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1.0 Method statement

Document created: 13 Mar 25
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Prepared by: Steve Jones
Position: Managing Director

SJJ Generic RAMS

Location of works:
SJJ System Services Ltd

Site address:
Unit 20 Heads of Valley Ind Est
Heol Klockner
Rhymney
Gwent
NP22 5RL

Rams reference: Quotation Copy
Client reference: Sample
Client: Service Customers
Principal designer: Steve Jones
Principal contractor: SJJ System Services Ltd
Start date and end date: 13/03/2025 to 13/03/2026

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 Plant or equipment

Using telehandlers to lift suspended loads

- The supervisor must ensure that the operator has proof of competence, which should include proof of training (CPCS card or similar), proof of familiarisation with the telehandler to be used and adequate experience of the task to be undertaken
- Before lifting any load the operator is to inspect the load does not exceed the Safe Working Load (SWL)
- When using telescopic boom, the operator to ensure the reduced SWL is taken into consideration as per the manufactures instructions.
- Where it is stated “thorough examination certificate (TEC)”, you should confirm that the excavator requires a 12 month TEC and the accessories a 6 month TEC. This is to avoid clarify to the operator the timescales, to avoid confusion and ensure compliance.
- The supervisor must ensure that the telehandler being used has been maintained and has a current report of thorough examination covering both the machine and any attachments
- The supervisor must carry out a toolbox talk before work starts covering the task to be carried out, personnel involved, work area, risks, exclusion zones and procedures
- At the start of each day or shift the operator should carry out the pre-use checks specified in the manufacturer's operating instructions
- Seat belts must be worn at all times
- The telehandler's brake engine must be switched off and then applied before the operator leaves the cab. Before any personnel approach the telehandler to secure loads etc. the operator must ensure that the telehandler is made safe i.e. the brake applied and the engine switched off
- The operator should plan the route and final destination of the load, making sure the route is clear of all obstacles, that there are no width or height issues with the load or telehandler and that the final destination is a safe and suitable place for the load. If the route involves travelling or working on slopes, the manufacturer's operators instructions should be consulted before traversing gradients and cross slopes
- Where you have stated planning a route : please add when working near excavations and walking routes stop blocks and adequate warning signs should be positions to prevent the collisions with pedestrians and plant falling into excavations. Also, excavator driver to ensure no overhead services (overhead line equipment) above.
- Before lifting a load the operator should get out and inspect the load - check for warning signs, centre of gravity, loose materials on the load or anything anchoring the load
- Before lifting the load the operator should check ground conditions to make sure it is suitable for them to drive and use stabilisers on. Spreader mats should be used if the ground conditions or weight of the load make it necessary to do so
- The operator should then lift the load approximately 150mm (6 inches) and check the load position, weight and balance
- The load should then be secured, strapped down or fastened where necessary
- Before setting off, the boom should be telescoped in as far as possible and the load lowered as close to the ground as possible to increase stability whilst travelling
- If the load obscures the operator's view when travelling, a banksman should be used. A banksman should also be used when reversing
- Before placing the load in the final position the operators should check the ground conditions
- If the operator is unable to clearly see the load's final position, a qualified banksman should be used to signal to the operator when landing the load
- When the lifting operation has been completed, the telehandler should be stored in a safe place, on level ground where possible, with the handbrake engaged, the boom and fork arms/handling attachment lowered to the ground, the key removed and the cab locked. The key should be stored in a safe place and not left in the machine
- When using extension forks the safe working limit should be reduced as the standard Rated Capacity chart will not give the correct information as it only applies to loads on standard length forks. Information on the rated capacity of extended forks can be found in the manufacturer's operating instructions
- If the operator is unsure of any aspect of the lifting operation they must immediately stop and consult their supervisor

1.2.2 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

1.2.3 Hot works

Using a flame torch (thermal cutting) - fume control

- Use the correct nozzle
- Ensure the flame does not burn at its maximum length, instead try to keep it as short as possible
- Extinguish the torch during short working pauses, this may be made easier by using gas economisers with a pilot flame to avoid the need to reset the mixture when relighting the torch
- Where there is a choice of possible coatings, select one with lower fume emissions using the coatings' safety data sheet (SDS)
- Cover the parts to be cut with tape or plastic film before painting or schedule the painting so that as much of it as possible is conducted after cutting has been completed
- Where possible remove any coatings or contaminants from the cutting point prior to commencing the cut (as far as possible use mechanical means, eg scraper, emery paper or, for larger areas, vacuum blasting, although the dust that is released will need to be controlled)
- Establish what action should be taken if an unknown coating cannot be removed from a work piece (this should include requirements for both LEV and RPE)
- Increase the length of the cutting torch; and working with the head outside the plume of fumes and, if working outside, work up wind from where the cut is made

Hot works - pre start inspection

- A pre-start inspection of the workplace must be carried out
- Check the location of work
- Check the fire safety and prevention procedures currently in place
- Check the material to be worked
- Check available ventilation
- Check other works in progress in and around the work area
- Check access & egress

1.2.4 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

1.2.5 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

Maintenance - PAT testing

- Ensure all appliances are isolated or unplugged
- Undertake a visual inspection
- Undertake testing of the appliance
- Fix appliances or tools as necessary and label
- Update site log book of those items that passed PAT testing
- Remove any items that failed testing from site

1.3 Risk assessment register

- 2.1 Working around live electrical equipment - page 17
- 2.2 Working in occupied areas - page 18
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- 2.32 Electrical work up to 400 volts - page 57
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- 2.34 Electrical isolations - page 59
- 2.35 Installation of cabling - page 60

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
- Fire Safety Act 2021
- 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 2022
- The Manual Handling Operations Regulations 1992
- The Construction (Design and Management) Regulations 2015
- The Personal Protective Equipment at Work Regulations 1992, amendment 2002
- The Pressure Systems Safety Regulations 2000
- Pressure Equipment Regulations 2016
- The Environmental Protection Act 1990
- Ozone Depleting Substances Regulations 2015
- Fluorinated Greenhouse Gases Regulations
- The Hazardous Waste Regulations 2005
- Electricity at Work Regulations 1989

1.6 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.

1.7 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.

1.8 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?

1.9 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)

1.10 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.

1.11 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.

1.12 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.

1.13 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 principal contractor.

1.14 COSHH register

- R23 - page 63
- R404A - page 77
- R449A - page 93
- REFRIGERANT R452A - page 110
- NITROGEN (OXYGEN FREE) - page 119
- Oxygen - page 123
- Acetylene, dissolved - page 126
- 4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR - page 144
- WD-40 Aerosol - page 151
- Multi Surface Cleaner - page 176
- 2007/000 CELLULOSE THINNERS - page 184

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 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.
- Welding gauntlets(gloves)
- Brazing goggles
- Flame retardant overalls
- RPE fume extraction welding hood

PPE considerations for the hot works may include:

1.19 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.

1.20 Hot works permit

Always assess whether works can be completed via cold techniques before proceeding with a hot works permit

The hot works permit must address the following points:

- What work will be done
- How and when it is to be done
- What safety and health precautions are needed
- Who is responsible for checking it is safe to start
- Who will check the work is done safely
- Who is responsible for confirming that work is complete and there is no longer a risk from, or to, the people doing the work.
- Start and finish times for hot works
- Location of works
- Type of activity
- Designated fire watch time

1.21 General lone working arrangements

The following considerations must be in place for managing general lone working tasks:

- Communication arrangements in place for keeping in touch with lone workers
- Access to emergency arrangements for lone workers
- Ensure lone workers and their line managers have information, instruction and training in lone working
- Ensure lone workers are fit for work before starting works and ensure health monitoring is in place to keep track of the health, safety and welfare of lone workers
- Ensure that any vulnerable persons are identified and lone working is controlled with a greater number of controls or agree that lone working is prohibited for these individuals
- Assess whether any devices need to be implemented to alert people of a lone working incident
- Ensure a full risk assessment and dynamic assessment(s) has taken place so that all foreseeable risks have been captured and adequately controlled
- Ensure a good level of housekeeping within the work area to allow a quick and safe evacuation in the event of an emergency
- Assess whether verbal or physical abuse could be a foreseeable hazard and manage the risk to your lone workers accordingly

Check for vulnerable persons in the workforce

Consider whether any 'man down' devices need to be implemented for lone workers

Always check lone workers fitness for work and manage their health as an ongoing requirement

Check that both operatives and line managers have suitable training and information in relation to lone working

Ensure emergency arrangements are in place for lone workers (communication, fire and first aid)

Ensure communications are in place to check in with lone workers such as a Buddy system

Ensure good housekeeping for a quick and safe evacuation when needed

Conduct ongoing risk assessment to ensure all hazards are being controlled

Check if verbal / physical abuse is likely to lone workers and protect them accordingly

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

Document created: 13 Mar 25
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Prepared by: Steve Jones
Position: Managing Director

SJJ Generic RAMS

Location of works:
SJJ System Services Ltd

Site address:
Unit 20 Heads of Valley Ind Est
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Rams reference: Quotation Copy
Client reference: Sample
Client: Service Customers
Principal designer: Steve Jones
Principal contractor: SJJ System Services Ltd
Start date and end date: 13/03/2025 to 13/03/2026

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 around live electrical equipment

2.1.1 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

2.1.2 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

2.2 Working in occupied areas

2.2.1 **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

2.3 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 Preventing slips, trips and falls

2.4.1 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 platforms 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 operatives are to ensure good housekeeping onsite and 'clean as you go' is to be 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

2.4.2 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

2.5 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 Lone working

2.6.1 Task: Communication and coordination

Hazard	Risk	Control measures	RR
Loss of communication Lone worker at risk from inadequate response to an incident.	3 x 5 = 15	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. Local procedures for lone working are to be produced and communicated with all operatives, including supervision requirements, permits and lone working emergency procedures Communication device (mobile phone / radio) issued to ensure contact can be made by the lone worker Buddy system / supervision checks are put in place to routinely check up on lone worker at agreed intervals. The lone worker is also to phone when job is complete and they are off site Consideration into whether a safety worn device needs to be used (man down / emergency panic button)	1 x 5 = 5

Persons at risk: User

2.6.2 Task: Sole occupancy driving for work

Hazard	Risk	Control measures	RR
Driving activities Risk of serious injury or death from a road traffic incident	3 x 5 = 15	Public transport use is encouraged where possible All drivers have a valid driving licence and insurance in place Staff must be fit for work before driving The vehicle must be regularly maintained and serviced to ensure optimum operation of the vehicle. Drivers must note weather conditions and drive accordingly A company driving policy is in place Breaks are encouraged every 2 hours of continuous driving to reduce tiredness and fatigue. Staff are not to drive more than 8 hours in one day. Toolbox talk and awareness training about safe driving is in place	1 x 5 = 5

Persons at risk: User

2.6.3 Task: Fitness for work

Hazard	Risk	Control measures	RR
Vulnerable persons Individuals may be at a greater risk from lone working if they are a young person, expectant	3 x 4	Young workers, expectant mothers and those with a medical condition or disability that would prohibit working alone shall not engage in lone working activities (eg diabetes, epilepsy, heart condition) Individuals will be assessed for fitness to work prior to commencing any	1 x 4

mother, or have a disability or medical condition that would prevent lone working from happening.	= 12	lone working activity. Advice from their GP may be required and HR consulted to assist with this. Access to occupational health (OH) and / or health & safety competent person is available to assist with risk assessing lone working activities Information, instruction and awareness around the dangers of lone working The work is only to be undertaken by those with the correct competencies, i.e. young workers would need supervision therefore not suitable for lone working	= 4

Persons at risk: User

2.6.4 **Task:** Accessing site / work location

Hazard	Risk	Control measures	RR
Access & egress Risk of injury to lone worker due to inadequate access and exit to site and inadequate first aid resources to respond to incident	4 x 4 = 16	Lone worker made aware of access / egress arrangements for the building Point of work / dynamic risk assessment completed to ensure access / egress to the work location is safe Any staff within the work location (eg security staff / out of hours staff) will be notified of works Good housekeeping maintained at all times to ensure escape routes remain free from obstruction at all times.	1 x 4 = 4

Persons at risk: User

2.6.5 **Task:** Emergency arrangements

Hazard	Risk	Control measures	RR
Emergency incident Harm and / or damage to premises as a result of inadequate emergency arrangements to respond to an incident	3 x 5 = 15	Ensure suitable fire detection and fire fighting equipment is in place and operational within lone working area Ensure emergency plans are in place for the work location and that the lone worker is made aware of the arrangements Ensure the lone worker is trained in responding to emergency incidents as required Ensure a suitable form of communication is in place to report the incident to the emergency services and line management	1 x 5 = 5

Persons at risk: All site operatives

2.6.6 **Task:** Personal security

Hazard	Risk	Control measures	RR
Violence in the workplace Lone worker at risk from verbal or physical abuse	3 x 4	Lone workers to receive conflict resolution awareness and routine toolbox talks about personal safety Lone workers to position vehicles close to works where possible or	1 x 4

	= 12	within a well lit environment Communication device issued to lone worker so that any emergency incident can be raised Further guidance and information is available via the Suzy Lamplugh trust - https://www.suzylamplugh.org/	= 4

Persons at risk: User

2.6.7 **Task:** General lone working

Hazard	Risk	Control measures	RR
Work equipment Increased risk of injury due to person working on their own and may not be able to get assistance	3 x 4 = 12	High-risk activities (like working on live electrical equipment and working in confined spaces) is to be either eliminated or minimised where possible 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 Equipment hazards to also be adequately controlled, such as ensuring equipment has the correct fitted guard before proceeding with work	1 x 4 = 4

