

# FGAS REPAIR RA 085

Consequence	5	10	15	20	25
	4	8	12	16	20
	3	6	9	12	15
	2	4	6	8	10
	1	2	3	4	5
Likelihood					

- Unacceptable – Stop activity
- Adequate – Monitor for continual compliance
- Acceptable – No further action / monitor

Risk Assessment:	085
Assessors Name:	P.Hardiman
Signature:	<i>PH</i>
Date:	January 2022
Review:	January 2023

## Location:

Likelihood	1 = Very unlikely	2 = Unlikely	3 = Fairly likely	4 = Likely	5 = Very likely
Consequence	1 = Insignificant	2 = Minor	3 = Moderate	4 = Major	5 = Catastrophic

## ENGINEERING DETAIL

WORKS DUE TO COMMENCE:

OPERATIVE NAMES:

WORK LOCATION:

SYSTEM REFERENCE:

HOT WORKS:

HOT WORKS MAY BE REQUIRED – ENGINEER TO ADVISE AND OBTAIN PERMITS PRIOR TO WORKS.

## METHODOLOGY

Engineers are to arrive upon agreed date and comply with site signing in procedures. Access shall be granted via site's permit to work system and any relevant keys will be signed for upon request. Tools and equipment shall be transported by hand via the reception area to the roof. The roof level is accessible via vertical ladder and un-assisted hatch. Although the risk of falling is considered minimal due to the ladder surround, care shall be taken when entering the roof condenser compound.

We propose completion of works inline with the following scope:

- Following the above procedure, isolate system at roof level and lock off supply.
- Reclaim any existing refrigerant, store within a clean receiver vessel and document recovery data.
- Introduce OFN to a pressure above atmosphere to locate the source of refrigerant escape.
- Repair leak as far as practicable and document location.
- Introduce OFN to a predetermined pressure above atmosphere and leave on test for a period no less than 1 week.
- Upon completion of a successful pressure test, evacuate system and commission.
- Additional virgin refrigerant shall be introduced to meet the field requirements which will be calculated during the works.
- Document all Fgas movement and produce report.

Upon completion of works, documentation shall be produced. All permits are to be signed off and any access cards/fobs/passess are to be returned to the relevant department/personnel.

Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Access Arrangements ROOF	Operatives and others e.g. property owners / users / other trades etc. Serious injury potential / fatality etc. through asphyxiation, burns etc.	2	5	10	Condensers are located at roof level. Care to be taken while negotiating the access ladder and hatch. Engineer to assess and request assistance if required.  Access is to be granted by site under permit to work conditions.	1	5	5

Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Pressure Introduction/ Discharge	Operatives and others e.g. property owners / users / other trades etc. Serious injury potential / fire / fatality etc.	4	3	12	Commencement of high pressure works to be undertaken by engineers familiar and qualified under current FGAS compliance regulating bodies. FCFS are currently affiliated with REFCOM and such, all works shall be in accordance with guidance outlined therewith. Personnel involved with the introduction and release of oxygen free nitrogen/FGAS medias into suitably sealed systems shall be trained and qualified. It is important to understand that noises generated from high pressure discharge can be extremely loud. It is imperative that Schrader depressors are removed from the discharge hose to counter the whistling effect commonly induced by nitrogen discharge. Care should be taken to ensure that there are no people in the vicinity while a controlled pressure discharge is taking place. Under all circumstances, a slow and controlled discharge must be carried out.	1	5	5

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					<p>PPE shall include gloves, eye protection and hearing protection. Notification and signage should also be considered in occupied spaces.</p> <p>Where deemed necessary, the local area is to be cordoned off to ensure a safe working environment.</p>			
Cuts and Grazes	Persons using plant and equipment. Serious injury potential through contact with sharps.	2	4	8	<p>Sharps and abrasive surfaces are a by-product of general works concerning refrigerant pipework and their adjoining components.</p> <p>Engineers are required to adopt appropriate PPE when engaging in activities which can generate potential risk concerning the production of sharps. Minimum PPE requirement for this type of work shall be standard workman's gloves.</p>	1	4	4
Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Electric Shock	Operatives and others e.g. property owners / users / other trades etc. Serious injury potential / fire / fatality etc.	3	5	15	<p>Prior to the commencement of work, plant shall be isolated and locked off with appropriate circuit/switch gear lock offs. Lock offs are to be labelled accordingly.</p> <p>Prior to undertaking work on electrical circuits / systems / equipment etc. to ensure that it is physically isolated and any stored energy dissipated.</p> <ol style="list-style-type: none"> <li>1. Identify correct isolation point or device.</li> <li>2. Check condition of voltage indicating device —i.e. test lamp or two-pole voltage detector.</li> <li>3. Switch off installation/circuit to be isolated.</li> </ol> <p>Verify with voltage indicating device that no voltage is present.</p> <p>Where any appliance is required to be operational during the works (twin circuit chiller), any risk shall be minimised by the implementation of safe working practices. No engineer shall</p>	1	5	5

