with the liquid.

2.4 A summary of symptoms and exposure limits associated with specific ammonia vapour concentrations is given in the table below.

| Vapour Concentration | General effect on unprotected human body | Exposure Limits |
|----------------------|--|--|
| 20 ppm | Smell readily detected by most people | Unlimited |
| 25 ppm | HSE long term exposure limit | 8hrs per day 5days per week |
| 35 ppm | HSE short term exposure limit | 15 mins. per day not more than 1hr per week |
| 50 ppm | Smell is distinctive and may be irritating | Do not stay longer than necessary |
| 70 ppm | No dangerous effects on healthy people | Leave the area |
| 400-700ppm | Immediate irritation to eyes nose, throat and respiratory system | Under normal circumstances no serious injury in 1 hour |
| 1700 ppm | Severe coughing cramp, serious irritation to nose, eyes, throat and respiratory system | 30 minutes exposure can lead to serious injury |
| 2000-5000 ppm | Severe coughing cramp, serious irritation to nose, eyes, throat and respiratory system | 30 minutes exposure can lead to death |
| 5000 ppm | Respiratory spasm rapid asphyxia | Lethal within a few minutes |

3.0 Fire Hazard

Ammonia in air will not ignite unless a minimum concentration of 16% is present and even then will not do so readily. Ammonia installations are not, therefore,

regarded as significant fire hazards. However if breaking into a system is required or any welding operation required, a safe system of work shall be operated; i.e., permit to work.

4.0 Site Safety Facilities

4.1 Ensure that emergency escape routes are known before starting work and that the following is available

4.2 Notices should be strategically placed warning personnel of the hazards associated with the area.

Fire hydrants should be located around the area, so that access to a supply of water would always be available irrespective of the wind direction. In addition to fire hydrants, a water supply should be available on the site for dealing with small spills and leaks. Local eye wash and shower facilities are recommended.

4.3 Suitable crash barriers should be provided to protect vulnerable sections of pipeline and other equipment containing ammonia, e.g., from vehicle collisions.

4.4 Emergency push buttons should be situated at each exit, and any other locations deemed necessary. These should sound an alarm and shut the plant down in a safe condition and start emergency ventilation. Where appropriate, the alarm should be incorporated into an existing factory or public warning system.

5.0 Commissioning & Decommissioning.

5.1 Pre-commissioning Check

The following pre-commissioning activities and checks should be made prior to pressure testing:

- a. Clean and dry system.
- b. Ensure that all the refrigeration equipment is in working order.
- c. Check the safety controls, instruments and alarms for correct and satisfactory operation.
- d. Check that the relief valves are correctly installed and have been set to the required pressure.

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- e. Check that all pipe connections have been made.
- 5.2 *Pressure testing to be carried out as per task procedure/risk assessment R10.*
- 5.3 *System evacuation to be carried out as per task procedure/risk assessment R9.*
- 5.4 *Charging System*
- a. Before the vacuum on the system is broken all equipment such as oil vessels and level controls and gauges, oil separator pots and the compressor crankcase itself should be charged with the quantity and type of oil recommended by the manufacturers; this can conveniently be drawn into the evacuated equipment.
 - b. The commissioning engineer shall fit to the system-calibrated pressure gauges and thermometers, to be used during charging and commissioning.
 - c. For large refrigeration installations the ammonia is usually delivered in large cylinders and only one cylinder should be connected to the system at a time during charging.
 - d. The connection of the charging line to the system is normally to an appropriate valve supplied by the installer. If no such valve is fitted the line should be connected to the low-pressure side of the system at a point where it will not cause liquid refrigerant to enter the compressor.
 - e. The charging line shall be of steel pipe of appropriate quality for refrigeration duty; a flexible charging hose or pipe suitable for ammonia should be used between charging line and cylinder.
 - f. The cylinder from which the charging is effected should be located in the open air in a position where it will not cause a hazard to other personnel involved on the site and a notice should be posted stating that the cylinder is being used for charging.
 - g. Gaseous ammonia shall be used to break vacuum (the orientation of the ammonia cylinder determines whether liquid or gas is delivered) and should initially be admitted slowly to avoid thermal shock. Sufficient ammonia should then be allowed to pass into the system to increase the pressure to about 0.5 Bar gauge. The charging cylinder shall be disconnected from the system and a leak test carried out on all parts of the system, using a suitable method, such as soapy water or litmus paper. Any leaks shall be corrected, after emptying the appropriate part of the system where necessary.

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N.B. If a welding process is to be carried out in order to repair a leak O.F.N. should be passed through that section of pipe-work before and during the process.

