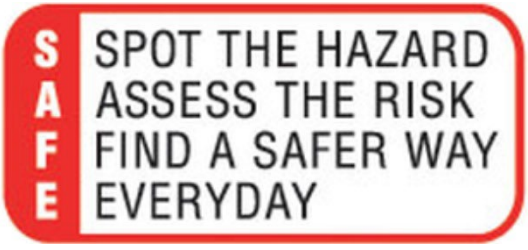
Prepared By:	Simon Young	**Copy No.:**	1
Title:	Technical Author		
Reviewed by:	Chris Dalby	**Authorised by:**	Malcolm Coates
Title:	HSQE Advisor	**Title:**	HSQE Manager
Date of Issue:	31/10/2023	**Review Date:**	31/10/2025
Reference No.:	R717 General Handling and System Procedures	**Version No.:**	02
Supersedes:	R717 General Handling and System Procedures	**Version No.:**	01

Amendment No.	Section No.	Page No.	Paragraph No.	Date	Amended By
01	Added statements RPE and Intrusive	2	5	31/10/2023	Malcolm Coates



Any person rendering assistance or under training must be supervised by the authorised competent person who has responsibility for safety.

DANGER

A minimum of two personnel should always be present when working on ammonia refrigeration plant. Only properly qualified and trained individuals should be allowed to service or repair ammonia refrigeration equipment.

A permit to work system must be introduced when the plant is commissioned and rigorously enforced thereafter.

Risk Element

- Explosion;
- Contact with the volatile liquid / gas causing tissue damage to eyes, nose, skin, lungs etc.
- Asphyxiation;
- Refrigerant burns;
- Injury when moving cylinder and plant;
- Environmental damage.

PPE Requirements

- Suitable Nitrile Gloves or Gauntlets;
- Safety Goggles;
- Coveralls (Standard or Chemical Resistant);
- Safety Footwear (Boots or Wellingtons);
- Hearing Protection – Plugs / Ear Defenders (if necessary);
- Respiratory Protective Equipment (Air Powered Hood).

Precautions to Eliminate/Reduce Risk

- Use of correct tools and equipment with at least **two** ammonia qualified and trained personnel to break into a system;
- Read COSHH and technical information on substances before proceeding;
- If the Ammonia is to be recovered, use the correct recovery cylinders and make sure they are not damaged. Cylinders must be weighed and tagged on completion;
- Use correct protective equipment and clothing to protect from chemicals. Nitrile or neoprene gloves, goggles, boots/wellingtons, chemical coveralls and air powered hood;
- Use correct mechanical handling equipment. (Trolleys, forklifts, hoists, pallet trolleys);
- No smoking, heat source or naked flame. Barrier off the area to prevent unauthorised access. Use warning signs with contact information;
- An emergency response plan should be in place in case of ammonia leaks or other accidents. Personnel should be trained on how to respond to emergencies and how to evacuate the area in case of a leak. All personnel who work with ammonia refrigeration systems must also be trained to respond to ammonia emergencies with proper protective gear and equipment. Coordination with local emergency management offices can help ensure a quick and effective response in the unlikely event of a large-scale ammonia release.
- Ammonia refrigeration systems should be properly ventilated to prevent the accumulation of ammonia gas.
- Work to any additional site requirements / procedures.

Action in an Emergency

- Shut off leak and evacuate area if there is no risk;
- Switch off electrical supply;
- Remove cylinders from heat source, keep cylinders cool;
- General first aid in cases of accident. Use water to treat burns. Seek medical help and report to site.

Safe Working Method

Pre use check of the equipment. Must be in good working order and the engineer competent to use.

Personnel must be familiar with plant operation and wear required PPE - protective gloves, safety goggles, coveralls, safety footwear and hearing protection (ear plugs / defenders) if required, respiratory protective equipment (Air Powered Hood).

Intrusive Works

- Charging (any volume);
- Evacuation (any volume);
- System/line breaking;
- Controlled/uncontrolled leaks or releases;
- Any works where there is a potential to release ammonia liquid or vapour:

Ensure Correct Tools are Used

- Nitrogen Pressure Regulator;
- Regulator;
- Suitable Gauge Manifold;
- Suitable Leak Detector.

Evacuation / Disposal

- Do not recover into cylinders;
- Vent slowly to a well-ventilated area.

Ammonia vapour can be safely discharged under water. Refer to Publication 5-20.

Removing From Site

Ammonia must not be transported from site by J & E Hall International, always use a registered waste removal company.

Charging Ammonia

- Ensure a safe system charging point is available;
- Prevent thermal shock, charge slowly;
- If the system is fitted with a heat exchanger that is likely to contain residual amounts of water, to avoid freezing, continue charging vapour until the pressure in the system has risen above 3.6 bar g.
  This will avoid thermal stress damage to the heat exchanger.
- Suitable hoses for Ammonia must be used;
- DO NOT trap liquid in service lines or system components (between valves etc.).

Pressure Testing

Refer to the systems Data Plate.

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