Persons at risk: All site operatives

2.7 Delivery of materials

2.7.1 Task: Unloading of materials

Hazard	Risk	Control measures	RR
Falls from height or a back strain/injury during unloading	5 x 4 = 20	The delivery driver is to avoid manual handling beyond their capability, which they believe may cause injury. The delivery driver is to ensure mechanical lifting aids (telehandler, pallet truck etc.) are used to offload materials wherever possible. The delivery driver is to ensure the correct loading of delivery vehicles prior to the vehicles leaving the materials yard and is to ensure the security of the load for transportation. Materials are to be palleted and wrapped wherever possible. The delivery driver is to ensure that delivery vehicles are loaded in the correct order of the deliveries so as to eliminate the need for re-stacking materials after the first delivery has been made. No one is to enter the back of the vehicle unless suitable edge protection is in place to prevent a fall from height. Where suitable edge protection is unavailable, a restraint lanyard will be used to restrict access to any leading edges.	1 x 4 = 4

Persons at risk: User

2.7.2 Task: Unloading materials

Hazard	Risk	Control measures	RR
Injuries from falling loads or the mechanical failure of a tail lift whilst unloading	5 x 4 = 20	The delivery driver is to take care of the security of the load when opening the doors or curtains. The delivery vehicle door or curtains are only to be opened from the ground and no entry is to be made to the vehicle whilst the doors or curtains are open. A tail lift is only to be operated under the manufacturer's recommended weight limits. A tail lift is only to be operated by those trained and assessed as competent to do so. A tail lift is to be inspected as per the manufacturer's recommendations. If operatives are manually unloading materials, items are to be positioned in the area required with the curtains/doors closed. A tail lift may be used as an interim platform for loading/unloading. The delivery driver is to ensure the correct loading of delivery vehicles prior to the vehicles leaving the materials yard and is to ensure the security of the load for transportation.	1 x 4 = 4

Persons at risk: User

2.8 Working outside

2.8.1 Task: Working outside

Hazard	Risk	Control measures	RR
Heatstroke/ sunburn	4 x 5 = 20	In advance of significantly hot weather, operatives will receive a toolbox talk regarding the hazards, risks and control measures in place. In warmer months, sun-protective clothing," such as long sleeves and full length trousers" A minimum of SFP30 sun cream will be provided for all operatives, where required, operatives are expected to re-apply it every 2-3 hours when working outdoors. Operatives are to take regular breaks, rehydrating and resting in the shade where possible.	1 x 5 = 5

Persons at risk: All site operatives

2.8.2 Task: Working outside

Hazard	Risk	Control measures	RR
Cold weather	4 x 5 = 20	In advance of significantly cold weather, operatives will receive a toolbox talk regarding the hazards, risks and control measures in place. In colder months, suitable warm clothes will be worn, suitable heating will be arranged within the welfare areas. Operatives are to take regular breaks, drinking warm drinks and resting in the warmth.	1 x 5 = 5

Persons at risk: All site operatives

2.9 General office work

2.9.1 Task: Display screen equipment

Hazard	Risk	Control measures	RR
Staff risk posture problems and pain, discomfort or injuries (e.g. to their hands/arms) from overuse or improper use of the equipment or from poorly designed workstations or work environments. Headaches or sore eyes can also occur, e.g. if the lighting is poor.	4 x 4 = 16	DSE Risk Assessments are to be carried out at least annual for all DSE users and any issues identified are to be rectified in a timely manner. Any actions are to be carried out ASAP. Additional re-assessments are to be carried out where there a change to the work equipment, work environment, or the individual. A initial DSE Risk Assessment will be completed at induction for all new starters. Workstation and equipment are to be set up to ensure good posture and to avoid glare and reflections on the screen Shared workstations are to be assessed for all users Work is to be planned to include regular breaks or changes of activity Lighting and temperature is to be suitably controlled Adjustable blinds are to be installed at the window to control natural light on the screen Noise levels are to be controlled Eye tests are to be provided for those who need them and the duty holder is to pay for basic spectacles specific for VDU use (or a portion of cost in other cases) Laptop users are to be trained to carry out their own DSE assessment for use away from office. When used at the office, the laptop should be used with a docking station, screen, keyboard and mouse.	1 x 4 = 4

Persons at risk: All site operatives

2.9.2 Task: General office work

Hazard	Risk	Control measures	RR
Staff could get electrical shocks or burns from using faulty electrical equipment. Electrical faults can also lead to fires.	3 x 5 = 15	Staff are to be trained to spot and report (to an office administrator) any defective plugs, discoloured sockets or any damaged cables/equipment. Defective equipment is to be taken out of use safely and is to be promptly replaced. Staff are to be told not to bring in their own appliances, toasters, fans etc. All mains electrical equipment and wiring is to be periodically inspected and maintained All portable electrical appliances to be periodically maintained and PAT testing All electrical equipment is to be used as per the manufacturer's instructions All staff will receive suitable information, instruction and training on the	1 x 5 = 5

safe use of the electrical equipment used.

Persons at risk: All site operatives

2.10 Using telehandlers

2.10.1 Task: Operating telehandler around people

Hazard	Risk	Control measures	RR
Telehandler chassis, boom or moving load striking people in area	4 x 5 = 20	Public excluded from secure site Segregate telehandler and personnel where possible Ensure telehandler has adequate vision aids such as rear-view mirrors, and cctv If necessary establish effective exclusion zone in conjunction with Principal Contractor All personnel to wear high visibility clothing Ensure personnel are fully briefed on need to keep clear of load during lifting and telehandler during travelling Ensure telehandler is made secure from unauthorised access or operation Use of plant and lifting equipment near walking routes and where there is no clear segregation is to be directed by a trained and assessed as competent banksman at all times Operators to adhere to the site speed limit at all times At no point will the safe working load be exceeded All operatives working in close proximity to plant and within the exclusion zone, to be briefed on the operators blind spots and safe working distances Where required warning systems such as beacons and sirens to be fitted	1 x 5 = 5

Persons at risk: All site operatives

2.10.2 Task: Operating telehandler under stability concerns

Hazard	Risk	Control measures	RR
Ground unable to support telehandler	4 x 4 = 16	Establish presence of voids/underground services with Principal Contractor Assess the ground conditions and establish whether it is safe to operate in the area If required, Supervisor to check that mats supplied match those specified in Method Statement and are suitable to support/disperse the load Any voids identified should be adequately demarked with barriers and warning signs to exclude plant access until suitable control measures can be implemented Stabilizer mats to be used as required	1 x 4 = 4

Persons at risk: All site operatives			
Telehandler overloaded	4 x 5 = 20	Ensure weight of load is known and accurate Telehandler operator to have proof of competence	1 x 5 = 5
Persons at risk: All site operatives			
Telehandler failure	4 x 3 = 12	Ensure telehandler has been adequately maintained, pre-use checks carried out and has current report of thorough examination	1 x 3 = 3
Persons at risk: All site operatives			

2.10.3 **Task:** Movement of load

Hazard	Risk	Control measures	RR
Load or telehandler structure collides with overhead obstacles	4 x 4 = 16	Route to be planned and overhead obstacles marked with goal posts and signs Boom to remain as low as practicable at all times Operator and banksman to be advised of any overhead risks	1 x 4 = 4
Persons at risk: All site operatives			
Load collides with other plant - cranes, excavators etc	4 x 5 = 20	Establish effective exclusion zone Ensure that the safe systems of work for other plant in the vicinity address this hazard	1 x 5 = 5
Persons at risk: All site operatives			
Telehandler boom comes within arcing distance of overhead lines	4 x 5 = 20	Establish presence or otherwise of overhead lines.If present arrange for isolation or position telehandler boom/load outside minimum safe approach distance	1 x 5 = 5
Persons at risk: All site operatives			

Loose parts on load may fall	4 x 5 = 20	Inspect load for lose objects prior to lift and secure/remove loose items All personnel to wear hard hats	1 x 5 = 5

Persons at risk: All site operatives

2.10.4 **Task:** Environmental conditions

Hazard	Risk	Control measures	RR
Telehandler becomes unstable when lifting loads with large wind area	4 x 5 = 20	Wind speed to be checked with hand held anemometer by Supervisor before lift starts. Lift to be aborted if wind speed exceeds 15 mph	1 x 5 = 5

Persons at risk: All site operatives

2.11 Using portable power tools

2.11.1 Task: Using portable power tools

Hazard	Risk	Control measures	RR
Electrocution causing serious or fatal injuries whilst using portable power tools	3 x 5 = 15	Only 110v or battery operated equipment to be used Electric equipment to be kept dry and stored in toolbox to protect from damp and damage Visual inspection prior to use, plugs, leads, power supply (transformer), insulation, switches, RCD(if used), signs of burns, casing, loose parts Damaged or defective equipment including leads to be replaced immediately or fixed by competent person Electrical equipment must not to be tampered with, anything showing evidence of tampering must not be used until tested by a professional Electrical equipment to be PAT tested	1 x 5 = 5
Persons at risk: User			
Hearing loss to site operatives working near noisy power tools	3 x 2 = 6	All operatives trained in risks of noise exposure Suitable hearing protectors should be provided for operatives and any surrounding workers Use low-noise tooling where possible Operatives and the supervisors are to co-ordinate with other workers in the area to ensure that works taking place do not impact one another's safety, where unavoidable operatives working nearby noisy works will be provided with suitable hearing protection.	1 x 2 = 2
Persons at risk: All site operatives			
Serious cuts, injuries or amputations to body parts from the incorrect use of cutting tools	3 x 5 = 15	All operatives to be trained in the safe usage of power tools Always choose the right tool for the job Ensure all portable tools are set up correctly and securely fastened to worktops as per product specifications Ensure any portable tools that are set up, are in a designated safe area avoiding thoroughfare of other workers or vehicles All cutting tools to have safety guards incorporated, fastened securely and regularly checked and maintained Ensure no loose clothing is worn in the vicinity of cutting, and gloves are worn at all time	1 x 5 = 5
Persons at risk: User			

2.12 Using disc cutters

2.12.1 Task: Operating petrol disc cutters or cut off saws

Hazard	Risk	Control measures	RR
Inhalation of respirable crystalline silica (RCS) causing silicosis, chronic obstructive pulmonary disease (COPD) or lung cancer	5 x 5 = 25	Operate machinery in a well ventilated and cordoned off area Attach water hose to cut-off saw and use as suppression during cutting A dust mask with respirator with an assigned protection factor of 20 must be worn at all times	1 x 5 = 5
Persons at risk: User			
Serious injuries sustained from using faulty equipment	4 x 4 = 16	Only a trained operative may use a cut-off saw or disc cutter Where damage and/or defects are identified, equipment will be taken out of use Equipment is to be visually inspected prior to use checking for damage and defects Ensure machinery is inspected regular and tracked in a log Ensure cutting disks are replaced when worn by a trained operative	1 x 4 = 4
Persons at risk: User			
Serious injuries sustained to eyes or body from contact with flying objects or cutting wheels	4 x 3 = 12	Only operatives with training and authorised to use cut of saws should undertake work Guard on cutting wheel to be correctly adjusted to suit work position Equipment will only be used as described within the manufacturers instructions Suitable eye protection will be worn at all times	1 x 3 = 3
Persons at risk: User			
Hearing damage sustained from the use of cut off saws or disk cutters	5 x 3 = 15	Designated area for cutting to be used where possible When cutting in situ, area to be cleared of personnel or provided with hearing protection Hearing protection to be worn by user at all times	1 x 3 = 3
Persons at risk: User			
Injuries sustained from equipment vibration	4 x 3 =	Use in compliance with Control of Vibration at Work Regulations 2005 Gloves to be worn at all times by operatives Working in short stints with breaks in-between to be applied See vibration risk assessment if sustained use of vibration equipment	1 x 3 =

	12	necessary Work equipment used, duration of use and frequency is to be calculated as per the vibration risk assessment All operatives are to receive a briefing on the exposure action values and limit values for the equipment used. Tools and equipment will be selected for use, with reduction of hand arm vibration and whole body vibration in mind.	3
Persons at risk: User			
Entanglement of clothing or hair whilst using abrasive wheel	3 x 4 = 12	User not to wear loose clothing or jewellery If operative has long hair, ensure hair is tied back	1 x 4 = 4
Persons at risk: User			

2.12.2 **Task:** Fuelling cut off saw or disc cutters (petrol two stroke oil)

Hazard	Risk	Control measures	RR
Serious injuries sustained from fire or explosion	4 x 4 = 16	Operatives are to read and understand the COSHH assessment A designated refuelling area is to be allocated, with suitable spill kits, storage areas and fire fighting provisions No smoking onsite unless in designated areas Ensure fuelling site is shaded and away from any possible ignition source Keep fuel in correct sealed containers When refuelling, ensure saw fuel cap is replaced securely All operatives included will receive information and instruction regarding the location and correct use of the spill kit	1 x 4 = 4
Persons at risk: User			

2.13 Using hand tools

2.13.1 Task: Using portable hand tools

Hazard	Risk	Control measures	RR
Injuries to hands sustained from incorrect use of portable hand tools	4 x 2 = 8	Always choose the right tool for the job All operatives to be trained in the safe use of hand tools before starting works and have necessary experience to use each hand tool Tools used shall have inherent safety features where possible, such as retractable blades for knives Keep cutting tools sharp, so that they cut true without needing to be forced Tools should be checked regularly for damage and any item to be found damaged or defective taken out of use immediately Guards to be used where available and never removed or adjusted from the intended position All portable hand tools are to be used as per the manufacturers instruction	1 x 2 = 2

Persons at risk: User

2.13.2 Task: Using retractable knife

Hazard	Risk	Control measures	RR
Cuts to body or hands whilst using retractable knife	4 x 3 = 12	Retractable knife or chosen cutting device to be used that is suitable for the job, only utilise knifes with molded plastic guard or retractable blade Knives should be checked before use and fitted with a sharp blade before beginning work Knife to be stored in a safely away when not in use Damaged or defective tools to be discarded using appropriate methods if they cannot be repaired	1 x 3 = 3