- h. With the system leak-free and ready for operation with some heat load available to assist in charging, the refrigerant cylinder shall be reconnected and should be arranged to supply liquid. When closing valves, for example to change cylinders, steps shall be taken to ensure that liquid ammonia is not trapped between isolating valves. As the low side pressure increases, it will be necessary to run the compressor to reduce that pressure and allow ammonia to continue to transfer into the system.
- i. During this procedure the operation of the compressor shall be monitored because, until such time as an adequate level of ammonia is charged into the system, the compressor will be operating outside the normal working range of pressures and temperatures for which the system was designed. The system shall not be left unattended during charging.
- j. The total weight of refrigerant charged into the system shall be recorded.
- k. To obtain liquid ammonia the cylinder should be laid horizontally and the foot of the cylinder then rose by means of a cradle to give an incline of 5%. The valve outlet must point upwards so that the internal dip pipe is immersed in the liquid in the cylinder. If in doubt, check with the suppliers' recommendations.

5.5 Purging of Refrigerant from the system

The operation of purging ammonia must only be carried out under continual supervision and should only be undertaken after reference to all current legislation and COSHH regulations. Personnel should ensure they are working within these regulations.

Ammonia must be purged into water and there are two important factors to appreciate before carrying out this operation. Firstly, there is a limit to the quantity of ammonia which can be absorbed and once this limit is reached then the ammonia will bubble through the saturated ammonium hydroxide and escape to the atmosphere. Secondly, if the purging arrangements merely consist of a line between the system and the water without any intermediate vessel there is a danger of water being drawn into the system as the system pressure approaches atmospheric?

- (a) Removal of ammonia refrigerant from compressor or plant:-
 - 1. Pump down the system and isolate the compressor or component (see Decommissioning section)
 - 2. Reduce the vapour pressure by transferring the ammonia to a suitable localised refrigeration system if practical.

3. The ammonia vapour must be discharged into a suitable water filled container.

5.6 Decommissioning

Before refrigerant is decanted from an ammonia system the layout of the pipe-work and the method of plant operation should be understood. This is most important as the incorrect operation of plant valves, during a decanting procedure could lead to hydraulic isolation of parts of the system, with the risk of failure.

It is important to appreciate that oil and ammonia are not miscible and that significant volumes of ammonia-contaminated oil can be held in natural traps in pipe-work and vessels.

If the plant machinery is available to run, the system, or part of the system, which is to be evacuated of refrigerant charge should be pumped down and the refrigerant removed from the high-pressure side of the system.

The best locations for decanting refrigerant are from the main high-pressure liquid line before the expansion device or from a liquid connection at the high-pressure receiver, if fitted.

In circumstances where the system machinery cannot be run, the use of a compressor and/or liquid transfer pump to remove the refrigerant may be required. This type of operation requires investigation of the plant and planning, to ensure safe operation.

- a. Connection equipment between the plant and storage cylinders may require to be made to suit the position on the plant where the connection is to be made.
- b. Any welding carried out on a connection should be done by a welder qualified to a recognised standard for this type of work. A safe system of work procedure shall be employed, i.e. hot work permit.
- c. A competent person should make any thread connection on joints.
- d. Hose or flexible connections used should be suitable for use with ammonia, and should be strength pressure tested every 12 months.
- e. There should be an isolation valve at the position where the plant connection is made. The operation of this valve should be clearly understood and clear access to it maintained at all times during the removal of refrigerant.

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- f. A sufficient number of cylinders, capable of storing the decanted refrigerant, should be available.
- g. Before commencing, the cylinders should be clearly identified as being suitable for the storage of decanted ammonia.
- h. Ensure that the cylinder is within its test due date.
- i. Examine the cylinder to ensure that there are no signs of damage.
- j. Each cylinder should be weighed and this weight checked against the cylinder's tare weight to enable the contents to be calculated.
- k. The normal capacity of the cylinders should be established. The cylinders must not be refilled with more than 80% of their normal refrigerant capacity.
- l. Suitable weighing equipment must be on site and positioned so that continuous measurement of the quantity of refrigerant being refilled into the cylinder can be monitored.
- m. Each cylinder must be shut off and disconnected immediately the correct amount of refrigerant has been refilled.
- n. Before removal of the cylinder from the weighing equipment, the gross weight should be checked and the cylinder clearly labelled with quantity of refrigerant held.
- o. Replace the cylinder valve protection cap.
- p. At all times refilled cylinders should be stored out of direct sunlight.
- q. If there is any doubt about the cylinder on any of the above points the cylinder should not be used.

