SJJ System Services Limited
Unit 20 Heads of the Valley Ind Est
Heol Klockner
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NP22 5RL

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1.0 Method statement

Document created: 22 May 20
Document updated: 22 May 20
Prepared by: Steve Jones
Position: Managing Director

SJJ Generic RAMS

Location of works:
SJJ System Services Ltd

Site address:
Unit 20 Heads Of The Valleys Ind Est
Heol Klockner
Rhymney
Gwent
NP22 5RL

Project reference: Quotation Copy
Client reference: Sample
Client: SJJ System Services
Principal designer: Ben Oram
Principal contractor: SJJ System Services Ltd
Start date and end date: 22/05/2020 to 22/05/2021

1.1 Description of activity

This is a general document to cover all aspects of Service, Repair, Maintenance, Calibration and upgrades on all types of test chambers and systems. Site specific will be generated upon order agreement

1.2 Sequence of operations

1.2.1 Manual handling

Pushing and pulling

- Pushing and pulling is done using the body's own weight; lean forward when pushing, lean backwards when pulling
- Ensure you have enough grip on the floor to be able to lean forward/ backwards
- Avoid twisting and bending your back
- Handling devices have handles/hand grips so that you can use your hands to exert a force; handle height should be between the shoulder and waist so that you can push/pull in a good, neutral posture
- Handling devices are well-maintained so that the wheels have appropriate size and they run smoothly
- Floors are hard, even and clean

Dual / two person lift

- Decide who will be caller (The caller co-ordinates the lift and ensures each lifter knows what to do and when)
- Assess the weight
- Correct positioning of feet and straight back - Comfortably apart with one leg slightly forward to maintain balance; One foot positioned in direction of movement; Other foot where it can give maximum thrust to the body
- Correct grip or use of handles where applicable - A full palm grip will reduce muscle stress to the arms and decrease the possibility of the load slipping
- Continue to dynamically assess the environment during lift / movement
- Lift together and relax load down together

Control for loading of vehicles

- Consider the equipment required and how it will be stowed in your vehicle. Rackign to be utilised and maintained if installed
- Check load capacity of vehicle and always distribute load evenly
- Secure items so they are not going to cause you, the vehicle or the equipment any damage during travel
- Load the vehicle so that unloading occurs on the non-traffic side (if possible)
- Load items in the order they are required and safe to get at when you have stopped
- Remember to allow for any passengers that need to be carried

1.2.2 HVAC

Service and maintenance

- HVAC units are to be isolated or turned off from the mains before maintenance starts
- Check the running pressure
- Clean the coil of the indoor/outdoor unit
- Clean the pump in accordance with manufacturer instructions
- Test the pump
- If the pump needs to be removed for maintenance, the O&M manual is to be followed for correct method
- Outdoor unit to be cleaned in accordance to engineer competence and O&M manual where available
- Clean the filter
- Filter to be changed in accordance with manufacture instructions or installer guidance. For further information; please consultant industry specific guidance such as SFG20, CIBSE Guide M or similar
- Clean the outdoor unit
- Check the controls for correct operation
- Replace the damaged filter
- Check the on/off air temperature of the coil on the indoor/outdoor unit
- Clean the fascia of the indoor unit

Removal of existing HVAC services

- Isolate associated services as required
- Test the appliance to prove it is dead before proceeding
- Erect access equipment in accordance with the safe use of ladders guidance notes/erection of tower scaffolds
- Remove existing condensate using gravity drainage or a pump

- Remove the internal fan coil units
- Remove the duct work and grills
- Remove the exterior condensers
- Remove all items from site

Pipework installation

- Pipework must be delivered to a safe, pre-determined secure location onsite
- Install CHW and LTHW pipework
- Organise and agree hot works with the client management before undertaking hot work
- Lag the pipework
- Tie pipework to the tray

Condenser unit(s) installation

- Install floor mounted condensers to a mounting block or concrete slab on a level and solid surface
- Install wall mounted condensers to a unistrut or other secure fixing point, as approved onsite
- Install the Big Foot mounted condenser level to the framework as per the manufacturer's instructions

Low voltage electrical works

- Advise the user of risks of electric shock, burns, and fire before commencing and undertake necessary site checks
- Isolate associated services as required
- Erect a safe working platform where needed by a trained operative
- Install a low voltage cable, tied to the containment or anchored to a predetermined route
- Connect to the associated equipment

Fan coil / AC unit installation

- Erect safe working platforms when working at height by a trained operative
- With the assistance of manual handling aids and/or lifting equipment lift the unit into position
- Fix the unit into place with secure fastenings - refer to the manufacturer's instructions
- Ensure the isolation of associated services before connecting up

Pressure testing pipework

- Check with management if a permit is required
- Before carrying out the pressure test, take precautions to evacuate all personnel from the area of risk and post notices advising that the system or equipment is under pressure
- Strength/leak test to 1.1 x the maximum working pressure of the system, for a minimum of 15 mins at 100 psi
- If there are no leaks, undertake a pressure test with oxygen-free nitrogen according to the specifications and document results
- The test pressure must not exceed that applied to the components by the manufacturer of the particular component
- 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) should be closed off and isolated from the system under test
- The test pressure in the system should be held for at least one hour but must follow the manufacturer's specification
- If any leaks are present the fault(s) should be corrected and the system re-tested following the codes of practice and pressure systems legislation

Adding of refrigerant

- Refer to the risk assessment for identified hazards and controls
- Ensure a refrigerant cylinder log sheet is kept with the amount of refrigerant used and the details of the equipment used
- Check the plant has been evacuated or holds a positive pressure of the same refrigerant
- Employ a decanting machine when evacuating part of/or the whole system. No refrigerant must be allowed to escape into the atmosphere
- Ensure air and moisture in the charging line is kept to a minimum
- Run the system and charge the refrigerant according to the manufacturer's specifications and codes of practice
- Run a leak test

Test & Commissioning

- Test the pipes for leaks under pressure in the presence of the client’s representative
- Perform hydraulic/smoke test and obtain certification from the client’s representative
- Maintain a ‘test certificate’, duly signed by the representatives of the client and contractor
- Erect a safe working platform where needed using a trained operative
- Power up the system using trained operatives
- The contractor must undertake commissioning as per the manufacturer's specifications
- The manufacturer must undertake commissioning as per the manufacturer's specifications

1.2.3 Electrical

Electrical isolations

- Obtain a permit to work
- Place warning notices and secure the areas where isolations are to be undertaken
- Conduct a fault diagnosis using approved test instruments
- Identify isolation points and verify de-energisation of electrical circuits and equipment
- Lock off the isolations to eliminate accidental re-energising

Removal of existing electrical services

- Remove existing LV cabling
- Remove existing HV cabling
- Remove all redundant electrical cabling
- Remove all items from site according to site waste management procedures

Testing and commissioning

- Complete all testing as per the codes of practice ensuring that all dead tests are carried out prior to energising
- Label all new circuits and provide a schedule for circuits inside the board
- Provide emergency lighting certificates according to codes of practice for building control approval

1.3 Risk assessment register

1.4 Training

All operatives are adequately trained to carry out required tasks.

Site Foreman is SSSTS approved.

Site Managers are SMSTS approved.

All site operatives hold current certification and have the following training:

- CSCS certification
- ECS certification
- JIB trade cards
- Test engineers hold City and Guilds 2391 certification
- All operatives are apprenticeship served electrical engineers
- Working at heights training
- Asbestos awareness training
- Abrasive wheels training

1.5 Legislation

- Health and Safety Work Act 1974
- The Management of Health and Safety at Work Regulations 1999, amendment 2006
- Workplace (Health, Safety and Welfare) Regulations 1992
- The Control of Asbestos Regulations 2012
- Provision and Use of Work Equipment Regulations (PUWER) 1998
- The Reportable Injuries Diseases & Dangerous Occurrence Regulations 2013 (RIDDOR)
- Control of Substances Hazardous to Health Regulations 2002
- The Work at Height Regulations 2005
- The Personal Protective Equipment at Work Regulations 1992, amendment 2002
- The Manual Handling Operations Regulations 1992
- The Construction (Design and Management) Regulations 2015
- The Pressure Systems Safety Regulations 2000
- Pressure Equipment Regulations 2016
- The Environmental Protection Act 1990
- Ozone Depleting Substances Regulations 2015
- The Hazardous Waste Regulations 2005
- Electricity at Work Regulations 1989

1.6 Method of access

- All operatives will be inducted by onsite supervisor.
- Access and egress routes will be detailed on site fire and emergency plan.
- Any unauthorised access will be identified and communicated.
- All operatives will maintain access and egress routes, and ensure that materials required for the task do not obstruct access to work areas and any debris caused by their operation will be removed.
- Waste will be kept to a minimum and removed from site each as agreed with client.
- Any problems with access & egress routes will be reported to the Site Supervisor.

1.7 Working from height

- When working at height, site operatives must ensure that the working area is cleared on a period basis to ensure that there is continually a clear and safe working area to prevent slips trips and falls.
- When using access equipment for working at height, operatives will make sure they check if the equipment is ‘fit for purpose’, i.e. if inspection tag is attached and in date.
- Working at height equipment should be inspected every 7days.
- If no tag is attached to access equipment, operatives will not use the equipment and report to supervisor.
- Any access equipment that need to be built will be done so my competent operatives who have industry accepted training certificate (i.e. PASMA)

1.8 Tools and equipment

- All equipment or tools brought on to premises will be of sound construction and will meet the statutory requirements applicable to these tools or equipment.
- Tools and equipment used on site will be inspected by competent staff on a regular basis to ensure they are fit for purpose.
- Electrical tools will be regularly PAT tested.
- Only competent operatives will use equipment that requires adequate training.
- Any unused tools will be kept locked in toolboxes.
- Hand tools
- Step ladders/podium steps/access towers
- Power tools (battery or 110v)
- Digital thermometer
- Refrigeration gauges
- Digital Volt/Ohm/Amp meter
- Vacuum pump
- Recovery machine
- Pipe bender & cutter
- Welding / Arc tools
- Insulated hand tools
- Digital volt/Ohm/Amp meter
- Insulated rubber mats and gloves
- Jig saw
- Cold cutter
- Cable jacks
- Lifter
- Pipe threading machine

Refer to risk assessment specific control measures for any tools & equipment.

1.9 Special permits

Hot works permit may be required onsite and to be organised with site management.

Permit to work may be required to work in riser cupboards, isolations or working on live power, these and other permits to be organised with site management as needed.

1.10 General waste handling

- A suitable route to transport waste must be considered prior to the work.
- Internal routes should be protected to prevent damage to the fabric and decoration of the building. Particular attention should be made to door frames and sharp changes of route direction.
- If external routes cross pedestrian footpaths an alternative route should be provided for the public. The waste route should be segregated using barrier fencing with suitable signage to direct the public to the alternative pathway and prevent unauthorised persons accessing the waste route.
- Ensure the correct PPE is worn when handling waste.
- Always use a mechanical means of moving waste whenever possible (e.g. wheel barrow). Use good manual handling techniques when mechanical assistance is not practical or safe.
- Always dispose of waste in accordance with principal contractor’s environmental policy and waste management plan.
- Report any environmental waste accidents or spillages immediately to the principal contractor who will put into action the emergency waste containment plan and inform the relevant authorities. A spill kit will be carried on site all times.

1.11 Use of skips

- Waste is to be deposited into a skip.
- Barrier fencing should be positioned around the skip with ‘keep out’ signage attached.
- Skips will be covered and secured to reduce the risk of arson and theft.
- Skips should be positioned a minimum of 6m away from buildings or other objects to reduce the spread of fire and to satisfy the requirements of insurance.
- Skips should be positioned to allow easy access for the skip vehicles to drop off new skips and collect full skips.
- Always use a banksman when skip vehicles are reversing.
- Skips are to be emptied regularly to reduce the risk of arson and theft.
- No hazardous material is to be deposited into skips.
- Temporary ramps used to gain access to skips should be sufficiently wide to prevent falls. On large or high skips, ramps should include side fall protection.
- Never climb into a skip.

1.12 Hazardous waste

- Hazardous waste such as asbestos must be collected by an approved licensed contractor.
- Hazardous waste should not be put with non-hazardous waste or sent for landfill.
- Sharps waste should be placed in a yellow sharps container and the lid firmly closed during transit. Sharps should never be carried in the front of vehicles.
- Hazardous waste like COSHH items should be disposed in COSHH bins if available on site.
- Hazardous items disposal procedures will be followed as identified in COSHH assessments.
- Flammable liquids will be kept to a minimum a vented store separate from the COSHH store will be provided.
- Gas store will be in secure store fully vented and situated in a well-ventilated area preferably outside.
- All efforts will be made to substitute COSHH materials for less noxious water-based materials.
- Hazardous waste (such as radiated waste and asbestos) is to be segregated from all other waste, bagged and stored within an exclusion zone. Only trained operatives issued with a permit to work are to enter areas containing hazardous waste.
- Consignment notices to be received upon removal, retained and copies provided to the principle contractor.

1.13 Hazardous Substances

Highly Flammable

Dangerous For The Environment

Gas Under Pressure

1.14 COSHH register

- R404A Refrigerant - page 60
- R23 Refrigerant - page 69
- R134a/D80 - page 76
- A-Gas R508B - page 81
- Oxygen free nitrogen (OFN) - page 95
- Oxygen, compressed - page 102
- Acetylene, dissolved - page 116
- DOW CORNING(R) 781 ACETOXY SILICONE BLACK - page 132
- DOW CORNING(R) 784 GLAZING SILICONE WHITE - page 154
- DOW CORNING(R) 787T METAL AND GLASS SILICONE CLEAR - page 161
- WD-40 - page 168

1.15 Emergency procedures

- Copy of emergency procedures will be kept on Safety Notice Board.
- Any changes in emergency procedures will be communicated to site operatives.
- Refer to the names of Fire Marshals on site Safety Notice Board.

The client or principal contractor will ensure that the existing site emergency procedures are followed and that relevant information is given to operatives at time of induction or when changes are made to procedures.

The principal contractor is responsible for ensuring that all operatives under their control adhere to the site emergency procedures at all times.

RIDDOR requires deaths and injuries to be reported to HSE, the following injuries are reportable when they result from a work-related accident:

- The death of any person (Regulation 6)
- Specified Injuries to workers (Regulation 4)
- Injuries to workers which result in their incapacitation for more than 7 days (Regulation 4)
- Injuries to non-workers which result in them being taken directly to hospital for treatment, or specified injuries to non-workers which occur on hospital premises. (Regulation 5)

A report must be received within 10 days of the incident, and can be submitted from HSE's website

1.16 First aid facilities

Refer to the onsite safety notice board for all first aid information.

A first aid box with enough equipment to cope with the number of workers on site should be provided for by the client or principal contractor.

The client or principal contractor should nominate an appointed person to take care of first-aid arrangements.

- The details of the appointed first aider and location of first aid provisions will be briefed during the site induction.
- Before where it states “a first aid box with enough equipment to cope with the number of workers…..” add, “a first aid assessment to be completed to ensure suitable first aid provisions are available for the number or people and works taking place.”
- Refer to the nearest hospital on site Safety Notice Board.

The number of appointed first aiders shall be dependent on the number of employees:

- **< 5:** At least one appointed person.
- **5–50:** At least one first-aider trained in EFAW or FAW, depending on the type of injuries that may occur.
- **More than 50:** At least one first-aider trained in FAW for every 50 people employed.

1.17 Welfare requirements

Welfare arrangements are supplied by the client or principal contractor.

These should be in line with Schedule 2 of the Construction Design & Management Regulations 2015 (CDM). All sites are to have a minimum amount of welfare facilities available for workers, which include the following:

- Toilets with hand washing and drying provisions
- Washing facilities suitable for the work taking place
- Drinking water, hot and cold or warm water
- Changing rooms and lockers
- All welfare areas will have adequate shelter, heating, lighting, ventilation and be suitable cleaned
- Rest areas with tables and chairs
- Provisions for heating food and water

1.18 PPE Requirements


Safety Hats


Bump caps


Safety Boots


Hi Vis Vest


Safety Gloves


Hearing Protection


Dust Mask


Safety Glasses


Safety Goggles


Welding Mask


Protective Clothing


Fall Restraint


Knee Pads


Use a gas monitor

1.19 Specific PPE requirements

- PPE requirements to be followed as per site rules.
- Any specific PPE requirements to be followed as instructed in Method Statements and Risk Assessments.

1.20 Manual handling

Manual handling aids will be used if available

The Manual Handling Operations Regulations (MHOR) 1992 establish a clear hierarchy of measures for dealing with risks from manual handling, these are:

- Avoid hazardous manual handling operations so far as is reasonably practicable.
- Assess any hazardous manual handling operations that cannot be avoided.
- Reduce the risk of injury so far as is reasonably practicable.
- The workforce will be trained to, observe safe lifting techniques, and safely handle loads.
- No one will be expected to lift on their own, materials weighing more than 25kg.
- Safe manual handling procedures should be followed at all times.

There are some basic principles that everyone should observe prior to carrying out a manual handling operation:

- Ensure that the object is light enough to lift, is stable and unlikely to shift or move.
- Heavy or awkward loads should be moved using a handling aid.
- Make sure the route is clear of obstructions.
- Make sure there is somewhere to put the load down wherever it is to be moved to.
- Stand as close to the load as possible, and spread your feet to shoulder width.
- Bend your knees and try and keep the back's natural, upright posture.
- Grasp the load firmly as close to the body as you can.
- Use the legs to lift the load in a smooth motion as this offers more leverage reducing the strain on your back.
- Carry the load close to the body with the elbows tucked into the body.
- Avoid twisting the body as much as possible by turning your feet to position yourself with the load.

When ever manual handling is to be undertaken, especially if it is an uncommon or high risk task, an assessment of four specific activities – Task, Individual, Load and Environment (easily remembered by the acronym TILE) needs to be implemented:

T - The Task
Does the activity involve twisting, stooping, bending, excessive travel, pushing, pulling or precise positioning of the load, sudden movement, inadequate rest or recovery periods, team handling or seated work?

I - The Individual
Does the individual require unusual strength or height for the activity, are they pregnant, disabled or suffering from a health problem. Is specialist knowledge or training required?

L - The Load
Is the load heavy, unwieldy, difficult to grasp, sharp, hot, cold, difficult to grip, are the contents likely to move or shift?

E- The Environment
Are there space constraints, uneven, slippery or unstable floors, variations in floor levels, extremely hot, cold or humid conditions, poor lighting, poor ventilation, gusty winds, clothing or Personal Protective Equipment that restricts movement?

1.21 Ladder permits

- Please complete a risk assessment to ensure that ladders / stepladders are the only viable option to complete the task (see working at height risk hierarchy for further information or consult your HSE representative / specialist
- Ladder permits are under a full shift / daily control as maximum validity. Each new day requires a new permit to be completed
- All operatives using steps/ladders must receive a TBT on Step Ladder/Ladder Safety and be issued a copy of the HSE “Top Tips for Ladder and Ladder Safety” pocket guide.
- Steps/ladders must be of a professional grade standard (EN 131) and must be in good condition with an individual identification number
- Steps / ladders must show evidence of weekly inspection prior to using the equipment
- Steps/ladders are to be removed from work area and secured at end of the each day.

1.22 COVID-19: Management

Use guidance from the government Plan to Rebuild strategy, Public Health England (PHE), Department of Health & Social Care (DHSC), Health & Safety Executive (HSE) and NHS to ensure risk assessments are following the latest advice.

- Please ensure all staff are aware of reporting requirements and that all confirmed cases are escalated to your H&S competent person.
- Information notes are to be sent out and any updates communicated in a timely manner to the workforce.
- This must include letting staff know about symptoms and actions the medical professionals are advising people to take.
- A colleague who has been isolated for 14 days cannot return to work until the appropriate ‘fit note’ documentation is provided to demonstrate they are now fit to return to work.
- Assessments to be reviewed on an ongoing basis or where significant change has occurred.
- Please remind staff that in order to minimise the risk of spread of infection, we rely on everyone in the industry taking responsibility for their actions and behaviours.
- Please encourage an open and collaborative approach between your teams on site where any issues can be openly discussed and addressed.
- Companies are being encouraged to publish their risk assessment results on their website, particularly where more than 50 workers are employed.

If in England call **NHS on 111**, if in Scotland call your **GP or NHS 24**, If in Wales call **0845 46 47 or 111** or if in Northern Ireland contact **0300 200 7885** where you will be assessed by an appropriate specialist. NHS guidance is that you do not go directly to your GP surgery, community pharmacy or hospital unless an emergency occurs

1.23 COVID-19: Training

Please ensure a manager’s brief has been completed alerting to company specific process / procedures

- https://www.nhs.uk/conditions/coronavirus-covid-19/
- https://www.nhs.uk/conditions/coronavirus-covid-19/self-isolation-advice/
- https://www.nhs.uk/conditions/coronavirus-covid-19/advice-for-travellers/
- https://www.gov.uk/government/publications/coronavirus-action-plan

All work will be undertaken by qualified competent persons with experience of the type of work described above, and in all cases in full accordance with safety procedures specified in the company's health and safety Policy.

The work activities described within this method statement and all associated safety measures are not to be deviated from in any way. If, for any reason, the method statement cannot be implemented in full or should the described process be found inadequate for the purpose of providing a safe working environment, the affected activities must cease until such time as the method statement has been amended and re-approved as appropriate with any changes

communicated by a toolbox talk to all employees involved before work recommences.

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2.0 Risk assessment

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Example risk matrix

Likelihood 4
x
Severity 5
=
Risk/residual risk 20

			Likelihood				
			Very Unlikely	Unlikely	Possible	Likely	Very likely
			1	2	3	4	5
Severity	Negligible	1	1	2	3	4	5
	Minor	2	2	4	6	8	10
	Moderate	3	3	6	9	12	15
	Major	4	4	8	12	16	20
	Extreme	5	5	10	15	20	25

2.1 Working in confined spaces

2.1.1 Task: Working in confined spaces

Hazard	Risk	Control measures	RR
Serious injury or fatality sustained from working in confined spaces due to lack of oxygen, poisonous gas, fumes, vapour, dust or inherently hot conditions	4 x 5 = 20	Under the Confined Spaces Regulations 1997, the site supervisor should always try to avoid entry to confined spaces, e.g. by doing the work from outside. If entry to a confined space is unavoidable, a safe system of work is to be followed, as per the method statement, and the site supervisor is to implement a confined works permit before starting work. Prior to entering any confined space, a rescue plan is to be agreed, documented and briefed to all workers The permit to work is to include training/instructions and monitoring/ auditing throughout the works, as well as specific emergency procedures. All site operatives involved are to be properly trained and instructed and the operation is to be manned by two operatives at all times, with a clear communication system also implemented. All mechanical and electrical equipment is to be isolated before the works begin. Operatives are to ensure that all internal spaces are clean before entry, removing any residue. Operatives are to ensure that the size of the entrance to the confined space allows workers wearing all the necessary equipment to climb in and out easily and that it provides ready access and egress in an emergency. The provision of additional ventilation is to be implemented if possible. Mechanical ventilation may be necessary to ensure an adequate supply of fresh air. It may be necessary to check the confined space is free from both toxic and flammable vapours and that the air is fit to breathe. Any testing is to be carried out by a competent person. The use of non-sparking tools, specially protected lighting and extra low voltage equipment (typically less than 25 V) and, where necessary, residual current devices may be required. The provision of breathing apparatus and rescue harnesses may be required. Emergency procedures are to be implemented as per the method statement in the event of failure.	1 x 5 = 5

Persons at risk: User

2.2 Preventing slips, trips and falls

2.2.1 Task: Movement at height or on raised platforms

Hazard	Risk	Control measures	RR
Severe or fatal injuries caused by slips, trips and falls at height	4 x 5 = 20	All raised planforms with be erected by a trained and competent individual Prior to use, all raised platforms will be inspected and tagged to display that the platform is safe to access. All operatives working at height will receive working at height training. All raised platforms will have suitable edge protection including double guard rails and toe boards. Ladders where required will be suitable installed and tied with ladder hatches/gates fitted to prevent falls from height. All operative are to ensure good housekeeping onsite and 'clean as you go' is to implemented across the site. All items on raised platforms are to be placed in a designated and safe area away from thoroughfares and edges of platforms. Raised platforms are to be protected by cappings or fenced off to prevent entry into any risk area. The correct PPE is to be worn at heights to prevent falling from height caused by slips, trips or falls.	1 x 5 = 5

Persons at risk: All site operatives

2.2.2 Task: Movement at ground level

Hazard	Risk	Control measures	RR
Severe strains, sprains and muscle breaks	4 x 3 = 12	All operatives are to be shown the correct area for safe storage of materials onsite before works begin. A clear working area is to be created onsite and operatives are to ensure that dustsheets, mats and other materials cannot slip or slide underfoot. Potential slip/trip hazards are to be managed and removed as they arise and site management is to be notified if assistance is required. Operatives are not to carry items that will hinder the carrier's clear view. All rubbish is to be removed from the site at scheduled times, organised by the site supervisor and in line with the site waste management plan.	1 x 3 = 3

Persons at risk: All site operatives

2.3 Arrival & departure from site

2.3.1 Task: Unloading equipment

Hazard	Risk	Control measures	RR
Electrical shock or fatal injuries sustained from contact with overhead cables	4 x 5 = 20	The prevailing site condition is to be checked and all deliveries are to be undertaken in a pre-determined safe area. No vehicles are to be parked or unloaded in the vicinity of overhead lines. If it is necessary for deliveries to be undertaken below overhead cables, the works and area are to be coordinated with either the local authority or the principal contractor. Sufficient protection is to be in place for workers and the public, together with ensuring safe working distances are achieved and goal posts are used where required.	1 x 5 = 5
Persons at risk: User			
Being crushed by a falling load, with potentially fatal injuries	5 x 5 = 25	Deliveries are to be taken in designated areas only. Other workers and the public are to be kept outside of the delivery area. Any machinery used for unloading is to be operated by trained personnel only and is to carry a through examination certificate for the lifting equipment (re-certificated every 12 months) and accessories (re-certificated every 6 months). There will be no walking/working beneath raised loads at any time. Unstable loads will be made safe prior to lifting At no point with the safe working load of the lifting equipment and accessories be exceeded Any items that could potentially be lifted by the wind are to be placed in designated anchor areas and/or weighted down. Ensure any equipment being used for unloading is not operated in overly windy conditions - operatives are to refer to the equipment or plant guidelines. Goods are to be placed on firm, level ground in designated areas. The height of the goods is to be kept to a minimum to prevent stack failure.	1 x 5 = 5
Persons at risk: All site operatives & public			
Muscle strains, sprains and injuries caused by lifting heavy loads	3 x 3 = 9	Where possible, manual handling will be avoided and manual handling aids used to facilitate manual handling. Manual handling on stairs will be avoided, at no point will any loads be carried up ladders The correct lifting techniques are to be used. All operatives are to be trained in the safe method of lifting - refer to manual handling section in the attached method statement. A two-man lift is to be enforced for reaching or carrying heavier items.	1 x 3 = 3

		Operatives are to split loads to make them lighter and safer to handle. Although there is no universal safe maximum, mechanical aids are to be used when loads exceed 25kg per person or as referenced in the method statement. Operatives are to be aware of handling large or bulky items (e.g. plasterboard) in windy conditions.	
Persons at risk: User			
Falls from vehicles - drivers may suffer serious, possibly fatal, injuries if they fall from the cab or trailer of a vehicle	3 x 5 = 15	Loading and unloading is to be planned. Working on the bed of the trailer is to be avoided. Suitable access equipment is to be used to access the trailer unit and drivers are to be trained how to use it safely. Drivers are to be trained in the safe system of work for sheeting loads, e.g. the safe use of PPE. Fall arrest equipment is to be inspected by a competent person prior to use. Drivers are to be instructed not to walk backwards on the trailer or to jump from the cab/trailer. Fixed steps and grab bars are to be used to allow drivers to access the cab safely. Drivers are to be reminded of the need for good housekeeping in the trailer and cab. Retrofit foldable steps are to be used to improve access to the trailer bed. Operatives are to consider using other forms of access equipment where appropriate, e.g. mobile elevating working platforms (MEWPS) or podium steps.	1 x 5 = 5
Persons at risk: All site operatives			

2.3.2 Task: Leaving vehicle

Hazard	Risk	Control measures	RR
Being struck by moving vehicles	4 x 4 = 16	All operatives are to park in designated areas. Site rules and authorised routes, provided by the client or principal contractor, are to be followed. All operatives are to wear hi-visibility jackets when leaving a vehicle. All operatives are to sign in onsite. All operatives are to receive a site induction. Banksman are to be used when vehicles are reversing.	1 x 4 = 4
Persons at risk: All site operatives			

2.3.3 Task: Leaving or entering site

Hazard	Risk	Control measures	RR
Struck by moving vehicles	5 x 4 = 20	All operatives and site visitors are to ensure they sign in when entering. Inductions are to be provided to all operatives and visitors before entering the worksite, individuals will be notified of the designated vehicle and pedestrian routes and site rules. Physical barriers such as stop blocks will be utilised to protect the pedestrian walking routes. Where there is a shared working area between individuals and vehicles, vehicle movements will only take place under the control of a trained and assessed as competent traffic marshal Operators/drivers are to adhere to the site speed limit at all times. At no point will the operator exceed the safe working load of the plant/ vehicle. All drivers and operators will be trained and assessed as competent for the equipment operated. The correct PPE is to be worn at all times. All operatives and visitors are to keep to pedestrian areas only. The use of crossover points is to be incorporated into the site plan by the principal contractor. All operatives are to be made aware of changes in the Site Traffic Management Plan as and when it is changed. All operatives and site visitors are to ensure they sign out when exiting the site. Operative and visitors are to watch out for other contractors leaving the area at the same time.	1 x 4 = 4

Persons at risk: All site operatives & public

2.4 Lone working

2.4.1 Task: Working alone

Hazard	Risk	Control measures	RR
Serious or fatal injuries caused by the lack of visual or audible communication with someone who can summon assistance in the case of an accident	4 x 4 = 16	Any medical conditions which might be relevant to an operative working alone are to be fully discussed with their line manager and, if necessary, occupational health and their GP. Operatives are not to work alone if any such condition is assessed to be putting them at increased risk. Local procedures for lone working are to be produced and communicated with all operatives, including supervision requirements, permits and lone working emergency procedures. The client or principal contractor is to deem which activities can or can't be undertaken whilst lone working and the site supervisor is to relay this to staff before undertaking any works. The authorisation for lone working is to be given by the client or principal contractor. The work is only to be undertaken by those with the correct competencies, i.e. young workers shall need supervision PAT tested items will have been labelled "Pass" and all electrical cables etc. are to be regularly visually inspected for damage. Operatives are not to interfere with plugs, cables etc. when any item is connected to the power supply. High-risk activities (like working on live electrical equipment and working in confined spaces) is to be either eliminated or minimised where possible. Operatives are to be supplied with a mobile phone in case of emergencies. Where possible, periodic telephone contact or visits to lone workers are to be undertaken by a supervisor.	1 x 4 = 4