Persons at risk: User

2.14 Using blow lamp or similar

2.14.1 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			

2.15 Hand soldering

2.15.1 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

2.16 Working from step ladders

2.16.1 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			

2.16.2 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	

2.17 Movement of boxed materials

2.17.1 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

2.18 Moving of general materials of normal size and shape

2.18.1 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

2.19 Moving pipes, rolls or irregular shaped or sized materials

2.19.1 **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

2.20 Cable pulling

2.20.1 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

2.20.2 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

2.21 Brazing

2.21.1 Task: Brazing

Hazard	Risk	Control measures	RR
Fire Risk of fire from heat source and sparks when brazing	3 x 5 = 15	Assess whether hot works can be eliminated such as cold techniques or off site fabrication Fire risk assessment in place and hot work permit to be implemented Combustibles to be removed from work area and escape routes kept free from obstruction at all times Fire watch in place after works Emergency plans in place - fire detection systems, suitable fire fighting equipment located nearby, trained fire marshals on site, and evacuation plans followed	1 x 5 = 5
Persons at risk: All site operatives, Public			
COSHH Hazardous substance exposure to the user resulting in long term ill-health	3 x 4 = 12	COSHH assessment in place for material being used Operatives made aware of health risks through COSHH awareness training and toolbox talks Occupational health monitoring and advice available where required Suitable serviced local exhaust ventilation (LEV) used Respiratory protective equipment (RPE) Base materials cleaned thoroughly before task to remove any hazardous substance contamination from the work area Adequate amount of flux applied to the task to protect the equipment	1 x 4 = 4
Persons at risk: All site operatives			
Repetitive tasks Injury or musculoskeletal disorder resulting from prolonged periods of working in the same position and repetitive movement on the limbs	3 x 4 = 12	Ergonomic assessment tool available for assessment and monitoring Supervision in place to inspect work technique Adequate work breaks provided	1 x 4 = 4
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 Condenser installation

2.23.1 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			

2.24 Installation of cable trunking and trays

2.24.1 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

2.24.2 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

2.25 Testing pressure systems

2.25.1 **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

2.26 Thermal and acoustic insulation to pipework

2.26.1 **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

2.27 Copper pipework installation

2.27.1 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			

2.28 Fan coil unit works

2.28.1 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			

2.29 Air handling unit works

2.29.1 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			

2.30 Electrical testing and commissioning

2.30.1 **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			

2.31 Removal of existing electrical services

2.31.1 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			

2.32 Electrical work up to 400 volts

2.32.1 **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

2.33 PAT testing of appliances or tools

2.33.1 **Task:** PAT testing of appliances or tools

Hazard	Risk	Control measures	RR
Electric shock from coming into contact with an appliance or tool whilst undertaking PAT testing	4 x 5 = 20	All appliances are to be isolated or unplugged, and operatives are to make sure the immediate vicinity of the electrical equipment is safe Any dangers that exist, such as moisture, combustible dust, or members of the public less than 2 metres away, are to be looked for and removed A visual inspection is to be undertaken to ensure there is no damage to the casing or flex, ingress of liquids or dust Operatives are to avoid handling parts of the equipment that may move, turn or become hot or electrically charged while testing Only new or well-maintained testing equipment and insulated tools are to be used All testing and labelling is to be undertaken by a qualified electrician Any tools that are deemed to provide a danger to users are to removed from site Testing equipment used must be in possession of a valid calibration certificate	1 x 5 = 5

Persons at risk: User

2.34 Electrical isolations

2.34.1 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

2.35 Installation of cabling

2.35.1 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			

2.35.2 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			

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
Stephen Jones	Managing Director	07506 777890
Anthony Mabbitt	Service Engineer	07939041405
Mark Whitfield	Service Engineer	07508 192386
Ryan Whitfield	Junior Engineer	
Chris Davies	Service/Technical Support Engineer	07535 315110
Ben Oram	Control Systems Engineer	07534 443337
Calum Maybank	Apprentice	07957 728142

COSHH assessment

R23

Overview

- **Reference:** 11116
- **Composition:** Carbon trifluoride; (Trifluoromethane; Fluoroform)

Hazards

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 AX 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:** Trifluoromethane: reacts violently with alkaline earth and alkali metals reacts violently with aluminium oxide at elevated temperatures producing hydrogen chloride and phosgene vapours is incompatible with beryllium, decaborane, diborane, difluoromethylene, dihypofluorite, fluorine, lithium, magnesium, potassium, acetylene-1,2-dioxide, potassium acetylene-1,2-dioxide, potassium-sodium alloy, sodium amide, Titanium, uranium hydride, zinc attacks aluminium, magnesium, zinc and their alloys As a general rule, hydrofluorocarbons tend to be flammable unless they contain more fluorine atoms than hydrogen atoms. Haloalkanes: are highly reactive:some of the more lightly subsϴtuted 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 reacquire 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, reacϴon 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. Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances
- **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:** Refrigerant gas R 23; Trifluoromethane (R23)
- **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

R23

A-Gas (UK) Ltd

Chemwatch Hazard Alert Code: **1**

Chemwatch: **1984**
Version No: **9.1.1.1**
Safety Data Sheet (Conforms to Regulation (EU) No 2015/830)

Issue Date: **27/06/2017**
Print Date: **14/05/2020**
L.REACH.GBR.EN

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

1.1. Product Identifier

Product name	R23
Chemical Name	trifluoromethane
Synonyms	C-H-F3; carbon trifluoride; methane, trifluoro -; fluoroform; methyl trifluoride; fluoryl; Amerfrost A-23; Freon R-23; Genetron 23; Arcton 1; Arcton; Propellant 23; Refrigerant 23; halocarbon 23
Proper shipping name	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
Chemical formula	CHF3
Other means of identification	Not Available
CAS number	75-46-7
EC number	200-872-4
REACH registration number	01-2119971823-29-XXXX

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

Relevant identified uses	Refrigerant, intermediate in organic synthesis; direct coolant for infrared detector cells; blowing agent for urethane foams.
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 Bristol BS20 7XH 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	**A-Gas (UK) Ltd**
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

Classification according to regulation (EC) No 1272/2008 [CLP] [1]	H280 - Gas under Pressure (Compressed gas)
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

2.2. Label elements

Hazard pictogram(s)	
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) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.

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*.

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

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classification according to regulation (EC) No 1272/2008 [CLP]
1.75-46-7 2.200-872-4 3.Not Available 4.01-2119971823-29-XXXX	>98	R23	Gas under Pressure (Compressed gas); H280, EUH044 [1]

Legend: *1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; * EU IOELVs available*

3.2.Mixtures

See 'Information on ingredients' in section 3.1

SECTION 4 FIRST AID MEASURES

4.1. Description of first aid measures

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 contact occurs: ‣ Immediately remove all contaminated clothing, including footwear. ‣ Flush skin and hair with running water (and soap if available). ‣ Seek medical attention in event of irritation.
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. ‣ Avoid giving milk or oils. ‣ Avoid giving alcohol.

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 intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- There is no specific antidote

C: Decontamination

- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- Treatment based on judgment of the physician in response to reactions of the patient

For frost-bite caused by liquefied petroleum gas:

- If part has not thawed, place in warm water bath (41-46 C) for 15-20 minutes, until the skin turns pink or red.
- Analgesia may be necessary while thawing.
- If there has been a massive exposure, the general body temperature must be depressed, and the patient must be immediately rewarmed by whole-body immersion, in a bath at the above temperature.
- Shock may occur during rewarming.
- Administer tetanus toxoid booster after hospitalization.
- Prophylactic antibiotics may be useful.
- The patient may require anticoagulants and oxygen.

[Shell Australia 22/12/87]

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	• Non combustible. • Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of: hydrogen fluoride **Contains low boiling substance:** Closed containers may rupture due to pressure buildup under fire conditions. • Vented gas is more dense than air and may collect in pits, basements.

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 where 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.

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. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature ·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.
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. Cylinder temperature should not exceed 52 deg C.
Storage incompatibility	Trifluoromethane: ‣ reacts violently with alkaline earth and alkali metals ‣ reacts violently with aluminium oxide at elevated temperatures producing hydrogen chloride and phosgene vapours ‣ is incompatible with beryllium, decaborane, diborane, difluoromethylene, dihypofluorite, fluorine, lithium, magnesium, potassium, acetylene-1,2-dioxide, potassium acetylene-1,2-dioxide, potassium-sodium alloy, sodium amide, titanium, uranium hydride, zinc ‣ attacks aluminium, magnesium, zinc and their alloys As a general rule, hydrofluorocarbons tend to be flammable unless they contain more fluorine atoms than hydrogen atoms. 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. ‣ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

7.3. Specific end use(s)

See section 1.2

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
R23	Inhalation 1 439 mg/m³ (Systemic, Chronic) *Inhalation 358 mg/m³ (Systemic, Chronic) **	Not Available

* Values for General Population

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
R23	Carbon trifluoride; (Trifluoromethane; Fluoroform)	440 ppm	4,900 ppm	29,000 ppm

Ingredient	Original IDLH	Revised IDLH
R23	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable.
May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.
CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly. It may not be appropriate to only recommend an exposure standard for simple asphyxiants rather it is essential that sufficient oxygen be maintained.

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	‣ Safety glasses with side shields. ‣ Chemical goggles. ‣ 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.
Body protection	See Other protection below
Other protection	‣ 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.

Respiratory protection

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

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AX-AUS / Class1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand
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)

- 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.

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	Colourless, liquefiable, gas with slight ethereal odour; slightly soluble in water. Soluble in alcohol, acetone, benzene, hydrocarbons, chlorinated solvents, ketones, esters and organic acids. Vapour heavier than air.

Physical state	Compressed Gas	**Relative density (Water = 1)**	1.52 @ -100 C
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)	-160	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	-82.2	**Molecular weight (g/mol)**	70.02
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Fast	**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)	4210 @ 21 deg C	**Gas group**	Not Available
Solubility in water	Partly miscible	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	2.43	**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. ‣ Presence of elevated temperatures.
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	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation, of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. 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. 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. Symptoms of asphyxia (suffocation) may include headache, dizziness, shortness of breath, muscular weakness, drowsiness and ringing in the ears. If the asphyxia is allowed to progress, there may be nausea and vomiting, further physical weakness and unconsciousness and, finally, convulsions, coma and death. Significant concentrations of the non-toxic gas reduce the oxygen level in the air. As the amount of oxygen is reduced from 21 to 14 volume %, the pulse rate accelerates and the rate and volume of breathing increase. 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.
Ingestion	Overexposure is unlikely in this form. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. In common with other halogenated aliphatics, fluorocarbons may cause dermal problems due to a tendency to remove natural oils from the skin causing irritation and the development of dry, sensitive skin. They do not appear to be appreciably absorbed. Open cuts, abraded or irritated skin should not be exposed to this material Material on the skin evaporates rapidly and may cause tingling, chilling and even temporary numbness 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	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). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures.. Persons with potential for exposure should not wear contact lenses.

Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Principal route of occupational exposure to the gas is by inhalation. 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.

R23	**TOXICITY**	**IRRITATION**
	Inhalation (rat) LC50: >662243.517 mg/l/4H[2]	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*	

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 either not available or does not fill the criteria for classification*
✓ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

12.1. Toxicity

R23	**ENDPOINT**	**TEST DURATION (HR)**	**SPECIES**	**VALUE**	**SOURCE**
	LC50	96	Fish	129.356mg/L	3
	EC50	96	Algae or other aquatic plants	154.54mg/L	2
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - 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*				

For trifluoromethane:
Environmental Fate
TERRESTRIAL FATE: An estimated Koc value of 53 determined from a log Kow of 0.64 and a regression-derived equation, indicates that trifluoromethane is expected to have high mobility in soil. Volatilization of trifluoromethane from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 9.52x10-2 atm-cu m/mole. The potential for volatilization of trifluoromethane from dry soil surfaces may exist based on a vapor pressure of 3.53x10+4 mm Hg. Highly fluorinated compounds such as trifluoromethane are not expected to biodegrade rapidly.
In addition to carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), the greenhouse gases mentioned in the Kyoto Protocol include synthetic substances that share the common feature of being highly persistent in the atmosphere and exhibiting very high specific radiative forcing (radiative forcing is the change in the balance between radiation coming into the atmosphere and radiation out; a positive radiative forcing tends on average to warm the surface of the earth). These synthetic substances include hydrocarbons that are partially fluorinated (HCFs) or totally fluorinated (PFCs) as well as sulfur hexafluoride (SF_6).
The greenhouse potential of these substances, expressed as multiples of that of CO_2, are within the range of 140 to 11,700 for HFCs, from 6500 to 9,200 for PFCs and 23,900 for SF_6. Once emitted into the atmosphere, these substances have an impact on the environment for decades, centuries, or in certain instances, for thousands of years.
DO NOT discharge into sewer or waterways.

12.2. Persistence and degradability

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

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
R23	LOW (LogKOW = 0.64)

12.4. Mobility in soil

Ingredient	Mobility
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	2T

Land transport (ADR)

14.1. **UN number**	1984
14.2. **UN proper shipping name**	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3. **Transport hazard class(es)**	Class: 2.2 Subrisk: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Hazard identification (Kemler): 20 Classification code: 2A Hazard Label: 2.2 Special provisions: 662 Limited quantity: 120 ml Tunnel Restriction Code: 3 (C/E)

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1984
14.2. **UN proper shipping name**	Refrigerant gas R 23; Trifluoromethane (R23)
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 2.2 ICAO / IATA Subrisk: Not Applicable ERG Code: 2A
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
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**	1984
14.2. **UN proper shipping name**	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3. **Transport hazard class(es)**	IMDG Class: 2.2 IMDG Subrisk: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	EMS Number: F-C , S-V Special provisions: Not Applicable Limited Quantities: 120 mL

Inland waterways transport (ADN)

14.1. **UN number**	1984
14.2. **UN proper shipping name**	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3. **Transport hazard class(es)**	2.2 Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Classification code: 2A Special provisions: 662 Limited quantity: 120 ml Equipment required: PP Fire cones number: 0

14.7. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

R23 IS FOUND ON THE FOLLOWING REGULATORY LISTS

Europe EC Inventory

Europe European Customs Inventory of Chemical Substances

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

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2015/830; Regulation (EC) No 1272/2008 as updated through ATPs.