To reduce the risk of error, empty 69kg cylinders are available from the refrigerant producer. Also bulk road tankers are available for decanting and filling large refrigeration plants, for more information telephone the refrigerant producers and suppliers.

6.0 The Handling & Storage of Ammonia Cylinder

- 6.1 The storage and handling of ammonia cylinders by a user will normally be discussed with a supplier's representative before cylinders are initially supplied to the user.

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The smaller cylinders can be lifted either horizontally or to the vertical with suitable rope stops. Chain slings should be used for lifting where lugs are provided for that purpose.

- 6.2 Ammonia cylinders are of robust construction and may be handled with a fork lift truck, which should only be driven by trained personnel on a smooth, regular work area. Cylinders must not come into violent contact with each other or with other objects and should not be allowed to drop onto the ground.
- 6.3 Cylinders of ammonia must never be heated and should not be exposed to heat radiating from sources such as furnaces. They should be stored and used outside preferably with protection from direct sunlight. If necessary, protection against accidental damage and/or tampering should be provided. Cylinders may be stored inside but in well-ventilated buildings isolated from occupied workspaces by a gas proof barrier. Entry into such buildings must be from the outside and not from a workspace.
- 6.4 Chemical splash goggles and protective gloves must always be worn when making or breaking joints in pipelines where there is the possibility of ammonia being present. Breathing apparatus and or a respirator mask should be available or close at hand
- 6.5 When returning used cylinders, the isolation valve should not be over-tightened. The cap must be replaced on the valve outlet and the protection cover screwed onto the cylinder, over the valve assembly.
- 6.6 The cylinder is delivered with instruction label attached. If the user wishes to return a cylinder drawing attention to the isolation valve or residual ammonia he should attach the appropriate label, obtainable from the supplier.

7.0 Personal Protective Equipment & Safety Equipment

- 7.1 Protective clothing, goggles, and gloves, carefully and safely stored, shall be readily available in the vicinity of the system but externally to the area of risk. Breathing apparatus and or a respirator mask should be available or close at hand
 - a. The user has had full and regular training in its use.
 - b. The equipment has been inspected and maintained in accordance with its manufacturer's recommendations.
- 7.2 Self contained breathing sets, full protective clothing and lifeline should be available external to area of risk for use by trained personnel where rescue work or emergency isolation of equipment may have to be undertaken.
 - a. The user has had full and regular training in its use.

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- b. The equipment has been inspected and maintained in accordance with its manufacturer's recommendations.
- 7.3 Ensure fire fighting equipment appropriate to the system and to ammonia is provided.
- 7.4 Ensure adequate first aid equipment and instruction are being provided in the same safe area as protective equipment and self contained breathing sets.
- Ensure that concise and precise first aid instructions are clearly displayed in the machinery rooms and their accesses. Any regular first aid personnel shall be made fully aware of the special problems of ammonia accidents.
- 7.5 Ensure the location of protective, first aid and rescue equipment is clearly indicated on notices within and external to the areas of risk.
- 7.6 Ensure irrigation facilities or eye wash bottles containing an eye wash solution or distilled water area available at all ammonia handling points. It is important the facilities are inspected and/or the solution changed at least at six monthly intervals. Ensure that in the machinery room adequate supplies of clean water shall be available by hand or foot operated douches or in open containers.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE HANDLING OF AMMONIA REFRIGERANT
Risk Rating: HIGH

Hazards (Risk Element in Task Procedure)

1. Leakage of toxic liquid or vapour.
2. Suffocation and burns to respiratory tracts.
3. Refrigerant burns.
4. Fire and explosion.
5. Injury when moving cylinder or equipment.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always use correct tools and equipment.
4. Always follow correct safety procedures.
5. Ensure adequate ventilation to the area.
6. Use correct personal protective equipment.
7. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of refrigerants and refrigerant contaminated substances and waste/contaminated oil

Emergency Procedure:

1. Isolate the leak if without risk.
2. Switch off electrical supply.

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3. Evacuate area.
4. Handle refrigerant in accordance with C.O.S.H.H. Assessment.
5. Treat injuries in accordance with C.O.S.H.H. Assessment.
6. Remove cylinders from heat source, keep cylinders cool.
7. Use fire extinguishers to put out small fires.
8. Call emergency services if necessary.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R23 - THE PRESSURE TESTING OF REFRIGERATED DISPLAY CASE AND MULTI-COMPRESSOR PACK PIPEWORK SYSTEMS DURING MANUFACTURE OR REFURBISHMENT