Persons at risk: User

2.5 Working out of hours

2.5.1 Task: Working out of hours

Hazard	Risk	Control measures	RR
General injuries sustained whilst undertaking work out of hours and not receiving prompt help or response	4 x 3 = 12	Local procedures for out of hours working should be produced and communicated with all operative's, including signing in books, inductions, out of hours emergency procedures Client or principal contractor will deem which activities can or can't be undertaken out of hours and the site supervisor will relay this to staff before undertaking any works. Authorisation for working out of hours to be given by the client or principal contractor Only those with correct competencies will be able to undertake work i.e. young workers will need supervision, management are to ensure that workers do not exceed the hours set out in the working time directive Young workers working hours will not exceed, 8 hours per day or 40 hours per week with a minimum of 12 hours consecutive rest hours between shifts and no night work Working alone out of hours will typically be avoided, if required a lone working risk assessment will be undertaken Atleast one operative to be supplied with a mobile phone in case of emergencies	1 x 3 = 3

Persons at risk: All site operatives

2.6 Working in occupied areas

2.6.1 Task: Working in areas of high volume of movement

Hazard	Risk	Control measures	RR
Collisions or falls from high traffic areas	3 x 3 = 9	Work areas to be visibly cordoned off and alternative routes marked Traffic management plan to be implemented, detailing the designated vehicle and pedestrian routes. Plant and vehicle movements will only be allowed under the direction of a traffic marshal Pedestrian routes to be protected by fixed barriers such as stop blocks	1 x 3 = 3

Persons at risk: All site operatives

2.7 Working around live electrical equipment

2.7.1 Task: Working close to or adjacent to electrical services

Hazard	Risk	Control measures	RR
Contact with live electrical equipment whilst undertaking work, causing serious or fatal injuries due to, incomplete installation, poor building maintenance or unfit safe system of work being employed	4 x 5 = 20	Ensure a safe system of work has been implemented with site supervisor including a permit to work if necessary Follow electrical isolations risk assessment where necessary before operatives or site occupants undertake their respective work Competent electrician to identify with site supervisor any live electrics and fit warning notices if live electrics cannot be made dead during works Site supervisor to control access of site operatives into areas of risk, employing a permit to work system where any risk of contact with live electricity is present Ensure all workers are aware of any live electrics through inductions and regular tool box talks Prevent direct contact by ensuring all insulation barriers/covers are fitted to any electrical boards, equipment etc. by a competent electrician No works to be carried out directly on live equipment	1 x 5 = 5

Persons at risk: All site operatives

2.7.2 Task: Working in areas near live electrical equipment

Hazard	Risk	Control measures	RR
Serious or fatal burns and injuries from electric shock	4 x 5 = 20	All operatives to be informed of any live electrical services and how to avoid injury during site induction Protect exposed services prior to commencing work Competent electrician to isolate as many live electrical circuits to area of concern as possible before commencing work Warning signs to be placed on all live equipment No works to be carried out directly on live equipment Services and utilities drawings are to be consulted to identify the existing services prior to works commencing.	1 x 5 = 5

Persons at risk: All site operatives

2.8 Using ladders

2.8.1 Task: Using ladders

Hazard	Risk	Control measures	RR
Unsafe or defective ladder failure causing serious injuries to user	4 x 4 = 16	A 'pre-use' check will be undertaken by the user at the beginning of the working day; before a task, and after something has changed, e.g. a ladder has been dropped or moved from a dirty area to a clean area (check the state or condition of the feet) The user will check the stiles – make sure they are not bent or damaged, as the ladder could buckle or collapse The user will check the feet – if they are missing, worn or damaged the ladder could slip. Also check ladder feet when moving from soft/dirty ground (e.g. dug soil, loose sand/stone, a dirty workshop) to a smooth, solid surface (e.g. paving slabs), to make sure the foot material and not the dirt (e.g. soil, chippings or embedded stones) is making contact with the ground The user will check the rungs – if they are bent, worn, missing or loose the ladder could fail The user will check any locking mechanisms – if they are bent or the fixings are worn or damaged the ladder could collapse. Ensure any locking bars are engaged. The user will check the stepladder platform – if it is split or buckled the ladder could become unstable or collapse Check the steps or treads on stepladders – if they are contaminated they could be slippery; if the fixings are loose on steps, they could collapse If you spot any of the above defects, don't use the ladder and notify site supervisor	1 x 4 = 4
Persons at risk: User			
Falls from height whilst using ladder	4 x 5 = 20	All users are trained in the safe use of ladders and working at height Light tools and materials should be secured within a tool belt when climbing ladders User will not overreach whilst on ladder – user to make sure belt buckle (navel) stays within the stiles Three points of contact with the ladder must me maintained at all times User to make sure ladder is long enough or high enough for the task User to ensure ladder is not overloaded – consider workers' weight and the equipment or materials they are carrying before working at height User to make sure the ladder angle is at 75° – you should use the 1 in 4 rule (i.e. 1 unit out for every 4 units up) User to always grip the ladder and face the ladder rungs while climbing	1 x 5 = 5

or descending – user will never slide down the stiles

User should not move or extend ladders while standing on the rungs

User should not work off the top three rungs, and will ensure the ladder extends at least 1 m (three rungs) above area of working

User not to stand ladders on moveable objects, such as pallets, bricks, lift trucks, tower scaffolds, excavator buckets, vans, or mobile elevating work platforms

User to avoid holding items when climbing (consider using a tool belt)

User won't work within 6m horizontally of any overhead power line, unless it has been made dead or it is protected with insulation.

A non-conductive ladder (e.g. fibreglass or timber) will be used for any electrical work

User will maintain three points of contact when climbing (this means a hand and two feet) and wherever possible at the work position

Where user cannot maintain a handhold, other than for a brief period (e.g. to hold a nail while starting to knock it in, starting a screw etc), user will need to take other measures to prevent a fall or reduce the consequences if one happened

For a leaning ladder, user will secure it (e.g. by tying the ladder to prevent it from slipping either outwards or sideways) and have a strong upper resting point, i.e. do not rest a ladder against weak upper surfaces (e.g. glazing or plastic gutters) and user could also implement an effective stability device

Where ladders are operated by a single user, ladder will be fitted with relevant supports for one man use

Where a task takes longer than 30 minutes, an alternative means of access should will be considered

Persons at risk: User

2.9 Working from step ladders

2.9.1 Task: Working from step ladders

Hazard	Risk	Control measures	RR
Contact with over head cables causing possible fatal injury through electric shock	3 x 5 = 15	Check prevailing site condition Take care when erecting/positioning step ladders close to an services Do not erect step ladder in close proximity to a power cables - seek advice from supervisor before commencing with work	1 x 5 = 5
Persons at risk: User			
Head injuries caused by falling objects	5 x 3 = 15	Barrier off work area Take care when placing step ladder avoiding thorough fare of workers or public if possible When step ladder is secure, remove any dislodgeable items in close proximity Keep persons away from ladder and surrounding area when carrying out work	1 x 3 = 3
Persons at risk: All site operatives & public			

2.9.2 Task: Working from step-ladders

Hazard	Risk	Control measures	RR
Injuries sustained from the unsafe use of step-ladders	5 x 3 = 15	Operatives will ensure that step-ladders are only used for work that is short-term, of a light nature, that requires one hand to be used, and that can be done without stretching Inspect step-ladders before use to ensure that there are no obvious defects Do not paint stepladders, or use those that have been painted, painting can cover up defects Do not put step-ladders in front of doorways without taking appropriate precautions to prevent people bumping into them and never obstruct a fire exit with a ladder If the step-ladder is being erected in a public area or on a public path, then it is essential to provide proper protection for pedestrians or vehicles before the step-ladder is put up Wherever possible a step-ladder should be footed while someone climbs The step-ladder should be resting on a stable and secure surface The step-ladder should be placed away from overhead and wall mounted power cables	1 x 3 = 3

	Step-ladders should never be supported on the bottom rung but always on the feet Tools etc. should be carried in tool bags or belts rather than by hand, so that the step-ladder can be properly gripped during climbing Do not lean from ladders or stepladders

Persons at risk: User

2.10 Working on mobile scaffold

2.10.1 Task: Working on mobile scaffold

Hazard	Risk	Control measures	RR
Falls or serious injury from collapse of structure due to unsafe erection	4 x 5 = 20	The employer will ensure that all employees required to erect, alter or dismantle mobile scaffolds, receive the necessary training All mobile scaffolds shall be erected to manufacturers / suppliers instructions If a static tower is to be free standing, the height to base ratio, using shortest base dimensions, should be 4:1 for internal use 3.5:1 for external use If the tower is a mobile tower that is fitted with castors or wheels, the ratios are: Inside a building 3.5:1, Outside buildings 3:1. The minimum base dimensions can be increased, and stability improved by the use of out-riggers or stabilisers. The recommended maximum height for a free standing tower is 9.6m when mobile, and 12m when static Mobile scaffolds should not be used outside in adverse weather conditions, If they are to be left erected overnight then they will require the brakes to be applied on the wheels/castors and tied or secured to a permanent structure At all times, operatives are to remain within the guard rails of the mobile tower Operatives are never to stand on guard rails or overstretch out of the safe working area While climbing onto the scaffold tower, operatives are never to climb ion the outside of the ladder Ladder hatches are to remain closed at all times when not in use	1 x 5 = 5
Persons at risk: User			
Falls or serious injury whilst working from mobile scaffold tower	4 x 4 = 16	All operatives should be trained in the safe use of mobile towers Mobile scaffolds must not be used or moved on sloping, uneven or obstructed surfaces Overhead obstructions should be noted i.e. ceiling heights, roof members, electrical light fittings etc. and in particular overhead electricity cables when using mobile scaffold Only the access ladder securely installed to mobile tower may be used to access various levels of mobile tower	1 x 4 = 4
Persons at risk: All site operatives			
Injuries sustained from falling objects	4 x 3	A suitable working platform must be provided which is closely boarded, incorporates guard rails and a toeboard on all four sides Mobile scaffolds should never be overloaded	1 x 3

= 12	Materials should be securely stacked and brick guards or netting used	= 3

Persons at risk: All site operatives

2.11 Cable pulling

2.11.1 Task: Cable pulling

Hazard	Risk	Control measures	RR
Injuries sustained from incorrect pulling of new runs of cables	4 x 3 = 12	All hazardous manual handling operations should be avoided so far as is reasonably practicable The workforce will be trained to, observe safe lifting techniques, and safely handle loads for materials of regular shape or size Any heavy or awkward loads should be moved using a handling aid Team to consider correct and safest method for cable pulling prior to completing the task. Methodology to be briefed and fully understood with team before proceeding Before undertaking any manual handling operations, make sure the route is clear of obstructions Cable drums should positioned in an area that allow a straight pull The use of cable rollers or holders should be implemented to ensure as much friction is reduced as possible All operatives to be wearing correct PPE for the job, including hard hat, gloves, hi vis vest and safety glasses All operatives to pull cables on firm ground, avoiding twisting the body as much as possible by position one self with the load Cables shouldn't be pulled above the shoulders or below the torso of the user Reduce the risk of injury so far as is reasonably practicable	1 x 3 = 3

Persons at risk: User

2.11.2 Task: Pulling cables at height

Hazard	Risk	Control measures	RR
Falls from height whilst pulling cables	4 x 3 = 12	Manual handling at height should be avoided where possible At all times the selected access equipment should be suitably tied All operatives to pull cables on firm and level ground from selected access equipment Ensure the weight of the cable pulled does not exceed the safe working load of the access equipment Risk assessments for specific access equipment used will be followed at all times Regular rest periods will be taken	1 x 3 = 3

Persons at risk: User

2.12 Moving pipes, rolls or irregular shaped or sized materials

2.12.1 **Task:** Moving pipes, rolls or irregular shaped or sized materials

Hazard	Risk	Control measures	RR
Injuries sustained from incorrect manual handling of pipes, rolls or irregular shape or sized materials	4 x 3 = 12	All hazardous manual handling operations should be avoided so far as is reasonably practicable The workforce will be trained to observe safe lifting techniques, and safely handle loads for materials of regular shape or size Any heavy or awkward loads should be moved using a handling aid If not using handling aids, consider reducing weight of load by breaking up materials to a more manageable size If breaking up into smaller loads consider frequency of bending and how this can be managed efficiently with site operatives Consider lifting in teams if load is already considered within acceptable limits It may be possible to roll drums of cable, this should be undertaken as a last resort if the above fails; the area should be cleared and movement of drum controlled by a team of operatives Before undertaking any manual handling operations, make sure the route is clear of obstructions and somewhere to put the load down wherever it is to be moved to All operatives to be wearing correct PPE for the job The operative should stand as close to the load as possible, with feet spread to shoulder width, bent knees and the back in a natural, upright posture The user should grasp the load firmly and as close to the body as possible The legs should be used to lift the load in a smooth motion, this offers more leverage reducing the strain on the user's back Carry the load close to the body with the elbows tucked into the body Avoid twisting the body as much as possible by turning your feet to position yourself with the load Individual fitness for task to be confirmed; HSE recommended lifting load guidance to be followed; avoid twisting / stopping where possible; toolbox talk on manual handling to be completed Reduce the risk of injury so far as is reasonably practicable	1 x 3 = 3

Persons at risk: All site operatives

2.13 Moving of general materials of normal size and shape

2.13.1 Task: Moving of materials of a regular shape and size

Hazard	Risk	Control measures	RR
Injuries sustained from incorrect manual handling of materials with a regular shape and size	4 x 3 = 12	All hazardous manual handling operations should be avoided so far as is reasonably practicable The workforce will be trained to observe safe lifting techniques, and safely handle loads for materials of regular shape or size Any heavy or awkward loads should be moved using a handling aid If not using handling aids, consider reducing weight of load by breaking up materials to a more manageable size If breaking up into smaller loads consider frequency of bending and how this can be managed efficiently with site operatives Consider lifting in teams if load is already considered within acceptable limits Any of the regular shaped materials should be light, stable and unlikely to shift or move during lifting Before undertaking any manual handling operations, make sure the route is clear of obstructions and somewhere to put the load down wherever it is to be moved to All operatives to be wearing correct PPE for the job The operative should stand as close to the load as possible, with feet spread to shoulder width, bent knees and the back in a natural, upright posture The user should grasp the load firmly and as close to the body as possible The legs should be used to lift the load in a smooth motion, this offers more leverage reducing the strain on the user's back Carry the load close to the body with the elbows tucked into the body Avoid twisting the body as much as possible by turning your feet to position yourself with the load Individual fitness for task to be confirmed; HSE recommended lifting load guidance to be followed; avoid twisting / stopping where possible; toolbox talk on manual handling to be completed Reduce the risk of injury so far as is reasonably practicable	1 x 3 = 3

Persons at risk: User

2.14 Movement of boxed materials

2.14.1 Task: Movement of general boxed materials

Hazard	Risk	Control measures	RR
Injuries sustained from incorrect manual handling of boxed materials	4 x 3 = 12	All hazardous manual handling operations should be avoided so far as is reasonably practicable The workforce will be trained to observe safe lifting techniques, and safely handle loads for materials of boxed materials Any heavy or awkward loads should be moved using a handling aid If not using handling aids, consider reducing weight of load by breaking up materials to a more manageable size If breaking up into smaller loads consider frequency of bending and how this can be managed efficiently with site operatives Consider lifting in teams if load is already considered within acceptable limits Any of the regular shaped materials should be light, stable and unlikely to shift or move during lifting Before undertaking any manual handling operations, make sure the route is clear of obstructions and somewhere to put the load down wherever it is to be moved to All operatives to be wearing correct PPE for the job The operative should stand as close to the load as possible, with feet spread to shoulder width, bent knees and the back in a natural, upright posture The user should grasp the load firmly and as close to the body as possible The legs should be used to lift the load in a smooth motion, this offers more leverage reducing the strain on the user's back Carry the load close to the body with the elbows tucked into the body Avoid twisting the body as much as possible by turning your feet to position yourself with the load Individual fitness for task to be confirmed; HSE recommended lifting load guidance to be followed; avoid twisting / stopping where possible; toolbox talk on manual handling to be completed Reduce the risk of injury so far as is reasonably practicable	1 x 3 = 3

Persons at risk: User

2.15 Air handling unit works

2.15.1 Task: Manoeuvring and installing air handling unit into place

Hazard	Risk	Control measures	RR
Musculoskeletal injuries when installing the unit and securing it into place	4 x 3 = 12	Operatives are to review the manual handling method statement before lifting any heavy or bulky items Mechanical lifting assistants should be used for any load that is awkward or weighs more than 25kg Where mechanical aid is not feasible, management must ensure sufficient manpower resources are allocated for the safe lifting and position of air handling unit The manufacturer's specification is to be referred to for fixing the air handling unit into place	1 x 3 = 3
Persons at risk: All site operatives			
Unit or materials falling from height onto engineer or other site operatives	3 x 5 = 15	Trained operatives are to be employed in the safe lifting and securing of the air handling unit, following LOLER regulations where any lifting equipment is used The area is to be cordoned off before undertaking any works, and engineers are to work from safe working platforms like fixed scaffolding or an access tower The manufacturer's instructions are to be followed when installing the air handling unit on the base structure. If unsure, the site supervisor or nominated structural engineer is to be consulted If AHU is being craned into position, operatives are to follow the separate cranage risk assessment from a specialist contractor and follow LOLER regulations at all times. Employees who are not trained are strictly not to be admitted into the cordoned lifting space. The site supervisor is to be present throughout the lift	1 x 5 = 5
Persons at risk: All site operatives			

2.16 Fan coil unit works

2.16.1 Task: Manoeuvring and installing a fan coil unit into place

Hazard	Risk	Control measures	RR
Musculoskeletal injuries when installing the unit and securing it into place	4 x 3 = 12	Operatives are to review the manual handling method statement before lifting any heavy or bulky items Mechanical lifting assistants are to be used for any load that is awkward or weighs more than 25kg Where mechanical aid is not feasible, management is to ensure sufficient manpower resources are allocated for the safe lifting and positioning of the fan coil unit Operatives are to refer to the manufacturer's specification for the fixing of the condenser unit before undertaking the works	1 x 3 = 3
Persons at risk: User			
Unit or materials falling from height onto engineers or other site operatives	4 x 4 = 16	It is to be ensured that trained operatives are employed in the safe lifting and securing of fan coil unit The area is to be cordoned off before undertaking any works, and engineers are to work from safe working platforms like podium steps or an access tower The manufacturer's instructions are to be followed when fastening hangers to the soffit and operatives are to check that the hangers can carry the loads. If unsure, the operatives are to consult the site supervisor or the nominated structural engineer A mechanical handling aid (i.e. genie lift) is to be used when positioning and securing the fan coil unit into place. The unit is to be securely fastened before removing the handling aid If positioning the unit without a handling aid, workers are not to be positioned below the unit and are to be in a location where they can safely undertake the works without strain	1 x 4 = 4
Persons at risk: All site operatives			

2.17 Copper pipework installation

2.17.1 Task: Copper pipework installation

Hazard	Risk	Control measures	RR
Lung damage caused by inhalation of fumes (which may contain cadmium) and skin and eye damage from sealants	3 x 3 = 9	All substances required to perform plumbing activities are to be identified i.e. lead, solder, plumber flux etc. and the relevant COSHH assessments and personal protective equipment is to be made available The use of respiratory equipment is to be considered in confined areas Skin contact with sealants is to be avoided and skin is to be washed as soon as possible All areas are to be kept very well ventilated during sealant works and the minimum requirement is to open all doors and windows	1 x 3 = 3
Persons at risk: User			
Serious injuries sustained from fire or explosions whilst using a blowtorch or similar for brazing/ bronze welding (oxy-ccetylene and oxy-propane)	4 x 5 = 20	A hot work permit system should be implemented onsite by the principal contractor or client Site operatives must comply with safety procedures and manufacturers' instructions whilst undertaking hot works Hot works are only to be carried out by suitably trained and competent personnel Users are to ensure that all combustible materials are removed, and that flammable liquids and gas cylinders are beyond the range of the blowtorch When using a blowtorch on metal surfaces, combustible material in contact with the metal behind or adjacent to the work area is to be removed before work commences Operatives are to keep watch whilst work is in progress for signs of fire or smouldering in the immediate vicinity A portable fire extinguisher is to be readily available wherever and whenever hot works are in progress The blowtorch is always to be extinguished when it is not in use and it is never to be left burning whilst unattended Adequate ventilation is to be ensured where gas burning appliances are in use The area is to be checked thoroughly at the end of the work period and signed off as being safe on a hot works permit by the site supervisor and user	1 x 5 = 5
Persons at risk: All site operatives			

2.18 Thermal and acoustic insulation to pipework

2.18.1 **Task:** Thermal and acoustic insulation

Hazard	Risk	Control measures	RR
Lung damage caused by inhalation of fumes and skin and eye damage from adhesives, welding agents, or fibre from insulation	4 x 2 = 8	Operatives are to wear safety goggles and safety masks with face fit testing for operatives The cutting and welding of insulation is to be minimised where possible All insulation works are to be undertaken in a well-ventilated area	1 x 2 = 2

Persons at risk: User

2.19 Testing pressure systems

2.19.1 **Task:** Testing pressure systems

Hazard	Risk	Control measures	RR
Serious injury caused by brittle failures, missile generation or failure under pressurisation	4 x 5 = 20	Secure test area - the site supervisor is to be informed, any permit to work systems are to be in place, and warning notices are to be visible to others likely to enter the test area The floor area is to be cleared before the test to reduce trip hazards in case of emergency PPE (goggles) are to be worn All end caps are to be secured prior to the test commencement A hose is to be connected to the drain valve throughout the test in case of emergency A container is to be on hand in case of water leaks Any spillages are to be cleaned up immediately and warning notices put in place if the area remains slippery A complete air test is to be completed first to check for leaks Once the air test is complete, pressurisation is to proceed in a slow, controlled and procedural manner Site operatives are to monitor pipework throughout the pressure test	1 x 5 = 5

Persons at risk: All site operatives

2.20 Installation of cable trunking and trays

2.20.1 Task: Fabrication and fixing of metal services i.e. conduit, basket tray unistrut

Hazard	Risk	Control measures	RR
Injuries or cuts to hands and eyes from general fixing and the assembly of metal services	4 x 2 = 8	The using portable tools or equipment risk assessment is to be followed A safe area is to be designated by site management to cut materials to size Materials are to be deburred and sharp edges removed Cut resistant gloves/ gauntlets to be worn	1 x 2 = 2

Persons at risk: User

2.20.2 Task: Installation of cable trunking and trays at height

Hazard	Risk	Control measures	RR
Falls from height during cable tray installation causing serious injuries	4 x 4 = 16	The working from height risk assessment (specific to the access equipment being used) is to be followed When installing cable trunking or trays at height, a safe system of work is to be employed including having another operative to assist with placement and mounting Selection of suitable access equipment for task (PECO, MEWP, mobile scaffold tower) to be used/ ladders only to be used for low intensity and sporadic work Ladders to follow safe usage guidance and be regularly inspected to ensure equipment remains operational	1 x 4 = 4

Persons at risk: User

2.21 Condenser installation

2.21.1 Task: Condenser outdoor installation

Hazard	Risk	Control measures	RR
Injuries to hands and back due to lifting, and working on outdoor condenser units	5 x 3 = 15	A competent person is to be responsible for the installation of the outdoor unit and the location is to be agreed with the principal contractor or client Operatives are to review the manual handling method statement before lifting any heavy or bulky items. Mechanical lifting assistants are to be used for any load that is awkward or weighs more than 25kg The manufacturer's specification for fixing the condenser unit is to be referred to before undertaking the works	1 x 3 = 3

Persons at risk: User

2.22 Charging or decanting synthetic refrigerant

2.22.1 Task: Charging or decanting synthetic refrigerant

Hazard	Risk	Control measures	RR
Serious injuries sustained from the transporting of refrigerant or explosion	3 x 5 = 15	Mechanical handling equipment for cylinders is to be used where possible Labels are to be prominently displayed to state the refrigerant in the system and warn against charging any other gas into the system The refrigerant is to be handled in accordance with the COSHH assessment sheet Cylinders are to be clearly identified and stored in a separate area Cylinders are to be removed from the heat source and kept in a cool space Waste refrigerants are to be disposed of through registered waste operators only and waste transfer notes are to be obtained The recovered refrigerant is not to be transported Suitable first aid arrangements in place and works performed out of hours / within engineering hours where possible	1 x 5 = 5
Persons at risk: All site operatives & public			
Synthetic refrigerant coming into contact with skin causing freeze and chemical burns	5 x 3 = 15	Only competent and trained engineers are to undertake any charging or decanting of refrigerant Engineers are never to work alone when charging or decanting refrigerant and the supervising partner is to be versed in emergency procedures The correct PPE (as specified in the attached method statement) is to be worn COSHH statements for refrigeration are to be read before beginning the operation	1 x 3 = 3
Persons at risk: User			
Asphyxiation due to gases escaping into the atmosphere	4 x 5 = 20	Any operatives working on equipment designed to contain, or containing, F-Gas refrigerants will have an F-Gas Company Certificate and follow legislation accordingly The correct tools and equipment are to be used for the purpose of charging/re-charging Refrigerants are asphyxiates and can accumulate particularly in low lying areas such as pits, below ground plant rooms, sealed stairwells, beer cellars, etc., therefore adequate levels of ventilation are to be ensured, particularly in low lying areas The engineer is to strictly control access to the area	1 x 5 = 5

Persons at risk: All site operatives						
Severe lung damage	4	x	5	=	20	Existing detectors and alarms must remain operational during works. Site emergency procedures shall be briefed to operatives prior to works and a permit to work issued. All arrangements are to be followed at all times and any concerns immediately notified to management	1	x	5	=	5
Persons at risk: All site operatives						

2.23 Installation of cabling

2.23.1 Task: Installation of cabling

Hazard	Risk	Control measures	RR
Cuts, abrasions and possible injury to eyes during cable installation and termination works	3 x 2 = 6	Operatives are to be wearing the correct PPE, including gloves, hi-vis jackets, hard hats, safety glasses and boots Cable ends are to be covered or taped before the final termination to minimise cuts All operatives are to be competent and trained to strip/cut cabling to minimise flying debris and cuts	1 x 2 = 2
Persons at risk: User			
Contact with live electricity causing serious or fatal injuries	3 x 3 = 9	Site management is to ensure all power has been terminated in the areas of work Any isolations are to be undertaken by a competent operative who needs to follow the electrical isolations risk assessment before undertaking any work Isolation certificate to be issued prior to works, test before touch to be followed through proving dead testing Any services that have to remain live are fully signed and briefed prior to commencing works If there is any doubt, seek the advice and instruction from LV / HV authorised person (AP) senior authorised person (SAP), Authorised Engineer (AE) or senior authorised engineer (SAE) as required	1 x 3 = 3
Persons at risk: User			

2.23.2 Task: Installation of cabling at height

Hazard	Risk	Control measures	RR
Falls from height during cable installation	4 x 3 = 12	Operatives are to follow the working from height risk assessment (specific to the access equipment being used) When installing cables at height, a safe system of work is to be employed, including having another operative to assist with cable pulling and cable mounting	1 x 3 = 3
Persons at risk: User			

2.24 Electrical isolations

2.24.1 **Task:** Electrical Isolations

Hazard	Risk	Control measures	RR
Contact with live electricity causing serious or fatal injuries	4 x 5 = 20	Operatives are to ensure a safe system of work has been implemented with the principal contractor or representative Equipment is to be checked with a compliant tester, insulated hand tools and a competent electrician prior to commencing the works. The equipment is to be approved by the site supervisor The installation/circuit being isolated is to be switched off, and a voltage indicating device used to verify that no voltage is present. This is to be reconfirmed again All electrical equipment is to be made dead and locked off by a competent electrician and the keys are to be retained Warning notices are to be provided and operatives are to double check that the circuit or equipment is dead and locked off by lock out, tag out (LOTO) policy, to be followed at all times. Circuit main earth(s) are to be applied where necessary and precautions taken against adjacent live parts where necessary A permit to work is to be issued and local earth(s) applied where necessary Continual vigilance and monitoring of circuits is to be undertaken by a competent electrician or a designated site representative Only GS38 compliant test tools to be used Isolation certificate to be issued prior to works, test before touch to be followed through proving dead testing Any services that have to remain live are fully signed and briefed prior to commencing works If there is any doubt, seek the advice and instruction from LV / HV authorised person (AP) senior authorised person (SAP), Authorised Engineer (AE) or senior authorised engineer (SAE) as required	1 x 5 = 5

Persons at risk: User

2.25 Electrical work up to 400 volts

2.25.1 **Task:** Electrical work up to 400 volts

Hazard	Risk	Control measures	RR
Serious or fatal burns and injuries from electric shock	5 x 5 = 25	Please consult your appointed person or authorised engineer (AP / AE) for site specific safe systems of work before proceeding Working on or near live equipment is not to be undertaken unless completely necessary and deemed as such by the principal contractor or representative A safe system of work is to be recorded when 'live' work is necessary and should only be undertaken by a trained and competent electrician If coordinating work where more than one group is involved, the necessary precautions and emergency procedures are to be discussed with all operatives The roles and responsibilities of the supervisors and workers, including those of any contractors who may be employed, are to be clearly defined before undertaking any work Any supervisors are to be competent to supervise the work, with the level of supervision being appropriate to the danger and the competence of those carrying out the work Sufficient lighting and working space is to be allowed for before undertaking any work The electrical isolations risk assessment is to be followed by a competent electrician Only a competent electrician may work on electrical services up to 400 volts. Unauthorised, unqualified or untrained people are not to be allowed to work on any electrical services Any live working is to be undertaken with a partner who will be able to assist in an emergency Correct PPE is to be worn at all times Specialist contractor to be used, and a member of NICEIC Enlist the guidance / instruction from an AP, SAP, AE SAE as required	1 x 5 = 5