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
R23	75-46-7	Not Available	01-2119971823-29-XXXX

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

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

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	No (R23)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	27/06/2017
Initial Date	Not Available

Full text Risk and Hazard codes

SDS Version Summary

Version	Issue Date	Sections Updated
8.1.1.1	17/06/2010	Supplier Information
9.1.1.1	27/06/2017	Supplier Information, Synonyms

Other information

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.

The 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

R404A

Overview

- **Reference:** 10175
- **Composition:** 1,1,1-trifluoroethane, pentafluoroethane, 1,1,1,2- tetrafluoroethane

Hazards

First aid

Eyes

If product comes in contact with eyes remove the paent from gas source or contaminated area. Take the paent 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 paent lie or sit down and lt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, leng the water run out of the outer corners. The paent 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 paent looks up, and side to side as the eye is rinsed in order to beer 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 paent cannot tolerate light, protect the eyes with a clean, loosely ed bandage. Ensure verbal communicaon and physical contact with the paent. 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

Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical aenon in event of irritaon.

Inhalation

Following exposure to gas, remove the paent from the gas source or contaminated area. NOTE: Personal Protecve Equipment (PPE), including posive 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 iniang first aid procedures. If the paent is not breathing

Handling precautions and PPE

Respiratory

Type AX Filter of sufficient capacity.

Hand

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.

Skin

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.

Eye

Safety glasses with side shields. Chemical goggles. 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.

	spontaneously, administer rescue breathing. If the paent 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 instrucon. Keep the paent warm, comfortable and at rest while awaing 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. If poisoning occurs, contact a doctor or Poisons Informaon Centre. Avoid giving milk or oils. Avoid giving alcohol.

- **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:** N/A
- **Storage precautions:** DO NOT use aluminium or galvanised containers Cylinder: Ensure the use of equipment rated for cylinder pressure. Ensure the use of compable materials of construcon. Valve protecon cap to be in place unl cylinder is secured, connected. Cylinder must be properly secured either in use or in storage.
- **Flashpoint:** N/A
- **Transport precautions:** REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1- trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)
- **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 vapour and any contact with liquid or gas. Protecve equipment including respirator should be used. DO NOT enter confined spaces were gas may have accumulated. Increase venlaon. Major Spills: Clear area of all unprotected personnel and move upwind. Alert Emergency Authority and advise them of the locaon and nature of hazard. Wear breathing apparatus and protecve 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 condions Burn issuing gas at vent pipes. DO NOT exert excessive pressure on valve; DO NOT aempt to operate damaged valve.

R404A

A-Gas (UK) Ltd

Chemwatch Hazard Alert Code: **1**

Chemwatch: **8531-92**
Version No: **9.1**
Safety data sheet according to REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758

Issue Date: **23/12/2022**
Print Date: **11/01/2024**
L.REACH.GB.EN

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

1.1. Product Identifier

Product name	R404A
Synonyms	Suva HP62; 404A; Suva 404A; Suva R404A; HP62
Proper shipping name	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1- trifluoroethane, and 1,1,1,2- tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1- trifluoroethane)
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Refrigerant, for professional users only The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
Uses advised against	No specific uses advised against are identified.

1.3. Details of the manufacturer or supplier of the safety data sheet

Registered company name	**A-Gas (UK) Ltd**
Address	Banyard Road, Portbury West Bristol BS20 7XH 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	**A-Gas (UK) Ltd**	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	**+44 (0) 1275 376600**	**+44 20 3901 3542**
Other emergency telephone numbers	**Not Available**	**+44 808 164 9592**

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

2.1. Classification of the substance or mixture

Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567 [1]	H280 - Gases Under Pressure (Liquefied Gas)
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567*

2.2. Label elements

Page 1 continued...

Hazard pictogram(s)	
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) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read carefully and follow all instructions.

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

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	Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567	SCL / M-Factor	Nanoform Particle Characteristics
1. 420-46-2 2.206-996-5 3.Not Available 4.01-2119492869-13-XXXX	30-60	1,1,1-trifluoroethane	Flammable Gases Category 1A; H220, EUH044 [1]	Not Available	Not Available
1. 354-33-6 2.206-557-8 3.Not Available 4.01-2119485636-25-XXXX	30-60	pentafluoroethane	Gases Under Pressure (Liquefied Gas); H280, EUH044 [1]	Not Available	Not Available
1. 811-97-2 2.212-377-0 3.Not Available 4.01-2119459374-33-XXXX	<10	1,1,1,2-tetrafluoroethane	Gases Under Pressure (Liquefied Gas); H280, EUH044 [1]	Not Available	Not Available

Legend:	*1. Classified by Chemwatch; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties*

Continued...

SECTION 4 First aid measures

4.1. Description of first aid measures

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 contact occurs: ‣ Immediately remove all contaminated clothing, including footwear. ‣ 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. ‣ For advice, contact a Poisons Information Centre or a doctor. ‣ Avoid giving milk or oils. ‣ Avoid giving alcohol.

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 intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

‣ Maintain an open airway and assist ventilation if necessary
‣ Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
‣ Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

‣ There is no specific antidote

C: Decontamination

‣ Inhalation; remove victim from exposure, and give supplemental oxygen if available.
‣ Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- Treatment based on judgment of the physician in response to reactions of the patient

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	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

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: carbon monoxide (CO) carbon dioxide (CO_2) hydrogen fluoride other pyrolysis products typical of burning organic material. **Contains low boiling substance:** Closed containers may rupture due to pressure buildup under fire conditions.

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 where 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.

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. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · 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.
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. **DO NOT** store above 50 deg. C.

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	‣ **DO NOT** use aluminium or galvanised containers ‣ 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.
Storage incompatibility	‣ Avoid reaction with oxidising agents ‣ Avoid magnesium, aluminium and their alloys, brass and steel.
Hazard categories in accordance with Regulation (EC) No 1272/2008	Not Available
Qualifying quantity (tonnes) of dangerous substances as referred to in Article 3(10) for the application of	Not Available

+	+	+	+	+	+	+

X — *Must not be stored together*
0 — *May be stored together with specific preventions*

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

7.3. Specific end use(s)

See section 1.2

SECTION 8 Exposure controls / personal protection

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
1,1,1-trifluoroethane	Inhalation 438.61 mg/m³ (Systemic, Chronic) *Inhalation 219.3 mg/m³ (Systemic, Chronic) **	350 µg/L (Water (Fresh))
pentafluoroethane	Inhalation 16 444 mg/m³ (Systemic, Chronic) *Inhalation 1 753 mg/m³ (Systemic, Chronic) **	0.1 mg/L (Water (Fresh)) 1 mg/L (Water - Intermittent release) 0.6 mg/kg sediment dw (Sediment (Fresh Water))
1,1,1,2-tetrafluoroethane	Inhalation 13 936 mg/m³ (Systemic, Chronic) *Inhalation 2 476 mg/m³ (Systemic, Chronic) **	0.1 mg/L (Water (Fresh)) 1 mg/L (Water - Intermittent release) 0.01 mg/L (Water (Marine)) 0.75 mg/kg sediment dw (Sediment (Fresh Water)) 73 mg/L (STP)

* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs).	1,1,1,2-tetrafluoroethane	1,1,1,2-Tetrafl oroethane (HFC 134a)	1000 ppm / 4240 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
1,1,1,2-tetrafluoroethane	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
1,1,1-trifluoroethane	Not Available	Not Available
pentafluoroethane	Not Available	Not Available
1,1,1,2-tetrafluoroethane	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. Individual protection measures, such as personal protective equipment	
Eye and face protection	‣ Safety glasses with side shields. ‣ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ‣ 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

Continued...

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	‣ 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.

Respiratory protection

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

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	Colourless liquefied gas with slight ether-like odour

Physical state	Liquified Gas	**Relative density (Water = 1)**	1.044 @ 25 deg C
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	~7	**Decomposition temperature (°C)**	728
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	-46.2	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	1254.6 @ 25 C, 2310 @ 50 deg C	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	3.4 @ 25 deg C	**VOC g/L**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	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. ‣ Extremely high temperatures.
10.3. Possibility of hazardous reactions	See section 7.2
10.4. Conditions to avoid	See section 7.2

Continued...

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. Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system. 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. 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. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. In common with other halogenated aliphatics, fluorocarbons may cause dermal problems due to a tendency to remove natural oils from the skin causing irritation and the development of dry, sensitive skin. They do not appear to be appreciably absorbed.
Ingestion	Overexposure is unlikely in this form. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. 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	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). 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).
Chronic	Principal route of occupational exposure to the gas is by inhalation. 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. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

R404A	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
1,1,1-trifluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: 5140.0 ppm[2]	Not Available

Continued...

pentafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: >709000 ppm4h[2]	Not Available
1,1,1,2-tetrafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: 359453.102 ppm4h[2]	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*	

1,1,1-TRIFLUOROETHANE	**NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
PENTAFLUOROETHANE	Cardiac sensitisation threshold limit >245400 mg/m3 Anaesthetic effects threshold limit 490800 mg/m3 * DuPont SDS
1,1,1,2-TETRAFLUOROETHANE	* with added oxygen - ZhongHao New Chemical Materials MSDS Excessive concentration can have a narcotic effect; inhalation of high concentrations of decomposition products can cause lung oedema. Disinfection by products (DBPs) re formed when disinfectants such as chlorine, chloramine, and ozone react with organic and inorganic matter in water. The observations that some DBPs such as trihalomethanes (THMs), di-/trichloroacetic acids, and 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) are carcinogenic in animal studies have raised public concern over the possible adverse health effects of DBPs. To date, several hundred DBPs have been identified. Numerous haloalkanes and haloalkenes have been tested for carcinogenic and mutagenic activities. n general, the genotoxic potential is dependent on the nature, number, and position of halogen(s) and the molecular size of the compound.

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 either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

11.2 Information on other hazards

11.2.1. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

11.2.2. Other information

See Section 11.1

SECTION 12 Ecological information

12.1. Toxicity

R404A	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available

1,1,1-trifluoroethane	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	~71mg/l	2
	EC0(ECx)	96h	Algae or other aquatic plants	>44mg/l	2

pentafluoroethane	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	>114mg/l	2
	EC50	48h	Crustacea	>97.9mg/l	2
	EC50	96h	Algae or other aquatic plants	142mg/l	2
	LC50	96h	Fish	>81.8mg/l	2
	NOEC(ECx)	96h	Fish	10mg/l	2

1,1,1,2-tetrafluoroethane	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	>114mg/l	2

	EC50	48h	Crustacea	980mg/l	Not Available
	EC50	96h	Algae or other aquatic plants	142mg/l	2
	NOEC(ECx)	96h	Fish	300mg/l	Not Available
	LC50	96h	Fish	450mg/l	Not Available
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 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
1,1,1-trifluoroethane	HIGH	HIGH
pentafluoroethane	HIGH	HIGH
1,1,1,2-tetrafluoroethane	HIGH	HIGH

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
1,1,1-trifluoroethane	LOW (LogKOW = 1.7393)
pentafluoroethane	LOW (LogKOW = 1.5472)
1,1,1,2-tetrafluoroethane	LOW (LogKOW = 1.68)

12.4. Mobility in soil

Ingredient	Mobility
1,1,1-trifluoroethane	LOW (KOC = 48.64)
pentafluoroethane	LOW (KOC = 154.4)
1,1,1,2-tetrafluoroethane	LOW (KOC = 96.63)

12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT	✗	✗	✗
vPvB	✗	✗	✗

PBT Criteria fulfilled?	No
vPvB	No

12.6. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

12.7. Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

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

Continued...

Sewage disposal options	Not Available

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2TE

Land transport (ADR-RID)

14.1. **UN number or ID number**	3337
14.2. **UN proper shipping name**	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1- trifluoroethane, and 1,1,1,2- tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1- trifluoroethane)
14.3. **Transport hazard class(es)**	Class: 2.2 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Hazard identification (Kemler): 20 Classification code: 2A Hazard Label: 2.2 Special provisions: 662 Limited quantity: 120 ml Tunnel Restriction Code: C/E

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	3337
14.2. **UN proper shipping name**	Refrigerant gas R 404A
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 2.2 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 2L
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
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**	3337
14.2. **UN proper shipping name**	REFRIGERANT GAS R 404A

Continued...

14.3. Transport hazard class(es)	IMDG Class: 2.2 IMDG Subsidiary Hazard: Not Applicable
14.4. Packing group	Not Applicable
14.5 Environmental hazard	Not Applicable
14.6. Special precautions for user	EMS Number: F-C , S-V Special provisions: Not Applicable Limited Quantities: 120 mL

Inland waterways transport (ADN)

14.1. UN number	3337
14.2. UN proper shipping name	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)
14.3. Transport hazard class(es)	2.2 Not Applicable
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Classification code: 2A Special provisions: 662 Limited quantity: 120 ml Equipment required: PP Fire cones number: 0

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
1,1,1-trifluoroethane	Not Available
pentafluoroethane	Not Available
1,1,1,2-tetrafluoroethane	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
1,1,1-trifluoroethane	Not Available
pentafluoroethane	Not Available
1,1,1,2-tetrafluoroethane	Not Available

SECTION 15 Regulatory information

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

1,1,1-trifluoroethane is found on the following regulatory lists

Not Applicable

pentafluoroethane is found on the following regulatory lists

Not Applicable

1,1,1,2-tetrafluoroethane is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

UK Workplace Exposure Limits (WELs).