Method Statement: **THE PRESSURE TESTING OF REFRIGERATED DISPLAY CASE AND MULTI-COMPRESSOR PACK PIPEWORK SYSTEMS DURING MANUFACTURE OR REFURBISHMENT**

Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

Provision and Use of Work Equipment Regulations 1998

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Institute of Refrigeration Good Practice Guide 24 "Pressurising installed systems with Nitrogen to find Leaks"

Institute of Refrigeration Good Practice Guide 28 "Safe use of Service Manifolds"

Institute of Refrigeration Guidance Note 16 EN378:2008 "Review of Key Provisions

HSE bulletin GN4 Safety in Pressure Testing

EN378-2 (2008) Refrigerating and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

General

This task should be carried in accordance with Risk Assessment R10 but the following differing procedures are to be carried after the Strength Test and Tightness Test has been completed the equipment should be left as described below

There will be different limits on the pressure set for the **Strength test** and **Tightness test** depending whether the equipment is to be installed in the high pressure or low pressure side of a future refrigeration system

1. The pressure must be reduced to 17bar before removal from the bench for storage prior to fitting into the case.
2. The residual pressure in the system should be checked and marked on the test label before it is reduced to a holding pressure of 3.5bar for transport to site.

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3. Equipment to be used for pressure testing:-

The following additional equipment to that described in Risk Assessment R10 paragraph 10 may be required

A number of mobile safety screens.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

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Risk Assessment: THE PRESSURE TESTING OF REFRIGERATED DISPLAY CASE
AND MULTI-COMPRESSOR PACK PIPEWORK SYSTEMS
DURING MANUFACTURE OR REFURBISHMENT

Risk Rating: HIGH

Hazard:

1. Uncontrolled release of energy (explosion).

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. All personnel removed from risk area (behind mobile screens).
4. Operator(s) to wear required personal protective equipment i.e. overalls, goggles, gloves, safety shoes and safety hat.
5. It is mandatory that nitrogen cylinders are properly secured to prevent them from being knocked over and when not in use the cylinder valve is closed off
6. Equipment used in testing is regularly checked and maintained as laid down in safety regulations.

Emergency Procedure:

1. Isolate or close down nitrogen supply.
2. Clear the area.
3. Isolate leak if without risk.
4. Release pressure from system slowly and safely.

All Method Statements and Risk Assessments must be signed and dated and the job title of the author stated.

Refrigeration

R24 - BREAKING INTO REFRIGERATION AND AIR CONDITIONING SYSTEMS EXCLUDING THOSE CONTAINING FLAMMABLE REFRIGERANTS

Method Statement: **BREAKING INTO REFRIGERATION AND AIR CONDITIONING SYSTEMS EXCLUDING THOSE CONTAINING FLAMMABLE REFRIGERANTS**

Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

General

Many of the tasks of servicing and maintaining refrigeration and air conditioning equipment involve the technician having to "break in" to a system, for instance changing line components, repairing leaks etc. It is important that the person carrying out these tasks understands the dangers that can arise if safe working procedures are not followed or possible hazards are not detected.

By strict adherence to the following procedures, personnel will eliminate the chances of danger arising from uncontrolled releases of refrigerant, refrigerant burns or asphyxiation.

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1.0 Refrigeration Systems with Liquid Receivers

- 1.1 Refrigerant must be removed from the section of the system that is going to be worked upon. This can be achieved by:
- a) Pumping refrigerant into a liquid receiver, (monitor both the suction and discharge pressures when carrying out this process).
 - b) Isolate the section to be worked upon by closing down the appropriate shut off valves.
 - c) Observe that the entire refrigerant has been removed from the section of the system to be worked upon. If necessary fit local pressure gauge to observe 0 psig.
 - d) It is important to wait for a short period of time before attempting the next part of the process because the system may not have fully pumped down and time will be required to see if the suction pressure rises. If the suction pressure does rise then the pump down procedure should be repeated until there is no rise in suction pressure. Note very few systems fully pump down on the first attempt.
 - e) Slowly and carefully "crack" the nuts or bolts holding the component within the system. If liquid refrigerant escapes, reseal the joint and check again for full evacuation of refrigerant from that part of the system.
 - f) Do not release refrigerant to atmosphere (neither liquid nor vapour). Slack off nuts or bolts and remove the component from the system. Replace or adjust parts as necessary and reseal the system. Evacuate and leak test.
 - g) Where brazed joints are involved, the component will have to be cut out using pipe cutters or a hacksaw. Ensure satisfactory refrigerant removal first.
 - h) Wear appropriate personal protective equipment at all times, i.e. gloves, eye protection. Do not breathe refrigeration vapour.