Persons at risk: All site operatives

2.26 Removal of existing electrical services

2.26.1 Task: Removal of existing electrical services

Hazard	Risk	Control measures	RR
Falls from height during strip out or removal of services	5 x 4 = 20	The working from height risk assessment is to be followed when stripping out fixtures, fittings and services from above When pulling cables at height, a safe system of work is to be employed including having another operative to assist with cable pulling	1 x 4 = 4
Persons at risk: User			
Contact with live electricity causing serious or fatal injuries	5 x 5 = 25	The electrical isolations risk assessment is to be followed A safe system of work is to be employed with the site supervisor	1 x 5 = 5
Persons at risk: All site operatives			

2.27 Electrical testing and commissioning

2.27.1 **Task:** Testing and commissioning

Hazard	Risk	Control measures	RR
Serious or fatal burns and injuries sustained from electric shock testing 'decommissioned' equipment	5 x 5 = 25	A competent testing electrician is to ensure that the equipment is dead and locked off When testing equipment, where possible operatives are to test it dead, and if not possible they are to look at energising it to a safe current The environment in the direct vicinity of the testing and commissioning is to be reviewed If testing on live equipment, the operative is to review the risk assessment for live testing	1 x 5 = 5
Persons at risk: User			
Serious or fatal burns and injuries from electric shock testing live equipment	5 x 5 = 25	Only test engineers are to be permitted to carry out testing of live equipment as part of their duties The area is to be reviewed and it is to be determined if a separate test area can be created where the equipment can be taken for testing Where possible, residual current devices (RCDs) are to be employed to provide supplementary protection Physical safeguards are to be applied to the equipment being tested to prevent injury, e.g. the use of temporary or permanent screens, barriers, and insulating mats Isolating transformers are to be used as the source of the supply to mains-powered test equipment if possible when undertaking hardware precautions Where the risk of arc flash exists, adequate calorific value PPE is to be employed and only properly-maintained insulated tools used If using a test bench, all test equipment is to be placed on an insulated shelf immediately above the test bench All test and shorting leads are to be fused Where there is a risk of touching live parts, insulated gloves are to be worn A second person is to be in attendance in case of an accident	1 x 5 = 5
Persons at risk: User			

2.28 COVID-19: Office work

2.28.1 Task: COVID-19: Office work

Hazard	Risk	Control measures	RR
Travelling to work - risk of COVID infection from others	3 x 4 = 12	1) Staff to only travel to work where work cannot be performed at home 2) Personal vehicle, bike or walking to be conducted where possible to complete your commute to and from work 3) Aim to minimise the frequency and amount of time using public transport 4) If using public transport, face covering is recommended 5) Look to travel outside rush hour periods where possible and to review starting / finishing times for staff to limit	1 x 4 = 4
Persons at risk: User			
Suspected case whilst working within the office	4 x 4 = 16	If a worker develops a high temperature or a new, persistent cough they should: 1) Return home immediately 2) Avoid touching anything 3) Self isolate for a period of 7 days 4) The office organise a thorough clean of the work area	1 x 4 = 4
Persons at risk: User			
Access / egress to the office	4 x 4 = 16	1) Stop all non-essential visitors 2) Only essentials works from contractors to be permitted 3) Any worker that has the ability to work from home shall continue to do so 4) Introduce staggered start / finish times and lunch breaks to reduce congestion 5) Operate the office at minimum capacity to avoid exposure to others 6) Where possible, remove any touch points to limit contact around the office 7) Require all workers to wash their hands regularly (20 seconds) 8) Continue social distancing (2m) whilst walking around the premises 9) Regularly clean common contact surfaces in reception, office, access control and delivery areas e.g. scanners, turnstiles, screens, telephone handsets, desks, particularly during peak flow times 10) The use of stairs is preferred than use of lifts to limit close contact with persons 11) Number of people using the lift to be minimised or reserved to those that need it (such as mobility problem)	1 x 4 = 4

		12) One way systems are encouraged to be implemented where possible or signage installed to help manage footfall	
Persons at risk: User			
Welfare & hygiene - sanitary conveniences, rest areas and eating areas	4 x 4 = 16	1) Wash your hands thoroughly and regularly. Use soap and water for at least 20 seconds. Use alcohol-based hand sanitiser if soap and water is not available and hand washing technique to be adopted as directed by NHS 2) Avoid touching your face/eyes/nose/mouth with unwashed hands and cover your cough or sneeze with a tissue then throw it in the bin 3) Increase cleaning rota / schedule in your work area 4) Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush 5) Provide suitable and sufficient rubbish bins for hand towels with regular removal and disposal 6) Ensure sufficient supplies of soap, hand sanitiser and paper towels remain in place 7) Restrict the number of people using toilet facilities where possible 8) Staff should be asked to bring pre-prepared meals and refillable drinking bottles from home 9) Workers to wash hands prior to handling / eating food and to stay 2m away from one another 10) Where catering is provided on site, it should provide pre-prepared and wrapped food only - Payments should be taken by contactless card and the use of disposable crockery, eating utensils is encouraged 11) Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced 12) Tables should be cleaned between each use 13) Based on the size of each facility, determine how many people can use it at any one time to maintain a distance of two metres 14) Increase ventilation where possible particularly within enclosed spaces 15) Complete regular clothes washing after coming into contact with persons as there is evidence to suggest the virus can stay on fabrics	1 x 4 = 4
Persons at risk: User			
Use of display Screen Equipment (DSE)	3 x 3 = 9	1) DSE assessment in the office to be reviewed to ensure controls in place remain effective and that 2m social distancing remains in place 2) Occupational health information available upon request should any new difficulty arise from previous home working 3) Regular breaks away from the screen are encouraged with regular stretching whilst maintaining 2m distancing	1 x 3 = 3

			4) Equipment to be checked to ensure ongoing operation and to report concerns to line management 5) Any hot desking arrangements used must be thoroughly cleaned after each use and be suitably set up by the individual user. Seek H&S advice as required 6) Staff to be placed next to one another rather than face on or shields / barriers to be considered 7) Environmental factors - HVAC systems changes will not generally be required however seek advice from your specialist contractor 8) Those using the office should ideally be partnering or within a fixed team to limit multiple persons using the facilities		
Persons at risk: User					
Stress - including mental health	4 x 4 = 16		1) Remote staff to receive periodic contact via online team meeting or line management call 2) Advise staff of technology apps that can assist with stress management and / or mental health 3) Where enrolled, advise employees about occupational health advice available, including any confidential employee assistance programme (EAP) 4) Stress assessments available from H&S / HR specialists 5) Offer flexible working arrangements where possible 6) Review any mental health first aider support	1 x 4 = 4	
Persons at risk: User					
Control of water systems - Legionella	4 x 4 = 16		1) Water risk assessment to be reviewed to ensure scheme of control remains in place and effective 2) Seek the advice from your water treatment contractor as required 3) Seldom used water outlets to be flushed weekly and temperature checks continue 4) Cleaning and disinfection regime to continue 5) Speak to your landlord / building management in regards to checking Legionella compliance	1 x 4 = 4	
Persons at risk: All site operatives					
Statutory compliance - risk of breaching requirements	4 x 4 = 16		1) Ensure documentation is available to prove that equipment requiring statutory examination has taken place or request proof from building agent / landlord 2) Speak to your specialist contractor regarding advice on using equipment again and to follow manufacturer instructions 3) Where equipment has exceeded the date, place equipment out of use until testing completed and equipment deemed operational again	2 x 4 = 8	

Persons at risk: User

Contact with others including visitors, contractors and delivery drivers	4 x 4 = 16	1) Remote work and conferencing to be always be considered as first method of work 2) Anyone deemed extremely clinically vulnerable will not be permitted to site 3) Those deemed clinically vulnerable may attend site if 2m social distancing can be achieved at all times 4) Visits permitted where related to essential works that cannot be completed from home 5) Host to make visitors aware of COVID controls on site and to limit their time on site to a minimum 6) Ensuring all persons have access to hygiene measures and welfare facilities 7) Where possible, deliveries to be left centrally at reception for collection by one person or one person to meet driver by vehicle 8) Additional lockers to be implemented where possible for visitors to store items whilst socially distancing	1 x 4 = 4

Persons at risk: User

2.29 COVID-19: Construction site

2.29.1 Task: COVID-19: Construction site

Hazard	Risk	Control measures	RR
Transmission - Exposure from others due to: 1) Living with someone with a confirmed case of COVID-19 2) Have come into close contact (within 2 metres for 15 minutes or more) with a confirmed case of COVID-19 3) Being advised by a public health agency that contact with a diagnosed case has occurred	3 x 4 = 12	1) Continue following government action of self isolation and only to leave house on the following circumstances: for medical reasons; to shop for necessary food supplies; for exercise; and for work where you cannot do this at home 2) Any existing individual risk assessments (disability, young persons or new / expectant mothers) to be reviewed 3) Maintain contact with line management and Human Resources (HR) and to follow company policy / guidance 4) Travel is only required where you cannot work from home. Use private transportation, cycle or walk. As a last resort public transport to be used as a minimum and to implement social distancing where possible 5) To continue following ongoing government guidance 6) Stay at home and only attend hospital in an emergency. Do not attend GP surgery and phone NHS line (111) if further advice is required 7) Company to ensure extremely clinically vulnerable persons do not come to work and continue to shield themselves whilst following their specific medical advice issued to them 8) Follow good NHS hygiene measures at all times 9) Avoid all visitors to your home unless they are providing a medical requirement 10) Do not approach delivery staff, allow packages to be left on the doorstep 11) Do not take any antibiotics as they do not work against viruses	1 x 4 = 4
Persons at risk: User			
Suspected case whilst working on site	4 x 4 = 16	If a worker develops a high temperature or a persistent cough while at work, they should: 1) Return home immediately 2) Avoid touching anything 3) Cough or sneeze into a tissue and put it in a bin, or if they do not have tissues, cough and sneeze into the crook of their elbow 4) They must then follow the guidance on self-isolation and not return to work until their period of self-isolation has been completed 5) The work area should receive deep cleaning and social distancing maintained	1 x 4 = 4

Persons at risk: User

General travel including foreign travel	4	x	4	=	16	1) Do not travel unless you cannot work from home or deemed a key worker – implement teleconferencing for meetings 2) Where an individual has recently travelled abroad, they must self isolate for 14 days 3) Please continue to follow any further national government advice provided 4) Where an occupational health (OH) service provider has been appointed, please seek additional advice or concerns through this service 5) All persons to limit their use of public transport. Where travel is essential, please use private single occupancy where possible, cycle or walk	1 x 4 = 4

Persons at risk: User

Access / egress to site	4	x	4	=	16	Where possible, please consider and implement the following practices: 1) Ensure all extremely clinically vulnerable persons do not attend site 2) Stop all non-essential visitors 3) Log all visitors to site 4) Introduce staggered start and finish times to reduce congestion and contact at all times 5) Monitor site access points to enable social distancing – you may need to change the number of access points, either increase to reduce congestion or decrease to enable monitoring 6) Remove or disable entry systems that require skin contact e.g. fingerprint scanners and look to increase cleaning or removal of common 'touch points' on site 7) Require all workers to wash or clean their hands before entering or leaving the site 8) Allow plenty of space (two metres) between people waiting to enter site 9) Regularly clean common contact surfaces in reception, office, access control and delivery areas e.g. scanners, turnstiles, screens, telephone handsets, desks, particularly during peak flow times 10) Reduce the number of people in attendance at site inductions and consider holding them outdoors wherever possible 11) Drivers should remain in their vehicles if the load will allow it and must wash or clean their hands before unloading goods and materials. 12) Designate walking routes and one way systems with signage to help maintain social distancing 13) Additional parking and cycling facilities to be implemented to encourage those to avoid using public transport when travelling to work	1 x 4 = 4

Persons at risk: User

Inclement weather – cold temperature	2 x 2 = 4	1) All persons to dress appropriately for the weather 2) Welfare facilities provided to shelter from the elements 3) Maintain good hygiene measures at all times 4) PPE on individual issue basis and not to be shared	1 x 2 = 2

Persons at risk: User

Poor hygiene	4 x 4 = 16	1) Wash your hands thoroughly and regularly. Use soap and water for at least 20 seconds. Use alcohol-based hand sanitiser if soap and water is not available and hand washing technique to be adopted as directed by NHS 2) Avoid touching your face/eyes/nose/mouth with unwashed hands and cover your cough or sneeze with a tissue then throw it in the bin. 3) Provide additional hand washing facilities to the usual welfare facilities if a large spread out site or significant numbers of personnel on site 4) Regularly clean the hand washing facilities and check soap and sanitiser levels 5) Provide suitable and sufficient rubbish bins for hand towels with regular removal and disposal 6) Sites will need extra supplies of soap, hand sanitiser and paper towels and these should be securely stored 7) Restrict the number of people using toilet facilities at any one time e.g. use a welfare attendant Wash hands before and after using the facilities Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush Portable toilets should be avoided wherever possible, but where in use these should be cleaned and emptied more frequently	1 x 4 = 4

Persons at risk: User

Canteen - exposure from large numbers of persons	4 x 4 = 16	1) The workforce can stay on site once they have entered it and not use local shops to limit contact with others 2) Dedicated eating areas should be identified on site to reduce food waste and contamination 3) Break times should be staggered to reduce congestion and contact at all times 4) Hand cleaning facilities or hand sanitiser should be available at the entrance of any room where people eat and should be used by workers when entering and leaving the area 5) The workforce should be asked to bring pre-prepared meals and refillable drinking bottles from home 6) Workers should sit 2 metres apart from each other whilst eating and	1 x 4 = 4

			avoid all contact 7) Where catering is provided on site, it should provide pre-prepared and wrapped food only - Payments should be taken by contactless card wherever possible and Crockery, eating utensils, cups etc. should not be used 8) Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced 9) Tables should be cleaned between each use 10) All rubbish should be put straight in the bin and not left for someone else to clear up 11) All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs, door handles, vending machines and payment devices		
Persons at risk: User					
Use of Changing facilities, showers and drying rooms	4 x 4 = 16		1) Introduce staggered start and finish times to reduce congestion and contact at all times 2) Introduce enhanced cleaning of all facilities throughout the day and at the end of each day 3) Consider increasing the number or size of facilities available on site if possible 4) Based on the size of each facility, determine how many people can use it at any one time to maintain a distance of two metres 5) Provide suitable and sufficient rubbish bins in these areas with regular removal and disposal	1 x 4 = 4	
Persons at risk: User					
Manual handling - dual lifting	4 x 4 = 16		1) Always consider if the task can be performed with one person using mechanical aid 2) Ensure the individual(s) are fit for work prior to commencing task 3) Break down the load where possible so that one person can comfortably carry 4) Assess your route so you can maintain 2m social distance whilst moving the load 5) Where dual lifts cannot be avoided, lift facing away from each each or side by side rather than face to face where possible 6) Where teams are used, try to keep to fixed teams / partnering to prevent cross over of workers 7) Where PPE is to be used, this is on an individual issue and items should not be shared	1 x 4 = 4	
Persons at risk: User					

Taking / accepting deliveries - contact with materials and persons (driver)	4 x 4 = 16	1) Review logistics plans to ensure safest routes have been identified including implementing one way systems 2) Maintain 2m social distancing when accepting materials 3) Materials to be placed outside of sites to reduce exposure to drivers 4) Review work programme to assess whether 'just in time' arrangements can be made to prevent additional or unnecessary deliveries 5) Hand washing and sanitiser measures available to maintain good hygiene	1 x 4 = 4
Persons at risk: User			
Working in local vicinity to construction workforce (maintaining 2m distancing)	4 x 4 = 16	1) Starting and finishing times are to be staggered and reviewed to ensure no build up of staff / teams in areas 2) Workers who are unwell with symptoms of Covid-19 should not attend the workplace 3) Work design to be reviewed regularly to identify any safer ways to move around site 4) Work programme to be reviewed to identify any work reordering that would limit exposure to others 5) Tasks are to be rearranged to enable them to be done by one person or a small number of persons without compromising safety measures 6) Maintain social distancing measure of 2 metres from each other as much as possible with supervision in place to monitor compliance 7) Avoid skin to skin and face to face contact 8) Stairs should be used in preference to lifts or hoists and consider one ways systems around construction sites 9) Consider alternative or additional mechanical aids to reduce worker interface 10) Any additional COVID 19 measures specified by your Principal Contractor's site rules must be followed. Details of this shall be shared at site induction 11) Above hygiene measures and additional cleaning schedules to remain (regularly washing hands for at least 20 seconds with soap and warm water) 12) Any health concern to be raised immediately to line management / principal Contractor	1 x 4 = 4
Persons at risk: All site operatives			
Working within 2 metres of working team	4 x 4 =	1) Always consider if the task can be performed differently without having to breach the 2m social distancing rule 2) Workers are to limit face to face working and work facing away from each other when possible	2 x 4 =

	16	3) Limit the frequency of working within 2m to an absolute minimum and ensure it is for strictly low intensity, sporadic work where exposure to this distance is less than 15 mins 4) Consider introducing an enhanced authorisation process (permit to work) for activities where less than 2m distance may be required 5) Provide additional supervision to monitor distancing and teams not to be rotated 6) Continue to conduct dynamic risk assessments whilst completing the work and speak up if there is a safer way of completing the task 7) All equipment to be thoroughly cleaned prior and after using it 8) Increased ventilation will be provided within enclosed spaces 9) Sites can consider face covering however, it is advised to speak to your H&S competent person on these matters and supplies should be reserved for medical staff as it has been documented that the protective effect is minimal and supplies have been difficult to procure 10) Where respiratory protective equipment (RPE) needs to be worn, face fit testing (FFT) must be in place. This equipment is reserved to protect workers from other hazardous substances rather than COVID19 as there is limited evidence that the equipment will offer a high level of protection 11) Consideration given to disposable gloves and eyewear to prevent and reduce potential contamination 12) Reusable PPE should be thoroughly cleaned after use and not shared between workers. These should be stored in suitable places 13) Single use PPE should be disposed of so that it cannot be reused and to control potential contamination is controlled (waste removed by a responsible, approved contractor) 14) Workers deemed clinically vulnerable should never work within 2m of persons and preference should be given to whether any change in task can allow an individual to work from home where possible	8
Persons at risk: User			
First aid - including mental health	4 x 4 = 16	1) First aid contents to be monitored to ensure adequate supplies remain 2) First aid and cover arrangements to be reviewed 3) First aider certificates to be checked for validity and understand amended practices in regards to attending a casualty during COVID (such as revised CPR methodology) 4) Emergency plans on site and communicated so all staff understand what action to take in the event of a suspected or confirmed case of COVID 19 5) Mental health first aiders to be considered 6) Communicate any occupational health service available to the workforce including any available employee assistance programme	1 x 4 = 4

	(EAP) or public support 7) Line management to regularly communicate to their team(s) 8) Effective reporting system established on site in order to rectify any raised issues or incidents in a timely manner
Persons at risk: User	

2.30 Hand soldering

2.30.1 Task: Hand soldering

Hazard	Risk	Control measures	RR
Electrocution	5 x 4 = 20	Ensure all items being worked on are switched off and disconnected from any power source. Visually inspect mains powered soldering equipment before use, paying particular attention to burnt or melted cable insulation. Ensure mains powered soldering equipment carries an in-date PAT certificate, including any air filtration or local exhaust vent equipment.	1 x 4 = 4
Persons at risk: All site operatives			
Hot soldering iron and tip	5 x 3 = 15	Always place the soldering iron into its holder when not soldering. Place a sign warning of hot items. Use the correct equipment for holding smaller objects that require soldering. The use of safety glasses/goggles should be considered to protect the eyes from solder splashes.	2 x 3 = 6
Persons at risk: All site operatives			
Fumes caused by the use of rosin cored solder	3 x 5 = 15	Substitution of rosin cored solder should be considered. Appropriate fume extraction should be used and turned on when soldering. Filters should be checked in accordance to manufacturer's guidelines.	1 x 5 = 5
Persons at risk: All site operatives & public			
Lead or cadmium silver solder	3 x 4 = 12	When required, wear protective equipment such as respirators. Suitable gloves, protective clothing and eye protection may also be appropriate for certain work where splashing of fluxes etc can occur.	1 x 4 = 4
Persons at risk: User			
Rosin cored lead or cadmium silver solder	3 x 4 = 12	Avoid skin contact with rosin-based solder fluxes, but if this occurs, wash with soap and water as soon as possible. A simple skin conditioning cream may be used after washing and drying. Suitable precautions to avoid skin contact should be taken. Long sleeved clothing and the use of gloves must also be considered.	1 x 4 = 4

		Workbenches and surrounding areas should be clean and well maintained.	
Persons at risk: User			

2.31 Using blow lamp or similar

2.31.1 **Task:** Using blow lamp or similar

Hazard	Risk	Control measures	RR
Serious injuries sustained from fire or explosions whilst using a blowlamp or similar for brazing/ bronze welding (oxy-ccetylene & oxy-propane)	4 x 5 = 20	A hot work permit system should be implemented onsite by the principal contractor or client Site operatives must comply with safe procedures and manufacturers instructions whilst undertaking hot works Only suitably trained and competent personnel are permitted to carry out hot works User must ensure all combustible materials are removed, with flammable liquids and gas cylinders beyond the range of the blowtorch When using a blowtorch on metal surfaces, combustible material in contact with the metal behind or adjacent to the work area should be removed before work commences Keep a watch whilst work is in progress for signs of fire or smouldering in the immediate vicinity Ensure a portable fire extinguisher is readily available wherever and whenever hot works are in progress Always extinguish a blowtorch when not in use and never leave it burning unattended Ensure adequate ventilation where gas burning appliances are in use Ensure area is checked thoroughly at the end of the work period and signed off on hot works permit as being safe by site supervisor and user	1 x 5 = 5
Persons at risk: All site operatives			
Lung damage caused by inhalation of fumes (which may contain cadmium) and skin & eye damage from sealants	4 x 4 = 16	All substances required to perform plumbing activities are identified i.e., lead, solder, plumber flux etc. and the relevant COSHH Assessments and personal protective equipment is made available Consider use of respiratory equipment in confined areas Avoid skin contact with sealants and wash from skin as soon as possible All areas must be kept very well ventilated during sealant works and minimum requirement is to open all doors and windows	1 x 4 = 4
Persons at risk: User			

Site briefing and induction form

SJJ Generic RAMS

All persons who have signed below confirm that they have been briefed on the safe working methods and arrangements detailed in this method of work statement.

Date	Name	Signature

Supervision and personnel

Name	Role	Phone
Steve Jones	Managing Director	07506777890
Joseph Birch	Service Engineer	07947 802653
Anthony Mabbitt	Service Engineer	07939041405
Mark Whitfield	Service Engineer	07508 192386
Chris Davies	Service/Technical Support Engineer	07535 315110
Ben Oram	Control Systems Engineer	07534 443337
Ryan Whitfield	Junior Engineer	

COSHH assessment

R404A Refrigerant

Hazards:

- **Reference:** 299
- **Composition:** 1,1,1-Trifluoroethane (143a), Pentafluoroethane (R125), 1,1,1,2-Tetrafluoroethane (R134a)

First aid

Eyes

Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention

Skin

Allow to evaporate. Wash off with warm water. If symptoms persist, call a physician

Inhalation

In case of higher concentrations: narcosis, asphyxia, may cause cardic arrhythmia

Ingestion

Unlikely route of exposure

Handling precautions and PPE

Respiratory

Self-contained breathing apparatus (EN 133) Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions Use only respiratory protection that conforms to international / national standards

Hand

Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact). Protective gloves Suitable material: Fluoroelastomer

Skin

Wear suitable protective clothing If splashes are likely to occur, wear: apron, boots, Neoprene

Eye

Tightly fitted safety goggles

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** 1000ppm
  - **Short term exposure limit (STEL 15min TWA):** None Given
- **Factors which increase risks:** Not classified as hazardous
- **Storage precautions:** Keep only in the original container Store in a receptacle equipped with a vent Keep containers tightly closed in a cool, well-ventilated place Keep in properly labelled containers Keep in a bunded area Keep away from heat/sparks/open flames/ hot surfaces. No smoking. Keep away from incompatible product
- **Flashpoint:** Not applicable
- **Transport precautions:** Transport as - 2.2 - Non-flammable, non-toxic gas. Shipping name: REFRIGERANT GAS R404A
- **Disposal precautions:** In accordance with local and national regulations Refer to manufacturer/supplier for information on recovery/ recycling
- **Spill procedures:** Prevent further leakage or spillage if safe to do so. Allow to evaporate. Keep away from incompatible products. Discharge into the environment must be avoided Inform the responsible authorities in case of gas leakage or of entry into waterways, soil or drains.
- **Additional info:** Eye wash bottles or eye wash stations in compliance with applicable standards. When using do not eat, drink or smoke. Gloves, overalls and boots have to be double layered (protection against cold temperature). Handle in accordance with good industrial hygiene and safety practice

1. Identification of the substance / preparation and company / undertaking

Product name	R404A	
REACH registration numbers	1,1,1-Trifluoroethane	01-2119492869-13
	Pentafluoroethane	01-2119485636-25
	1,1,1,2-Tetrafluoroethane	01-2119459374-33
Company	Harp International Ltd Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX Tel: +44 (0) 1443 842255 Fax: +44 (0) 1443 841805 Email: harp@harpintl.com	
Emergency phone number	+44 (0) 1270 502891 (24 hour)	
Use	Refrigeration	

2. Hazards identification

EC Classification

Regulation (EC) No. 1272/2008 (CLP) Gases under pressure – Liquefied gas

Label Elements

Name on label

Hazardous components 1,1,1-Trifluoroethane (143a)
Pentafluoroethane (R125)
1,1,1,2-Tetrafluoroethane (R134a)

Hazard statement(s) H280: Contains gas under pressure; may explode if heated

Signal word(s) Warning

Hazard pictogram(s)

Precautionary statement(s)
Storage P410 + P403: Protect from sunlight. Store in a well-ventilated place.

3. Composition / information on ingredients

Concentration

Substance name	CAS No.	EC No.	Concentration
1,1,1-Trifluoroethane (143a)	420-46-2	206-996-5	ca. 52%
Pentafluoroethane (R125)	354-33-6	206-557-8	ca. 44%
1,1,1,2-Tetrafluoroethane (R134a)	811-97-2	212-377-0	ca. 4%

Hazardous components according to Regulation (EC) 1272/2008 as amended

Substance name	Hazard class	Hazard category	H Phrases
1,1,1-Trifluoroethane (143a)	Flammable gases	Category 1	H220
	Gases under pressure	Liquefied gas	H280
Pentafluoroethane (R125)	Gases under pressure	Liquefied gas	H280
1,1,1,2-Tetrafluoroethane (R134a)	Gases under pressure	Liquefied gas	H280

4. First aid measures

Inhalation Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call a physician.

Skin contact Allow to evaporate. Wash off with warm water. If symptoms persist, call a physician.

Eye contact Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.

Ingestion Unlikely route of exposure.

Most important symptoms/effects, acute and delayed

Inhalation In case of higher concentrations: narcosis, asphyxia, may cause cardic arrhythmia.

Skin contact Contact with liquid or refrigerated gas can cause cold burns and frostbite. Prolonged skin contact may defat the skin and produce dermatitis.

Eye contact Causes frostbite burns to eyes. Symptoms: Lachrymation, redness, swelling of tissue, frostbite, burn.

Ingestion Gas. Not applicable.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.

Unsuitable extinguishing media: None.

Specific hazards arising from the Chemical	The product is not flammable. Hazardous decomposition products formed under fire conditions.
Special protective actions for Fire-Fighters	Wear self-contained breathing apparatus and protective suit Wear chemical resistant oversuit Special protective actions for fire-fighters In case of fire, use water spray Keep product and empty container away from heat and sources of ignition

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel	Prevent further leakage or spillage if safe to do so Keep away from incompatible products
Advice for emergency responders	Immediately evacuate personnel to safe areas Keep people away from and upwind of spill/leak Wear self-contained breathing apparatus and protective suit Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing Suppress (knock down) gases/vapours/mists with a water spray jet Avoid spraying the leak source Ventilate area
Environmental precautions	Discharge into the environment must be avoided Inform the responsible authorities in case of gas leakage or of entry into waterways, soil or drains
Methods and materials for containment and cleaning up	Allow to evaporate Prevent product from entering drains
Reference to other sections	Refer to protective measures listed in sections 7 and 8.

7. Handling and storage

Precautions for safe handling	Use only in well-ventilated areas Use only clean and dry utensils Keep away from water Preferably transfer by pump or gravity Keep away from incompatible products

Conditions for storage, including incompatibilities

Storage	Keep only in the original container Store in a receptacle equipped with a vent Keep containers tightly closed in a cool, well-ventilated place Keep in properly labelled containers Keep in a bunded area Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep away from incompatible products
Packing material	Suitable material – steel cylinder
Specific use(s)	For further information, please contact supplier.

8. Exposure controls / personal protection

Control parameters

Exposure limit values

Substance	Harp acceptable exposure limit	EH40 workplace exposure limits
Pentafluoroethane	TWA = 1000 ppm	Not listed
1,1,1-Trifluoroethane	TWA = 1000 ppm	Not listed
1,1,1,2-Tetrafluoroethane	TWA = 1000 ppm	TWA = 1000 ppm / 4240 mg/m^3

Exposure controls

Appropriate engineering controls	Ensure adequate ventilation Apply technical measures to comply with the occupational exposure limits
Respiratory protection	Self-contained breathing apparatus (EN 133) Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions Use only respiratory protection that conforms to international / national standards
Hand protection	Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact). Protective gloves Suitable material: Fluoroelastomer
Eye protection	Tightly fitted safety goggles
Skin and body protection	Wear suitable protective clothing If splashes are likely to occur, wear: apron, boots, Neoprene
Hygiene measures	Eye wash bottles or eye wash stations in compliance with applicable standards When using do not eat, drink or smoke Gloves, overalls and boots have to be double layered (protection against cold temperature). Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Dispose of rinse water in accordance with local and national regulations.