Additional Regulatory Information

Continued...

Not Applicable

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

Information according to 2012/18/EU (Seveso III):

Seveso Category	Not Available

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (1,1,1-trifluoroethane; pentafluoroethane; 1,1,1,2-tetrafluoroethane)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	23/12/2022
Initial Date	26/11/2004

Full text Risk and Hazard codes

H220	Extremely flammable gas.

SDS Version Summary

Version	Date of Update	Sections Updated
8.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification
9.1	23/12/2022	Classification review due to GHS Revision change.

Other information

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.

The 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

Continued...

Definitions and abbreviations

- PC

COSHH assessment

R449A

Overview

- **Reference:** 12307
- **Composition:** 1,1,1,2-tetrafluoroethane, 2,3,3,3-tetrafluoropropene, Pentafluoroethane, Difluoromethane

Hazards

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

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

Handling precautions and PPE

Respiratory

Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate. Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used 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.

Hand

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.

N/A

	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. For advice, contact a Poisons Information Centre or a doctor.

Skin	
 Eye	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.

- **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:** N/A
- **Storage precautions:** DO NOT use aluminium or galvanised containers 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. Avoid reaction with oxidising agents metals.
- **Flashpoint:** N/A
- **Transport precautions:** Proper shipping name: REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3 (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
- **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:** Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. DO NOT enter confined spaces where gas may have accumulated. Increase ventilation. 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.

R449A

A-Gas (UK) Ltd

Version No: **10.1**
Safety data sheet according to REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758

Issue Date: **28/10/2021**
Print Date: **07/12/2023**
L.REACH.GB.EN

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

1.1. Product Identifier

Product name	R449A
Synonyms	Not Available
Proper shipping name	REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3 (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Refrigerant, For professional users only.
Uses advised against	No specific uses advised against are identified.

1.3. Details of the manufacturer or supplier of the safety data sheet

Registered company name	**A-Gas (UK) Ltd**
Address	Banyard Road, Portbury West Bristol BS20 7XH 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	**A-Gas (UK) Ltd**	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	**+44 (0) 1275 376600**	**+44 20 3901 3542**
Other emergency telephone numbers	**Not Available**	**+44 808 164 9592**

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

2.1. Classification of the substance or mixture

Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567 [1]	H280 - Gases Under Pressure (Liquefied Gas)
Legend:	*1. Classification by vendor; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567*

2.2. Label elements

Hazard pictogram(s)	

Page 1 continued...

Signal word	**Warning**

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.

Supplementary statement(s)

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read carefully and follow all instructions.

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

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	Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567	SCL / M-Factor	Nanoform Particle Characteristics
1. 811-97-2 2.212-377-0 3.Not Available 4.01-2119459374-33-XXXX	25.7	1,1,1,2-tetrafluoroethane	Gases Under Pressure (Liquefied Gas); H280, EUH044 [1]	Not Available	Not Available
1. 754-12-1 2.468-710-7 3.Not Available 4.01-0000019665-61-XXXX	25.3	2,3,3,3-tetrafluoropropene	Flammable Gases Category 1A, Gases Under Pressure (Liquefied Gas); H220, H280, EUH019, EUH044 [1]	Not Available	Not Available
1. 354-33-6 2.206-557-8 3.Not Available 4.01-2119485636-25-XXXX	24.7	pentafluoroethane	Gases Under Pressure (Liquefied Gas); H280, EUH044 [1]	Not Available	Not Available
1. 75-10-5 2.200-839-4 3.Not Available 4.01-2119471312-47-XXXX	24.3	difluoromethane	Flammable Gases Category 1A; H220, EUH044 [1]	Not Available	Not Available

Legend:	*1. Classification by vendor; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties*

SECTION 4 First aid measures

4.1. Description of first aid measures

Continued...

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. ‣ For advice, contact a Poisons Information Centre or a doctor.

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 intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- There is no specific antidote

C: Decontamination

- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.

Continued...

- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- Treatment based on judgment of the physician in response to reactions of the patient

For frost-bite caused by liquefied petroleum gas:

- If part has not thawed, place in warm water bath (41-46 C) for 15-20 minutes, until the skin turns pink or red.
- Analgesia may be necessary while thawing.
- If there has been a massive exposure, the general body temperature must be depressed, and the patient must be immediately rewarmed by whole-body immersion, in a bath at the above temperature.
- Shock may occur during rewarming.
- Administer tetanus toxoid booster after hospitalization.
- Prophylactic antibiotics may be useful.
- The patient may require anticoagulants and oxygen.

[Shell Australia 22/12/87]

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	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

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: carbon monoxide (CO) carbon dioxide (CO2) hydrogen fluoride other pyrolysis products typical of burning organic material. **Contains low boiling substance:** Closed containers may rupture due to pressure build-up under fire conditions.

Continued...

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 where 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.

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. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · 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.
Fire and explosion protection	See section 5
Other information	Storage temperature: <52 deg.c> ‣ 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	‣ **DO NOT** use aluminium or galvanised containers ‣ 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.
Storage incompatibility	‣ Avoid reaction with oxidising agents metals
Hazard categories in accordance with Regulation (EC) No 1272/2008	Not Available
Qualifying quantity (tonnes) of dangerous substances as referred to in Article 3(10) for the application of	Not Available

+	+	+	+	+	+	+

X — *Must not be stored together*
0 — *May be stored together with specific preventions*
\+ — *May be stored together*

Continued...

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

7.3. Specific end use(s)

See section 1.2

SECTION 8 Exposure controls / personal protection

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
1,1,1,2-tetrafluoroethane	Inhalation 13 936 mg/m³ (Systemic, Chronic) *Inhalation 2 476 mg/m³ (Systemic, Chronic) **	0.1 mg/L (Water (Fresh)) 1 mg/L (Water - Intermittent release) 0.01 mg/L (Water (Marine)) 0.75 mg/kg sediment dw (Sediment (Fresh Water)) 73 mg/L (STP)
2,3,3,3-tetrafluoropropene	Inhalation 950 mg/m³ (Systemic, Chronic) Inhalation 186 400 mg/m³ (Systemic, Acute) *Inhalation 113.1 mg/m³ (Systemic, Chronic) ** *Inhalation 186 400 mg/m³ (Systemic, Acute) **	0.1 mg/L (Water (Fresh)) 1 mg/L (Water - Intermittent release) 0.01 mg/L (Water (Marine)) 1.51 mg/kg sediment dw (Sediment (Fresh Water)) 0.151 mg/kg sediment dw (Sediment (Marine)) 1.49 mg/kg soil dw (Soil)
pentafluoroethane	Inhalation 16 444 mg/m³ (Systemic, Chronic) *Inhalation 1 753 mg/m³ (Systemic, Chronic) **	0.1 mg/L (Water (Fresh)) 1 mg/L (Water - Intermittent release) 0.6 mg/kg sediment dw (Sediment (Fresh Water))
difluoromethane	Inhalation 7 035 mg/m³ (Systemic, Chronic) *Inhalation 750 mg/m³ (Systemic, Chronic) **	0.142 mg/L (Water (Fresh)) 1.42 mg/L (Water - Intermittent release) 0.534 mg/kg sediment dw (Sediment (Fresh Water))

* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs).	1,1,1,2-tetrafluoroethane	1,1,1,2-Tetrafl oroethane (HFC 134a)	1000 ppm / 4240 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
1,1,1,2-tetrafluoroethane	Not Available	Not Available	Not Available
2,3,3,3-tetrafluoropropene	2,200 ppm	Not Available	1.40E+05 ppm
difluoromethane	3,000 ppm	6,500 ppm	39,000 ppm

Ingredient	Original IDLH	Revised IDLH
1,1,1,2-tetrafluoroethane	Not Available	Not Available
2,3,3,3-tetrafluoropropene	Not Available	Not Available
pentafluoroethane	Not Available	Not Available
difluoromethane	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.

Continued...

8.2.2. Individual protection measures, such as personal protective equipment	
Eye and face protection	‣ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ‣ 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	‣ 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.

Respiratory protection

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

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used
- 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.

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 liquefied gas with a slight ether-like odour.

Physical state	Liquified Gas	**Relative density (Water = 1)**	1.10 @25C
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	-46	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	>1 (CCL4=1.0)	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	1274.8 @ 25C	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	3.07	**VOC g/L**	Not Available

Continued...

Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	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	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation, of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. 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. 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. 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. Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin)
Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Repeated exposure may cause skin cracking, flaking or drying following normal handling and use. In common with other halogenated aliphatics, fluorocarbons may cause dermal problems due to a tendency to remove natural oils from the skin causing irritation and the development of dry, sensitive skin. They do not appear to be appreciably absorbed. Open cuts, abraded or irritated skin should not be exposed to this material 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. 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).
Eye	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). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas, however concentrated atmospheres may

Continued...

	produce irritation after brief exposures..
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment. Principal route of occupational exposure to the gas is by inhalation. 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.

R449A	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
1,1,1,2-tetrafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: 359453.102 ppm4h[2]	Not Available
2,3,3,3-tetrafluoropropene	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: >86.831 ppm4h[2]	Not Available
pentafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: >709000 ppm4h[2]	Not Available
difluoromethane	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: >760000 ppm4h[2]	Not Available
	Oral (Mouse) LD50; 1810 mg/kg[2]	
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*	

1,1,1,2-TETRAFLUOROETHANE	* with added oxygen - ZhongHao New Chemical Materials MSDS Excessive concentration can have a narcotic effect; inhalation of high concentrations of decomposition products can cause lung oedema.
2,3,3,3-TETRAFLUOROPROPENE	Mutagenicity : Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells. Experiments showed mutagenic effects in cultured bacterial cells. Reproductive toxicity : Animal testing showed no reproductive toxicity. Teratogenicity : Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity. * Vendor For similar product, 1,3,3,3-tetrafluoropropene HFO-1234ze is not likely to accumulate in the bodies of humans or animals HFO-1234ze is practically non-toxic. Short-term exposures at levels higher than 10% have not induced cardiac sensitization to adrenalin nor induced serious toxic effects. Rats and rabbits did not exhibit any serious toxic, developmental or reproductive effects even with exposures to high levels of HFO-1234ze. Based on a series of mutagenicity and genomics studies, the cancer risk for HFO-1234ze is LOW The fluoroalkenes vary widely in acute inhalation toxicity. Those, such as perfluoroisobutylene, PFIB, the most highly toxic member, attacks the pulmonary epithelium of rats eventuating in edema and death after a delay of about one day. Other fluoroalkenes, such as hexafluoropropylene (HFP) or chlorotrifluoroethylene (CTFE), also cause pulmonary injury but at lower concentrations produce concentration dependent changes in the renal concentrating mechanism of the rat. Changes in the CNS of rats and rabbits have also been reported for CTFE.
PENTAFLUOROETHANE	Cardiac sensitisation threshold limit >245400 mg/m3 Anaesthetic effects threshold limit 490800 mg/m3 * DuPont SDS
1,1,1,2-TETRAFLUOROETHANE & 2,3,3,3-TETRAFLUOROPROPENE	Disinfection by products (DBPs) re formed when disinfectants such as chlorine, chloramine, and ozone react with organic and inorganic matter in water. The observations that some DBPs such as trihalomethanes (THMs), di-/trichloroacetic acids, and 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) are carcinogenic in animal studies have raised public concern over the possible adverse health effects of DBPs. To date, several hundred DBPs have been identified. Numerous haloalkanes and haloalkenes have been tested for carcinogenic and mutagenic activities. n general, the genotoxic potential is dependent on the nature, number, and position of halogen(s) and the molecular size of the compound.

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

Continued...

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✓ *– Data available to make classification*

11.2 Information on other hazards

11.2.1. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

11.2.2. Other information

See Section 11.1

SECTION 12 Ecological information

12.1. Toxicity

R449A

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

1,1,1,2-tetrafluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	48h	Crustacea	980mg/l	Not Available
EC50	96h	Algae or other aquatic plants	142mg/l	2
NOEC(ECx)	96h	Fish	300mg/l	Not Available
LC50	96h	Fish	450mg/l	Not Available

2,3,3,3-tetrafluoropropene

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>2.5mg/l	2
EC50	48h	Crustacea	65mg/l	2
LC50	96h	Fish	>197mg/l	Not Available
ErC50	72h	Algae or other aquatic plants	>100mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	>100mg/l	Not Available

pentafluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	48h	Crustacea	>97.9mg/l	2
EC50	96h	Algae or other aquatic plants	142mg/l	2
LC50	96h	Fish	>81.8mg/l	2
NOEC(ECx)	96h	Fish	10mg/l	2

difluoromethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	48h	Crustacea	>97.9mg/l	2
EC50	96h	Algae or other aquatic plants	142mg/l	2
LC50	96h	Fish	>81.8mg/l	2
NOEC(ECx)	96h	Fish	10mg/l	2

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 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

Continued...

Ingredient	Persistence: Water/Soil	Persistence: Air
1,1,1,2-tetrafluoroethane	HIGH	HIGH
2,3,3,3-tetrafluoropropene	HIGH	HIGH
pentafluoroethane	HIGH	HIGH
difluoromethane	LOW	LOW

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
1,1,1,2-tetrafluoroethane	LOW (LogKOW = 1.68)
2,3,3,3-tetrafluoropropene	LOW (LogKOW = 2.1485)
pentafluoroethane	LOW (LogKOW = 1.5472)
difluoromethane	LOW (LogKOW = 0.2)

12.4. Mobility in soil

Ingredient	Mobility
1,1,1,2-tetrafluoroethane	LOW (KOC = 96.63)
2,3,3,3-tetrafluoropropene	LOW (KOC = 154.4)
pentafluoroethane	LOW (KOC = 154.4)
difluoromethane	LOW (KOC = 23.74)

12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT	✗	✗	✗
vPvB	✗	✗	✗

PBT Criteria fulfilled?	No
vPvB	No

12.6. Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

12.7. Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

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

Continued...