					<p>commence work where live terminals are able to be accessed while carrying out works in close proximity.</p> <p>Use of cable detection equipment when working close to live systems. All equipment that requires calibration is checked and documented. Company policies and procedures are followed at all times together with regular work in progress inspections and testing which is undertaken and recorded.</p>			
Burns (HOT/COLD)	Operatives	2	5	10	<p>The characteristics of refrigerant may induce extremely cold surfaces. This is especially prevalent where the rapid expansion of FGAS media is concerned. Blistering of the skin can easily occur if in direct contact with refrigerant. Gloves are to be worn at all times when transferring refrigerant media.</p> <p>Compressed gas (dynamic) can reach temperatures in excess of 100 degrees Celsius. It is imperative</p>	1	5	5
Manual Handling	Operatives and others in the vicinity. Serious injury potential.	3	5	15	<p>The weight of refrigeration components and containment cylinders can vary. Compressors and brazed plate heat exchangers can be exceptionally and surprisingly heavy. Where loads exceed 20kg, Lifting equipment must be adopted at every possible opportunity. However, where engineers feel it to be necessary, loads with a gross weight below 20kg may also require mechanical aid or additional personnel to execute the task. Objects shall be visually assessed prior to lifting.</p> <p>Engineers are trained in the correct execution of heavy/awkward lifting and must use experienced judgement prior to undertaking tasks.</p> <p>Suitable PPE shall be worn at all times. This includes the use of safety footwear, gloves* and hard hats where loads are to be lifted above the torso.</p> <p>*gloves are to be selected with the load in mind as many component finishes offer little friction. For example; Rubber lined workman's gloves are best suited for scroll compressors</p>	1	5	5

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Tools and equipment	Operatives and others in the vicinity. Serious injury potential / fire / electric shock / fatality etc.	4	4	16	All tools and equipment, no matter how frequently used must be inspected thoroughly prior to each use. The engineer shall ensure correct operation and use of all specialist/electronic equipment. Under no circumstance shall any engineer engage in any working practice with defective, worn, uncalibrated tools or equipment unsuitable for the task at hand.	2	4	8
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Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Fire	Operatives and others e.g. property owners / users / other trades etc. Serious injury potential / fatality etc. through asphyxiation, burns etc.	4	5	20	<p>The use of oxygen and acetylene is common jointing method concerning the repair of refrigeration pipework. Engineers are to be suitably qualified in the correct use and handling of flammable gasses. Heat mats are to be used where pipework requires brazing in close proximity to combustible materials. Every attempt must be made to reduce the risk of fire. Suitable fire extinguishers are to be deployed while hot works are being conducted. A minimum of 1 hour fire watch is to be completed following a 20 minute cool down of the targeted area. PPE includes: Gloves, Flame retardant workwear, eye protection, face shield (if appropriate), burns kit.</p> <p>Hot works must be carried out in a well ventilated environment to reduce the risk of asphyxiation. Hot works must be carried out with a second engineer present to oversee environmental conditions while the hot works engineer is focused on the task at hand.</p>	2	5	10

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Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Slips/Trips/Falls	Operatives and others in the vicinity. Serious injury potential.	3	5	15	Often, water and lubricants are used and occasionally can be transferred to floors and surfaces. This can cause slipping by hand or foot. It important for the engineer to identify and control the use of such medias to minimise transfer. Hand slips can often cause injury to hands and face. Foot slips can often result in falls. PPE such as safety footwear and gloves can minimise slips. Any spillages must be dealt with immediately. Furthermore, walkways are to be kept clear of obstacles and task related equipment in order to minimise risk of trip. Equipment should be stored out of gangways and the immediate working environment.	2	3	6

Hazard	Who can be harmed & how	Risk Rating			Control measures in place	Residual Risk		
		L	C	R		L	C	R
Asphyxiation	Operatives and other in the Vicinity	3	5	15	The release of oxygen free nitrogen into the internal atmosphere may deplete or dilute the oxygen in the room. Care must be taken to ensure a well ventilated are when discharging nitrogen. If the nitrogen charge is large, consider a staged release. Open local doors to increase the room volume. If available, open windows to ensure a supply of fresh air.	1	1	1

**Additional Information:**

It should be noted that the suspected leak area is at the condenser location. However, access may be required to the meeting room if the engineer is unable to trace the leak at roof level.

We are aware that meetings are booked within this room throughout the day at pre-determined intervals. Our engineer is aware of this and shall request permission prior to access. Owing to the recurring issue with this system, we would advise a pressure test period of no less than 1 week. Extended leak testing (past the minimum stated) shall be at the discretion of the engineer as per FGAS working practice guidance.