2.0 Refrigeration Systems without liquid receivers (this includes split air conditioning systems, integral commercial and domestic type systems)

- 2.1 This type of system does not usually carry large quantities of refrigerant but are often difficult to break into because of the lack of isolation valves and access points. Sometimes, as in the case of domestic systems, they are totally sealed. As with systems detailed in section one, the technician must ensure removal of all refrigerant from the system before removal of any component. In the case of totally sealed systems, this will necessitate the fitting of a line tap valve. The method to be used is as follows:-

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- a) Fit gauges and lines by means of line tap, access fittings or service valves to the system.
- b) Remove all refrigerant from system as described in task procedure R5.
- c) Wear appropriate personal protective equipment as described in section 1 and do not breathe refrigeration vapour.
- d) Repair or replace components as described in task procedure R1.

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Risk Assessment: **BREAKING INTO REFRIGERATION AND AIR CONDITIONING SYSTEMS EXCLUDING THOSE CONTAINING FLAMMABLE REFRIGERANTS**

Risk Rating: **HIGH**

Hazard:

1. Explosion.
2. Asphyxiation.
3. Refrigerant burns.
4. Flying debris or dust particles.

Control Measure (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Use the correct tools and work equipment.
4. Read and understand COSHH information on refrigerants before proceeding.
5. Use personal protective equipment. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, glasses, head protection.
4. No smoking, heat source or naked flames.
5. Ensure that there is an adequate wait period after pump down to ensure that all the refrigerant is removed from the system (observe suction gauge during this period for any rise in pressure).

Emergency Procedure:

1. Shut off leak if without risk.
2. Switch off electrical supply.
3. Evacuate area.
4. Handle refrigerant in accordance with COSHH assessment sheet.
5. Treat injuries in accordance with COSHH assessment sheet.
6. Remove cylinders from any heat source, keep cylinders cool.

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Refrigeration

R25 - THE MANUAL DEFROSTING OF REFRIGERATED DISPLAY CASES AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)

Method Statement: **THE MANUAL DEFROSTING OF REFRIGERATED DISPLAY CASES AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)**

Risk Rating: **HIGH**

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

General

There are occasions when display case and cold room evaporators become blocked with ice and they need manually defrosting. Before commencing the task the product should be removed from the cabinet and moved away from the evaporator in the cold room. In no circumstances should food products be allowed to remain within the cabinet or in the vicinity of the evaporators in the cold room. If working in area where there are a number of people or the general public, ensure before starting work that the area where work is being carried out is cordoned off (work on display cases on the sales floor area).

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description

1. Ensure cabinet or unit cooler is isolated electrically.
2. Remove base plates, baffles, back plates and fans as necessary.

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3. Carry out leak test on all refrigeration line components, coil block pipe work and repair any leaks as necessary. (see Risk Assessment R14).
4. Carry out visual inspection of evaporator coil block, refrigeration line components and pipe work, fan blades and motors, electrical wiring harness, defrost heaters, cabinet fabric for danger and hazards.
5. Ensure if possible that the drain is clear and is not blocked by rubbish and dirt (see Risk Assessment R19).
6. Check over operation of defrost system ensuring that if the system uses electric defrost that the system pumps down before the heaters are energised.
7. If possible, use the evaporator defrosts heaters to remove excessive ice build-up.
8. If further heat is required to complete defrost, switch off and isolate the evaporator electrically and use warm water, trying to ensure that the water does not go over the floor of the cold room, but down the evaporator condensate drain. (Do not use equipment producing a naked flame to try and defrost evaporators). **Do not** use a sharp instrument to remove the ice formation.
9. Continue using either or both of the above methods until all the ice has been removed.
10. The above work must be carried out in a safe manner, taking care not to allow water to enter electrical connections, boxes, motors etc.
11. Allow water to drain and dry off components, plates, fan blades etc. as necessary.
12. Energise the electrical components by switching on the main isolator and check for satisfactory operation both refrigeration and electrically, taking care not to make contact with moving parts or electrical energy. (See Risk Assessments E1, E2, E4, E6) and proceed to the fault the diagnose fault that caused the evaporator to be clogged with ice.
13. After the fault has been rectified, refit all baffles, fan and motors, deck plates etc. and switch on equipment at mains isolator.
14. Check operation and ensure cabinet or cold room reaches satisfactory temperature (design temperature).
15. Clean up any spillage of water etc. from floor to prevent any slip hazard.
17. Hand over equipment to customer.