9. Physical and chemical properties

Form	Compressed liquefied gas
Colour	Colourless
Odour	Ether-like
pH	Neutral
pKa	Not applicable
Melting point/freezing point	-103°C (Pentafluoroethane)
Boiling point/boiling range	-46.7°C
Flash point	Not applicable
Evaporation rate	No data
Flammability (solid, gas)	The product is not flammable
Flammability	Not applicable

Explosive properties	Not explosive
Vapour pressure	10.98 bar at 20°C 20.03 bar at 50°C
Vapour density	>3
Density	Not applicable
Bulk density	Not applicable
Solubility	430 mg/l at 25°C, water (pentafluoroethane)
Solubility/qualitative	No data available
Partition coefficient: n-octanol/water	log Pow: 1.48, 20°C (pentafluoroethane)
Auto-ignition temperature	728°C
Decomposition temperature	>700°C
Viscosity	Not applicable
Oxidizing properties	Non oxidizer

10. Stability and reactivity

Reactivity	Risk of violent reaction
Chemical stability	Stable under recommended storage conditions
Possibility of hazardous reactions	Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions. Vapours are heavier than air and may spread along floors
Conditions to avoid	Heat
Materials to avoid	Light and/or alkaline metals, powdered metals, alkaline earth metals, oxidising agents
Hazardous decomposition products	Gaseous hydrogen fluoride (HF), Fluorophosgene The release of other hazardous decomposition products is possible

11. Toxicological information

Acute toxicity	
Acute oral toxicity	Not applicable
Acute inhalation toxicity	LC50, 4 h, >2,030,000 mg/m3 (1,1,1-Trifluoroethane) LC0, 4 h, rat, >800000 ppm (Pentafluoroethane)
Acute dermal toxicity	Not relevant
Skin corrosion	Not applicable
Serious eye damage/eye irritation	Not applicable
Respiratory or skin sensitization	Not applicable
Mutagenicity	In vitro tests did not show mutagenic effects (Pentafluoroethane) In vivo tests did not show mutagenic effects (Pentafluoroethane)
Carcinogenicity	No data available
Toxicity for reproduction	No toxicity to reproduction (Pentafluoroethane)
Repeated dose toxicity	Inhalation, after a single exposure, dog, 10% w/w, risk of cardiac sensitization at high dose (Pentafluoroethane) Inhalation, repeated exposure, rat, >=50000ppm, NOAEL (Pentafluoroethane)
Other information	No data available

12. Ecological information

Toxicity

Fishes	Brachydanio rerio	LC50	96 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Fishes	Brachydanio rerio	LC50	96 h	Ca. 200 mg/l	1,1,1,3,3-pentafluorobutane
Fishes	Various species	LC50	96 h	109mg/l	1,1,1-Trifluoroethane
Crustaceans	Daphnia magna	EC50	48 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	NOEC	48 h	200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	EC50	48 h	300 mg/l	1,1,1-Trifluoroethane
Crustaceans	Various species	EC50	Calculated value	115 mg/l	1,1,1-Trifluoroethane
Algae	Selenastrum capricornutum	NOEC	72 h	13.2 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Selenastrum capricornutum	EC50	72 h	>114 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Various species	EC50	72 h	71 mg/l	1,1,1-Trifluoroethane
Terrestrial plants		NOEC	growth	>=6 g/m^3	1,1,1,3,3-pentafluorobutane

Persistence and degradability

Abiotic degradation — Air, indirect photo-oxidation. Conditions: sensitizer: OH radicals. Degradation products: carbon dioxide (CO_2) / hydrofluoric acid
Water. Result: non-significant hydrolysis

Biodegradation — Aerobic, tested according to closed bottle test, degradation, 5% after 28 d. Result: not readily biodegradable (Pentafluoroethane)

Bioaccumulative potential — Bioaccumulative potential: log Pow 1.48. Result: does not bioaccumulate (Pentafluoroethane)

Mobility — Soil/sediments, adsorption, log KOC: from 1.3 – 2.3. Conditions: calculated value
Air, Henry's law constant (H), from 65 – 185 kPa.m^3/mol, 20°C. Conditions: calculated value, considerable volatility

Other adverse effects — Ozone depletion potential = 0
Result = no effect on stratospheric ozone
Ozone depletion potential; ODP; (R11 = 1) (Pentafluoroethane)
Global Warming Potential = 3922

13. Disposal considerations

Waste disposal methods — In accordance with local and national regulations
Refer to manufacturer/supplier for information on recovery/recycling

Contaminated packaging — To avoid treatments, as far as possible, use dedicated containers

14. Transport information

International transport regulations

IATA-DGR

UN number	UN 3337
Class	2.2
ICAO-Labels	2.2 - Non-flammable, non-toxic gas
Proper shipping name	REFRIGERANT GAS R404A

IMDG

UN number	UN 3337
Class	2.2
IMDG-Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	3337
EmS	F-C, S-V
Proper shipping name	REFRIGERANT GAS R404A

ADR

UN number	UN 3337
Class	2
ADR/RID Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	20 / 3337
Proper shipping name	REFRIGERANT GAS R404A

RID

UN number	UN 3337
Class	2
ADR/RID Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	20 / 3337
Proper shipping name	REFRIGERANT GAS R404A

ADN

UN number	UN 3337
Class	2
ADR/RID Labels	2.2 – Non-flammable, non-toxic gas
Proper shipping name	REFRIGERANT GAS R404A

15. Regulatory information

Applicable Laws or Regulations

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as amended
- Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations, as amended
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended
- Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste
- EH40/2005 Workplace Exposure Limits, as amended through 1, 10, 2007 (WEL's) published by the Health and Safety Executive (HSE). Issued under the Control of Substances Hazardous to Health Regulations, as amended

Notification status

Inventory information	Status
Australian Inventory of Chemical Substances (AICS)	In compliance with inventory
Canadian Domestic Substances List (DSL)	In compliance with inventory
Inventory of Existing Chemical Substances (China) (IECS)	In compliance with inventory
Japanese Existing and New Chemical Substances (MITI List) (ENCS)	In compliance with inventory
New Zealand Inventory of Chemicals (NZIOC)	In compliance with inventory
Toxic Substance Control Act List (TSCA)	In compliance with inventory
EU List of Existing Chemical Substances (EINECS)	In compliance with inventory
Korean Existing Chemicals Inventory (KECI (KR))	In compliance with inventory
Philippine Inventory of Chemicals and Chemical Substances (PICCS)	In compliance with inventory

16. Other information

Full text of H-Statements referred to under section 3

H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated

This data sheet contains changes from the previous version, CLP01 dated May 2012. Sections 2, 3 & 16 were updated.

This datasheet was prepared in accordance with Regulation (EC) No. 1907/2006.

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COSHH assessment

R23 Refrigerant

Hazards:

- **Reference:** 300
- **Composition:** Trifluoromethane

First aid

Eyes

Skin

Take off all contaminated clothing immediately. Flush are with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician

Inhalation

Remove from exposure, lie down. Move to fresh air. Keep patient warn and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician

Ingestion

Not considered a potential route of exposure

Handling precautions and PPE

Respiratory

Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released

Hand

Wear heat insulating gloves

Skin

Wear Impervious clothing

Eye

Safety glasses with side-shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** None Given
  - **Short term exposure limit (STEL 15min TWA):** None Given
- **Factors which increase risks:** Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC. Contains gas under pressure; may explode if heated. Contains fluorinated greenhouse gas covered by the Koyoto Protocol
- **Storage precautions:** Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep at temperature not exceeding 52 oC. Keep containers tightly closed in a dry, cool and wellventilated place. Store in original container. Protect from contamination
- **Flashpoint:** None given
- **Transport precautions:** Transport as 2.2 - Non-flammable, non-toxic gas
- **Disposal precautions:** Can be reused after re-conditioning. In accordance with local and national regulations. Empty pressure vessels should be returned to the supplier
- **Spill procedures:** Personal precautions: Evacuate personnel to safe areas. Ventilate the area. Clean Up: Product Evaporates
- **Additional info:** Handle in accordance with good industrial hygiene and safety practice

1. Identification of the substance / preparation and company / undertaking

Product name	R23
REACH registration number	Registration deadline not expired
Company	Harp International Ltd Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX Tel: +44 (0) 1443 842255 Fax: +44 (0) 1443 841805 Email: harp@harpintl.com
Emergency phone number	+44 (0) 1270 502891 (24 hour)
Use	Refrigerant

2. Hazards identification

Classification of the substance or mixture

Gases under pressure – Liquified gas H280: Contains gas under pressure; may explode if heated

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC

Label Elements

Gas cylinder

Warning

H280	Contains gas under pressure; may explode if heated. Contains fluorinated greenhouse gas covered by the Koyoto Protocol
P410 + P403	Protect from sunlight. Store in a well-ventilated place.

Other hazards
Rapid evaporation of the liquid may cause frostbite.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

3. Composition / information on ingredients

Hazardous ingredient(s)

Chemical name	CAS No.	EC No.	Registration number	Classification according to Directive 67/548/EEC	Classification according to Regulation 1272/2008 (CLP)	Concentration (%)
Trifluoromethane	75-46-7	200-872-4			Press. Gas H280	100

For the full text of H-statements mention in this section, see section 16.

4. First aid measures

Description of first aid measure

General advice	Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
Inhalation	Remove from exposure, lie down. Move to fresh air. Keep patient warn and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Skin contact	Take off all contaminated clothing immediately. Flush are with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
Eye contact	Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Seek medical attention.
Ingestion	Not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed

Symptoms	Skin contact may provoke the following symptoms: Frostbite. Inhalation may provoke the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity.

Indication of any immediate medical attention and special treatment needed

Treatment	Do not give adrenaline or similar drugs

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special hazards arising from the substance or mixture

Specific hazards during fire fighting	Fire or intense heat may cause violent rupture of packages Hazardous thermal decomposition products: Carbon oxides, hydrogen fluoride, carbonyl fluoride, fluorocarbons

Advice for fire fighters

Special protective equipment	In the event of a fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire. Exposure to decomposition products may be a hazard to health.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions	Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8.

Environmental precautions

Environmental precautions	Should not be released to the environment

Methods and materials for containment and cleaning up

Methods for cleaning up	Evaporates

Refer to other sections

7. Handling and storage

Precautions for safe handling

Advice on safe handling	Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Advice on protection against fire & explosion	No special protective measures against fire required

Conditions for safe storage, including any incompatibilities

Requirements for storage areas & containers	Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in original container. Protect from contamination
Advice on common storage	No materials to be especially mentioned
Storage temperature	<52°C
Specific end uses	No data available

8. Exposure controls / personal protection

Control parameters

Exposure controls

Engineering measures	Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.
Eye protection	Safety glasses with side-shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material
Hand protection	Heat insulating gloves
Skin and body protection	Impervious clothing
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

Form	Liquified gas
Colour	Colourless
Odour	Slight ether-like
pH	neutral
Melting point/range	-155.2°C
Boiling point/boiling range	-82.2°C at 1 013 hPa
Explosive properties	Not explosive
Lower explosion/flammability limit	Not applicable
Upper explosion/flammability limit	Not applicable
Vapour pressure	46 986 hPa at 25°C 41 600 hPa at 20°C
Density	0.67 g/cm^3 at 25°C (as liquid) 1.029 g/cm^3 at 0°C (as liquid) 0.0047 g/cm^3 at -82°C (1 013 hPa) 0.0037 g/cm^3 at 25°C (1 013 hPa)
Water solubility	1.08 g/l at 20°C
Partition coefficient: n-octanol/water	log P_{ow}: 0.64
Relative vapour density	2.4 (Air = 1.0)
Other information	No data available

10. Stability and reactivity

Reactivity	Decomposes on heating
Chemical stability	The product is chemically stable
Possibility of hazardous reactions	Polymerization will not occur
Conditions to avoid	The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs of HFCs with chlorine may become flammable or reactive under certain conditions.
Incompatible materials	Alkali metals, alkaline earth metals, powdered metals, powdered metal salts
Hazardous decomposition products	Hazardous thermal decomposition products may include hydrogen fluoride, carbon oxides, fluorocarbons, carbonyl fluoride.

11. Toxicological information

Information on toxicological effects

Acute inhalation toxicity	LC50 / rat: > 663 000 ppm
Skin irritation	Not tested on animals, not classed as irritant, no skin irritation, not expected to cause skin irritation based on expert review of the properties of the substance
Eye irritation	Not tested on animals. Not classified as irritant. No eye irritation. Not expected to cause eye irritation based on expert review of the properties of the substance

Sensitisation	Not tested on animals. Not a skin sensitizer. Does not cause skin sensitization. Not expected to cause sensitization based on expert review of the properties of the substance.
Mutagenicity assessment	Animal testing did not show any mutagenic effects
Carcinogenicity assessment	No data available
Toxicity to reproduction assessment	No toxicity to reproduction
Human experience	Excessive exposures may affect human health as follows. Inhalation: Severe shortness of breath, narcosis, irregular cardiac activity
Further information	Rapid evaporation of the liquid may cause frostbite.

12. Ecological information

Toxicity

Persistence and degradability	No data available

Bioaccumulative potential

Bioaccumulation	No data available

Mobility in soil

Mobility in soil	No data available

Results of PBT and vRvB assessment

PBT and vPvB assessment	No data available

Other adverse effects

Ozone depletion potential	0
Global warming potential (GWP)	12 000

13. Disposal considerations

Waste treatment methods

Product	Can be reused after re-conditioning. In accordance with local and national regulations.
Contaminated packaging	Empty pressure vessels should be returned to the supplier.

14. Transport information

ADR

Class	2
Classification code	2A
HI No	20
UN number	1984
Labelling no	2.2
Proper shipping name	Trifluoromethane
Tunnel restriction code	(C/E)

IATA_C

Class	2.2
UN number	1984
Labelling number	2.2
Proper shipping name	Trifluoromethane

IMDG

Class	2.2
UN number	1984
Labelling no.	2.2
Proper shipping name	Trifluoromethane

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
No data available

Chemical Safety Assessment
A Chemical Safety Assessment is not required for this substance

16. Other information

Full text of H-Statements referred to under section 3.

H280: Contains gas under pressure; may explode if heated.

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COSHH assessment

R134a/D80

- **Reference:** 11065
- **Composition:** 1,1,1,2-Tetrafluoroethane, Kerosine - unspecified - distillates (petroleum), hydrotreated light

First aid

Eyes	Keep eyelids open to allow evaporation of the product. Rinse immediately with plenty of water for 15 minutes holding the eyelids open. Seek medical attention if irritation or symptoms persist.
Skin	Allow to evaporate. Wash off immediately with plenty of soap and water. Remove contaminated clothing. Seek medical attention if irritation or symptoms persist.
Inhalation	Move the exposed person to fresh air. If breathing is difficult give oxygen. Seek medical attention if irritation or symptoms persist.
Ingestion	N/A

Handling precautions and PPE

 Respiratory	Ensure adequate ventilation of the working area.
 Hand	Wear suitable gloves.
 Skin	Wear suitable protective clothing.
 Eye	In case of splashing, wear:. Face shield.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** 1,1,1,2-TETRAFLUOROETHANE: 1000 ppm, 4240 mg/m3
  - **Short term exposure limit (STEL 15min TWA):** N/A
- **Factors which increase risks:** Heat. Avoid contact with:. Strong oxidising agents.
- **Storage precautions:** Keep away from incompatible materials. Keep in a cool, dry, well ventilated area. Store in original container.
- **Flashpoint:** N/A
- **Transport precautions:** REFRIGERANT GAS, N.O.S. (contains 1,1,1,2-terafluoroethane (REFRIGERANT GAS R134a))
- **Disposal precautions:** Dispose of in compliance with all. Refer to manufacturer / supplier for information on recovery / recycling.
- **Spill procedures:** Allow to evaporate. Do not allow product to enter drains.
- **Additional info:** N/A

A-GAS™

SAFETY DATA SHEET

according to 1907/2006/EC, Article 31

R134a/D80

Revision 0

Revision date 2011-12-20

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name	R134a/D80

1.3. Details of the supplier of the safety data sheet

Company	A-Gas UK Limited
Address	Banyard Road Portbury West Bristol BS20 7XH United Kingdom
Telephone	01275 376600
Fax	01275 376601
Email address of the competent person	info.uk@agas.com

1.4. Emergency telephone number

Emergency telephone number	01275 376600

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Main hazards	No Significant Hazard

SECTION 3: Composition/information on ingredients

3.2. Mixtures

67/548/EEC / 1999/45/EC

Chemical Name	Index No.	CAS No.	EC No.	REACH Registration Number	Conc. (%w/w)	Classification
1,1,1,2-Tetrafluoroethane		811-97-2	212-377-0		90 - 100%	
Kerosine - unspecified; Distillates (petroleum), hydrotreated light	649-422-00-2	64742-47-8	265-149-8		1 - 10%	Xn; R65

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move the exposed person to fresh air. If breathing is difficult give oxygen. Seek medical attention if irritation or symptoms persist.
Eye contact	Keep eyelids open to allow evaporation of the product. Rinse immediately with plenty of water for 15 minutes holding the eyelids open. Seek medical attention if irritation or symptoms persist.
Skin contact	Allow to evaporate. Wash off immediately with plenty of soap and water. Remove contaminated clothing. Seek medical attention if irritation or symptoms persist.

SECTION 5: Firefighting measures

5.1. Extinguishing media

R134a/D80

Revision 0
Revision date 2011-12-20

5.1. Extinguishing media

Use extinguishing media appropriate to the surrounding fire conditions. Cool fire exposed containers with waterspray.

5.3. Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Wear:. Self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation of the working area. Evacuate personnel to a safe area. Keep public away from danger area. Keep upwind.

6.2. Environmental precautions

Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Allow to evaporate. Do not allow product to enter drains.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Ensure adequate ventilation of the working area. Keep away from sources of ignition - No smoking. Use only equipment and materials which are compatible with the product.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from incompatible materials. Keep in a cool, dry, well ventilated area. Store in original container.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1. Exposure Limit Values

1,1,1,2-Tetrafluoroethane	**WEL 8-hr limit ppm:** 1000	**WEL 8-hr limit mg/m3:** 4240
	WEL 15 min limit ppm: -	**WEL 15 min limit mg/m3:** -

8.2. Exposure controls

8.2.1. Appropriate engineering controls	Ensure adequate ventilation of the working area.
Eye/face protection	In case of splashing, wear:. Face shield.
Skin protection - Hands	Wear suitable gloves.
Skin protection - Other	Wear suitable protective clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State	Liquified Gas.
Colour	Colourless
Odour	Slight

SECTION 10: Stability and reactivity

10.2. Chemical stability

Stable under normal conditions. Vapours are heavier than air.

10.4. Conditions to avoid

Heat.

10.5. Incompatible materials

R134a/D80

Revision 0
Revision date 2011-12-20

10.5. Incompatible materials

	Avoid contact with:. Strong oxidising agents.

10.6. Hazardous decomposition products

	Carbon oxides. Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	Symptoms of exposure may include headache, nausea, vomiting and unconsciousness.
Skin corrosion/irritation	May cause irritation to eyes. May cause irritation to skin.

11.1.4. Toxicological Information

1,1,1,2-Tetrafluoroethane	**Inhalation Rat LC50/4H h:** 1500 gm/m3	**Inhalation Mouse LC50/2H h:** 1700 gm/m3

SECTION 12: Ecological information

12.1. Toxicity

1,1,1,2-Tetrafluoroethane	**Daphnia EC50/48h:** 980 mg/l	**Rainbow trout LC50/96h:** 450 mg/l

SECTION 13: Disposal considerations

Disposal methods

	Dispose of in compliance with all. Refer to manufacturer / supplier for information on recovery / recycling.

SECTION 14: Transport information

Hazard pictograms

	

14.1. UN number

	UN1078

14.2. UN proper shipping name

	REFRIGERANT GAS, N.O.S. (contains 1,1,1,2-terafluoroethane (REFRIGERANT GAS R134a))

14.3. Transport hazard class(es)

ADR/RID	2
Subsidiary risk	-
IMDG	2.2
Subsidiary risk	-
IATA	2.2
Subsidiary risk	-

14.4. Packing group

Packing group	-

14.5. Environmental hazards

Environmental hazards	No
Marine pollutant	No

ADR/RID

Hazard ID	20
Tunnel Category	(C/E)

IMDG

R134a/D80

Revision 0
Revision date 2011-12-20

IMDG

EmS Code	F-C S-V

IATA

Packing instruction (Cargo)	200
Maximum quantity	150 kg
Packing instruction (Passenger)	200
Maximum quantity	75 kg

SECTION 15: Regulatory information

Labelling

Risk phrases	No Significant Hazard.

SECTION 16: Other information

Other information

Text of risk phrases in Section 3	R65 - Harmful: may cause lung damage if swallowed.

COSHH assessment

A-Gas R508B

Hazards:

- **Reference:** 11121
- **Composition:** Hexafluoroethane; (Freon 116; Perfluoroethane), Carbon trifluoride; (Trifluoromethane; Fluoroform)

First aid

Eyes

If product comes in contact with eyes remove the patient from gas source or contaminated area. Take the patient to the nearest eye wash, shower or other source of clean water. Open the eyelid(s) wide to allow the material to evaporate. Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and Tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) Transport to hospital or doctor. Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. Ensure verbal communication and physical contact with the patient. DO NOT allow the patient to rub the eyes DO NOT allow the patient to Tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.

Skin

If skin or hair contact occurs: Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation. In case of cold burns (frost-bite): Move casualty into warmth before thawing the affected part; if feet are affected carry if possible Bathe the affected area immediately in Luke-warm water (not more than 35 deg C) for 10 to 15 minutes, immersing if possible and without rubbing DO NOT apply hot water or radiant heat. Apply a clean, dry, light dressing of "fluffed-up" dry gauze bandage If a limb is involved, raise and support this to reduce swelling If an adult is involved and where intense pain occurs provide pain killers such as paracetomol Transport to hospital, or doctor

Handling precautions and PPE

Respiratory

Type GAX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Hand

When handling sealed and suitably insulated cylinders wear cloth or leather gloves. Insulated gloves: NOTE: Insulated gloves should be loose finding so that may be removed quickly if liquid is spilled upon them. Insulated gloves are not made to permit hands to be placed in the liquid; they provide only short-term protection from accidental contact with the liquid.

Skin

Protective overalls, closely fitted at neck and wrist.

Eye

Approved safety goggles. In case of splashing, wear: Face shield.

	Subsequent blackening of the exposed Tissue indicates potential of necrosis, which may require amputation.
 Inhalation	Following exposure to gas, remove the patient from the gas source or contaminated area. NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. If the patient is not breathing spontaneously, administer rescue breathing. If the patient does not have a pulse, administer CPR. If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. Keep the patient warm, comfortable and at rest while awaiting medical care. MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
 Ingestion	Not considered a normal route of entry.

- Maximum/workplace exposure limit:
  - Long term exposure limit (LTEL 8hr TWA): N/A
  - Short term exposure limit (STEL 15min TWA): N/A
- Factors which increase risks: Haloalkanes: are highly reactive: some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. may produce explosive compounds following prolonged contact with metallic or other azides may react on contact with potassium or its alloys - although apparently stable on contact with a wide rage of halocarbons, reaction products may be shock sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . BRETHERICK L.: Handbook of Reactive Chemical Hazards react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. Avoid magnesium, aluminium and their alloys, brass and steel.
- Storage precautions: Cylinder: Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected. Cylinder must be properly secured either in use or in storage.
- Flashpoint: N/A
- Transport precautions: COMPRESSED GAS, N.O.S. (fluorinated hydrocarbons)
- Disposal precautions: Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase. Ensure damaged or non-returnable cylinders are gas-free before disposal.
- Spill procedures: Minor Spills Avoid breathing vapor and any contact with liquid or gas. Protective equipment including respirator should be used. DO NOT enter confined spaces were gas may have accumulated. Increase ventilation. Major Spills Clear area of all unprotected personnel and move upwind. Alert Emergency Authority and advise them of the location and nature of hazard. Wear breathing apparatus and protective gloves. Prevent by any means available, spillage from entering drains and water-courses. Remove leaking cylinders to a safe place. Fit vent pipes. Release pressure under safe, controlled conditions Burn issuing gas at vent pipes. DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve

- **Additional info:** N/A

A-Gas R508B

A-Gas (UK) Ltd

Chemwatch Hazard Alert Code: **2**

Chemwatch: **6601-22**
Version No: **2.1.1.1**
Safety Data Sheet (Conforms to Regulations (EC) No 2015/830)

Issue Date: **01/01/2013**
Print Date: **01/12/2015**
Initial Date: **Not Available**
L.REACH.GBR.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1.Product Identifier

Product name	A-Gas R508B
Synonyms	R508B
Proper shipping name	COMPRESSED GAS, N.O.S. (fluorinated hydrocarbons)
Other means of identification	Not Available

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Refrigerant. Used according to manufacturer's directions.
Uses advised against	Not Applicable

1.3. Details of the supplier of the safety data sheet

Registered company name	A-Gas (UK) Ltd
Address	Banyard Road, Portbury West BS20 7XH Bristol United Kingdom
Telephone	+44 (0) 1275 376600
Fax	[+44] (0) 1275 376601
Website	www.agas.com
Email	info.uk@agas.com

1.4. Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	+44 (0) 1275 376600
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

2.1.Classification of the substance or mixture

Considered a dangerous mixture according to Directive 1999/45/EC, Reg. (EC) No 1272/2008 (if applicable) and their amendments. Classified as Dangerous Goods for transport purposes.

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	0		
Toxicity	2		
Body Contact	1		
Reactivity	1		
Chronic	2		

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

DSD classification	In case of mixtures, classification has been prepared by following DPD (Directive 1999/45/EC) and CLP Regulation (EC) No 1272/2008 regulations
DPD classification [1]	R4 Forms very sensitive explosive metallic compounds. R44 Risk of explosion if heated under confinement.
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I; 3. Classification drawn from EC Directive 1272/2008 - Annex VI*
Classification according to regulation (EC) No 1272/2008 [CLP] [1]	Gas under Pressure (Liquefied gas)
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI*

2.2. Label elements

Continued...

CLP label elements	
SIGNAL WORD	WARNING

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated

Supplementary statement(s)

EUH044	Risk of explosion if heated under confinement

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.

Precautionary statement(s) Disposal

Not Applicable

2.3. Other hazards

Inhalation may produce health damage*.

Cumulative effects may result following exposure*.

May produce skin discomfort*.

Limited evidence of a carcinogenic effect*.

Vapours potentially cause drowsiness and dizziness*.

REACh - Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

3.1.Substances

See 'Composition on ingredients' in Section 3.2

3.2.Mixtures

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classification according to directive 67/548/EEC [DSD]	Classification according to regulation (EC) No 1272/2008 [CLP]
1.76-16-4 2.200-939-8 3.Not Available 4.Not Available	50-70	R116	R44 [1]	Gas under Pressure (Compressed gas); H280, EUH044 [1]
1.75-46-7 2.200-872-4 3.Not Available 4.Not Available	30-50	R23	R4, R44 [1]	Gas under Pressure (Compressed gas); H280, EUH044 [1]

Legend: *1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI 4. Classification drawn from C&L*

SECTION 4 FIRST AID MEASURES

4.1. Description of first aid measures

General	▸ Not considered a normal route of entry. ▸ Following exposure to gas, remove the patient from the gas source or contaminated area. ▸ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▸ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▸ If the patient is not breathing spontaneously, administer rescue breathing. ▸ If the patient does not have a pulse, administer CPR. ▸ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▸ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▸ Keep the patient warm, comfortable and at rest while awaiting medical care. ▸ **MONITOR THE BREATHING AND PULSE, CONTINUOUSLY.** ▸ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary. ▸ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▸ Take the patient to the nearest eye wash, shower or other source of clean water. ▸ Open the eyelid(s) wide to allow the material to evaporate. ▸ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open

Continued...

	▸ and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. ▸ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▸ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▸ Transport to hospital or doctor. ▸ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▸ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▸ Ensure verbal communication and physical contact with the patient. **DO NOT** allow the patient to rub the eyes **DO NOT** allow the patient to tightly shut the eyes **DO NOT** introduce oil or ointment into the eye(s) without medical advice **DO NOT** use hot or tepid water. If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. In case of cold burns (frost-bite): ▸ Move casualty into warmth before thawing the affected part; if feet are affected carry if possible ▸ Bathe the affected area immediately in luke-warm water (not more than 35 deg C) for 10 to 15 minutes, immersing if possible and without rubbing ▸ **DO NOT** apply hot water or radiant heat. ▸ Apply a clean, dry, light dressing of "fluffed-up" dry gauze bandage ▸ If a limb is involved, raise and support this to reduce swelling ▸ If an adult is involved and where intense pain occurs provide pain killers such as paracetomol ▸ Transport to hospital, or doctor ▸ Subsequent blackening of the exposed tissue indicates potential of necrosis, which may require amputation.
Eye Contact	▸ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▸ Take the patient to the nearest eye wash, shower or other source of clean water. ▸ Open the eyelid(s) wide to allow the material to evaporate. ▸ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. ▸ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▸ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▸ Transport to hospital or doctor. ▸ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▸ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▸ Ensure verbal communication and physical contact with the patient. **DO NOT** allow the patient to rub the eyes **DO NOT** allow the patient to tightly shut the eyes **DO NOT** introduce oil or ointment into the eye(s) without medical advice **DO NOT** use hot or tepid water.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. In case of cold burns (frost-bite): ▸ Move casualty into warmth before thawing the affected part; if feet are affected carry if possible ▸ Bathe the affected area immediately in luke-warm water (not more than 35 deg C) for 10 to 15 minutes, immersing if possible and without rubbing ▸ **DO NOT** apply hot water or radiant heat. ▸ Apply a clean, dry, light dressing of "fluffed-up" dry gauze bandage ▸ If a limb is involved, raise and support this to reduce swelling ▸ If an adult is involved and where intense pain occurs provide pain killers such as paracetomol ▸ Transport to hospital, or doctor ▸ Subsequent blackening of the exposed tissue indicates potential of necrosis, which may require amputation.
Inhalation	▸ Following exposure to gas, remove the patient from the gas source or contaminated area. ▸ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▸ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▸ If the patient is not breathing spontaneously, administer rescue breathing. ▸ If the patient does not have a pulse, administer CPR. ▸ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▸ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▸ Keep the patient warm, comfortable and at rest while awaiting medical care. ▸ **MONITOR THE BREATHING AND PULSE, CONTINUOUSLY.** ▸ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	▸ Not considered a normal route of entry.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11

4.3. Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary oedema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.

- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 FIREFIGHTING MEASURES

5.1. Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.
LARGE FIRE: Cool cylinder.
DO NOT direct water at source of leak or venting safety devices as icing may occur.