HAZCHEM	2TE

Land transport (ADR-RID)

14.1. **UN number or ID number**	1078
14.2. **UN proper shipping name**	REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3 (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
14.3. **Transport hazard class(es)**	Class: 2.2 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Hazard identification (Kemler): 20 Classification code: 2A Hazard Label: 2.2 Special provisions: 274 582 662 Limited quantity: 120 ml Tunnel Restriction Code: C/E

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1078
14.2. **UN proper shipping name**	Refrigerant gas, n.o.s. * (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 2.2 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 2L
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
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**	1078
14.2. **UN proper shipping name**	REFRIGERANT GAS, N.O.S. (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
14.3. **Transport hazard class(es)**	IMDG Class: 2.2 IMDG Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5 **Environmental hazard**	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)

Continued...

14.1. **UN number**	1078
14.2. **UN proper shipping name**	REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3 (contains 1,1,1,2-tetrafluoroethane and 2,3,3,3-tetrafluoropropene)
14.3. **Transport hazard class(es)**	2.2 Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Classification code: 2A Special provisions: 274; 582; 662 Limited quantity: 120 ml Equipment required: PP Fire cones number: 0

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
1,1,1,2-tetrafluoroethane	Not Available
2,3,3,3-tetrafluoropropene	Not Available
pentafluoroethane	Not Available
difluoromethane	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
1,1,1,2-tetrafluoroethane	Not Available
2,3,3,3-tetrafluoropropene	Not Available
pentafluoroethane	Not Available
difluoromethane	Not Available

SECTION 15 Regulatory information

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

1,1,1,2-tetrafluoroethane is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
UK Workplace Exposure Limits (WELs).

2,3,3,3-tetrafluoropropene is found on the following regulatory lists

Not Applicable

pentafluoroethane is found on the following regulatory lists

Not Applicable

difluoromethane is found on the following regulatory lists

Not Applicable

Additional Regulatory Information

Not Applicable

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

Information according to 2012/18/EU (Seveso III):

Seveso Category	Not Available

15.2. Chemical safety assessment

Continued...

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (1,1,1,2-tetrafluoroethane; 2,3,3,3-tetrafluoropropene; pentafluoroethane; difluoromethane)
China - IECSC	No (2,3,3,3-tetrafluoropropene; difluoromethane)
Europe - EINEC / ELINCS / NLP	No (2,3,3,3-tetrafluoropropene)
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (2,3,3,3-tetrafluoropropene)
Vietnam - NCI	Yes
Russia - FBEPH	No (2,3,3,3-tetrafluoropropene)
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	28/10/2021
Initial Date	04/08/2015

Full text Risk and Hazard codes

H220	Extremely flammable gas.

SDS Version Summary

Version	Date of Update	Sections Updated
9.1	03/08/2021	Toxicological information - Acute Health (inhaled), Hazards identification - Classification, First Aid measures - First Aid (swallowed), Composition / information on ingredients - Ingredients, Accidental release measures - Spills (major), Handling and storage - Storage (storage incompatibility), Identification of the substance / mixture and of the company / undertaking - Use, Name
10.1	28/10/2021	Hazards identification - Classification, Name

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources using available literature references.

The 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

- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- 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
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration

- AIIC: Australian Inventory of Industrial Chemicals
- DSL: Domestic Substances List
- NDSL: Non-Domestic Substances List
- IECSC: Inventory of Existing Chemical Substance in China
- EINECS: European INventory of Existing Commercial chemical Substances
- ELINCS: European List of Notified Chemical Substances
- NLP: No-Longer Polymers
- ENCS: Existing and New Chemical Substances Inventory
- KECI: Korea Existing Chemicals Inventory
- NZIoC: New Zealand Inventory of Chemicals
- PICCS: Philippine Inventory of Chemicals and Chemical Substances
- TSCA: Toxic Substances Control Act
- TCSI: Taiwan Chemical Substance Inventory
- INSQ: Inventario Nacional de Sustancias Químicas
- NCI: National Chemical Inventory
- FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

end of SDS

COSHH assessment

REFRIGERANT R452A

Overview

- **Reference:** 16853
- **Composition:** PENTAFLUOROETHANE, 2,3,3,3-TETRAFLUOROPROP-1-EN, DIFLUOROMETHANE

Hazards

First aid

Eyes

Bathe the eye with running water for 15 minutes. Consult a doctor.

Skin

Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Do not use hot water. If frostbite has occurred call a physician.

Inhalation

Remove casualty from exposure ensuring one's own safety whilst doing so. If unconscious, check for breathing and apply artificial respiration if necessary. Consult a doctor.

Ingestion

N/A

Handling precautions and PPE

Respiratory

Vapours are heavier than air and can cause suffocation by reducing the oxygen available for breathing.

Hand

Protective gloves. Material: Leather gloves. The suitability for a specific workplace should be discussed with the producers of the protective gloves. Material: Low temperature resistant gloves.

Skin

Protective clothing.

Eye

Safety glasses with side-shields. Safety goggles. Face-shield. Ensure eye bath is to hand.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** PENTAFLUOROETHANE: 1000 ppm, 2,3,3,3-TETRAFLUOROPROP-1-EN:500 ppm, DIFLUOROMETHANE: 1000 ppm
  - **Short term exposure limit (STEL 15min TWA):** N/A
- **Factors which increase risks:** Heat, hot surfaces, sources of ignition, flames, strong bases, finely powdered metals, strong oxidising agents.
- **Storage precautions:** Store in a cool, well ventilated area. Store at a temperature not exceeding 45°C. Keep container tightly closed.
- **Flashpoint:** N/A
- **Transport precautions:** Shipping name: REFRIGERANT GAS, N.O.S. (PENTAFLUOROETHANE; 2,3,3,3-TETRAFLUOROPROP-1-EN).
- **Disposal precautions:** Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licenced installation. The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.
- **Spill procedures:** Do not use equipment in clean-up procedure which may produce sparks. Material evaporates. Ventilate the area, especialy low or enclosed places where heavy vapours might collect.

SAFETY DATA SHEET

REFRIGERANT R452A

Compilation date: 30/01/2017

Revision No: 1

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

1.1. Product identifier

Product name: REFRIGERANT R452A

Synonyms: OPTEON XP44

SOLSTICE R452A

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

Leicestershire

LE10 3EZ

United Kingdom

Tel: 01455 630790

Fax: 01455 630791

Email: sds@nationalref.com

1.4. Emergency telephone number

Emergency tel: Carechem24 +44 (0)1865 407333

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Press. Gas: H280

Most important adverse effects: Contains gas under pressure; may explode if heated.

2.2. Label elements

Label elements:

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

Hazard pictograms: GHS04: Gas cylinder

Signal words: Warning

Precautionary statements: P410+403: Protect from sunlight. Store in a well-ventilated place.

[cont...]

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

PENTAFLUOROETHANE - REACH registered number(s): 01-2119485636-25

EINECS	CAS	PBT / WEL	CLP Classification	Percent
206-557-8	354-33-6	Substance with a Community workplace exposure limit.	Press. Gas: H280	50-70%

2,3,3,3-TETRAFLUOROPROP-1-EN - REACH registered number(s): 01-0000019665-61

-	754-12-1	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	10-30%

DIFLUOROMETHANE

200-839-4	75-10-5	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	10-30%

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Do not use hot water. If frostbite has occurred call a physician.

Eye contact: Bathe the eye with running water for 15 minutes. Consult a doctor.

Ingestion: Not applicable.

Inhalation: Remove casualty from exposure ensuring one's own safety whilst doing so. If unconscious, check for breathing and apply artificial respiration if necessary. Consult a doctor.

4.2. Most important symptoms and effects, both acute and delayed

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: There may be a feeling of tightness in the chest with shortness of breath. Drowsiness or mental confusion may occur. There may be loss of consciousness. Breathing may stop.

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

Immediate / special treatment: Do not give drugs from adrenaline-ephedrine group.

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Suitable extinguishing media for the surrounding fire should be used. Alcohol resistant foam. Water spray. Carbon dioxide. Dry chemical powder. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: Non flamable gas. Pressure build up. Fire or intense heat may cause violent rupture of packages. In combustion emits toxic fumes.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: If outside keep bystanders upwind and away from danger point. Ventilate the area, especialy low or enclosed places where heavy vapours might collect. Refer to section 8 of SDS for personal protection details.

6.2. Environmental precautions

Environmental precautions: Should not be released into the environment. Stop release if safe to do so. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Do not use equipment in clean-up procedure which may produce sparks. Material evaporates. Ventilate the area, especialy low or enclosed places where heavy vapours might collect.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Ensure there is sufficient ventilation of the area. Avoid the formation or spread of mists in the air.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area. Store at a temperature not exceeding 45°C. Keep container tightly closed.

Suitable packaging: Must only be kept in original packaging.

7.3. Specific end use(s)

Specific end use(s): No data available.

[cont...]

Section 8: Exposure controls/personal protection

8.1. Control parameters

Hazardous ingredients:

PENTAFLUOROETHANE

Workplace exposure limits: **Respirable dust**

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
EU	1000 ppm	-	-	-

2,3,3,3-TETRAFLUOROPROP-1-EN

EU	500 ppm	-	-	-

DIFLUOROMETHANE

UK	1000 ppm	-	-	-

DNEL/PNEC Values

Hazardous ingredients:

PENTAFLUOROETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	16444 mg/m3	Workers	Systemic
DNEL	Inhalation	1753 mg/m3	Consumers	Systemic
PNEC	Fresh water	0.1 mg/l	-	-
PNEC	Fresh water sediments	0.6 mg/kg	-	-

2,3,3,3-TETRAFLUOROPROP-1-EN

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	273 mg/m3	Workers	-
PNEC	Fresh water	> 0.1 mg/l	-	-
PNEC	Marine water	> 0.01 mg/l	-	-
PNEC	Fresh water sediments	> 1.77 mg/kg	-	-
PNEC	Soil (agricultural)	> 1.54 mg/kg	-	-

DIFLUOROMETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation (developmental tox)	16444 mg/m3	Workers	Systemic
DNEL	Inhalation (developmental tox)	1753 mg/m3	Consumers	Systemic

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area.

Respiratory protection: Vapours are heavier than air and can cause suffocation by reducing the oxygen available for breathing. Respiratory protection complying with EN 137 Self-contained breathing apparatus must be available in case of emergency.

[cont...]

Hand protection: Protective gloves. Material: Leather gloves. The suitability for a specific workplace should be discussed with the producers of the protective gloves. Material: Low temperature resistant gloves.

Eye protection: Safety glasses with side-shields. Safety goggles. Face-shield. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Environmental: Gas escapes to be kept to the minimum by engineering processes and operating methods.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquified gas

Colour: Colourless

Odour: Characteristic odour

Boiling point/range°C: <-47

Flammability limits %: lower: Not applicable.

upper: Not applicable.

Flash point°C: Not applicable.

Vapour pressure: 13159 hPa at 25oC

Relative density: 1.13 at 25oC

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions. Stable at room temperature.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions. Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Sources of ignition. Flames.

10.5. Incompatible materials

Materials to avoid: Strong bases. Finely powdered metals. Strong oxidising agents.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of hydrogen fluoride.

Section 11: Toxicological information

11.1. Information on toxicological effects

[cont...]

Hazardous ingredients:

PENTAFLUOROETHANE

GASES	RAT	4H LC50	800000	ppmV

2,3,3,3-TETRAFLUOROPROP-1-EN

GASES	RAT	4H LC50	> 400000	ppmV

DIFLUOROMETHANE

GASES	RAT	LD50	520000	ppmV

Toxicity values: No data available.

Symptoms / routes of exposure

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: There may be a feeling of tightness in the chest with shortness of breath. Drowsiness or mental confusion may occur. There may be loss of consciousness. Breathing may stop.

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

ALGAE	96H LC50	> 100	mg/l
Daphnia magna	48H EC50	> 83	mg/l
FISH	96H ErC50	>197	mg/l

DIFLUOROMETHANE

ALGAE	96H ErC50	142	mg/l
Daphnia magna	48H EC50	652	mg/l
FISH	96H LC50	1.057	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Readily absorbed into soil.

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Ozone Depletion Potential (ODP): 0 (R11 = 1) R452A Global Warming Potential (GWP) = 2141 (CO_2=1)

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Product evaporates.

Recovery operations: Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licenced instalation.

Disposal of packaging: Return to supplier.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

14.1. UN number

UN number: UN1078

14.2. UN proper shipping name

Shipping name: REFRIGERANT GAS, N.O.S.
(PENTAFLUOROETHANE; 2,3,3,3-TETRAFLUOROPROP-1-EN)

14.3. Transport hazard class(es)

Transport class: 2

14.4. Packing group

14.5. Environmental hazards

Environmentally hazardous: No **Marine pollutant:** No

14.6. Special precautions for user

Special precautions: No special precautions.

Tunnel code: C/E

Transport category: 3

Section 15: Regulatory information

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

Specific regulations: Not applicable.

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: H220: Extremely flammable gas.