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Risk Assessment: THE MANUAL DEFROSTING OF REFRIGERATED DISPLAY CASES AND/OR COLDROOM FORCED AIR EVAPORATORS (UNIT COOLERS)

Risk Rating: HIGH

Hazards (Risk Element in Task Procedure)

1. Electric shock.
2. Asphyxiation.
3. Explosion.
4. Refrigerant leakage.
5. Laceration to hands.
6. Slips.

Control Measures (Method of Eliminating/Reducing Risk)

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always ensure electrical supply is isolated from equipment (except when defrost heaters are energised and then ensure safe operation.
4. Wear correct personal protective equipment, i.e. safety goggles, gloves, overalls.
6. Ensure floor areas are kept dry to avoid slippage by other persons.

Emergency Procedure

1. Switch off electrical supply.
2. Shut off refrigerant leak (if without risk) and evacuate area.
3. Treat injuries in accordance with respective COSHH assessment.

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Refrigeration

R26 - THE CLEANING AND MAINTENANCE OF REFRIGERATION EQUIPMENT

Method Statement: THE CLEANING AND MAINTENANCE OF REFRIGERATION EQUIPMENT

Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
The Environmental Act 1990
Provision and Use of Work Equipment Regulations 1998
The Hazardous Waste Regulations 2005
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

If working in an area where there are a number of people or the general public. Ensure before starting work that the area where work is being carried out is cordoned off.

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

5. Ensure equipment is isolated electrically.
6. Remove cover plates as necessary.
7. Carry out leak test on all refrigeration line components, including condenser coil block, pipe work and repair any leaks as necessary. (See Risk Assessments R14).
8. Carry out visual inspection of evaporator and condenser coil block, refrigeration line components and pipe work, fan blades and motors, electrical wiring harness.

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5. Clean condenser coil block, either using a brush, vacuum cleaner, dry nitrogen or compressed air observe all safety rules. Clean condenser fan blades as required, using a propriety cleaner if required (refer to appropriate COSHH sheet). This work must be carried out in a safe manner taking care not to allow cleaning agents to enter electrical connections, boxes, motors etc. (Ensure that fan blades are isolated in such a manner that they will not operate whilst being cleaned)
6. Energise the electrical components by switching on the main isolator and check for satisfactory operation both the refrigeration cycle and electrical control, taking care not to make contact with moving parts or with electrical connections . (See Risk Assessments E1, E2, E4, E6).
7. Refit all protection covers and switch on equipment at mains isolator.
8. Check operation and ensure that equipment operates satisfactory and the correct duty for the equipment is achieved.
9. Clean up any spillage of water etc. from floor to prevent any slip hazard.
10. Hand over equipment to customer.
11. Remove waste substance/product from site in suitable sealed containers. Complete waste consignment notes and ensure waste substance/product is carried by a registered waste carrier to a registered waste company. (Hazardous Waste Regulations apply to the transfer or destruction of refrigerant)

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Risk Assessment: THE CLEANING AND MAINTENANCE OF
REFRIGERATION EQUIPMENT

Risk Rating: HIGH

Hazards (Risk Element In Task Procedure):

1. Electric shock
2. Asphyxiation
3. Explosion
4. Refrigerant Leakage
5. Laceration to hands
6. Acid burns

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Always ensure electrical supply is isolated from equipment.
4. Wear correct personal protective equipment i.e. goggles, gloves, overalls.
5. If refrigerant leakage occurs or is found, refer matter to competent refrigerant handler (only competent persons can break into a refrigeration system).

Emergency Procedure:

1. Switch off electrical supply.
2. Shut off refrigerant leak (if without risk) and evacuate area.
3. Neutralise any acid spillage and clean up immediately.
4. Treat injuries in accordance with respective COSHH assessment.

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Refrigeration

R27 - INSTALLATION/REMOVAL OF COLDSTORE EVAPORATORS

Method Statement: INSTALLATION/REMOVAL OF COLDSTORE EVAPORATORS
Risk Rating: MEDIUM

This task may be subject to the following Health and Safety Regulations

The Electricity at Work Regulations 1989

The Control of Substances Hazardous to Health Regulations 2002(COSHH)

The Environmental Act 1990

Provision and Use of Work Equipment Regulations 1998

The Hazardous Waste Regulations 2005

Personal Protective Equipment at Work Regulations 1992 (PPE)

Manual Handling Operations Regulations 1992.

Lifting Operators and Lifting Equipment Regulations 1998

Working Height Regulations 2005

HSE publication, Work at Height – a brief guide INDG 401

HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402

HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

ACOP-245502 Approved Code of Practice Guidance Rider Operated Fork Lift Trucks

Safety in Working with Lift Trucks.