5.2. Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

5.3. Advice for firefighters

Fire Fighting	GENERAL - Alert Fire Brigade and tell them location and nature of hazard. - Wear breathing apparatus and protective gloves. - Fight fire from a safe distance, with adequate cover. - Use water delivered as a fine spray to control fire and cool adjacent area.
Fire/Explosion Hazard	- Containers may explode when heated - Ruptured cylinders may rocket - Fire exposed containers may vent contents through pressure relief devices. - High concentrations of gas may cause asphyxiation without warning. - May decompose explosively when heated or involved in fire. - Contact with gas may cause burns, severe injury and/ or frostbite. Decomposition may produce toxic fumes of; hydrogen fluoride

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

See section 8

6.2. Environmental precautions

See section 12

6.3. Methods and material for containment and cleaning up

Minor Spills	- Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. - **DO NOT** enter confined spaces were gas may have accumulated. - Increase ventilation.
Major Spills	- Clear area of all unprotected personnel and move upwind. - Alert Emergency Authority and advise them of the location and nature of hazard. - Wear breathing apparatus and protective gloves. - Prevent by any means available, spillage from entering drains and water-courses. - Remove leaking cylinders to a safe place. - Fit vent pipes. Release pressure under safe, controlled conditions - Burn issuing gas at vent pipes. - **DO NOT** exert excessive pressure on valve; **DO NOT** attempt to operate damaged valves.

6.4. Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

7.1. Precautions for safe handling

Safe handling	- Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. - The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. - Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. - Before connecting gas cylinders, ensure manifold is mechanically secure and does not containing another gas. - **DO NOT** transfer gas from one cylinder to another. - Obtain a work permit before attempting any repairs. - **Do not** attempt repair work on lines, vessels under pressure.
Fire and explosion protection	See section 5
Other information	- Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. - Such compounds should be sited and built in accordance with statutory requirements. - The storage compound should be kept clear and access restricted to authorised personnel only. - Cylinders stored in the open should be protected against rust and extremes of weather.

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	- Cylinder: - Ensure the use of equipment rated for cylinder pressure. - Ensure the use of compatible materials of construction. - Valve protection cap to be in place until cylinder is secured, connected. - Cylinder must be properly secured either in use or in storage.

Continued...

Storage incompatibility	Haloalkanes: • are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. • may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. • may produce explosive compounds following prolonged contact with metallic or other azides • may react on contact with potassium or its alloys - although apparently stable on contact with a wide rage of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . BRETHERICK L.: Handbook of Reactive Chemical Hazards • react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. • Avoid magnesium, aluminium and their alloys, brass and steel.

7.3. Specific end use(s)

See section 1.2

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

DERIVED NO EFFECT LEVEL (DNEL)

Not Available

PREDICTED NO EFFECT LEVEL (PNEC)

Not Available

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
R116	Hexafluoroethane; (Freon 116; Perfluoroethane)	730 ppm	6100 ppm	6100 ppm
R23	Carbon trifluoride; (Trifluoromethane; Fluoroform)	64 ppm	700 ppm	4200 ppm

Ingredient	Original IDLH	Revised IDLH
R116	Not Available	Not Available
R23	Not Available	Not Available

MATERIAL DATA

8.2. Exposure controls

8.2.1. Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
8.2.2. Personal protection	
Eye and face protection	• Chemical goggles. • Full face shield may be required for supplementary but never for primary protection of eyes. • Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	• When handling sealed and suitably insulated cylinders wear cloth or leather gloves. • Insulated gloves: NOTE: Insulated gloves should be loose fitting so that may be removed quickly if liquid is spilled upon them. Insulated gloves are not made to permit hands to be placed in the liquid; they provide only short-term protection from accidental contact with the liquid.
Body protection	See Other protection below
Other protection	• Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change) • Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated. • Protective overalls, closely fitted at neck and wrist. • Eye-wash unit. • Ensure availability of lifeline in confined spaces. • Staff should be trained in all aspects of rescue work.
Thermal hazards	Not Available

Respiratory protection

Type GAX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	GAX-AUS	-	GAX-PAPR-AUS / Class 1
up to 50 x ES	-	GAX-AUS / Class 1	-
up to 100 x ES	-	GAX-2	GAX-PAPR-2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

8.2.3. Environmental exposure controls

See section 12

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Clear colourless gas with slight ethereal odour.		
Physical state	Liquified Gas	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	-88	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	100
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Not Available	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

9.2. Other information

Not Available

SECTION 10 STABILITY AND REACTIVITY

10.1.Reactivity	See section 7.2
10.2.Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
10.3. Possibility of hazardous reactions	See section 7.2
10.4. Conditions to avoid	See section 7.2
10.5. Incompatible materials	See section 7.2
10.6. Hazardous decomposition products	See section 5.3

SECTION 11 TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Inhaled	Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. Common, generalised symptoms associated with non-toxic gas inhalation include : ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. Exposure to high concentrations of fluorocarbons may produce cardiac arrhythmias or cardiac arrest due sensitisation of the heart to adrenalin or noradrenalin. Deaths associated with exposures to fluorocarbons (specifically halogenated aliphatics) have occurred in occupational settings and in inhalation of bronchodilator drugs. Bronchospasm consistently occurs in human subjects inhaling fluorocarbons. At a measured concentration of 1700 ppm of one of the commercially available aerosols there is a biphasic change in ventilatory capacity, the first reduction occurring within a few minutes and the second delayed up to 30 minutes. Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in

	breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.
Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Vapourising liquid causes rapid cooling and contact may cause cold burns, frostbite, even through normal gloves. Frozen skin tissues are painless and appear waxy and yellow. Signs and symptoms of frost-bite may include "pins and needles", paleness followed by numbness, a hardening an stiffening of the skin, a progression of colour changes in the affected area, (first white, then mottled and blue and eventually black; on recovery, red, hot, painful and blistered). Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Vapourising liquid causes rapid cooling and contact may cause cold burns, frostbite, even through normal gloves. Frozen skin tissues are painless and appear waxy and yellow. Signs and symptoms of frost-bite may include "pins and needles", paleness followed by numbness, a hardening an stiffening of the skin, a progression of colour changes in the affected area, (first white, then mottled and blue and eventually black; on recovery, red, hot, painful and blistered). Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	For perfluorinated carbons (PFCs): PFCs are inert fluids composed of a complex combination of organic compounds resulting from the distillation of electrochemically fluorinated (ECF) compounds. This class consists of branched, linear and cyclic perfluorinated hydrocarbons having carbon numbers predominantly in the range of C5-C18 and boiling in the range of approximately 25 C-255 C (77 F-491 F). Perfluorinated amine and ether compounds may also be present Acute oral and inhalation toxicity tests with perfluoroalkanes show no toxicity at any dose tested, and even extremely high-dose intraperitoneal injection resulted in no lethality. In contrast, perfluoroalkenes (such as octafluorocyclopentene, perfluoroisobutylene, hexafluoropropene) have shown evidence of inhalation toxicity, in some cases, extreme. The material may produce peroxisome proliferation. Peroxisomes are single, membrane limited, cytoplasmic organelles that are found in the cells of animals, plants, fungi and protozoa. Peroxisome proliferators include certain hypolipidaemic drugs, phthalate ester plasticisers, industrial solvents, herbicides, food flavours, leukotriene D4 antagonists and hormones. Numerous studies in rats and mice have demonstrated the hepatocarcinogenic effects of peroxisome proliferators, and these compounds have been unequivocally established as carcinogens. Principal route of occupational exposure to the gas is by inhalation. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. It is generally accepted that the fluorocarbons are less toxic than the corresponding halogenated aliphatic based on chlorine. Repeated inhalation exposure to the fluorocarbon FC-11 does not produce pathologic lesions of the liver and other visceral organs in experimental animals. There has been conjecture in non-scientific publications that fluorocarbons may cause leukemia, cancer, sterility and birth defects; these have not been verified by current research. The high incidence of cancer, spontaneous abortion and congenital anomalies amongst hospital personnel, repeatedly exposed to fluorine-containing general anaesthetics, has caused some scientists to call for a lowering of the fluorocarbon exposure standard to 5 ppm since some are mutagens.

A-Gas R508B	TOXICITY	IRRITATION
	Not Available	Not Available
R116	TOXICITY	IRRITATION
	Not Available	Not Available
R23	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

R116	For perfluorinated carbons (PFCs): PFCs are inert fluids composed of a complex combination of organic compounds resulting from the distillation of electrochemically fluorinated (ECF) compounds. This class consists of branched, linear and cyclic perfluorinated hydrocarbons having carbon numbers predominantly in the range of C5-C18 and boiling in the range of approximately 25 C-255 C (77 F-491 F). Perfluorinated amine and ether compounds may also be present Acute oral and inhalation toxicity tests with perfluoroalkanes show no toxicity at any dose tested, and even extremely high-dose intraperitoneal injection resulted in no lethality. In contrast, perfluoroalkenes (such as octafluorocyclopentene, perfluoroisobutylene, hexafluoropropene) have shown evidence of inhalation toxicity, in some cases, extreme. The material may produce peroxisome proliferation. Peroxisomes are single, membrane limited, cytoplasmic organelles that are found in the cells of animals, plants, fungi and protozoa. Peroxisome proliferators include certain hypolipidaemic drugs, phthalate ester plasticisers, industrial solvents, herbicides, food flavours, leukotriene D4 antagonists and hormones. Numerous studies in rats and mice have demonstrated the hepatocarcinogenic effects of peroxisome proliferators, and these compounds have been unequivocally established as carcinogens. For perfluoropropane (PF3) and other aliphatic perfluoroalkanes (PFAs) Perfluoroalkanes (PFAs) are very stable. They are not oxidized even by ozone to any appreciable extent; their atmospheric half-life greater than 5000 y PFAs are chemically inert; included in this family is Teflon (a polymeric, high-molecular-weight PFA). The major concern from exposure to high concentrations of gaseous PFAs is their potential for cardiac toxicity. Cardiac effects are known to occur when humans or animals are exposed to high concentrations of other fluorinated hydrocarbons (FCs), including Freons FCs, such as chlorofluorocarbons, could induce cardiac arrhythmias by sensitising the heart to epinephrine. No significant acute toxicological data identified in literature search.
R23	No significant acute toxicological data identified in literature search. Repeated exposure of dogs to 5000 ppm and rats to 1000 ppm resulted in no toxic effects.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✗ *– Data available but does not fill the criteria for classification*
✓ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

Continued...

SECTION 12 ECOLOGICAL INFORMATION

12.1. Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
R116	LC50	96	Fish	18.215mg/L	3
R116	EC50	96	Algae or other aquatic plants	37.5mg/L	2
R116	EC50	384	Crustacea	4.384mg/L	3
R23	LC50	96	Fish	129.356mg/L	3
R23	EC50	96	Algae or other aquatic plants	154.54mg/L	2
R23	EC50	384	Crustacea	30.032mg/L	3
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
R116	HIGH	HIGH
R23	LOW	LOW

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
R116	LOW (LogKOW = 2)
R23	LOW (LogKOW = 0.64)

12.4. Mobility in soil

Ingredient	Mobility
R116	LOW (KOC = 224.7)
R23	LOW (KOC = 35.04)

12.5.Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT Criteria fulfilled?	Not Available	Not Available	Not Available

12.6. Other adverse effects

No data available

SECTION 13 DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Product / Packaging disposal	▸ Evaporate residue at an approved site. ▸ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase. ▸ Ensure damaged or non-returnable cylinders are gas-free before disposal.
Waste treatment options	Not Available
Sewage disposal options	Not Available

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	2TE

Land transport (ADR)

14.1.UN number	1956
14.2.Packing group	Not Applicable
14.3.UN proper shipping name	COMPRESSED GAS, N.O.S. (Fluorinated hydrocarbons)

14.4.Environmental hazard	No relevant data
14.5. Transport hazard class(es)	Class: 2.2 Subrisk: Not Applicable
14.6. Special precautions for user	Hazard identification (Kemler): 20 Classification code: 1A Hazard Label: 2.2 Special provisions: 274 655 662 Limited quantity: 120 ml

Air transport (ICAO-IATA / DGR)

14.1. UN number	1956
14.2. Packing group	Not Applicable
14.3. UN proper shipping name	Compressed gas, n.o.s. * (fluorinated hydrocarbons)
14.4. Environmental hazard	No relevant data
14.5. Transport hazard class(es)	ICAO/IATA Class: 2.2 ICAO / IATA Subrisk: Not Applicable ERG Code: 2L
14.6. Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 200 Cargo Only Maximum Qty / Pack: 150 kg Passenger and Cargo Packing Instructions: 200 Passenger and Cargo Maximum Qty / Pack: 75 kg Passenger and Cargo Limited Quantity Packing Instructions: Forbidden Passenger and Cargo Limited Maximum Qty / Pack: Forbidden

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1956
14.2. Packing group	Not Applicable
14.3. UN proper shipping name	COMPRESSED GAS, N.O.S. (fluorinated hydrocarbons)
14.4. Environmental hazard	Not Applicable
14.5. Transport hazard class(es)	IMDG Class: 2.2 IMDG Subrisk: Not Applicable
14.6. Special precautions for user	EMS Number: F-C, S-V Special provisions: 274 Limited Quantities: 120 mL

Inland waterways transport (ADN)

14.1. UN number	1956
14.2. Packing group	Not Applicable
14.3. UN proper shipping name	COMPRESSED GAS, N.O.S. (fluorinated hydrocarbons)
14.4. Environmental hazard	No relevant data
14.5. Transport hazard class(es)	2.2 Not Applicable
14.6. Special precautions for user	Classification code: 1A Special provisions: 274; 655; 662 Limited quantity: 120 ml Equipment required: PP Fire cones number: 0

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

15.1. Safety, health and environmental regulations / legislation specific for the substance or mixture

R116(76-16-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

European Customs Inventory of Chemical Substances ECICS (English)	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

R23(75-46-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

European Customs Inventory of Chemical Substances ECICS (English)	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : 67/548/EEC, 1999/45/EC, 98/24/EC, 92/85/EC, 94/33/EC, 91/689/EEC, 1999/13/EC, Commission Regulation (EU) 2015/830, Regulation (EC) No 1272/2008 and their amendments as well as the following British legislation: - The Control of Substances Hazardous to Health Regulations (COSHH) 2002 - COSHH Essentials - The Management of Health and Safety at Work Regulations 1999

15.2. Chemical safety assessment

For further information please look at the Chemical Safety Assessment and Exposure Scenarios prepared by your Supply Chain if available.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier
R116	76-16-4	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Press. Gas.	GHS04, Wng	H280
2	Liq. Gas, Press. Gas.	GHS04, Wng	H280

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
R23	75-46-7	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Liq. Gas	GHS04, Wng	H280
2	Liq. Gas, Press. Gas., Skin Irrit. 2, Eye Irrit. 2, STOT SE 3	GHS04, Wng, GHS07	H280, H315, H319, H335

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (R23; R116)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Full text Risk and Hazard codes

H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

Other information

DSD / DPD label elements

Not Applicable

Relevant risk statements are found in section 2.1

Indication(s) of danger	Not Applicable

SAFETY ADVICE

S03	Keep in a cool place.
S15	Keep away from heat.
S56	Dispose of this material and its container at hazardous or special waste collection point.

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:

Continued...

www.chemwatch.net

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:
EN 166 Personal eye-protection
EN 340 Protective clothing
EN 374 Protective gloves against chemicals and micro-organisms
EN 13832 Footwear protecting against chemicals
EN 133 Respiratory protective devices

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

COSHH assessment

Oxygen free nitrogen (OFN)

Hazards:

- **Reference:** 528
- **Composition:** Nitrogen

First aid

Eyes

Not a route of exposure

Skin

Not a route of exposure

Inhalation

In high concentrations may cause asphyxiation, symptoms may include loss of mobility/ consciousness, victim may not be aware of asphyxiation, remove victim to fresh air wearing a self contained breathing apparatus, keep victim warm and rested, call a doctor, apply artificial respiration if breathing stops

Ingestion

Not a route of exposure

Handling precautions and PPE

Respiratory

Ensure adequate ventialtion

Hand

Wear stout gloves

Skin

N/A

Eye

N/A

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** N/A
  - **Short term exposure limit (STEL 15min TWA):** N/A
- **Factors which increase risks:** None
- **Storage precautions:** Keep cylinders below 50oC in a well ventilated place
- **Flashpoint:** N/A
- **Transport precautions:** Non flammable, non toxic gas
- **Disposal precautions:** Vent to atmosphere in a well ventilated place, do not discharge into any place where its accumulation could be dangerous
- **Spill procedures:** Evacuate area, wear self-contained breathing apparatus when entering area unless atmosphere is proved safe, ensure adequate air ventilation.
- **Additional info:** N/A

SAFETY DATA SHEET
OXYGEN FREE NITROGEN

SECTION 1: IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

1.1. Product identifier

Product name:	OXYGEN FREE NITROGEN (OFN)
EC Number:	231-783-9
REACH Registration Number:	Listed in Annex IV/V REACH, exempted from registration.
CAS Number:	007727-37*9

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use:	Industrial and professional. Perform risk assessment before use.
Advised Against:	

1.3. Details of the supplier of the safety data sheet

Company name:

National Refrigerants Ltd.
4 Watling Close
Sketchley Meadows Business Park
Hinckley LE10 3EZ
Tel: +44(0)1455 630790
Fax: +44(0) 1455 630791
Email: sds@nationalref.com

1.4. Emergency telephone number

Emergency Tel: +44(0) 1865 407333

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance of mixture

Hazard Class and Category Code Regulation EC 1272/2008 (CLP):	
Physical Hazard:	Gasses under pressure – Compressed gas - Warning (H280)
Classification EC 67/648 or EC 1999/45	Not included in Annex VI Not classified as dangerous preparation/substance. No EC labelling required.

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)
Hazard pictograms

Hazard pictogram code:	GHS04
Signal word;	Warning
Hazard statements	
Storage:	P403: Store in a well-ventilated place

Labelling EC 67/548 or EC 1999/45
Symbol(s): None

R Phrase(s):	None
S Phrase(s):	None

2.3. Other hazards

Asphyxiant in high concentrations.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1. Substances

NITROGEN

EINECS	CAS	Index No.	Registration No.	Classification	Percent
231-783-9	7727-37-9	-	NOTE 1	Press gas (H280)	100%

Contains no other components or impurities which will influence the classification of the product,
NOTE 1: Listed in Annex IV / V REACH, exempted from registration.
NOTE 2: Registration deadline not expired.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to fresh air wearing a self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stops.

Eye contact: Not a route of exposure.

Ingestion: Not a route of exposure.

Skin contact: Not a route of exposure.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Extinguishing media: All known extinguishants can be used. .

5.2. Special hazards arising from the substance or mixture

Special hazards arising from the mixture: Exposure of cylinders to fire may cause the cylinders to rupture or explode.

5.3. Advice for fire-fighters

Advice for fire-fighters: Move away from cylinders and keep cool with water spray from a protected position.
If in a confined space use a self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Evacuate area.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved safe.
Ensure adequate air ventilation.

6.2. Environmental precautions

Environmental precautions: Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Gas, ventilate area.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Handling requirements: Prevent suck-back of water into the cylinder.
Do not allow feed-back into the cylinder.
Only use properly specified equipment which is rated at the pressure and temperature for this product. Contact your supplier if in doubt.
Refer to the suppliers cylinder handling instructions. (See appendix.)

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep cylinders below 50°C in a well ventilated place.

7.3. Specific end use(s)

Specific end use(s) No data available

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Exposure controls

Personal protection: Ensure adequate ventilation.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

State:	Gas
Colour:	Colourless gas
Odour:	None
Molecular weight:	28
Melting point:	-210°C
Boiling Piont:	-196°C
Critical temperature:	-147°C
Vapour pressure:	Not applicable.
Relative density (Air = 1):	0.97
Relative density (water = 1):	Not applicable
Solubility in water:	20 mg/l

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

Reactivity: Stable under normal conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions

10.3. Possibility of hazardous reactions

Hazardous reactions: None.

10.4. Conditions to avoid

Conditions to avoid:	None

10.5. Incompatible material

Materials to avoid:	None

10.6. Hazardous decomposition products

Hazardous decomposition products	None

SECTION 11: TOXICOLOGICAL INFORMATION

No known toxicological effects from this product.

SECTION 12. ECOLOGICAL INFORMATION

No known ecological damage caused by this product.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

General:	Do not discharge into any place where its accumulation could be dangerous.
Disposal of Produce:	Vent to atmosphere in a well ventilated place.
Disposal of packaging:	Return to supplier.
N.B.	

SECTION 14. TRANSPORT INFORMATION

UN Number: UN1066

Labeling ADR, IMDG, IATA

2.2: Non flammable, non toxic gas.

14.1. ADR

Proper Shipping Name:	NITROGEN, COMPRESSED
Class/Division:	2
Tunnel Code:	(E)
Hazard Identification Number:	20
Labelling ADR:	2.2
Further Information	Packing Instructions: P200. Avoid transport on vehicles where load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product cylinders: - Ensure that the cylinders are firmly secured. - Ensure cylinder valves are closed and not leaking. - Ensure outlet cap or plug (where provided) is correctly fitted - Ensure valve protection device (where provided) is correctly fitted. - Ensure there is adequate ventilation. - Complies with applicable regulations.

14.2. IATA

Proper Shipping Name:	NIRTOGEN, COMPRESSED
Class/Division:	2.2
Passenger and Cargo Aircraft	
Packing Instruction:	200
Cargo only Aircraft	

Packing Instruction: 200

14.3. IMDG

Proper Shipping Name: NITROGEN, COMPRESSED
Class/Division: 2.2
IMO Packing group: P200
EmS: F-C, S-V

SECTION 15. REGULATORY INFORMATION

15.1. Safety, health and environment regulations/legislation specific for the substance or mixture

15.2. Chemical Safety Assessment

No data available.

16. OTHER INFORMATION

Other information:

Asphyxiant in high concentration.
Keep cylinders in a well ventilated place.
Do not breathe the gas.
The hazard of asphyxiation is often overlooked and must be stressed during operator training.
.
This safety sheet is prepared in accordance with Commission Regulation (EU) No. 453/2010.
* Indicates text in SDS which has changed since the last revision

GENERAL SAFETY & HANDLING DATA

1. GENERAL

Only trained persons should handle compressed gases.
Observe all regulations and local requirements regarding the storage of Cylinders.
Do not remove or deface labels provided by the supplier for the identification of the Cylinder contents.
Ascertain the identity of the gas before using it.
Know and understand the properties and hazards associated with each gas before using it.
When doubt exists as to the correct handling procedure for a particular gas contact the supplier.

HANDLING AND USE

Wear stout gloves.
Never lift a Cylinder by the cap or guard unless the supplier states it is designed for that purpose.
Use trolley or other suitable device or technique for transporting heavy Cylinders, even for a short distance.
Where necessary wear suitable eye and face protection.
The choice between safety glasses, chemical goggles, or full face shield will depend on the pressure and nature of the gas being used,

Where necessary for toxic gases see that self-contained positive pressure breathing apparatus or full face airline respirator is available in the vicinity of the working area.
Employ suitable pressure regulating device on all Cylinders when gas is being emitted to systems with lower pressure rating than that of the Cylinder.
Ascertain that all electrical systems in the area are suitable for service with each gas.

Never use direct flame or electrical heating devices to raise the pressure of a Cylinder, Cylinders should not be subjected to temperatures above 45°C.
Never re-compress a gas mixture without consulting the supplier. Never attempt to transfer gases from one Cylinder to another.
Do not use Cylinders as rollers or supports, or for any other purpose other than to contain the gas as supplied.
Never permit oil, grease or other readily combustible substances to come into contact with valves of Cylinders containing oxygen or other oxidants.
Keep Cylinder valves clean and free from contaminants particularly oil and water.

Do not subject Cylinders to mechanical shocks which may cause damage to their valves or safety devices.

Never attempt to repair or modify Cylinder valves or safety relief devices. Damaged valves should be reported immediately to the supplier.
Close the Cylinder valve whenever gas is not required even if the Cylinder is still connected to the equipment.

2. STORAGE

Cylinders should be stored in a well-ventilated area.
Some gases will require a purpose built area.
Store Cylinders in a location free from fire risk and away from sources of heat and ignition. Designate as a no smoking area.

Gas Cylinders should be segregated in the storage according to the various categories.

The storage area should be kept clear and access should be restricted to authorized persons only, the area should be clearly marked as a storage area and appropriate hazard warning signs displayed (Flammable, Toxic etc.).
The amount of flammable or toxic gases should be kept to a minimum.
Flammable gases should be stored away from other combustible materials.

Cylinders held in storage should be periodically checked for general condition and leakage.

Cylinders in storage should be properly secured to prevent toppling or rolling.
Vertical storage is recommended where the Cylinder is designed for this.
Cylinder valves should be tightly closed and, where appropriate, valves should be capped or plugged.
Protect Cylinders stored in the open against rusting and extremes of weather.
Cylinders should not be stored in conditions likely to encourage corrosion.
Store full and empty Cylinders separately and arrange full Cylinders so that the oldest stock is used first.

FOR FURTHER INFORMATION CONTACT YOUR NEAREST DISTRIBUTION CENTRE

COSHH assessment

Oxygen, compressed

Hazards:

- **Reference:** 099
- **Composition:** Oxygen

First aid

Eyes

Adverse effects not expected from this product.

Skin

Adverse effects not expected from this product.

Inhalation

Move the exposed person to fresh air at once.

Ingestion

Ingestion is not considered a potential route of exposure.

Handling precautions and PPE

Respiratory

N/A

Hand

Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks.

Skin

Wear working gloves while handling containers. Guideline: EN 388 Protective gloves against mechanical risks.

Eye

Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** N/A
  - **Short term exposure limit (STEL 15min TWA):** N/A
- **Factors which increase risks:** Violently oxidises organic material. May react violently with combustible materials. May react violently with reducing agents.
- **Storage precautions:** Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Avoid asphalted locations for storage, transfer and use (ignition risk if spilt). Segregate from flammable gases and other flammable materials being stored.
- **Flashpoint:** N/A
- **Transport precautions:** OXYGEN, COMPRESSED
- **Disposal precautions:** Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.
- **Spill procedures:** Prevent further leakage or spillage if safe to do so. Provide adequate ventilation.
- **Additional info:** N/A

SECTION 1: Identification of the substance/ mixture and of the company/ undertaking

1.1 Product identifier

Product name: Oxygen, compressed

Additional identification

Chemical name: oxygen

Chemical formula: O2
INDEX No. 008-001-00-8
CAS-No. 7782-44-7
EC No. 231-956-9
REACH Registration No. Listed in Annex IV/ V of Regulation (EC) No 1907/ 2006 (REACH), exempted from registration.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses:

Industrial and professional. Perform risk assessment prior to use.
Balance gas for mixtures. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Food packaging gas. Laboratory use. Laser gas. Oxidising agent. Process gas. Shielding gas in gas welding. Test gas. Use of gas to manufacture pharmaceutical products.
Consumer use.
Oxidising agent.

Uses advised against Industrial or technical grade unsuitable for medical and/ or food applications or inhalation.

1.3 Details of the supplier of the safety data sheet

Supplier

BOC
Priestley Road, Worsley
M28 2UT Manchester

Telephone: 0800 111 333

E-mail: ReachSDS@boc.com

1.4 Emergency telephone number: 0800 111 333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Directive 67/ 548/ EEC or 1999/ 45/ EC as amended.

O; R8

The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/ 2008 as amended.

Physical Hazards

Oxidising gases	Category 1	H270: May cause or intensify fire; oxidiser.
Gases under pressure	Compressed gas	H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

Signal Words: Danger

Hazard Statement(s): H270: May cause or intensify fire; oxidiser.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statement

Prevention: P220: Keep/ Store away from combustible materials.
P244: Keep valves and fittings free from oil and grease.

Response: P370+P376: In case of fire: Stop leak if safe to do so.

Storage: P403: Store in a well-ventilated place.

Disposal: None.

2.3 Other hazards: None.

SECTION 3: Composition/ information on ingredients

3.1 Substances

Chemical name	oxygen
INDEX No.:	008-001-00-8
CAS-No.:	7782-44-7
EC No.:	231-956-9
REACH Registration No.:	Listed in Annex IV/ V of Regulation (EC) No 1907/ 2006 (REACH), exempted from registration.
Purity:	100% The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name:	-

SECTION 4: First Aid Measures

General: Move the exposed person to fresh air at once.

4.1 Description of first aid measures

Inhalation: Move the exposed person to fresh air at once.

Eye contact: Adverse effects not expected from this product.

Skin Contact: Adverse effects not expected from this product.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed: Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: None.

Treatment: None.

SECTION 5: Firefighting Measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Water. Dry powder. Foam. Carbon dioxide.

Unsuitable extinguishing media: None.

5.2 Special hazards arising from the substance or mixture: Supports combustion.

Hazardous Combustion Products: None.

5.3 Advice for firefighters

Special fire fighting procedures: In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for firefighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Eliminate all ignition sources if safe to do so. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor the concentration of the released product.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up: Provide adequate ventilation.

6.4 Reference to other sections: Refer to sections 8 and 13.

SECTION 7: Handling and Storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Keep equipment free from oil and grease. Open valve slowly to avoid pressure shock. Use only oxygen approved lubricants and sealants. Use only with equipment cleaned for oxygen service and rated for the pressure. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/ regional/ national/ international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2 Conditions for safe storage, including any incompatibilities:

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Avoid asphalted locations for storage, transfer and use (ignition risk if spilt). Segregate from flammable gases and other flammable materials being stored.

7.3 Specific end use(s):

None.

SECTION 8: Exposure Controls/ Personal Protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls: Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Avoid oxygen rich (>23,5%) atmospheres. Gas detectors should be used when quantities of oxidising gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product.

Individual protection measures, such as personal protective equipment

General information: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Eye/ face protection: Wear eye protection to EN 166 when using gases.
Guideline: EN 166 Personal Eye Protection.

Skin protection

Hand Protection: Wear working gloves while handling containers
Guideline: EN 388 Protective gloves against mechanical risks.

Body protection: No special precautions.

Other: Wear safety shoes while handling containers
Guideline: ISO 20345 Personal protective equipment - Safety footwear.

Respiratory Protection: Not required.

Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: For waste disposal, see section 13.

SECTION 9: Physical And Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	Gas
Form:	Compressed gas
Colour:	Colorless
Odour:	Odorless
Odour Threshold:	Odour threshold is subjective and is inadequate to warn of over exposure.

pH:	not applicable.
Melting Point:	-218.4 °C
Boiling Point:	-183 °C
Sublimation Point:	not applicable.
Critical Temp. (°C):	-118.0 °C
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	This product is not flammable.
Flammability limit - upper (%):	not applicable.
Flammability limit - lower(%):	not applicable.
Vapour pressure:	4,053 kPa (-124.1 °C)
Vapour density (air=1):	No data available.
Relative density:	1.1
Solubility(ies)	
Solubility in Water:	39 mg/ l
Partition coefficient (n-octanol/ water):	Not known.
Autoignition Temperature:	not applicable.
Decomposition Temperature:	Not known.
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	No data available.
Explosive properties:	Not applicable.
Oxidising Properties:	Oxidising

9.2 Other information: None.

Molecular weight: 32 g/ mol (O_2)

SECTION 10: Stability and Reactivity

10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of Hazardous Reactions: Violently oxidises organic material. May react violently with combustible materials. May react violently with reducing agents.