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

Legal disclaimer: National Refrigerants Ltd believes that the information and recommendations contained herein (including data and statments) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated. National Refrigerants expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

COSHH assessment

NITROGEN (OXYGEN FREE)

Overview

- **Reference:** 11111
- **Composition:** Nitrogen

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	Use self contained breathing apparatus in all circumstances where there is medium confinement, insufficient oxygen, in cases of uncontrolled emissions and in all circumstances where standard respiratory protection does not provide adequate protection. Use only respiratory protection the conforms to international / national standards. In the case of vapour formation use a respirator with an approved filter.
 Hand	Wear suitable gloves. Ensure the permeability and break through times are compatible with the specific workplace conditions i.e. duration of contact and mechanical strain.
 Skin	Wear protective clothing. Apron (Plastic or rubber) Rubber boots. Wash all contaminated clothing before reuse.
 Eye	Approved safety goggles. In case of splashing, wear: Face shield.

- **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:** Heat.
- **Storage precautions:** Store in original container. Keep away from incompatible materials. Do not expose cylinder to temperatures higher than 50°C. Sources of ignition should be removed from storage area. Store cylinder in a well ventilated area. Store in accordance with local fire code and/or building code or any pertaining regulations.
- **Flashpoint:** N/A
- **Transport precautions:** NITROGEN, COMPRESSED
- **Disposal precautions:** Refer to manufacturer / supplier for information on recovery / recycling.
- **Spill procedures:** Allow to evaporate. Do not allow product to enter drains.

A-GAS™

SAFETY DATA SHEET

according to 1907/2006/EC, Article 31

NITROGEN (OXYGEN FREE)

Revision 0
Revision date 17-05-2010

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND THE COMPANY

Product name	NITROGEN (OXYGEN FREE)
Company	A-Gas UK Limited Banyard Road Portbury West Bristol BS20 7XH United Kingdom info.uk@agas.com
Telephone	01275 376600
Fax	01275 376601
Emergency telephone number	0800 731 1444

2. HAZARDS IDENTIFICATION

Main hazards	No Significant Hazard.
Other hazards	Compressed gas.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous ingredients

	Conc.	CAS	EINECS	Symbols/Risk phrases
Nitrogen		7727-37-9	231-783-9	

4. FIRST AID MEASURES

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.
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.
Inhalation	Move the exposed person to fresh air. If breathing is difficult give oxygen. Seek medical attention if irritation or symptoms persist.
Ingestion	Not applicable.

5. FIRE FIGHTING MEASURES

Extinguishing media	Use extinguishing media appropriate to the surrounding fire conditions. Cool fire exposed containers with waterspray.
Fire hazards	Heating produces hazardous fumes.
Protective equipment	Wear self contained breathing apparatus and protective clothing.

NITROGEN (OXYGEN FREE)

Revision 0
Revision date 17-05-2010

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Ensure adequate ventilation of the working area. Evacuate personnel to a safe area. Prevent further spillage if safe. Keep public away from danger area. Keep upwind. Eliminate all sources of ignition.
Environmental precautions	Should not be released into the environment.
Clean up methods	Allow to evaporate. Do not allow product to enter drains.

7. HANDLING AND STORAGE

Handling	Ensure adequate ventilation of the working area. Keep away from sources of ignition - No smoking. Keep away from heat. Use only equipment and materials which are compatible with the product. Protect containers from physical damage. Store in cool, dry, well-ventilated area away from busy areas, emergency exits, flammables, combustibles, and other incompatible materials. Do not allow the temperature where cylinders are stored to exceed 50°C. Containers should be stored upright, firmly secured to prevent falling or being knocked over. Do not drag, slide or roll cylinders. Use suitable equipment for cylinder movement even for short distances. Use a "first in-first out" inventory system to prevent containers from being stored for excessive periods of time. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.
Storage	Store in original container. Keep away from incompatible materials. Do not expose cylinder to temperatures higher than 50°C. Sources of ignition should be removed from storage area. Store cylinder in a well ventilated area. Store in accordance with local fire code and/or building code or any pertaining regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures	Ensure adequate ventilation of the working area.
Occupational exposure controls	Apply technical measures to comply with the occupational and workplace exposure limits. Use only in an area equipped with a safety shower. Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feedingstuffs.
Respiratory protection	Use self contained breathing apparatus in all circumstances where there is medium confinement, insufficient oxygen, in cases of uncontrolled emissions and in all circumstances where standard respiratory protection does not provide adequate protection. Use only respiratory protection the conforms to international / national standards. In the case of vapour formation use a respirator with an approved filter.
Hand protection	Wear suitable gloves. Ensure the permeability and break through times are compatible with the specific workplace conditions i.e. duration of contact and mechanical strain.
Eye protection	Approved safety goggles. In case of splashing, wear: Face shield.
Protective equipment	Wear protective clothing. Apron (Plastic or rubber) Rubber boots. Wash all contaminated clothing before reuse.

NITROGEN (OXYGEN FREE)

Revision 0
Revision date 17-05-2010

9. PHYSICAL AND CHEMICAL PROPERTIES

Description	Compressed gas.
Colour	Colourless.
Odour	Odourless.
Boiling point	-196°C
Melting point	-210°C

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions. Vapours are heavier than air.
Conditions to avoid	Heat.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	No known adverse health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity	No data is available on this product.

13. DISPOSAL CONSIDERATIONS

General information	Dispose of in compliance with all local and national regulations.
Disposal methods	Refer to manufacturer / supplier for information on recovery / recycling.

14. TRANSPORT INFORMATION

ADR/RID

UN	1066	Packing group	-
Class	2	Hazard ID	20
Proper Shipping Name	NITROGEN, COMPRESSED .		

IMDG

UN	1066	Packing group	-
Class	2	Marine pollutant	NO
EmS Code	F-C S-V		

IATA

UN	1066	Packing group	-
Class	2	Subsidiary risk	-
Packing Instruction (Cargo)	200	Maximum quantity	150 kg
Packing Instruction (Passenger)	200	Maximum quantity	75 kg

15. REGULATORY INFORMATION

Risk phrases	No Significant Hazard.

16. OTHER INFORMATION

Further information	The information supplied in this Safety Data Sheet is designed only as guidance for the safe use, storage and handling of the product. This information is correct to the best of our knowledge and belief at the date of publication however no guarantee is made to its accuracy. This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process.

COSHH assessment

Oxygen

Overview

- **Reference:** 2532
- **Composition:** N/A

First aid

Eyes

N/A

Skin

N/A

Inhalation

Not hazardous

Ingestion

Ingestion is not considered a potential route of exposure.

Handling precautions and PPE

Respiratory

N/A

Hand

N/A

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:** May react violently with reducing agents. Violently oxidises organic material.
- **Storage precautions:** Use no oil or grease. Open valve slowly to avoid pressure shock. Segregate from flammable gases and other flammable materials in store. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact BOC if in doubt. Keep away from ignition sources (including static discharges). Refer to BOC container handling instructions. Keep container below 50°C in a well ventilated place.
- **Flashpoint:** N/A
- **Transport precautions:** Oxygen, compressed
- **Disposal precautions:** To atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Contact BOC if guidance is required.
- **Spill procedures:** Ventilate area.

BOC

SAFETY DATA SHEET

Oxygen (Food Fresh)

1 IDENTIFICATION OF THE SUBSTANCE/ PREPARATION AND OF THE COMPANY

Product name	Oxygen
Chemical formula	O_2
Company identification	see footer
Emergency phone Nos	see footer

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/ Preparation	Substance
Components/ Impurities	Contains no other components or impurities which will influence the classification of the product.
CAS Nr	7782-44-7
EC Nr (from EINECS)	231-956-9
Specifications	99.5% minimum Conforms to BS4364 and E948

3 HAZARDS IDENTIFICATION

Hazards identification	Compressed gas. Oxidant. Strongly supports combustion. May react violently with combustible materials.

4 FIRST AID MEASURES

Inhalation	Not hazardous.
Ingestion	Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards	Supports combustion. Non flammable. Exposure to fire may cause containers to rupture/explode. Inform Fire Brigade.
Hazardous combustion products	None.
Suitable extinguishing media	All known extinguishants can be used.
Specific methods	If possible, stop flow of product. Move container away and cool with water from a protected position.
Special protective equipment for fire fighters	None.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources. Post warning notices (including no smoking).
Environmental precautions	Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Clean up methods	Ventilate area.

7 HANDLING AND STORAGE

Handling and storage

Use no oil or grease.
Open valve slowly to avoid pressure shock. Segregate from flammable gases and other flammable materials in store. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact BOC if in doubt. Keep away from ignition sources (including static discharges). Refer to BOC container handling instructions. Keep container below 50°C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection	Do not smoke while handling product. Avoid oxygen rich (>21%) atmospheres. Ensure adequate ventilation. Clothing impregnated with oxygen should be ventilated by walking in fresh open air for 15 minutes.

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular weight	32
Melting point	-219°C
Boiling point	-183°C
Critical temperature	-118°C
Relative density, gas	1.1 (air=1)
Relative density, liquid	1.1 (water=1)
Vapour Pressure 20°C	Not applicable
Solubility mg/l water	39 mg/l
Appearance/Colour	Colourless gas
Odour	None
Autoignition temperature	Not applicable
Other data	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity	May react violently with combustible materials. May react violently with reducing agents. Violently oxidises organic material.

11 TOXICOLOGICAL INFORMATION

General	No toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General	No ecological damage caused by this product.

SAFETY DATA SHEET

13 DISPOSAL CONSIDERATIONS

General	To atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Contact BOC if guidance is required.

14 TRANSPORT INFORMATION

Proper Shipping Name	Oxygen, compressed
UN Nr	1072
Class/Div	2.2
Subsidiary risk	5.1
ADR/RID Classification Code	1O
ADR/RID Hazard Nr	25
Labelling ADR	Label 2.2: non flammable non toxic gas Label 5.1: fire intensifying risk

Other transport information

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 and:

- cylinder valve is closed and not leaking.
- valve outlet cap nut or plug (where provided) is correctly fitted.
- valve protection device (where provided) is correctly fitted
- adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548	008-001-00-8.
Designation in Dir 95/2/EC	E948
EC Classification	O;R8
Labelling of cylinders	
- Symbols	Label 2.2: non flammable non toxic gas. Label 5.1: fire intensifying risk.
- Risk phrases	R8 Contact with combustible material may cause fire.
- Safety phrases	S9 Keep container in well-ventilated place. S17 Keep away from combustible material.

16 OTHER INFORMATION

Ensure all national/local regulations are observed.

Ensure operators understand the hazard of oxygen enrichment.

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Do not use oxygen as a substitute for air, nitrogen or any other gas.

Always leak check cylinders when first collected, delivered or used using an approved leak detection fluid.

Details given in this document are believed to be correct at the time of going to press. 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.

For further safety information please refer to "Safe Under Pressure" and "Safe handling, storage and transport of industrial gas cylinders", both of which are available from your local BOC outlet.

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws.

CYLINDER CHARACTERISTICS

Cylinder Size	Maximum Filled Pressure at 15°C (bar)	Approx. Dimensions incl. valve and guard where supplied (mm)	Approx. Full Cylinder weight (kg)	Manifolded Cylinder Pallets (MCPs)	Maximum Filled Pressure at 15°C (bar)	Approx. Dimensions incl. cylinders (mm)	Max. Gross Weight (kg)
W	230	230 x 1460	83.8	WW	230	1290 x 1810 x 840	1500

For product and safety enquiries please phone

In the United Kingdom:
0800 111 333

BOC
Customer Service Centre
Priestley Road, Worsley
Manchester M28 2UT
Fax: 0800 111 555

In Ireland:
Dublin (01) 409 1800

BOC
P.O. Box 201
Bluebell, Dublin 12
Fax: 01 409 1805

COSHH assessment

Acetylene, dissolved

Overview

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

Hazards

First aid

Eyes

Adverse effects not expected from this product.

Skin

Adverse effects not expected from this product.

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.

Ingestion

Ingestion is not considered a potential route of exposure.

Handling precautions and PPE

Respiratory

When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.

Hand

Wear working gloves while handling containers.

Skin

Wear fire resistant or flame retardant clothing.

Eye

Safety eyewear should be used to avoid exposure to liquid splashes.

- **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, no smoking, high temperature high pressure may decompose violently at high temperature and/or pressure or in the presence of a catalyst, air and oxidizers,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.
- **Storage precautions:** 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.
- **Flashpoint:** N/A

- **Transport precautions:** Proper Shipping Name: ACETYLENE, DISSOLVED. 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.
- **Disposal precautions:** 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.
- **Spill procedures:** Provide adequate ventilation. Eliminate sources of ignition.

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:	C2H2
INDEX No.	601-015-00-0
CAS-No.	74-86-2
EC No.	200-816-9
REACH Registration No.	01-2119457406-36-0041 UK-01-3758468859-4-0001

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 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 Word: 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 Statements

General None.

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: In case of leakage, eliminate all ignition sources.

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 gasis 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 UK-01-3758468859-4-0001
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

Chemical name	Chemical formula	Concentration	CAS-No.	REACH Registration No.	M-Factor:	Notes
acetylene (ethyne)	C2H2	100%	74-86-2	01-2119457406-36-0041 UK-01-3758468859-4-0001	-	

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.
This substance has workplace exposure limit(s).
PBT: persistent, bioaccumulative and toxic substance.
vPvB: very persistent and very bioaccumulative substance.

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 . In case of leakage, eliminate all ignition sources. 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. Eliminate 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 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	-

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:	Guideline: EN 388 Protective gloves against mechanical risks. Additional Information: Wear working gloves while handling containers
Body protection:	Wear fire resistant or flame 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:	When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Guideline: EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
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:	Colourless
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 Experimental result, Key study
Boiling Point:	-84.7 °C (101.3 hPa) Experimental result, Key study
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) Experimental result, Key study
Flammability limit - lower(%):	2.3 %(V)
Vapour pressure:	4,535 kPa (22 °C) Experimental result, Key study
Vapour density (air=1):	0.91 AIR=1
Relative density:	0.377 (25 °C)
Solubility(ies)	
Solubility in Water:	1,200 mg/l (25 °C)
Partition coefficient (n-octanol/water):	0.37
Autoignition Temperature:	305 °C Experimental result, Key study
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.