Institute of Refrigeration Good Practice Guide 1 "Replacing Evaporators"

This procedure must only be carried out by personnel with suitable qualification that allows them to access the interior of refrigeration systems (F. Gas regulation)

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

Before an evaporator can be removed, the refrigeration system should be pumped down and the evaporator isolated and disconnected from the system, both mechanically and electrically. These procedures may only be carried out by competent personnel - see risk assessments R2 and R5.

The task described below should be undertaken by a competent person. Regulation 3 and 8 of the Lifting Operators and Lifting Equipment Regulations 1998 apply.

Installation - (removal being a reverse procedure).

(a) The weight and size of the evaporator must be established.

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- (b) A suitable number and type of the correct load bearing capacity lifting device must be selected - lifting gear, fork lift or Mobile Elevated Working Platform (MEWP).
- (c) The working area must be cleared of all personnel not directly involved in the operation and unauthorised access to the lifting area is to be restricted
- (d) The evaporator must be securely mounted onto the lifting device, which must be on clear, level and stable ground. (This may require removal of the 'drip tray'), and reference should be made to the manufacturer's lifting instructions.
- (e) The evaporator may then be lifted into position. A competent 'banks man' may be required to guide the unit onto its fixings. 'Banks man' may require suitable access equipment dependant upon the working height; this may be in the form of 'podium step', access towers, or MEWP.
- (f) Once the evaporator is positioned it can then be secured onto its fixing arrangement.

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Risk Assessment: **INSTALLATION/REMOVAL OF COLDSTORE EVAPORATORS**
Risk Rating: **MEDIUM**

Hazards:

1. Working at height.
2. Risk of injury to personnel due to equipment moving unexpectedly/insecure load.
3. Objects falling from height
4. Electric shock (removal operation).
5. Refrigerant leakage/burn (removal operation).
6. Danger to third parties.
7. Exposure to substance - dirt/dust (removal operation).
8. Eye injury (removal operation).
9. Manual handling injuries.
10. Vehicular contact with personnel (fork lift truck or MEWP).
11. Overloading lifting equipment.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Lifting equipment selection, sitting and lift planning by competent person.
4. Check condition of lifting equipment.
5. Check operative's certification of competence for lifting equipment.
6. Follow manufacturers lifting instructions.
7. Large items of plant should only be moved by suitably trained personnel, using the appropriate equipment.
8. Wear correct personal protective equipment; overalls, footwear, face mask, gloves, and glasses, head protection
9. Working area to be cordoned off.
10. Equipment to be isolated by competent personnel only (removal operation)

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11. Refer to risk assessment B1 for working at height.

Emergency Procedure:

1. Isolate plant and electrics, if appropriate (removal operation).
2. If without risk, secure or make safe all plant and equipment.
3. Remove injured person (if safe to do so) and administer first aid if qualified to do so.
4. Summon assistance or call emergency services (if necessary).

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Refrigeration

R28 - HANDLING OF CARBON DIOXIDE (CO2) REFRIGERANT

Method Statement: HANDLING OF CARBON DIOXIDE (CO2) REFRIGERANT
Risk Rating: HIGH

This task may be subject to the following Health and Safety Regulations
The Electricity at Work Regulations 1989
The Control of Substances Hazardous to Health Regulations 2002(COSHH)
Provision and Use of Work Equipment Regulations 1998
Personal Protective Equipment at Work Regulations 1992 (PPE)
Manual Handling Operations Regulations 1992.
Confined Spaces Regulations 1997.
HSE Guidance Note GS5 Entry into Confined Spaces
HSE Bulletin "Safe Work in Confined Spaces (L101)
Working Height Regulations 2005
HSE publication, Work at Height – a brief guide INDG 401
HSE publication, Safe use of ladders and stepladders an employer's guide INDG 402
HSE publication, Preventing falls from boom-type mobile elevated work platforms MISC614

Only personnel who have had specific training in the use of this refrigerant should attempt to carry out work on systems containing this refrigerant.

Be familiar with the following publications.

1. The Institute of Refrigeration Safety Code for Compression Refrigeration Systems Utilising Carbon Dioxide
2. BS EN 378 2008 parts 1-4

Before starting this task, carry out a site specific risk assessment to determine all the risks that could be associated with the task procedure. Ensure that the equipment required for the task is available and that the personal protection equipment required is in good condition.