10.4 Conditions to Avoid: None.

10.5 Incompatible Materials: Combustible materials Reducing Agents. Keep equipment free from oil and grease. For material compatibility see latest version of ISO-11114. Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (>30 bar) oxygen lines and equipment in case of combustion.

10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological Information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral
Product Based on available data, the classification criteria are not met.

Acute toxicity - Dermal
Product Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation
Product Based on available data, the classification criteria are not met.

Skin Corrosion/ Irritation
Product Based on available data, the classification criteria are not met.

Serious Eye Damage/ Eye Irritation
Product Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitisation
Product Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product Based on available data, the classification criteria are not met.

Carcinogenicity
Product Based on available data, the classification criteria are not met.

Reproductive toxicity
Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product Based on available data, the classification criteria are not met.

Aspiration Hazard
Product Not applicable to gases and gas mixtures..

SECTION 12: Ecological Information

12.1 Toxicity

Acute toxicity
Product No ecological damage caused by this product.

12.2 Persistence and Degradability
Product Not applicable to gases and gas mixtures..

12.3 Bioaccumulative Potential
Product The substance is naturally occurring.

12.4 Mobility in Soil
Product Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Results of PBT and vPvB assessment
Product Not classified as PBT or vPvB.

12.6 Other Adverse Effects: No ecological damage caused by this product.

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.

Disposal methods: Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at http:/ / www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes
Container: 16 05 04*: gases in pressure containers (including halons) containing dangerous substances

SECTION 14: Transport Information

ADR

14.1 UN Number:	UN 1072
14.2 UN Proper Shipping Name:	OXYGEN, COMPRESSED
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2, 5.1
Hazard No. (ADR):	25
Tunnel restriction code:	(E)
Emergency Action Code:	2S
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

RID

14.1 UN Number:	UN 1072
14.2 UN Proper Shipping Name	OXYGEN, COMPRESSED
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2, 5.1
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IMDG

14.1 UN Number:	UN 1072
14.2 UN Proper Shipping Name:	OXYGEN, COMPRESSED
14.3 Transport Hazard Class(es)	
Class:	2.2
Label(s):	2.2, 5.1
EmS No.:	F-C, S-W
14.3 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IATA

14.1 UN Number:	UN 1072
14.2 Proper Shipping Name:	Oxygen, compressed
14.3 Transport Hazard Class(es):	
Class:	2.2
Label(s):	2.2, 5.1
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–
Other information	
Passenger and cargo aircraft:	Allowed.
Cargo aircraft only:	Allowed.

14.7 Transport in bulk according to Annex II of MARPOL73/ 78 and the IBC Code: not applicable

Additional identification: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/ legislation specific for the substance or mixture:

EU Regulations

Directive 96/ 82/ EC (Seveso II): on the control of major accident hazards involving dangerous substances:

Chemical name	CAS-No.	Concentration
oxygen	7782-44-7	100%

Directive 98/ 24/ EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
oxygen	7782-44-7	100%

National Regulations

Management of Health and Safety at Work Regulations (1999 No. 3242). The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541). Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677). Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306). Personal Protective Equipment Regulations (1992 No. 2966). Control of Major Accident Hazards Regulations (COMAH, 2015 No. 483). Pressure Systems Safety Regulations (PSSR, 2000 No. 128). Only products that comply with the food regulations (EC) No. 1333/ 2008 and (EU) No. 231/ 2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 453/ 2010.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other Information

Revision Information: Not relevant.

Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:
Agency for Toxic Substances and Diseases Registry (ATSDR) (http:/ / www.atsdr.cdc.gov/).
European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
European Chemical Agency: Information on Registered Substances http:/ / apps.echa.europa.eu/ registered/ registered-sub.aspx#search
European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.
International Programme on Chemical Safety (http:/ / www.inchem.org/)
ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
Matheson Gas Data Book, 7th Edition.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http:/ / ecb.jrc.ec.europa.eu/ esis/).
The European Chemical Industry Council (CEFIC) ERICards.
United States of America's National Library of Medicine's toxicology data network TOXNET (http:/ / toxnet.nlm.nih.gov/ index.html)
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
Substance specific information from suppliers.
Details given in this document are believed to be correct at the time of publication.
EH40 (as amended) Workplace exposure limits.

Wording of the R-phrases and H-statements in sections 2 and 3

H270	May cause or intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
R8	Contact with combustible material may cause fire.

Training information:

Users of breathing apparatus must be trained. Ensure operators understand the hazard of oxygen enrichment. Ensure operators understand the hazards.

Classification according to Regulation (EC) No 1272/ 2008 as amended.

Ox. Gas 1, H270

Press. Gas Compr. Gas, H280

Other information:

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/ local regulations are observed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Note: When the Product Name appears in the SDS header the decimal sign and its position comply with rules for the structure and drafting of international standards, and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

Last revised date: 03.08.2016

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

COSHH assessment

Acetylene, dissolved

Hazards:

- **Reference:** 100
- **Composition:** acetylene (ethyne)

First aid

Eyes	Adverse effects not expected from this product.
Skin	Adverse effects not expected from this product.
Inhalation	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Ingestion	Ingestion is not considered a potential route of exposure.

Handling precautions and PPE

Respiratory	N/A
Hand	Wear working gloves while handling containers.
Skin	Wear fire/flame resistant/retardant clothing. Wear safety shoes while handling containers.
Eye	Safety eyewear, goggles or face-shield.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** acetylene (ethyne): 2500 ppm
  - **Short term exposure limit (STEL 15min TWA):** acetylene (ethyne): 2500 ppm
- **Factors which increase risks:** Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. May react violently with oxidants. Air and oxidisers.
- **Storage precautions:** Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Acetylene cylinders should be stored vertically
- **Flashpoint:** N/A
- **Transport precautions:** ACETYLENE, DISSOLVED
- **Disposal precautions:** Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.
- **Spill procedures:** Provide adequate ventilation. Eliminate sources of ignition.
- **Additional info:** N/A

SECTION 1: Identification of the substance/ mixture and of the company/ undertaking

1.1 Product identifier

Product name: Acetylene, dissolved

Trade name: Acetylene

Additional identification

Chemical name: acetylene (ethyne)

Chemical formula: C_2H_2
INDEX No. 601-015-00-0
CAS-No. 74-86-2
EC No. 200-816-9
REACH Registration No. 01-2119457406-36-0041

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Industrial and professional. Perform risk assessment prior to use.
Fuel gas for welding, cutting, heating, brazing and soldering applications. Use as a fuel. Use for electronic component manufacture. Using gas alone or in mixtures for the calibration of analysis equipment. Using gas as feedstock in chemical processes. Formulation of mixtures with gas in pressure receptacles. Metal coating by spray gun. Lubrication of moulds for the manufacture of glass bottles.
Consumer use.
Fuel gas for welding, cutting, heating, brazing and soldering applications.

Uses advised against Contact supplier for more information on uses. Uses other than those listed above are not supported.

1.3 Details of the supplier of the safety data sheet

Supplier

BOC
Priestley Road, Worsley
M28 2UT Manchester

Telephone: 0800 111 333

E-mail: ReachSDS@boc.com

1.4 Emergency telephone number: 0800 111 333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Directive 67/ 548/ EEC or 1999/ 45/ EC as amended.

F+; R12 R5 R6

The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/ 2008 as amended.

Physical Hazards

Flammable gas	Category 1	H220: Extremely flammable gas.
Chemically unstable gases	Category A	H230: May react explosively even in the absence of air.
Gases under pressure	Dissolved gas	H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

Signal Words: Danger

Hazard Statement(s):
H220: Extremely flammable gas.
H230: May react explosively even in the absence of air.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statement

Prevention:
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response:
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381: Eliminate all ignition sources if safe to do so.

Storage:
P403: Store in a well-ventilated place.

Disposal:
P501: Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.

2.3 Other hazards: For safety reasons, acetylene is dissolved in a solvent, either acetone (CAS No, 67-64-1) or N,N-dimethylformamide (DMF) (CAS No. 68-12-2). A small quantity of the solvent (as an impurity) may be carried over with the acetylene as it is used. The concentration of the solvent in the gas is below the limit which could affect the classification of the acetylene.

SECTION 3: Composition/ information on ingredients

3.1 Substances

Chemical name	acetylene (ethyne)
INDEX No.:	601-015-00-0
CAS-No.:	74-86-2
EC No.:	200-816-9
REACH Registration No.:	01-2119457406-36-0041
Purity:	100% The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name:	Acetylene

SECTION 4: First Aid Measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact: Adverse effects not expected from this product.

Skin Contact: Adverse effects not expected from this product.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed: Respiratory arrest.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: None.

Treatment: None.

SECTION 5: Firefighting Measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Water Spray or Fog. Dry powder. Foam.

Unsuitable extinguishing media: Carbon dioxide.

5.2 Special hazards arising from the substance or mixture: Fire or excessive heat may produce hazardous decomposition products. When involved in a fire, acetylene can begin to decompose, breaking down into its constituent elements of hydrogen and carbon. The decomposition reaction is exothermic and produces heat. Acetylene cylinders are designed to contain and inhibit decomposition of acetylene, however, if left unchecked decomposition could lead to cylinder failure. Acetylene may continue to be a hazard after a external fire has been extinguished, due to the decomposition of the acetylene within the cylinder, and requires specific operational procedures.

Hazardous Combustion Products: If involved in a fire the following toxic and/ or corrosive fumes may be produced by thermal decomposition: carbon monoxide

5.3 Advice for firefighters

Special fire fighting procedures: In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive re-ignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out. Acetylene cylinders that have been heated, damaged by fire or subjected to a flash back must not be moved until it has been demonstrated that there is no decomposition of the acetylene within the cylinder. Acetylene cylinders should be cooled with a water spray and a hazard zone designated around them. Water cooling should be continued for at least one hour. After a minimum of one hour of water cooling the cylinder's temperature should be checked to see if it has been effectively cooled. Effectively cooled means bringing the cylinder shell temperature down to ambient temperature. The "Wetting test" and/ or thermal imaging equipment should be used to ascertain if the cylinder shell has been effectively cooled. When effective cooling of the cylinder shell has been achieved, water cooling should be stopped. The cylinder should still not be moved for a further one hour, during this time temperature checks of the cylinder shell should be made every 15 minutes. If any increase in temperature is observed a further one hour continuous water cooling should be applied to the cylinder before its temperature is re-checked. When the cylinder shell temperature remains at ambient temperature for one hour without being water cooled, and is not leaking, the cylinder may be moved.

Special protective equipment for firefighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:	Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres . Biminate all ignition sources if safe to do so. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
6.2 Environmental Precautions:	Prevent further leakage or spillage if safe to do so.
6.3 Methods and material for containment and cleaning up:	Provide adequate ventilation. Biminate sources of ignition.
6.4 Reference to other sections:	Refer to sections 8 and 13.

SECTION 7: Handling and Storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use only non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/ regional/ national/ international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place. Avoid suckback of water, acid and alkalis. Solvent may accumulate in piping systems. For maintenance use appropriately chemically resistant gloves and goggles. Only equipment fitted with suitable means of preventing a 'flash back' should be fitted to the cylinders. Mechanical shock alone to a cold acetylene cylinder cannot initiate decomposition. For further information on safe use refer to EIGA "Code of Practice: Acetylene" IGC Doc 123.

7.2 Conditions for safe storage, including any incompatibilities:

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Acetylene cylinders should be stored vertically. If a cylinder has been transported horizontally, it should be stood upright for a minimum of 1 hour prior to use. This will allow the acetone to evenly re-distribute within the cylinder and prevent acetone being carried into the flame during use causing a 'flame thrower' effect.

7.3 Specific end use(s):

None.

SECTION 8: Exposure Controls/ Personal Protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

DNEL-Values

Critical component	type	Value	Remarks
acetylene (ethyne)	Worker - inhalative, long-term - systemic	2500 ppm	-
	Worker - inhalative, short-term - systemic	2500 ppm	-

PNEC-Values

Critical component	type	Value	Remarks
acetylene (ethyne)			PNEC not available.

8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below lower explosion limits. Gas detectors should be used when quantities of flammable gases or vapours may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system. Use only permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges.

Individual protection measures, such as personal protective equipment

General information:	A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Do not eat, drink or smoke when using the product.
Eye/ face protection:	Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.
Skin protection	
Hand Protection:	Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks.
Body protection:	Wear fire/ flame resistant/ retardant clothing. Guideline: ISO/ TR 2801:2007 Clothing for protection against heat and flame -- General recommendations for selection, care and use of protective clothing.
Other:	Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear.
Respiratory Protection:	Not required.
Thermal hazards:	No precautionary measures are necessary.
Hygiene measures:	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
Environmental exposure controls:	For waste disposal, see section 13.

SECTION 9: Physical And Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance	
Physical state:	Gas
Form:	Dissolved gas
Colour:	Colorless
Odour:	Garlic-like odor
Odour Threshold:	Odour threshold is subjective and is inadequate to warn of over exposure.
pH:	not applicable.
Melting Point:	-80.7 °C
Boiling Point:	-84.7 °C (101.3 hPa)

Sublimation Point:	not applicable.
Critical Temp. (°C):	35.0 °C
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	Flammable gas
Flammability limit - upper (%):	99.99 %(V)
Flammability limit - lower(%):	2.3 %(V)
Vapour pressure:	698.5968 kPa (25 °C)
Vapour density (air=1):	0.91 AIR=1
Relative density:	0.6208 (-82 °C)4 °C
Solubility(ies)	
Solubility in Water:	1,200 mg/ l (25 °C)
Partition coefficient (n-octanol/ water):	0.37
Autoignition Temperature:	305 °C
Decomposition Temperature:	635 °C
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0.011 mPa.s
Explosive properties:	Not applicable.
Oxidising Properties:	not applicable.
9.2 Other information:	None.
Molecular weight:	26.02 g/ mol (C_2H_2)

SECTION 10: Stability and Reactivity

10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of Hazardous Reactions: Can form a potentially explosive atmosphere in air. May react violently with oxidants. Forms explosive acetylides with copper, silver and mercury. Do not use alloys containing more than 65% copper.

10.4 Conditions to Avoid: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. High temperature High pressure May decompose violently at high temperature and/ or pressure or in the presence of a catalyst.

10.5 Incompatible Materials: Air and oxidisers. For material compatibility see latest version of ISO-11114. Avoid contact with pure copper, mercury, silver and brass with greater than 65% copper. Do not use alloys containing more than 43% silver. For further information on safe use refer to EIGA "Code of Practice: Acetylene" IGC Doc 123.

10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/ or corrosive fumes may be produced by thermal decomposition: The following decomposition products may be produced: carbon monoxide

SECTION 11: Toxicological Information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral
Product Based on available data, the classification criteria are not met.

Acute toxicity - Dermal
Product Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation
Product Based on available data, the classification criteria are not met.

acetylene (ethyne) LOEC: 100000 ppm

Skin Corrosion/ Irritation
Product Based on available data, the classification criteria are not met.

Serious Eye Damage/ Eye Irritation
Product Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitisation
Product Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product Based on available data, the classification criteria are not met.

Carcinogenicity
Product Based on available data, the classification criteria are not met.

Reproductive toxicity
Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product Based on available data, the classification criteria are not met.

Aspiration Hazard
Product Not applicable to gases and gas mixtures..

SECTION 12: Ecological Information

12.1 Toxicity

Acute toxicity
Product No ecological damage caused by this product.

Acute toxicity - Fish
acetylene (ethyne) LC50 (Various, 96 h): 545 mg/ l Remarks: QSAR

Acute toxicity - Aquatic Invertebrates
acetylene (ethyne) EC50 (Water flea (Daphnia magna), 48 h): 242 mg/ l

Toxicity to microorganisms
acetylene (ethyne) EC50 (Alga, 72 h): 57 mg/ l

12.2 Persistence and Degradability
Product Not applicable to gases and gas mixtures..

12.3 Bioaccumulative Potential
Product The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in Soil
Product Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Results of PBT and vPvB assessment
Product Not classified as PBT or vPvB.

12.6 Other Adverse Effects:
No ecological damage caused by this product.

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.

Disposal methods: Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at http:// www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes

Container: 16 05 04*: gases in pressure containers (including halons) containing dangerous substances

SECTION 14: Transport Information

ADR

14.1 UN Number:	UN 1001
14.2 UN Proper Shipping Name:	ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.1
Hazard No. (ADR):	239
Tunnel restriction code:	(B/ D)
Emergency Action Code:	2SE
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

RID

14.1 UN Number:	UN 1001
14.2 UN Proper Shipping Name	ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.1
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IMDG

14.1 UN Number:	UN 1001
14.2 UN Proper Shipping Name:	ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es)	
Class:	2.1
Label(s):	2.1
EmS No.:	F-D, S-U
14.3 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IATA

14.1 UN Number:	UN 1001
14.2 Proper Shipping Name:	Acetylene, dissolved
14.3 Transport Hazard Class(es):	
Class:	2.1
Label(s):	2.1
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–
Other information	
Passenger and cargo aircraft:	Forbidden.
Cargo aircraft only:	Allowed.

14.7 Transport in bulk according to Annex II of MARPOL73/ 78 and the IBC Code: not applicable

Additional identification: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/ legislation specific for the substance or mixture:

EU Regulations

Regulation (EC) No. 1907/ 2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
acetylene (ethyne)	74-86-2	100%

Directive 96/ 82/ EC (Seveso II): on the control of major accident hazards involving dangerous substances:

Chemical name	CAS-No.	Concentration
acetylene (ethyne)	74-86-2	100%

Directive 98/ 24/ EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
acetylene (ethyne)	74-86-2	100%

National Regulations

Dangerous Substances and Explosive Atmospheres Regulations (DSEAR 2002 No. 2776). Management of Health and Safety at Work Regulations (1999 No. 3242). The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541). Control of Substances

Hazardous to Health Regulations (COSHH, 2002 No. 2677). Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306). Personal Protective Equipment Regulations (1992 No. 2966). Control of Major Accident Hazards Regulations (COMAH, 2015 No. 483). Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations (EPS, 1996 No. 192). Pressure Systems Safety Regulations (PSSR, 2000 No. 128). Only products that comply with the food regulations (EC) No. 1333/ 2008 and (EU) No. 231/ 2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 453/ 2010.
THE ACETYLENE SAFETY (ENGLAND AND WALES AND SCOTLAND) REGULATIONS 2014 No. 1639

15.2 Chemical safety assessment: CSA has been carried out.

SECTION 16: Other Information

Revision Information: Not relevant.

Key literature references and sources for data: Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:
Agency for Toxic Substances and Diseases Registry (ATSDR) (http:/ / www.atsdr.cdc.gov/).
European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
European Chemical Agency: Information on Registered Substances http:/ / apps.echa.europa.eu/ registered/ registered-sub.aspx#search
European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.
International Programme on Chemical Safety (http:/ / www.inchem.org/)
ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
Matheson Gas Data Book, 7th Edition.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http:/ / ecb.jrc.ec.europa.eu/ esis/).
The European Chemical Industry Council (CEFIC) ERICards.
United States of America's National Library of Medicine's toxicology data network TOXNET (http:/ / toxnet.nlm.nih.gov/ index.html)
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
Substance specific information from suppliers.
Details given in this document are believed to be correct at the time of publication.
EH40 (as amended) Workplace exposure limits.

Wording of the R-phrases and H-statements in sections 2 and 3

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
R5	Heating may cause an explosion.
R6	Explosive with or without contact with air.
R12	Extremely flammable.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard.

Classification according to Regulation (EC) No 1272/ 2008 as amended.

Flam. Gas 1, H220

Chem. Unst. Gas A, H230

Press. Gas Diss. Gas, H280

Other information: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/ local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Note: When the Product Name appears in the SDS header the decimal sign and its position comply with rules for the structure and drafting of international standards, and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

Last revised date: 01.02.2016

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

COSHH assessment

DOW CORNING(R) 781 ACETOXY SILICONE BLACK

- **Reference:** 2118
- **Composition:** Silicone elastomer

First aid

Eyes

Flush eyes with water as a precaution. Get medical attention if irritation develops and persists.

Skin

Wash with water and soap as a precaution. Get medical attention if symptoms occur.

Inhalation

If inhaled, remove to fresh air. Get medical attention if symptoms occur.

Ingestion

N/A

Handling precautions and PPE

Respiratory

Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Hand

Wash hands before breaks and at the end of workday.

Skin

Skin should be washed after contact.

Eye

Wear the following personal protective equipment: Safety glasses

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** N/A
  - **Short term exposure limit (STEL 15min TWA):** N/A
- **Factors which increase risks:** Oxidizing agents
- **Storage precautions:** Keep in properly labelled containers. Store in accordance with the particular national regulations.
- **Flashpoint:** > 100 °C (Closed Cup)
- **Transport precautions:** N/A
- **Disposal precautions:** Dispose of in accordance with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- **Spill procedures:** Soak up with inert absorbent material. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
- **Additional info:** N/A

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

DOW CORNING

DOW CORNING(R) 781 ACETOXY SILICONE BLACK

Version	Revision Date:	SDS Number:	Date of last issue: 28.11.2016
1.6	28.04.2017	687299-00007	Date of first issue: 29.10.2014

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name : DOW CORNING(R) 781 ACETOXY SILICONE BLACK

Product code : 000000000003295257

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Adhesive, binding agents

1.3 Details of the supplier of the safety data sheet

Company : Dow Corning Europe S.A.
rue Jules Bordet - Parc Industriel - Zone C
B-7180 Seneffe

PO box : 65091

Telephone :
English Tel: +49 611237507
Deutsch Tel: +49 611237500
Français Tel: +32 64511149
Italiano Tel: +32 64511170
Español Tel: +32 64511163

E-mail address of person responsible for the SDS : sdseu@dowcorning.com

1.4 Emergency telephone number

Dow Corning (Barry U.K. 24h) Tél: +44 1446732350
Dow Corning (Wiesbaden 24h) Tél: +49 61122158
Dow Corning (Seneffe 24h) Tel: +32 64 888240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)
Not a hazardous substance or mixture.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)
Not a hazardous substance or mixture.

Additional Labelling
EUH210 Safety data sheet available on request.

2.3 Other hazards

None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical nature : Silicone elastomer

Hazardous components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Octamethylcyclotetrasiloxane	556-67-2 209-136-7 014-018-00-1 01-2119529238-36	Flam. Liq. 3; H226 Repr. 2; H361f Aquatic Chronic 4; H413	>= 0.25 - < 1

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : Flush eyes with water as a precaution.
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention.
Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

None known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically and supportively.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides
Silicon oxides
Formaldehyde
Metal oxides
Chlorine compounds
Nitrogen oxides (NOx)

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment.
Follow safe handling advice and personal protective equipment recommendations.

6.2 Environmental precautions

Environmental precautions : Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Soak up with inert absorbent material.
For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Do not swallow.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Handle in accordance with good industrial hygiene and safety practice.
Take care to prevent spills, waste and minimize release to the environment.

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in properly labelled containers. Store in accordance with the particular national regulations.

Advice on common storage : Do not store with the following product types:

Strong oxidizing agents

7.3 Specific end use(s)

Specific use(s) : These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Amorphous fumed silica	112945-52-5	TWA (inhalable dust)	6 mg/m3 (Silica)	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'., Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller definitions and explanatory material are given in MDHS14/3., Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
		TWA (Respirable dust)	2.4 mg/m3 (Silica)	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts			

	contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'., Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller definitions and explanatory material are given in MDHS14/3., Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
Titanium dioxide	13463-67-7	TWA (inhalable dust)	10 mg/m3	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'., Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller definitions and explanatory material are given in MDHS14/3., Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
		TWA (Respirable dust)	4 mg/m3	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhala-			

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Iron(III) Oxide	1309-37-1	TWA (inhalable dust)	10 mg/m3	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'., Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller definitions and explanatory material are given in MDHS14/3., Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
		TWA (Respirable dust)	4 mg/m3	GB EH40
Further information	For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust, The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m-3 8-hour TWA of inhalable dust or 4 mg.m-3 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit., Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'., Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller			

	definitions and explanatory material are given in MDHS14/3., Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
Cobalt aluminate blue spinel	1345-16-0	TWA	0.1 mg/m3 (Cobalt)	GB EH40
Further information	Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase 'R42: May cause sensitisation by inhalation'; or 'R42/43: May cause sensitisation by inhalation and skin contact' or - are listed in section C of HSE publication 'Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma' as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., Capable of causing cancer and/or heritable genetic damage. The identified substances include those which: - are assigned the risk phrases 'R45: May cause cancer'; 'R46: may cause heritable genetic damage'; 'R49: May cause cancer by inhalation' or - a substance or process listed in Schedule 1 of COSHH., Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used, Carcinogenic applies for cobalt dichloride and sulphate., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.			
C.I. Pigment Green 7	1328-53-6	TWA (Dusts and mists)	1 mg/m3 (Copper)	GB EH40
		STEL (Dusts and mists)	2 mg/m3 (Copper)	GB EH40
Iron hydroxide oxide	20344-49-4	TWA (Fumes)	5 mg/m3 (Iron)	GB EH40
Further information	The word 'fume' is often used to include gases and vapours. This is not the case for exposure limits where 'fume' should normally be applied to solid par-			

	ticles generated by chemical reactions or condensed from the gaseous state, usually after volatilisation from melted substances. The generation of fume is often accompanied by a chemical reaction such as oxidation or thermal breakdown.			
		STEL (Fumes)	10 mg/m3 (Iron)	GB EH40
Further information	The word 'fume' is often used to include gases and vapours. This is not the case for exposure limits where 'fume' should normally be applied to solid particles generated by chemical reactions or condensed from the gaseous state, usually after volatilisation from melted substances. The generation of fume is often accompanied by a chemical reaction such as oxidation or thermal breakdown.			
Octamethylcyclotetrasiloxane	556-67-2	TWA	10 ppm	US WEEL

These substance(s) are inextricably bound in the product and therefore do not contribute to a dust inhalation hazard.

Amorphous fumed silica

Titanium dioxide

Cobalt aluminate blue spinel

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Titanium dioxide	Workers	Inhalation	Long-term local effects	10 mg/m3
	Consumers	Ingestion	Long-term systemic effects	700 mg/kg bw/day
Iron(III) Oxide	Workers	Inhalation	Long-term local effects	10 mg/m3
	Workers	Inhalation	Long-term systemic effects	10 mg/m3
C.I. Pigment Green 7	Workers	Inhalation	Long-term systemic effects	4 mg/m3
	Workers	Skin contact	Long-term systemic effects	450 mg/kg bw/day
	Consumers	Skin contact	Long-term systemic effects	225 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	45 mg/kg bw/day
Iron hydroxide oxide	Workers	Inhalation	Long-term systemic effects	10 mg/m3
	Workers	Inhalation	Long-term local effects	10 mg/m3
Octamethylcyclotetrasiloxane	Workers	Inhalation	Acute systemic effects	73 mg/m3
	Workers	Inhalation	Acute local effects	73 mg/m3
	Workers	Inhalation	Long-term systemic effects	73 mg/m3

	Workers	Inhalation	Long-term local effects	73 mg/m3
	Consumers	Inhalation	Acute systemic effects	13 mg/m3
	Consumers	Inhalation	Acute local effects	13 mg/m3
	Consumers	Inhalation	Long-term systemic effects	13 mg/m3
	Consumers	Inhalation	Long-term local effects	13 mg/m3
	Consumers	Ingestion	Acute systemic effects	3.7 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	3.7 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Titanium dioxide	Fresh water	0.184 mg/l
	Marine water	0.0184 mg/l
	Intermittent use/release	0.193 mg/l
	Sewage treatment plant	100 mg/l
	Fresh water sediment	1000 mg/kg
	Marine sediment	100 mg/kg
	Soil	100 mg/kg
C.I. Pigment Green 7	Fresh water sediment	10 mg/kg
	Marine sediment	1 mg/kg
	Soil	1 mg/kg
Octamethylcyclotetrasiloxane	Fresh water	0.00044 mg/l
	Marine water	0.000044 mg/l
	Fresh water sediment	0.64 mg/kg
	Marine sediment	0.064 mg/kg
	Soil	0.13 mg/kg
	Sewage treatment plant	> 10 mg/l

8.2 Exposure controls

Engineering measures

Processing may form hazardous compounds (see section 10).
Ensure adequate ventilation, especially in confined areas.
Minimize workplace exposure concentrations.

Personal protective equipment

Eye protection : Wear the following personal protective equipment:
Safety glasses

Hand protection
Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the

		glove manufacturer. Wash hands before breaks and at the end of workday.
Skin and body protection	:	Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
Respiratory protection	:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
Filter type	:	Combined particulates and organic vapour type (A-P)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	paste
Colour	:	in accordance with the product description
Odour	:	Acetic acid
Odour Threshold	:	No data available
pH	:	Not applicable
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	Not applicable
Flash point	:	> 100 °C Method: closed cup
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Not classified as a flammability hazard
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapour pressure	:	Not applicable
Relative vapour density	:	No data available
Relative density	:	1.02

Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

9.2 Other information

Molecular weight	:	No data available
Self-ignition	:	The substance or mixture is not classified as pyrophoric. The substance or mixture is not classified as self heating.

SECTION 10: Stability and reactivity

10.1 Reactivity

Not classified as a reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions	:	Use at elevated temperatures may form highly hazardous compounds. Can react with strong oxidizing agents. Hazardous decomposition products will be formed at elevated temperatures.

10.4 Conditions to avoid

Conditions to avoid	:	None known.

10.5 Incompatible materials

Materials to avoid	:	Oxidizing agents

10.6 Hazardous decomposition products

Thermal decomposition	:	Formaldehyde

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Information on likely routes of exposure : Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Components:

Octamethylcyclotetrasiloxane:

Acute oral toxicity : LD50 (Rat): > 4,800 mg/kg
Assessment: The substance or mixture has no acute oral toxicity
Remarks: On basis of test data.

Acute inhalation toxicity : LC50 (Rat): 2975 ppm
Exposure time: 4 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: On basis of test data.

Acute dermal toxicity : LD50 (Rabbit): > 2.5 ml/kg
Assessment: The substance or mixture has no acute dermal toxicity
Remarks: On basis of test data.