Safe Method of Work Description:

General

- 1.0 This risk assessment refers to Carbon dioxide as used for heat transference purposes in a vapour compression refrigerating system should not contain less than 15ppm of moisture
- 1.1 Carbon dioxide has the following classification
Safety group A1
Non Flammable

Non Toxic

Pressure Temperature Relationship

| Temperature | Pressure |
|---------------|-----------|
| -40°C | 10.05 bar |
| 0°C | 34.82 bar |
| 10°C | 44.97 bar |
| 20°C | 57.20 bar |
| Tran critical | 90.00 bar |

Critical Point of Carbon Dioxide 31.1°C

- 1.3 Carbon dioxide has a high thermal coefficient of expansion and therefore consideration should be given to very high pressure situations that will exist if the system is switched off, adequate pressure relief facilities should be fitted to relieve excess pressure to eliminate explosive situations occurring

Care must be taken to ensure that liquid carbon dioxide does not become trapped because a rise in ambient temperature may be sufficient to expand trapped liquid and generate excess pressure resulting in an explosive situation. This can also occur under certain circumstances when vapour becomes trapped

Ensure that when carrying out work requiring a heat source such as welding, that the contents of the area to be worked upon is evacuated before work commences. A safe system of work procedure shall be employed, i.e. hot work permit.

- 1.4 Carbon dioxide is a highly dense vapour and is heavier than air and therefore tends to displace atmosphere at low levels and gives no evidence of its presence, it cannot be seen and has no smell. It is therefore important that before entering a space or working on a vessel which is part of carbon dioxide system, that the atmosphere within the vessel is "clean" i.e. not contaminated by carbon dioxide. This will also apply to when entering plant rooms and insulated enclosures which could be considered to be "confined spaces"

- 1.5

Exposure Levels

| Percentage / ppm | General effect on the human body |
|----------------------------|--|
| (370ppm) | Naturally present in the atmosphere |
| 5000ppm | LTEL (long term exposure level – 8 hours) |
| 15000ppm | STEL (short term exposure level – 15 min) |
| 2% (20000ppm) | Has not been reported to cause harmful effect |
| Greater than 3% (20000ppm) | Progressively increasing discomfort which includes difficulty in breathing increased pulse rate, headache, dizziness, sweating, and disorientation |

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| | |
|------------------|------------------------------------|
| Greater than 10% | Can lead to loss of consciousness |
| Greater than 30% | Quickly results in death |
| 30000ppm | (TWA)Time Weighted Average as STEL |

% by volume in atmosphere

- 1.6 It is important that materials are checked to ensure that they are compatible Corrosion can occur on unprotected steelwork in wet and damp atmospheres of plant containing carbon dioxide. Special grades of steel and other materials such as stainless steel may need to be considered to eliminate problems of corrosion, low temperature operation and high pressure working
- 1.7 Carbon dioxide can form a solid powder at atmospheric pressure Therefore there is a possibility that relief valves can become blocked with powder when venting to atmosphere. It is therefore important that precautions are taken to eliminate this situation occurring
- 1.8 Carbon dioxide reacts with ammonia which causes a heating effect and forms ammonium carbonate which is a white powder

Ammonium carbonate will adhere to metal surfaces and block orifices and pipes, this substance is soluble in water and dissociates to ammonia and carbon dioxide at temperatures above 60°C

Carbon dioxide is slightly soluble in water and will form mild corrosive carbonic acid

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Risk Assessment: **HANDLING OF CARBON DIOXIDE (CO₂) REFRIGERANT**
Risk Rating: **HIGH**

Hazards:

1. Suffocation and burns to respiratory tracts.
3. Refrigerant burns.
4. Explosion.
5. Injury when moving cylinder or equipment.

Control Measures (Method of Eliminating/Reducing Risk):

1. Be familiar and have training in accordance with the Health and Safety Regulations and other reference material which will apply to this task (See Page 1 of this Risk Assessment)
2. There may be other Health and Safety Regulations and relevant information that may apply to this task other than that provided on Page 1 of this Risk Assessment
3. Trained personnel only.
4. Always use correct tools and equipment.
5. Always follow correct safety procedures.
6. Ensure adequate ventilation to the area.
7. Use correct personal protective equipment.
8. Remove waste substance/product from site in suitable sealed containers.

Emergency Procedure:

1. Isolate the leak if without risk.
2. Switch off electrical supply.
3. Evacuate area.
4. Handle refrigerant in accordance with C.O.S.H.H. Assessment.

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5. Treat injuries in accordance with C.O.S.H.H. Assessment.
6. Remove cylinders from heat source, keep cylinders cool.
7. Use fire extinguishers to put out small fires.
8. Call emergency services if necessary.

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