Skin corrosion/irritation

Not classified based on available information.

Product:

Result: No skin irritation
Remarks: Based on data from similar materials

Components:

Octamethylcyclotetrasiloxane:

Species: Rabbit
Result: No skin irritation
Remarks: On basis of test data.

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Result: No eye irritation

Remarks: Based on data from similar materials

Components:

Octamethylcyclotetrasiloxane:

Species: Rabbit
Result: No eye irritation
Remarks: On basis of test data.

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Components:

Octamethylcyclotetrasiloxane:

Assessment: Does not cause skin sensitisation.

Test Type: Maximisation Test
Species: Guinea pig
Result: negative
Remarks: On basis of test data.

Germ cell mutagenicity

Not classified based on available information.

Components:

Octamethylcyclotetrasiloxane:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Remarks: On basis of test data.

: Test Type: Mutagenicity (in vitro mammalian cytogenetic test)
Result: negative
Remarks: On basis of test data.

: Test Type: Chromosome aberration test in vitro
Result: negative
Remarks: On basis of test data.

: Test Type: In vitro sister chromatid exchange assay in mammalian cells
Result: negative
Remarks: On basis of test data.

: Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)

Result: negative
Remarks: On basis of test data.

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Rat
Application Route: inhalation (vapour)
Result: negative
Remarks: On basis of test data.

Test Type: Rodent dominant lethal test (germ cell) (in vivo)
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: On basis of test data.

Germ cell mutagenicity- Assessment : Animal testing did not show any mutagenic effects.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Not classified based on available information.

Components:

Octamethylcyclotetrasiloxane:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat, male and female
Application Route: inhalation (vapour)
Symptoms: Effects on fertility
Remarks: On basis of test data.

Effects on foetal development : Test Type: Prenatal development toxicity study (teratogenicity)
Species: Rabbit
Application Route: inhalation (vapour)
Symptoms: No effects on foetal development
Remarks: On basis of test data.

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, based on animal experiments.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Components:

Octamethylcyclotetrasiloxane:

Exposure routes: Ingestion

Assessment: No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

Exposure routes: inhalation (vapour)
Assessment: No significant health effects observed in animals at concentrations of 1 mg/l/6h/d or less.

Exposure routes: Skin contact
Assessment: No significant health effects observed in animals at concentrations of 200 mg/kg bw or less.

Repeated dose toxicity

Components:

Octamethylcyclotetrasiloxane:

Species: Rat
Application Route: Ingestion
Remarks: On basis of test data.

Species: Rat
Application Route: inhalation (vapour)
Remarks: On basis of test data.

Species: Rabbit
Application Route: Skin contact
Remarks: On basis of test data.

Aspiration toxicity

Not classified based on available information.

Further information

Components:

Octamethylcyclotetrasiloxane:

Remarks: Results from a 2 year repeated vapour inhalation exposure study to rats of octamethylcyclotetrasiloxane (D4) indicate effects (benign uterine adenomas) in the uterus of female animals. This finding occurred at the highest exposure dose (700 ppm) only. Studies to date have not demonstrated if these effects occur through pathways that are relevant to humans. Repeated exposure in rats to D4 resulted in protoporphyrin accumulation in the liver. Without knowledge of the specific mechanism leading to the protoporphyrin accumulation the relevance of this finding to humans is unknown.

SECTION 12: Ecological information

12.1 Toxicity

Components:

Octamethylcyclotetrasiloxane:

Toxicity to fish	:	LC50 (Cyprinodon variegatus (sheepshead minnow)): > 0.0063 mg/l Exposure time: 336 h Remarks: No toxicity at the limit of solubility
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Mysidopsis bahia (opossum shrimp)): > 0.0091 mg/l Exposure time: 96 h Remarks: No toxicity at the limit of solubility
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 0.022 mg/l Exposure time: 72 h Remarks: No toxicity at the limit of solubility
Toxicity to fish (Chronic toxicity)	:	NOEC: >= 0.0044 mg/l Species: Oncorhynchus mykiss (rainbow trout) Remarks: On basis of test data. No toxicity at the limit of solubility
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: >= 0.0079 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Remarks: On basis of test data. No toxicity at the limit of solubility

Ecotoxicology Assessment

Chronic aquatic toxicity	:	May cause long lasting harmful effects to aquatic life.

12.2 Persistence and degradability

Components:

Octamethylcyclotetrasiloxane:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 3.7 % Exposure time: 28 d Method: OECD Test Guideline 310
Stability in water	:	Degradation half life: 69.3 - 144 h (24.6 °C) pH: 7Method: OECD Test Guideline 111

12.3 Bioaccumulative potential

Components:

Octamethylcyclotetrasiloxane:

Bioaccumulation	:	Species: Pimephales promelas (fathead minnow) Bioconcentration factor (BCF): 12,400
Partition coefficient: n-octanol/water	:	log Pow: 6.48 (25.1 °C)

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Components:

Octamethylcyclotetrasiloxane:

Assessment : Remarks: Octamethylcyclotetrasiloxane (D4) meets the current REACh Annex XIII criteria for PBT and vPvB. In Canada, D4 has been assessed and deemed to meet the PiT criteria. However, D4 does not behave similarly to known PBT/vPvB substances. The weight of scientific evidence from field studies shows that D4 is not biomagnifying in aquatic and terrestrial food webs. D4 in air will degrade by reaction with naturally occurring hydroxyl radicals in the atmosphere. Any D4 in air that does not degrade by reaction with hydroxyl radicals is not expected to deposit from the air to water, to land, or to living organisms.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Remarks : Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	:	Dimethylbis[(1-oxoneodecyl)oxy]stannane (20)
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EC) No 850/2004 on persistent organic pollutants	:	Not applicable
Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
Not applicable

The components of this product are reported in the following inventories:

REACH	:	All ingredients (pre-)registered or exempt.
AICS	:	All ingredients listed or exempt.
IECSC	:	All ingredients listed or exempt.
PICCS	:	All ingredients listed or exempt.
DSL	:	All chemical substances in this product comply with the CEPA 1999 and NSNR and are on or exempt from listing on the Canadian Domestic Substances List (DSL).
TSCA	:	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Full text of H-Statements

H226	:	Flammable liquid and vapour.
H361f	:	Suspected of damaging fertility.
H413	:	May cause long lasting harmful effects to aquatic life.

Full text of other abbreviations

Aquatic Chronic	:	Chronic aquatic toxicity
Flam. Liq.	:	Flammable liquids
Repr.	:	Reproductive toxicity
GB EH40	:	UK. EH40 WEL - Workplace Exposure Limits
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
GB EH40 / TWA	:	Long-term exposure limit (8-hour TWA reference period)
GB EH40 / STEL	:	Short-term exposure limit (15-minute reference period)
US WEEL / TWA	:	Time weighted average

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule

for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Sources of key data used to compile the Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

GB / EN

COSHH assessment

DOW CORNING(R) 784 GLAZING SILICONE WHITE

- **Reference:** 2119
- **Composition:** Distillates (petroleum), hydrotreated middle, Triacetoxy(ethyl)silane, Methyltriacetoxysilane

First aid

Eyes	Flush with water.
Skin	Flush with water.
Inhalation	Remove to fresh air.
Ingestion	No first aid should be needed.

Handling precautions and PPE

Respiratory	A suitable respirator must be worn if the product is used in any circumstances where an aerosol or mist may be generated, such as during spraying or similar activities.
Hand	Suitable, heavy duty, plastic or rubber gauntlets should be worn: Nitrile rubber.
Skin	Wear impervious overalls in circumstances where significant skin contact can occur.
Eye	Face shield or safety goggles.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** Distillates (petroleum), hydrotreated middle: 5 mg/m3, Triacetoxy(ethyl)silane: 25 mg/m3, 10 ppm, Methyltriacetoxysilane: 25 mg/m3, 10 ppm
  - **Short term exposure limit (STEL 15min TWA):** Distillates (petroleum), hydrotreated middle: 10 mg/m3
- **Factors which increase risks:** Can react with strong oxidising agents. Cures in the presence of water or moisture, releasing a small amount of acetic acid.
- **Storage precautions:** Do not store with oxidizing agents. Keep container closed and store away from water or moisture.
- **Flashpoint:** N/A
- **Transport precautions:** N/A
- **Disposal precautions:** Dispose of in accordance with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- **Spill procedures:** Scrape up and place in a container fitted with a lid. The spilled product produces an extremely slippery surface.
- **Additional info:** N/A

DOW CORNING

PRODUCT SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 1.2
Revision Date: 26.11.2007

DOW CORNING(R) 784 GLAZING SILICONE WHITE

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

Trade name	:	DOW CORNING(R) 784 GLAZING SILICONE WHITE	
Company	:	Dow Corning S.A. rue Jules Bordet - Parc Industriel - Zone C B-7180 Seneffe Belgium	
Service	:	Dow Corning Central Europe	Tel: +49 6112371 Fax: +49 611237609
		Dow Corning Northern Europe	Tel: +44 1676528000 Fax: +44 1676528001
		Dow Corning Southern Europe	Tel: +33 472841360 Fax: +33 472841379
Emergency Phone Number	:	Dow Corning (Barry U.K. 24h) Dow Corning (Wiesbaden 24h) Dow Corning (Seneffe 24h)	Tel: +44 1446732350 Tel: +49 61122158 Tel: +32 64 888240
E-mail address (Safety Data Sheet)	:	sdseu@dowcorning.com	
Use of the substance/preparation	:	Adhesive, binding agents	

2. HAZARDS IDENTIFICATION

Not hazardous according to article 31 and Annex II of the EU REACH Regulation and its subsequent amendments.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical characterization: Silicone elastomer

Hazardous Ingredients:

Name	CAS-No.	EINECS/ ELINCS No.	Conc. (% w/w)	Classification	
Distillates (petroleum), hydrotreated middle	64742-46-7	265-148-2	7.8	Xn	R65
Triacetoxy(ethyl)silane	17689-77-9	241-677-4	1.9		R14
				C	R34
				Xn	R22
Methyltriacetoxysilane	4253-34-3	224-221-9	1.7		R14
				C	R34
				Xn	R22

4. FIRST AID MEASURES

On contact with eyes	:	Flush with water.
On skin contact	:	Flush with water.
If inhaled	:	Remove to fresh air.
On ingestion	:	No first aid should be needed.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media	:	On large fires use dry chemical, foam or water spray (fog). On small fires use carbon dioxide (CO2), dry chemical or water spray. Water can be used to cool fire exposed containers.
Unsuitable extinguishing media	:	None known.
Hazards during fire fighting	:	None known.
Special protective equipment/procedures	:	A self-contained respirator and protective clothing should be worn. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.
Hazardous Combustion Products	:	Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wear proper protective equipment.
Precautions to protect the environment	:	Do not allow large quantities to enter drains or surface waters.
Methods for cleaning up	:	Scrape up and place in a container fitted with a lid. The spilled product produces an extremely slippery surface.

7. HANDLING AND STORAGE

Advice on safe handling	:	General ventilation is recommended. Local ventilation is recommended. Avoid skin and eye contact. Do not breathe vapour.
Advice on storage	:	Do not store with oxidizing agents. Keep container closed and store away from water or moisture.
Specific uses	:	Refer to technical data sheet available on request.

Unsuitable packaging materials	:	None known.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls : Ventilation : Refer to Section 7

Exposure controls for hazardous components

Name	CAS-No.	Exposure Limits
Distillates (petroleum), hydrotreated middle	64742-46-7	10 mg/m3 STEL Oil Mist,mineral 5 mg/m3 TWA Oil Mist,mineral
Triacetoxy(ethyl)silane	17689-77-9	10 ppm TWA (CH3COOH) 25 mg/m3 TWA (CH3COOH)
Methyltriacetoxysilane	4253-34-3	10 ppm TWA (CH3COOH) 25 mg/m3 TWA (CH3COOH)

Personal protection equipment

Respiratory protection	:	Suitable respiratory protection should be worn if the product is used in large quantities, confined spaces or in other circumstances where the OEL may be approached or exceeded. Depending on the working conditions, wear a respiratory mask with filter(s) E or use a self-contained respirator. The choice of a filter type depends on the amount and type of chemical being handled in the workplace. Regarding filter characteristics, contact your respiratory protection supplier.
Hand protection	:	Chemical protective gloves should be worn: Silver shield(TM). 4H(TM). Viton(TM). Butyl rubber. Nitrile rubber. Neoprene rubber. Regarding glove's breakthrough time...,contact your chemical protective glove supplier.
Eye protection	:	Safety glasses should be worn.
Skin protection	:	Protective equipment is not normally necessary.
Hygiene measures	:	Exercise good industrial hygiene practice. Wash after handling, especially before eating, drinking or smoking.
Environmental exposure controls	:	Refer to section 6 and 12.
Additional information	:	These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form: Paste **Colour:** See product name **Odour:** Acetic acid

Important health, safety and environmental information

Explosive properties	:	No
Specific Gravity	:	1.02
Oxidizing properties	:	No

The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal usage conditions.
Conditions to avoid	:	None established.
Materials to avoid	:	Can react with strong oxidising agents. Cures in the presence of water or moisture, releasing a small amount of acetic acid.
Hazardous decomposition products	:	Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

11. TOXICOLOGICAL INFORMATION

On contact with eyes	:	Vapours released during curing may cause eye irritation.
On skin contact	:	Can irritate on prolonged or repeated contact.
If inhaled	:	The vapour is irritating to the mouth, nose and throat.
On ingestion	:	Small amounts transferred to the mouth by fingers during use should not injure. Swallowing large amounts may cause digestive discomfort.
Other Health Hazard Information	:	This product contains (a) powder(s) hazardous by inhalation. This is not relevant to the current physical form of the product, which is not in a respirable form.

[1] Based on product test data.
[2] Based on test data from similar products.

12. ECOLOGICAL INFORMATION

Environmental fate and distribution

Solid material, insoluble in water. No adverse effects are predicted.

Ecotoxicity effects

No adverse effects on aquatic organisms are predicted.

Bioaccumulation : No bioaccumulation potential.

Fate and effects in waste water treatment plants

No adverse effects on bacteria are predicted.

13. DISPOSAL CONSIDERATIONS

Product disposal : Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

Packaging disposal : Dispose of in accordance with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

14. TRANSPORT INFORMATION

Road / Rail (ADR/RID)

Not subject to ADR/RID.

Sea transport (IMDG)

Not subject to IMDG code.

Air transport (IATA)

Not subject to IATA regulations.

15. REGULATORY INFORMATION

Labelling according to EEC Directive

S-phrases : S24 Avoid contact with skin.
S51 Use only in well-ventilated areas.

National legislation / regulations

Ozone depleting chemicals : No ozone depleting chemicals are present or used in manufacture.

Status

IECSC	:	All ingredients listed or exempt.
EINECS	:	All ingredients listed, exempt or notified (ELINCS).
MITI	:	Some components are not listed or not identified on ENCS.
TSCA	:	All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

16. OTHER INFORMATION

This product safety data sheet was prepared in compliance with article 31 and Annex II of the EU REACH Regulation as well as its relevant amendements, on the approximation of laws, regulations and administrative provisions relative to the classification, packaging and labelling of dangerous substances and preparations.

It is the responsibility of persons in receipt of this Product Safety Data Sheet to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces a formulation containing the Dow Corning product, it is the recipient's sole responsibility to ensure the transfer of all relevant information from the Dow Corning Product Safety Data Sheet to their own Product Safety Data Sheet in compliance with article 31 and Annex II of the EU REACH Regulation.

All information and instructions provided in this Safety Data Sheet (SDS) are based on the current state of scientific and technical knowledge at the date indicated on the present SDS. Dow Corning shall not be held responsible for any defect in the product covered by this SDS , should the existence of such defect not be detectable considering the current state of scientific and technical knowledge.

As stated above, this Safety Data Sheet has been prepared in compliance with applicable European law. If you purchase this material outside Europe, where compliance laws may differ, you should receive from your local Dow Corning supplier a SDS applicable to the country in which the product is sold and intended to be used. Please note that the appearance and content of the SDS may vary - even for the same product - between different countries, reflecting the different compliance requirements. Should you have any question, please refer to your local Dow Corning supplier.

R14 Reacts violently with water., **R22** Harmful if swallowed., **R34** Causes burns., **R65** Harmful: May cause lung damage if swallowed.

COSHH assessment

DOW CORNING(R) 787T METAL AND GLASS SILICONE CLEAR

- **Reference:** 2122
- **Composition:** Acetoxy Silanes

First aid

Eyes

Flush with water.

Skin

Flush with water.

Inhalation

Remove to fresh air.

Ingestion

No first aid should be needed.

Handling precautions and PPE

Respiratory

A suitable respirator must be worn if the product is used in any circumstances where an aerosol or mist may be generated, such as during spraying or similar activities.

Hand

Suitable, heavy duty, plastic or rubber gauntlets should be worn: Nitrile rubber.

Skin

Wear impervious overalls in circumstances where significant skin contact can occur.

Eye

Face shield or safety goggles.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** N/A
  - **Short term exposure limit (STEL 15min TWA):** Mixture of Acetoxy Silanes: 37 mg/m3, 15 ppm
- **Factors which increase risks:** Can react with strong oxidising agents.
- **Storage precautions:** Do not store with oxidizing agents. Keep container closed and store away from water or moisture.
- **Flashpoint:** > 350 °C
- **Transport precautions:** N/A
- **Disposal precautions:** Dispose of in accordance with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- **Spill procedures:** Scrape up and place in a container fitted with a lid. The spilled product produces an extremely slippery surface.
- **Additional info:** N/A

DOW CORNING

PRODUCT SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 1.3
Revision Date: 15.10.2007

DOW CORNING(R) 787T METAL AND GLASS SILICONE CLEAR

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

Trade name	:	DOW CORNING(R) 787T METAL AND GLASS SILICONE CLEAR	
Company	:	Dow Corning S.A. rue Jules Bordet - Parc Industriel - Zone C B-7180 Seneffe Belgium	
Service	:	Dow Corning Central Europe	Tel: +49 6112371 Fax: +49 611237609
		Dow Corning Northern Europe	Tel: +44 1676528000 Fax: +44 1676528001
		Dow Corning Southern Europe	Tel: +33 472841360 Fax: +33 472841379
Emergency Phone Number	:	Dow Corning (Barry U.K. 24h) Dow Corning (Wiesbaden 24h) Dow Corning (Seneffe 24h)	Tel: +44 1446732350 Tel: +49 61122158 Tel: +32 64 888240
E-mail address (Safety Data Sheet)	:	sdseu@dowcorning.com	
Use of the substance/preparation	:	Adhesive, binding agents	

2. HAZARDS IDENTIFICATION

Not hazardous according to article 31 and Annex II of the EU REACH Regulation and its subsequent amendments.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical characterization: Sealant.

Hazardous Ingredients:

Name	CAS-No.	EINECS/ ELINCS No.	Conc. (% w/w)	Classification	
Mixture of Acetoxy Silanes	-	Exempt or not available	5.0	Xn C	R22 R34

4. FIRST AID MEASURES

On contact with eyes	:	Flush with water.
On skin contact	:	Flush with water.
If inhaled	:	Remove to fresh air.
On ingestion	:	No first aid should be needed.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media	:	On large fires use dry chemical, foam or water spray (fog). On small fires use carbon dioxide (CO2), dry chemical or water spray. Water can be used to cool fire exposed containers.
Unsuitable extinguishing media	:	None known.
Hazards during fire fighting	:	None known.
Special protective equipment/procedures	:	A self-contained respirator and protective clothing should be worn. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.
Hazardous Combustion Products	:	Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wear proper protective equipment.
Precautions to protect the environment	:	Do not allow large quantities to enter drains or surface waters.
Methods for cleaning up	:	Scrape up and place in a container fitted with a lid. The spilled product produces an extremely slippery surface.

7. HANDLING AND STORAGE

Advice on safe handling	:	General ventilation is recommended. Local ventilation is recommended. Avoid skin and eye contact. Do not breathe vapour.
Advice on storage	:	Do not store with oxidizing agents. Keep container closed and store away from water or moisture.
Specific uses	:	Refer to technical data sheet available on request.
Unsuitable packaging materials	:	None known.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls	:	Ventilation : Refer to Section 7

Exposure controls for hazardous components

Name	CAS-No.	Exposure Limits
Mixture of Acetoxy Silanes	-	15 ppm STEL (CH3COOH) 37 mg/m3 STEL (CH3COOH)

Personal protection equipment

Respiratory protection : Suitable respiratory protection should be worn if the product is used in large quantities, confined spaces or in other circumstances where the OEL may be approached or exceeded.
Depending on the working conditions, wear a respiratory mask with filter(s) E or use a self-contained respirator.
The choice of a filter type depends on the amount and type of chemical being handled in the workplace. Regarding filter characteristics, contact your respiratory protection supplier.

Hand protection : Chemical protective gloves should be worn: Butyl rubber. Nitrile rubber. Neoprene rubber. Silver shield(TM). 4H(TM). Viton(TM). Regarding glove's breakthrough time...,contact your chemical protective glove supplier.

Eye protection : Safety glasses should be worn.

Skin protection : Protective equipment is not normally necessary.

Hygiene measures : Exercise good industrial hygiene practice. Wash after handling, especially before eating, drinking or smoking.

Environmental exposure controls : Refer to section 6 and 12.

Additional information : These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form: Paste **Colour:** Colorless **Odour:** Acetic acid

Important health, safety and environmental information

Autoignition temperature : > 350 °C

Explosive properties : No

Specific Gravity : 0.99

Oxidizing properties : No

The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal usage conditions.
Conditions to avoid	:	None established.
Materials to avoid	:	Can react with strong oxidising agents. Cures in the presence of water or moisture, releasing a small amount of acetic acid.
Hazardous decomposition products	:	Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

11. TOXICOLOGICAL INFORMATION

On contact with eyes	:	Vapours released during curing may cause eye irritation.
On skin contact	:	Can irritate on prolonged or repeated contact.
If inhaled	:	The vapour is irritating to the mouth, nose and throat.
On ingestion	:	Small amounts transferred to the mouth by fingers during use should not injure. Swallowing large amounts may cause digestive discomfort.
Other Health Hazard Information	:	This product contains (a) powder(s) hazardous by inhalation. This is not relevant to the current physical form of the product, which is not in a respirable form.

[1] Based on product test data.
[2] Based on test data from similar products.

12. ECOLOGICAL INFORMATION

Environmental fate and distribution

Solid material, insoluble in water. No adverse effects are predicted.

Ecotoxicity effects

No adverse effects on aquatic organisms are predicted.

Bioaccumulation : No bioaccumulation potential.

Fate and effects in waste water treatment plants

No adverse effects on bacteria are predicted.

13. DISPOSAL CONSIDERATIONS

Product disposal	:	Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
Packaging disposal	:	Dispose of in accordance with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

14. TRANSPORT INFORMATION

Road / Rail (ADR/RID)

Not subject to ADR/RID.

Sea transport (IMDG)

Not subject to IMDG code.

Air transport (IATA)

Not subject to IATA regulations.

15. REGULATORY INFORMATION

Labelling according to EEC Directive

S-phrases : S24 Avoid contact with skin.
S51 Use only in well-ventilated areas.

National legislation / regulations

Ozone depleting chemicals : No ozone depleting chemicals are present or used in manufacture.

Status

EINECS : All ingredients listed or exempt.

16. OTHER INFORMATION

This product safety data sheet was prepared in compliance with article 31 and Annex II of the EU REACH Regulation as well as its relevant amendements, on the approximation of laws, regulations and administrative provisions relative to the classification, packaging and labelling of dangerous substances and preparations.

It is the responsibility of persons in receipt of this Product Safety Data Sheet to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces a formulation containing the Dow Corning product, it is the recipient's sole responsibility to ensure the transfer of all relevant information from the Dow Corning Product Safety Data Sheet to their own Product Safety Data Sheet in compliance with article 31 and Annex II of the EU REACH Regulation.

All information and instructions provided in this Safety Data Sheet (SDS) are based on the current state of scientific and technical knowledge at the date indicated on the present SDS. Dow Corning shall not be held responsible for any defect in the product covered by this SDS , should the existence of such defect not be detectable considering the current state of scientific and technical knowledge.

As stated above, this Safety Data Sheet has been prepared in compliance with applicable European law. If you purchase this material outside Europe, where compliance laws may differ, you should receive from your local Dow Corning supplier a SDS applicable to the country in which the product is sold and intended to be used. Please note that the appearance and content of the SDS may vary - even for the same product - between different countries, reflecting the different compliance requirements. Should you have any question, please refer to your local Dow Corning supplier.

R22 Harmful if swallowed., **R34** Causes burns.

COSHH assessment

WD-40

Hazards:

- **Reference:** 004
- **Composition:** Mineral oil, white spirit

First aid

Eyes

Flush eyes thoroughly with water for at least 15 minutes

Skin

Wash with soap and water

Inhalation

Remove to fresh air, Obtain medical assistance

Ingestion

Do not induce vomiting, seek urgent medical advice

Handling precautions and PPE

Respiratory

None

Hand

Wear PVC gloves

Skin

Avoid contact with exposed skin, wear overalls

Eye

Wear goggles if splashing can occur

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** 800PPM
  - **Short term exposure limit (STEL 15min TWA):** 125PPM
- **Factors which increase risks:** Do not inhale vapours. Irritant to skin
- **Storage precautions:** Keep container below 50C in a well ventilated place. Store in well ventilated area
- **Flashpoint:** 97C
- **Transport precautions:** Transfer in sealed containers
- **Disposal precautions:** Aerosol containers dispose of as special waste. Do not pierce containers
- **Spill procedures:** None
- **Additional info:** Do not use in confined spaces

Safety data sheet according to Regulation (EC) No 1907/2006, Annex II

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

WD-40® MULTI-USE PRODUCT - [Aerosol]

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses of the substance or mixture:
Corrosion protection
Lubricant

Uses advised against:
No information available at present.

1.3 Details of the supplier of the safety data sheet

WD-40 Company Limited PO Box 440, Kiln Farm, Milton Keynes, MK11 3LF, UK
Telephone: +44 (0) 1908 555400, Fax: +44 (0) 1908 266900
www.wd40.co.uk

P.R. Rielly Limited KarKraft House, Kilbarrack Industrial Estate, Kilbarrack, Dublin 5, IE
Phone: 01-832 0006, Fax: 01-832 0016
web@team.ie

Danka Import Export , 548 St Joseph High Road, M-SVR 1018 St Venera
Phone: +356 21233649, Fax: +356 21233501
Danka@maltanet.net

Qualified person's e-mail address: info@chemical-check.de, k.schnurbusch@chemical-check.de Please DO NOT use for requesting Safety Data Sheets.

1.4 Emergency telephone

Emergency information services / official advisory body:

Telephone number of the company in case of emergencies:
+49 (0) 700 / 24 112 112 (WDC)

Emergency information services / official advisory body:

Telephone number of the company in case of emergencies:
+49 (0) 700 / 24 112 112 (WDC)

Emergency information services / official advisory body:
Medicines & Poisons Info Office - Mater Dei Hospital, Msida MSD 2090, Malta - Tel.: 2545 6504
Emergency Ambulance - Tel.: 112
Telephone number of the company in case of emergencies:
+49 (0) 700 / 24 112 112 (WDC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) 1272/2008 (CLP)

Hazard class	Hazard category	Hazard statement

STOT SE	3	H336-May cause drowsiness or dizziness.
Aerosol	1	H222-Extremely flammable aerosol.
Asp. Tox.	1	H304-May be fatal if swallowed and enters airways.
Aerosol	1	H229-Pressurised container: May burst if heated.

2.1.2 Classification according to Directives 67/548/EEC and 1999/45/EC (including amendments)

F+,Extremely flammable
Xn, Harmful, R65
R66
R67

2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008 (CLP)

Danger

H336-May cause drowsiness or dizziness. H222-Extremely flammable aerosol. H229-Pressurised container: May burst if heated.

P101-If medical advice is needed, have product container or label at hand. P102-Keep out of reach of children.
P210-Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P211-Do not spray on an open flame or other ignition source. P251-Do not pierce or burn, even after use. P261-Avoid breathing vapours or spray. P271-Use only outdoors or in a well-ventilated area.
P301+P310+P331-IF SWALLOWED: Immediately call a POISON CENTER/doctor. Do NOT induce vomiting. P312-Call a POISON CENTER/doctor if you feel unwell.
P405-Store locked up. P410+P412-Protect from sunlight. Do not expose to temperatures exceeding 50 °C.
P501-Dispose of contents/container safely.

EUH066-Repeated exposure may cause skin dryness or cracking.

Without adequate ventilation, formation of explosive mixtures may be possible.
Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics

2.3 Other hazards

The mixture does not contain any vPvB substance (vPvB = very persistent, very bioaccumulative) or is not included under XIII of the regulation (EC) 1907/2006.
The mixture does not contain any PBT substance (PBT = persistent, bioaccumulative, toxic) or is not included under XIII of the regulation (EC) 1907/2006.
Danger of bursting (explosion) when heated
Hydrocarbons can be harmful to water.
Without adequate ventilation, formation of explosive mixtures may be possible.
Product can compose a film on the water surface, which can prevent oxygen exchange.

SECTION 3: Composition/information on ingredients

Aerosol

3.1 Substance

n.a.

3.2 Mixture

Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics	
Registration number (REACH)	01-2119463258-33-XXXX
Index	---
EINECS, ELINCS, NLP	919-857-5 (REACH-IT List-No.)
CAS	CAS ---
content %	60-80

Classification according to Directive 67/548/EEC	Flammable, R10 Harmful, Xn, R65 R66 R67
Classification according to Regulation (EC) 1272/2008 (CLP)	Flam. Liq. 3, H226 Asp. Tox. 1, H304 STOT SE 3, H336

Carbon dioxide	Substance for which an EU exposure limit value applies
Registration number (REACH)	--
Index	---
EINECS, ELINCS, NLP	204-696-9
CAS	CAS 124-38-9
content %	1-5
Classification according to Directive 67/548/EEC	---
Classification according to Regulation (EC) 1272/2008 (CLP)	---

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.
The substances named in this section are given with their actual, appropriate classification!
For substances that are listed in appendix VI, table 3.1/3.2 of the regulation (EC) no. 1272/2008 (CLP regulation) this means that all notes that may be given here for the named classification have been taken into account.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

Supply person with fresh air.
Remove person from danger area.
Respiratory arrest - Artificial respiration apparatus necessary.

Skin contact

Remove polluted, soaked clothing immediately, wash thoroughly with plenty of water and soap, in case of irritation of the skin (flare), consult a doctor.

Eye contact

Remove contact lenses.
Wash thoroughly for several minutes using copious water. Seek medical help if necessary.

Ingestion

Rinse the mouth thoroughly with water.
Consult doctor immediately - keep Data Sheet available.
Do not induce vomiting.
Danger of aspiration

4.2 Most important symptoms and effects, both acute and delayed

If applicable delayed symptoms and effects can be found in section 11 and the absorption route in section 4.1.
The following may occur:
Irritation of the eyes
Inhalation:
Headaches
Nausea
Dizziness
Irritation of the respiratory tract
Effects/damages the central nervous system
With long-term contact:
Dermatitis (skin inflammation)
Ingestion:
Nausea
Vomiting
Diarrhoea
Danger of aspiration
In certain cases, the symptoms of poisoning may only appear after an extended period / after several hours.

4.3 Indication of any immediate medical attention and special treatment needed

n.c.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Foam
CO_2
Extinction powder

Unsuitable extinguishing media

Water

5.2 Special hazards arising from the substance or mixture

In case of fire the following can develop:
Oxides of carbon
Danger of bursting (explosion) when heated
Danger of explosion by prolonged heating.
Explosive vapour/air mixture

5.3 Advice for firefighters

According to size of fire
Protective respirator with independent air supply.
Cool container at risk with water.
Dispose of contaminated extinction water according to official regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove possible causes of ignition - do not smoke.
Ensure sufficient supply of air.
Avoid inhalation, and contact with eyes or skin.
Do not carry cleaning cloths soaked in product in trouser pockets.

6.2 Environmental precautions

If leakage occurs, dam up.
Resolve leaks if this possible without risk.
Prevent from entering drainage system.
Prevent surface and ground-water infiltration, as well as ground penetration.

6.3 Methods and material for containment and cleaning up

If spray or gas escapes, ensure ample fresh air is available.
Active substance:
Soak up with absorbent material (e.g. universal binding agent, sand, diatomaceous earth) and dispose of according to Section 13.

6.4 Reference to other sections

For personal protective equipment see Section 8 and for disposal instructions see Section 13.

SECTION 7: Handling and storage

In addition to information given in this section, relevant information can also be found in section 8 and 6.1.

7.1 Precautions for safe handling

7.1.1 General recommendations

Ensure good ventilation.
Keep away from sources of ignition - Do not smoke.
Do not use on hot surfaces.
Observe directions on label and instructions for use.
Use working methods according to operating instructions.
Take measures against electrostatic charging, if appropriate.

7.1.2 Notes on general hygiene measures at the workplace

General hygiene measures for the handling of chemicals are applicable.
Wash hands before breaks and at end of work.
Keep away from food, drink and animal feedingstuffs.
Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

7.2 Conditions for safe storage, including any incompatibilities

Keep out of access to unauthorised individuals.
Not to be stored in gangways or stair wells.
Observe special regulations for aerosols!
Observe special storage conditions (in Germany, e.g., in accordance with the regulations in the "Betriebssicherheitsverordnung").
Keep protected from direct sunlight and temperatures over 50 °C.
Store in a dry place.
Store cool
Store in a well ventilated place.

Safety data sheet according to Regulation (EC) No 1907/2006, Annex II
Revised on / Version: 26.08.2014 / 0002
Replaces revision of / Version: 30.04.2014 / 0001
Valid from: 26.08.2014
PDF print date: 05.09.2014
WD-40® MULTI-USE PRODUCT - [Aerosol]

7.3 Specific end use(s)
No information available at present.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Workplace exposure limit (WEL) of the total hydrocarbon solvent content of the mixture (RCP method according to EH40): 800 mg/m3

Chemical Name	Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics		Content [%]: 60 - 80
WEL-TWA: 800 mg/m3	WEL-STEL: ---		---
BMGV: ---		Other information:	(WEL acc. to RCP-method, EH40)

Chemical Name	Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics		Content [%]: 60 - 80
OELV-8h: 100 ppm (573 mg/m3) (White Spirit)	OELV-15min: 125 ppm (720 mg/m3) (White Spirit)		---
BLV: ---		Other information:	---

Chemical Name	Carbon dioxide		Content [%]: 1-5
WEL-TWA: 5000 ppm (9150 mg/m3) (WEL), 5000 ppm (9000 mg/m3) (EU)	WEL-STEL: 15000 ppm (27400 mg/m3) (WEL)		---
BMGV: ---		Other information:	---

Chemical Name	Carbon dioxide		Content [%]: 1-5
OELV-8h: 5000 ppm (9000 mg/m3) (OELV-8h, EC)	OELV-15min: 15000ppm (27000 mg/m3) (OELV-15min)		---
BLV: ---		Other information:	IOELV

Chemical Name	Carbon dioxide		Content [%]: 1-5
OELV-8h: 5000 ppm (9000 mg/m3) (OELV-8h, UE)	OELV-ST: ---		---
BMGV: ---		Other information:	---

Chemical Name	Oil mist, mineral		Content [%]:
WEL-TWA: 5 mg/m3 (ACGIH)	WEL-STEL: 10 mg/m3 (ACGIH)		---
BMGV: ---		Other information:	---

Chemical Name	Oil mist, mineral		Content [%]:
OELV-8h: 0,2 mg/m3 (Mineral oil, used in metal working (inhalable)), 5 mg/m3 (Mineral oil, pure, highly & severely refined (inhalable))	OELV-15min: ---		---
BLV: ---		Other information:	---

WEL-TWA = Workplace Exposure Limit - Long-term exposure limit (8-hour TWA (= time weighted average) reference period) EH40. AGW = "Arbeitsplatzgrenzwert" (workplace limit value, Germany). | WEL-STEL = Workplace Exposure Limit - Short-term exposure limit (15-minute reference period). | BMGV = Biological monitoring guidance value EH40. BGW = "Biologischer Grenzwert" (biological limit value, Germany) | Other information: Sen = Capable of causing occupational asthma. Sk = Can be absorbed through skin. Carc = Capable of causing cancer and/or heritable genetic damage.
** = The exposure limit for this substance is repealed through the TRGS 900 (Germany) of January 2006 with the goal of revision.

OELV-8h = Occupational Exposure Limit Value (8-hour reference period). (IFV) = Inhalable Fraction and Vapour. (I) = Inhalable Fraction. (R) = Respirable Fraction. | OELV-15min = Occupational Exposure Limit Value (15-minute reference period). (IFV) = Inhalable Fraction and Vapour. (I) = Inhalable Fraction. (R) = Respirable Fraction. | BLV = Biological limit value | Other information: Carc1A, Carc1B = carcinogenic substance, Cat. 1A or 1B. Muta1A, Muta1B = mutagenic substance, Cat. 1A or 1B. Repr1A, Repr1B = Substances known to be toxic for reproduction, Cat. 1A or 1B. Sk = can be absorbed through skin. Asphx = asphyxiant. Sen = Respiratory sensitizer. BOELV = Binding Occupational Exposure Limit Values. IOELV = Indicative Occupational Exposure Limit Values.

OELV-8h = Occupational Exposure Limit Value - 8 h (8-hour reference period as a time-weighted average) | OELV-ST = Occupational Exposure Limit Value - Short-term (15-minute reference period) | BMGV = Biological monitoring guidance value EH40. BGW = "Biologischer Grenzwert" (biological limit value, Germany) | Other information: Skin = Possibility of a significant uptake through the skin.

Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Area of application	Exposure route Environmental compartment	Effect on health	Descriptor	Value	Unit	Note
Workers / employees	Human - dermal	Long term, systemic effects	DNEL	300	mg/kg bw/day	
Workers / employees	Human - inhalation	Long term, systemic effects	DNEL	1500	mg/m3	
Consumer	Human - oral	Long term, systemic effects	DNEL	300	mg/kg bw/day	
Consumer	Human - dermal	Long term, systemic effects	DNEL	300	mg/kg bw/day	
Consumer	Human - inhalation	Long term, systemic effects	DNEL	900	mg/m3	

8.2 Exposure controls
8.2.1 Appropriate engineering controls

Ensure good ventilation. This can be achieved by local suction or general air extraction.
If this is insufficient to maintain the concentration under the WEL or AGW values, suitable breathing protection should be worn.
Applies only if maximum permissible exposure values are listed here.

8.2.2 Individual protection measures, such as personal protective equipment

General hygiene measures for the handling of chemicals are applicable.
Wash hands before breaks and at end of work.
Keep away from food, drink and animal feedingstuffs.
Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

Eye/face protection:
Tight fitting protective goggles with side protection (EN 166).

Skin protection - Hand protection:
Protective nitrile gloves (EN 374)
Minimum layer thickness in mm:
>= 0,4
Permeation time (penetration time) in minutes:
>= 480
The breakthrough times determined in accordance with EN 374 Part 3 were not obtained under practical conditions.
The recommended maximum wearing time is 50% of breakthrough time.
Protective hand cream recommended.

Skin protection - Other:
Protective working garments (e.g. safety shoes EN ISO 20345, long-sleeved protective working garments)

Respiratory protection:
Normally not necessary.
If OES or MEL is exceeded.
Filter A P 3 (EN 14387), code colour brown, white
Observe wearing time limitations for respiratory protection equipment.

Thermal hazards:
Not applicable

Additional information on hand protection - No tests have been performed.
In the case of mixtures, the selection has been made according to the knowledge available and the information about the contents.
Selection of materials derived from glove manufacturer's indications.
Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.
Selection of a suitable glove depends not only on the material but also on other quality characteristics and varies from manufacturer to manufacturer.
In the case of mixtures, the resistance of glove materials cannot be predicted and must therefore be tested before use.
The exact breakthrough time of the glove material can be requested from the protective glove manufacturer and must be observed.

8.2.3 Environmental exposure controls

No information available at present.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	Aerosol, Substance: Liquid
Colour:	Light brown
Odour:	Characteristic
Odour threshold:	Not determined
pH-value:	n.a.
Melting point/freezing point:	<-66 °C (ASTM D 97, Liquid concentrate)
Initial boiling point and boiling range:	176 °C (Liquid concentrate)
Flash point:	47 °C (Liquid concentrate)
Flash point:	Enclosed space ignition test (UN RTDG, Manual of Tests and Criteria, Part III, 31.5): <= 300 g/m3 (deflagration density)
Flash point:	Enclosed space ignition test (UN RTDG, Manual of Tests and Criteria, Part III, 31.5): <= 300 s/m3 (time equivalent)
Flash point:	Ignition distance test (UN RTDG, Manual of Tests and Criteria, Part III, 31.4): >= 75 cm
Evaporation rate:	Not determined
Flammability (solid, gas):	Yes
Lower explosive limit:	0,6 Vol-% ((Particulars of main substances contained))
Upper explosive limit:	8,0 Vol-% ((Particulars of main substances contained))
Vapour pressure:	7,2 bar (20 °C)
Vapour pressure:	9,4 bar (50 °C)
Vapour density (air = 1):	Not determined
Density:	0,817 g/ml (Liquid concentrate)
Bulk density:	n.a.
Solubility(ies):	Not determined
Water solubility:	Insoluble
Partition coefficient (n-octanol/water):	Not determined
Auto-ignition temperature:	Not determined
Decomposition temperature:	Not determined
Viscosity:	<1 cSt
Explosive properties:	Not determined
Oxidising properties:	No

9.2 Other information

Miscibility:	Not determined
Fat solubility / solvent:	Not determined
Conductivity:	Not determined
Surface tension:	Not determined
Solvents content:	Not determined

SECTION 10: Stability and reactivity

10.1 Reactivity
The product has not been tested.

10.2 Chemical stability
Stable with proper storage and handling.

10.3 Possibility of hazardous reactions
No dangerous reactions are known.

10.4 Conditions to avoid
See also section 7.
Heating, open flame, ignition sources
Pressure increase will result in danger of bursting.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.

10.5 Incompatible materials
See also section 7.
Avoid contact with strong oxidizing agents.

10.6 Hazardous decomposition products
See also Subsection 10.1 to 10.5.
See also section 5.2
No decomposition when used as directed.

SECTION 11: Toxicological information

Possibly more information on health effects, see Section 2.1 (classification).

Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:						n.d.a.
Acute toxicity, by dermal route:						n.d.a.
Acute toxicity, by inhalation:						n.d.a.
Skin corrosion/irritation:						n.d.a.
Serious eye damage/irritation:						n.d.a.
Respiratory or skin sensitisation:						n.d.a.
Germ cell mutagenicity:						n.d.a.
Carcinogenicity:						n.d.a.
Reproductive toxicity:						n.d.a.
Specific target organ toxicity - single exposure (STOT-SE):						n.d.a.
Specific target organ toxicity - repeated exposure (STOT-RE):						n.d.a.
Aspiration hazard:						n.d.a.
Respiratory tract irritation:						n.d.a.
Repeated dose toxicity:						n.d.a.
Symptoms:						n.d.a.
Other information:						Classification according to calculation procedure.

Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:	LD50	>5000	mg/kg	Rat	OECD 401 (Acute Oral Toxicity)	
Acute toxicity, by dermal route:	LD50	>5000	mg/kg	Rabbit	OECD 402 (Acute Dermal Toxicity)	
Acute toxicity, by inhalation:	LC50	>5000	mg/m3/8h	Rat	OECD 403 (Acute Inhalation Toxicity)	
Skin corrosion/irritation:				Rabbit	OECD 404 (Acute Dermal Irritation/Corrosion)	Not irritant Repeated exposure may cause skin dryness or cracking.
Serious eye damage/irritation:				Rabbit	OECD 405 (Acute Eye Irritation/Corrosion)	Not irritant
Respiratory or skin sensitisation:				Guinea pig	OECD 406 (Skin Sensitisation)	No (skin contact)
Germ cell mutagenicity:					OECD 471 (Bacterial Reverse Mutation Test)	Negative, Analogous conclusion
Carcinogenicity:					OECD 453 (Combined Chronic Toxicity/Carcinogenicity Studies)	Negative, Analogous conclusion
Reproductive toxicity:					OECD 414 (Prenatal Developmental Toxicity Study)	Negative, Analogous conclusion
Specific target organ toxicity - single exposure (STOT-SE):						May cause drowsiness or dizziness.
Aspiration hazard:						Yes
Repeated dose toxicity:					OECD 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents)	Not to be expected
Symptoms:						unconsciousness, headaches, dizziness, reddening of the skin

Carbon dioxide

Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Symptoms:						unconsciousness, blisters by skin-contact, vomiting, frostbite, annoyance, palpitations, itching, headaches, cramps, ear noises, dizziness

SECTION 12: Ecological information

Possibly more information on environmental effects, see Section 2.1 (classification).

WD-40® MULTI-USE PRODUCT - [Aerosol]

Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to fish:							n.d.a.
Toxicity to daphnia:							n.d.a.
Toxicity to algae:							n.d.a.
Persistence and degradability:		28d	>20-<60	%		OECD 310 (Ready Biodegradability - CO2 in sealed vessels (Headspace Test))	Not readily but inherent biodegradable.
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							n.d.a.
Other adverse effects:							n.d.a.

Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to fish:	LC50	96h	>1000	mg/l	Oncorhynchus mykiss	OECD 203 (Fish, Acute Toxicity Test)	
Toxicity to fish:	NOELR	28d	0,13	mg/l	Oncorhynchus mykiss	QSAR	
Toxicity to daphnia:	EC50	48h	>1000	mg/l	Daphnia magna	OECD 202 (Daphnia sp. Acute Immobilisation Test)	
Toxicity to daphnia:	NOELR	21d	0,23	mg/l	Daphnia magna	QSAR	
Toxicity to algae:	ErC50	72h	>1000	mg/l	Pseudokirchneriella subcapitata	OECD 201 (Alga, Growth Inhibition Test)	
Toxicity to algae:	EbC50	72h	>1000	mg/l	Pseudokirchneriella subcapitata	OECD 201 (Alga, Growth Inhibition Test)	
Toxicity to algae:	NOELR	72h	100	mg/l	Raphidocelis subcapitata	OECD 201 (Alga, Growth Inhibition Test)	
Toxicity to algae:	NOELR	72h	100	mg/l	Raphidocelis subcapitata	OECD 201 (Alga, Growth Inhibition Test)	groth rate
Toxicity to algae:	NOELR	72h	3	mg/l	Pseudokirchneriella subcapitata	OECD 201 (Alga, Growth Inhibition Test)	
Persistence and degradability:		28d	80	%		OECD 301 F (Ready Biodegradability - Manometric Respirometry Test)	Readily biodegradable

Results of PBT and vPvB assessment							No PBT substance, No vPvB substance

Carbon dioxide

Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Other adverse effects:							Greenhouse effect

SECTION 13: Disposal considerations

13.1 Waste treatment methods

For the substance / mixture / residual amounts

EC disposal code no.:
The waste codes are recommendations based on the scheduled use of this product.
Owing to the user's specific conditions for use and disposal, other waste codes may be allocated under certain circumstances. (2001/118/EC, 2001/119/EC, 2001/573/EC)
16 05 04 gases in pressure containers (including halons) containing dangerous substances
Recommendation:
Pay attention to local and national official regulations
E.g. suitable incineration plant.

For contaminated packing material

Pay attention to local and national official regulations
15 01 04 metallic packaging
15 01 01 paper and cardboard packaging
Dispose using dual system.

SECTION 14: Transport information

General statements

UN number: 1950

Transport by road/by rail (ADR/RID)

UN proper shipping name:
UN 1950 AEROSOLS
Transport hazard class(es): 2.1
Packing group: -
Classification code: 5F
LQ (ADR 2013): 1 L
LQ (ADR 2009): 2
Environmental hazards: Not applicable
Tunnel restriction code: D

Transport by sea (IMDG-code)

UN proper shipping name:
AEROSOLS
Transport hazard class(es): 2.1
Packing group: -
EmS: F-D, S-U
Marine Pollutant: n.a
Environmental hazards: Not applicable

Transport by air (IATA)

UN proper shipping name:
Aerosols, flammable
Transport hazard class(es): 2.1

Packing group: -
Environmental hazards: Not applicable

Special precautions for user

Persons employed in transporting dangerous goods must be trained.
All persons involved in transporting must observe safety regulations.
Precautions must be taken to prevent damage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Freighted as packaged goods rather than in bulk, therefore not applicable.
Minimum amount regulations have not been taken into account.
Danger code and packing code on request.
Comply with special provisions.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

For classification and labelling see Section 2.
Observe restrictions: Yes
Comply with trade association/occupational health regulations.
Observe youth employment law (German regulation).
Directive 2010/75/EU (VOC): ~ 65,5 %

15.2 Chemical safety assessment

A chemical safety assessment is not provided for mixtures.

SECTION 16: Other information

These details refer to the product as it is delivered.
EUF0002
Revised sections: n.a.

Classification and processes used to derive the classification of the mixture in accordance with the ordinance (EG) 1272/2008 (CLP):

Classification in accordance with regulation (EC) No. 1272/2008 (CLP)	Evaluation method used
STOT SE 3, H336	Classification according to calculation procedure.
Aerosol 1, H222	Classification based on test data.
Asp. Tox. 1, H304	Classification according to calculation procedure.
Aerosol 1, H229	Classification based on test data.

The following phrases represent the posted R phrases / H phrases, Hazard Class and Risk Category Code (GHS/CLP) of the product and the constituents (specified in Section 2 and 3).
10 Flammable.
65 Harmful: may cause lung damage if swallowed.
66 Repeated exposure may cause skin dryness or cracking.
67 Vapours may cause drowsiness and dizziness.
H226 Flammable liquid and vapour.
--- ---
H304 May be fatal if swallowed and enters airways.
H336 May cause drowsiness or dizziness.

STOT SE — Specific target organ toxicity - single exposure - narcotic effects
Aerosol — Aerosols
Asp. Tox. — Aspiration hazard
Flam. Liq. — Flammable liquid

Any abbreviations and acronyms used in this document:

AC Article Categories
acc., acc. to according, according to
ACGIH American Conference of Governmental Industrial Hygienists
ADR Accord européen relatif au transport international des marchandises Dangereuses par Route (= European Agreement concerning the International Carriage of Dangerous Goods by Road)
AOEL Acceptable Operator Exposure Level
AOX Adsorbable organic halogen compounds
approx. approximately
Art., Art. no. Article number
ATE Acute Toxicity Estimate according to Regulation (EC) 1272/2008 (CLP)
BAM Bundesanstalt für Materialforschung und -prüfung (Federal Institute for Materials Research and Testing, Germany)
BAuA Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (= Federal Institute for Occupational Health and Safety, Germany)
BCF Bioconcentration factor
BGV Berufsgenossenschaftliche Vorschrift (= Accident Prevention Regulation)
BHT Butylhydroxytoluol (= 2,6-Di-t-butyl-4-methyl-phenol)
BMGV Biological monitoring guidance value (EH40, UK)
BOD Biochemical oxygen demand
BSEF Bromine Science and Environmental Forum

bw body weight
CAS Chemical Abstracts Service
CEC Coordinating European Council for the Development of Performance Tests for Fuels, Lubricants and Other Fluids
CESIO Comité Européen des Agents de Surface et de leurs Intermédiaires Organiques
CIPAC Collaborative International Pesticides Analytical Council
CLP Classification, Labelling and Packaging (REGULATION (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures)
CMR carcinogenic, mutagenic, reproductive toxic
COD Chemical oxygen demand
CTFA Cosmetic, Toiletry, and Fragrance Association
DMEL Derived Minimum Effect Level
DNEL Derived No Effect Level
DOC Dissolved organic carbon
DT50 Dwell Time - 50% reduction of start concentration
DVS Deutscher Verband für Schweißen und verwandte Verfahren e.V. (= German Association for Welding and Allied Processes)
dw dry weight
e.g. for example (abbreviation of Latin 'exempli gratia'), for instance
EC European Community
ECHA European Chemicals Agency
EEA European Economic Area
EEC European Economic Community
EINECS European Inventory of Existing Commercial Chemical Substances
ELINCS European List of Notified Chemical Substances
EN European Norms
EPA United States Environmental Protection Agency (United States of America)
ERC Environmental Release Categories
ES Exposure scenario
etc. et cetera
EU European Union
EWC European Waste Catalogue
Fax. Fax number
gen. general
GHS Globally Harmonized System of Classification and Labelling of Chemicals
GWP Global warming potential
HET-CAM Hen's Egg Test - Chorionallantoic Membrane
HGWP Halocarbon Global Warming Potential
IARC International Agency for Research on Cancer
IATA International Air Transport Association
IBC Intermediate Bulk Container
IBC (Code) International Bulk Chemical (Code)
IC Inhibitory concentration
IMDG-code International Maritime Code for Dangerous Goods
incl. including, inclusive
IUCLID International Uniform ChemicaL Information Database
LC lethal concentration
LC50 lethal concentration 50 percent kill
LCLo lowest published lethal concentration
LD Lethal Dose of a chemical
LD50 Lethal Dose, 50% kill
LDLo Lethal Dose Low
LOAEL Lowest Observed Adverse Effect Level
LOEC Lowest Observed Effect Concentration
LOEL Lowest Observed Effect Level
LQ Limited Quantities
MARPOL International Convention for the Prevention of Marine Pollution from Ships
n.a. not applicable
n.av. not available
n.c. not checked
n.d.a. no data available
NIOSH National Institute of Occupational Safety and Health (United States of America)
NOAEC No Observed Adverse Effective Concentration
NOAEL No Observed Adverse Effect Level
NOEC No Observed Effect Concentration
NOEL No Observed Effect Level
ODP Ozone Depletion Potential
OECD Organisation for Economic Co-operation and Development
org. organic
PAH polycyclic aromatic hydrocarbon
PBT persistent, bioaccumulative and toxic

PC Chemical product category
PE Polyethylene
PNEC Predicted No Effect Concentration
POCP Photochemical ozone creation potential
ppm parts per million
PROC Process category
PTFE Polytetrafluorethylene
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals (REGULATION (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals)
REACH-IT List-No. 9xx-xxx-x No. is automatically assigned, e.g. to pre-registrations without a CAS No. or other numerical identifier. List Numbers do not have any legal significance, rather they are purely technical identifiers for processing a submission via REACH-IT.
RID Règlement concernant le transport International ferroviaire de marchandises Dangereuses (= Regulation concerning the International Carriage of Dangerous Goods by Rail)
SADT Self-Accelerating Decomposition Temperature
SAR Structure Activity Relationship
SU Sector of use
SVHC Substances of Very High Concern
Tel. Telephone
ThOD Theoretical oxygen demand
TOC Total organic carbon
TRGS Technische Regeln für Gefahrstoffe (=Technical Regulations for Hazardous Substances)
UN RTDG United Nations Recommendations on the Transport of Dangerous Goods
VbF Verordnung über brennbare Flüssigkeiten (= Regulation for flammable liquids (Austria))
VOC Volatile organic compounds
vPvB very persistent and very bioaccumulative
WEL-TWA, WEL-STEL WEL-TWA = Workplace Exposure Limit - Long-term exposure limit (8-hour TWA (= time weighted average) reference period), WEL-STEL = Workplace Exposure Limit - Short-term exposure limit (15-minute reference period) (EH40, UK).
WHO World Health Organization
wwt wet weight

The statements made here should describe the product with regard to the necessary safety precautions - they are not meant to guarantee definite characteristics - but they are based on our present up-to-date knowledge.
No responsibility.
These statements were made by:

Chemical Check GmbH, Chemical Check Platz 1-7, D-32839 Steinheim, Tel.: +49 5233 94 17 0, Fax: +49 5233 94 17 90

F GAS REGISTRATION CERTIFICATE

This certificate is awarded to

Sjj System Services Ltd

who are compliant with the guidelines as outlined in

Commission Implementing Regulation (EU) No 2015/2067 of 17 November 2015

Activity	(Stationary Refrigeration, Air Conditioning and Heatpump equipment)	**Certified**
Category I	(All activities on F Gas Systems as per Article 2:1)	Yes
Category II	(Activity on F Gas Systems containing up to 3Kgs)	Yes
Category III	(Refrigerant recovery in systems containing less than 3Kgs)	Yes
Category IV	(Leak Detection on F Gas Systems without breaking to the circuit)	Yes

Date Awarded

1st January 2020

Certificate / Reference No.

200156

Expiry Date

31st December 2020

Signature

David J Roome
F-Gas Registration

2020

F Gas Certificates are awarded in conjunction with Department of Communications, Climate Action and Environment and the Environmental Protection Agency

F Gas Registration Ltd, 70B Grange Close, Baldoyle Industrial Estate, Baldoyle, Dublin D13PK71.
Registration No: 485765. VAT No: IE 9760531D.
Phone 01-8618207 - Email: info@fgasregistration.ie - Web: www.fgasregistration.ie

FGAS
CERTIFICATION

STATIONARY EQUIPMENT QUALIFICATION COMPANY CERTIFICATE

Issued in accordance with the Fluorinated Greenhouse Gases Regulations 2015 No 310

SJJ System Services Ltd
Unit 20
Heads of the Valley Industrial Estate
Gwent
Tredegar
Caerffili
NP22 5RL

The above named company has demonstrated that it employs appropriately qualified personnel in a sufficient number to cover the expected volume of activities in the installation, commissioning, decommissioning, repair, maintenance or servicing of stationary refrigeration, air conditioning and heat pump equipment containing or is designed to contain certain fluorinated greenhouse gases. It has stated that it has the necessary tools and procedures available to the natural persons engaged in activities for which this certificate is issued.

The company is certified to work on all systems under or over 3kg (5 tonnes CO_2 eq) or hermetically sealed systems over 6 Kg (10 tonnes CO_2 eq).

This certificate is issued by Refcom in accordance with the requirements of Articles 2, 6 and 7 of implementing regulation 2015/2067.

Issue Date: 28 September 2018

Expiry Date: 28 September 2021

For and on behalf of Refcom Certification Ltd,
appointed by the Secretary of State for the Environment, Food and Rural Affairs.

Company Number: REF1014315

REFCOM
F-GAS CERTIFICATION

BESA

Refcom is a BESA Group Company

Allianz

Certificate of Employers' Liability Insurance (a)

(Where required by regulation 5 of the Employers' Liability (Compulsory Insurance) Regulations 1998 (the Regulations), one or more copies of this certificate must be displayed at each place of business at which the policy holder employs persons covered by this policy).

1. Policy number 60/SB/13572293/10

2. Name of policy holder SJJ System Services Ltd

3. Date of commencement of insurance policy 22/10/2019

4. Date of expiry of insurance policy 22/10/2020

We hereby certify that subject to paragraph 2:-

1. the policy to which this certificate relates satisfies the requirements of the relevant law applicable in Great Britain, Northern Ireland, the Isle of Man, the Island of Jersey, the Island of Guernsey and the Island of Alderney (b); and

2. (a) the minimum amount of cover provided by this policy is no less than £5 million (c).
   (b) ~~the cover provided under this policy relates to claims in excess of £ but not exceeding £~~

Signed on behalf of **Allianz Insurance Plc**

Authorised insurers

Jonathan Dye
Chief Executive

Notes

(a) *Where the employer is a company to which Regulation 3(2) of the regulations applies, the certificate shall state in a prominent place, either that the policy covers the holding company and all its subsidiaries, or that the policy covers the holding company and all subsidiaries except any specifically excluded by name, or that the policy covers the holding company and only the named subsidiaries.*

(b) *Specify applicable law as provided for in regulation 4(6) of the Regulations.*

(c) *See regulation 3(1) of the Regulations and delete whichever of paragraphs 2(a) or 2(b) does not apply. Where 2(b) is applicable, specify the amount of cover provided by the relevant policy.*

Account number: 60/12470

Date printed: 27/09/2019

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VERIFICATION OF LIABILITY INSURANCE

To Whom It May Concern

Client SJJ System Services Ltd, Unit 20 Heads of Valley Industrial Estate, Rhymney, Gwent. NP22 5RL.

Date: 15/10/2019

I can confirm, as Insurance Brokers for SJJ System Services Ltd the following covers are in force:

Public/Products Liability

Insurer:- Allianz Insurance Plc/AIG Europe Ltd

Period of cover:- 12 Months from 22nd October 2019

Limit of Indemnity:- £2 million/£3 million (Total £5 million)

Employers Liability

Insurer:- Allianz Insurance Plc

Period of cover:- 12 Months from 22nd October 2019

Limit of Indemnity:- £10 Million

Kind regards,

Andrew

Andrew Jenkins Cert CII
Corporate Account Executive
Commercial - Wales