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): LC 50 (Various, 96 h): 545 mg/l Remarks: QSAR QSAR, Supporting study

Acute toxicity - Aquatic Invertebrates
acetylene (ethyne): EC 50 (Water flea (Daphnia magna), 48 h): 242 mg/l

Toxicity to microorganisms
acetylene (ethyne): EC 50 (Alga, 72 h): 57 mg/l

12.2 Persistence and Degradability

Product: Not applicable to gases and gas mixtures..

Biodegradation
acetylene (ethyne): 50 % (3 d) Detected in water. QSAR, Supporting study

12.3 Bioaccumulative Potential

Product: The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

Bioconcentration Factor (BCF)
acetylene (ethyne): Bioconcentration Factor (BCF): 3 Aquatic sediment QSAR, Supporting study

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
14.4 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 MARPOL 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%

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, as amended.:

Chemical	CAS-No.	Lower-tier	Upper-tier

		Requirements	Requirements
acetylene (ethyne)	74-86-2	5 t	50 t

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) 2015/830.
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", as amended.
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 H-statements in sections 2 and 3

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

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: 08.03.2021

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

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

Overview

- **Reference:** 3833
- **Composition:** DISTILLATES, PETROLEUM, HYDROTREATED MIDDLE

First aid

Eyes

Rinse the eye with water immediately. Continue to rinse for at least 15 minutes and get medical attention.

Skin

Remove affected person from source of contamination. Rinse the skin immediately with lots of water. Get medical attention if irritation persists after washing.

Inhalation

Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.

Ingestion

DO NOT induce vomiting. Get medical attention immediately.

Handling precautions and PPE

Respiratory

Wear respirator if there is dust formation.

Hand

Use suitable protective gloves if risk of skin contact. Use thin cotton gloves inside the rubber gloves if allergy risk.

Skin

Wear suitable protective clothing as protection against splashing or contamination.

Eye

If risk of splashing, wear safety goggles or face shield.

- **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:** Avoid excessive heat for prolonged periods of time.
- **Storage precautions:** Store in tightly closed original container in a dry, cool and well-ventilated place. Keep in original container.
- **Flashpoint:** N/A
- **Transport precautions:** The product is not covered by international regulation on the transport of dangerous goods
- **Disposal precautions:** Dispose of waste and residues in accordance with local authority requirements. Recover and reclaim or recycle, if practical.
- **Spill procedures:** Stop leak if possible without risk. Do not contaminate water sources or sewer. Pick up with vacuum or absorbent solid, store in closed container for disposal. Avoid generation and spreading of dust. Avoid contact with skin or inhalation of spillage, dust or vapour. Wear necessary protective equipment. Containers with collected spillage must be properly labelled with correct contents and hazard symbol.

Stronger Bonds, Better Life

SAFETY DATA SHEET
4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

According to Regulation (EC) No 1907/2006

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

1.1. Product identifier

Product name	4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR
Product No.	642256

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

Identified uses	Sealant.

1.3. Details of the supplier of the safety data sheet

Supplier	BOSTIK LIMITED COMMON ROAD STAFFORD STAFFORDSHIRE ST16 3EH +44 1785 272625 sds.uk@bostik.com

1.4. Emergency telephone number

+44 1785 272650 (24 Hours)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical and Chemical Hazards	Not classified.
Human health	Not classified.
Environment	Not classified.

Classification (1999/45/EEC) Not classified.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

2.2. Label elements

Label In Accordance With (EC) No. 1272/2008

No pictogram required.

Precautionary Statements

P102	Keep out of reach of children.
P281	Use personal protective equipment as required.

2.3. Other hazards

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

DISTILLATES, PETROLEUM, HYDROTREATED MIDDLE	30-60%
CAS-No.: 64742-46-7 EC No.: 265-148-2	

Classification (EC 1272/2008)	Classification (67/548/EEC)
EUH066	Xn;R65.
Asp. Tox. 1 - H304	R66.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General information

General first aid, rest, warmth and fresh air.

Inhalation

Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.

Ingestion

DO NOT induce vomiting. Get medical attention immediately.

Skin contact

Remove affected person from source of contamination. Rinse the skin immediately with lots of water. Get medical attention if irritation persists after washing.

Eye contact

Rinse the eye with water immediately. Continue to rinse for at least 15 minutes and get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation

No specific symptoms noted.

Ingestion

No specific symptoms noted.

Skin contact

No specific symptoms noted.

Eye contact

No specific symptoms noted.

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

No specific first aid measures noted.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Extinguishing media

This product is not flammable. Use fire-extinguishing media appropriate for surrounding materials.

5.2. Special hazards arising from the substance or mixture

Specific hazards

Fire or high temperatures create: Toxic gases/vapours/fumes of: Carbon dioxide (CO2). Carbon monoxide (CO).

5.3. Advice for firefighters

Protective equipment for fire-fighters

Use protective equipment appropriate for surrounding materials.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions

Do not discharge into drains, [illegible]

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

6.3. Methods and material for containment and cleaning up

Stop leak if possible without risk. Do not contaminate water sources or sewer. Pick up with vacuum or absorbent solid, store in closed container for disposal. Avoid generation and spreading of dust. Avoid contact with skin or inhalation of spillage, dust or vapour. Wear necessary protective equipment. Containers with collected spillage must be properly labelled with correct contents and hazard symbol.

6.4. Reference to other sections

Wear protective clothing as described in Section 8 of this safety data sheet.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not handle broken packages without protective equipment. Use mechanical ventilation in case of handling which causes formation of dust. Avoid spilling, skin and eye contact.

7.2. Conditions for safe storage, including any incompatibilities

Store in tightly closed original container in a dry, cool and well-ventilated place. Keep in original container.

7.3. Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Ingredient Comments

WEL = Workplace Exposure Limits

8.2. Exposure controls

Protective equipment

Process conditions

Use engineering controls to reduce air contamination to permissible exposure level.

Engineering measures

All handling to take place in well-ventilated area.

Respiratory equipment

Wear respirator if there is dust formation.

Hand protection

Use suitable protective gloves if risk of skin contact. Use thin cotton gloves inside the rubber gloves if allergy risk.

Eye protection

If risk of splashing, wear safety goggles or face shield.

Other Protection

Wear suitable protective clothing as protection against splashing or contamination.

Hygiene measures

Wash promptly if skin becomes wet or contaminated. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke. Wash hands at the end of each work shift and before eating, smoking and using the toilet. Use appropriate skin cream to prevent drying of skin. DO NOT SMOKE IN WORK AREA!

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Paste
Colour	Clear

9.2. Other information

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

No specific reactivity hazards associated with this product.

10.2. Chemical stability

Stable under normal temperature conditions.

10.3. Possibility of hazardous reactions

Not available.
Hazardous Polymerisation
Unknown.

10.4. Conditions to avoid

Avoid excessive heat for prolonged periods of time.

10.5. Incompatible materials

Materials To Avoid
No incompatible groups noted.

10.6. Hazardous decomposition products

Fire creates: Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Health Warnings
Serious long-term effects are not known to be related to this type of product. Particles in the eyes may cause irritation and smarting. May cause discomfort if swallowed.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity
The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

12.1. Toxicity

No data available

12.2. Persistence and degradability

Degradability
There are no data on the degradability of this product.

12.3. Bioaccumulative potential

Bioaccumulative potential
No data available on bioaccumulation.

12.4. Mobility in soil

Mobility:
Semi-mobile.

12.5. Results of PBT and vPvB assessment

No data available

12.6. Other adverse effects

Not available.

SECTION 13: DISPOSAL CONSIDERATIONS

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

General information

When handling waste, consideration should be made to the safety precautions applying to handling of the product.

13.1. Waste treatment methods

Dispose of waste and residues in accordance with local authority requirements. Recover and reclaim or recycle, if practical.

SECTION 14: TRANSPORT INFORMATION

General	The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Transport Labels

No transport warning sign required.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Environmentally Hazardous Substance/Marine Pollutant

No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: REGULATORY INFORMATION

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

Statutory Instruments

The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (S.I 2009 No. 716).

Approved Code Of Practice

Classification and Labelling of Substances and Preparations Dangerous for Supply.

Guidance Notes

Workplace Exposure Limits EH40. Introduction to Local Exhaust Ventilation HS(G)37.

EU Legislation

Dangerous Substance Directive 67/548/EEC. Dangerous Preparations Directive 1999/45/EC. 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, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.

15.2. Chemical Safety Assessment

SECTION 16: OTHER INFORMATION

General information

This product should be used as directed by Bostik Ltd. For further information consult the product data sheet or contact Technical Services.

Information Sources

This safety data sheet was compiled using current safety information supplied by distributor of raw materials.

4 TRADE GENERAL PURPOSE SILICONE SEALANT CLEAR

Revision Comments

NOTE: Lines within the margin indicate significant changes from the previous revision. This safety data sheet supersedes all previous issues and users are cautioned to ensure that it is current. Destroy all previous data sheets and if in doubt contact Bostik Limited.

Issued By	Approved LJ
Revision Date	February 2014
Revision	4
Date	May 2010

Risk Phrases In Full

R65	Harmful: may cause lung damage if swallowed.
NC	Not classified.
R66	Repeated exposure may cause skin dryness or cracking.

Hazard Statements In Full

H304	May be fatal if swallowed and enters airways.
EUH066	Repeated exposure may cause skin dryness or cracking.

COSHH assessment

WD-40 Aerosol

Overview

- **Reference:** 7146
- **Composition:** Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics, Carbon dioxide

First aid

Eyes

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

Skin

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

Inhalation

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

Ingestion

Rinse the mouth thoroughly with water. Consult doctor immediately. Do not induce vomiting. Danger of aspiration.

Handling precautions and PPE

Respiratory

Filter A P 3, code colour brown, white. Observe wearing time limitations for respiratory protection equipment.

Hand

Protective nitrile gloves.

Skin

Protective working garments.

Eye

Tight fitting protective goggles with side protection.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 20 /0 aromatics: 800 mg/m3, Carbon dioxide: 5000 ppm, 9150 mg/m3, Oil mist, mineral: 5mg/m3
  - **Short term exposure limit (STEL 15min TWA):** Carbon dioxide: 15000 ppm, 27400 mg/m3, Oil mist, mineral: 10mg/m3
- **Factors which increase risks:** Protect from sunlight and do not expose to temperatures exceeding 50°C, do not pierce or burn, even after use, avoid contact with strong oxidizing agents.
- **Storage precautions:** 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.
- **Flashpoint:** 47 °C
- **Transport precautions:** Proper shipping name: Transport by road/by rail: AEROSOLS. Transport by sea: AEROSOLS. Transport by air: Aerosols, flammable. 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.
- **Disposal precautions:** The waste codes are recommendations based on the scheduled use of this product. Owing to the users specific conditions for use and disposal, other waste codes may be allocated under certain circumstances.
- **Spill procedures:** If spray or gas escapes, ensure ample fresh air is available.

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 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

WD40 Company Limited UK, PO Box 440 , Kiln Farm, Milton Keynes, MK11 3LF
Telephone 01908 555400, Fax 01908 266900
info@wd40.co.uk

E-mail address of the competent person: info@chemical-check.de, k.schnurbusch@chemical-check.de

1.4 Emergency telephone

Advisory office in case of poisoning:

Telephone number of the company in case of emergencies:
Tel.: +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)
Not determined

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)
Not determined

2.2.2 Labeling according to Directives 67/548/EEC and 1999/45/EC (including amendments).

Symbols: F+
Indications of danger:
Extremely flammable
R-phrases:
66 Repeated exposure may cause skin dryness or cracking.
67 Vapours may cause drowsiness and dizziness.
S-phrases:
23 Do not breathe vapour/spray.
24 Avoid contact with skin.

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 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
WD40 Company Limited UK, PO Box 440 , Kiln Farm, Milton Keynes, MK11 3LF
Telephone 01908 555400, Fax 01908 266900
info@wd40.co.uk

E-mail address of the competent person: info@chemical-check.de, k.schnurbusch@chemical-check.de

1.4 Emergency telephone
Advisory office in case of poisoning:

Telephone number of the company in case of emergencies:
Tel.: +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)
Not determined
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)
Not determined
2.2.2 Labeling according to Directives 67/548/EEC and 1999/45/EC (including amendments).

Symbols: F+
Indications of danger:
Extremely flammable
R-phrases:
66 Repeated exposure may cause skin dryness or cracking.
67 Vapours may cause drowsiness and dizziness.
S-phrases:
23 Do not breathe vapour/spray.
24 Avoid contact with skin.

35 This material and its container must be disposed of in a safe way.
46 If swallowed, seek medical advice immediately and show this container or label.
51 Use only in well-ventilated areas.
Additions:
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C.
Do not pierce or burn, even after use.
Do not spray on a naked flame or any incandescent material.
Keep away from sources of ignition - No smoking.
Keep out of the reach of children.
Without adequate ventilation, formation of explosive mixtures may be possible.

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.
Without adequate ventilation, formation of explosive mixtures may be possible.
Danger of bursting (explosion) when heated
Hydrocarbons can be harmful to water.
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 (ECHA)	01-2119463258-33-XXXX
Index	---
EINECS, ELINCS	919-857-5
CAS	CAS n.v.
content %	60-80
Symbol	Xn
R-phrases	10-65-66-67
Classification categories / Indications of danger	Flammable, Harmful
Hazard class/Hazard category	**Hazard statement**
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 (ECHA)	--
Index	---
EINECS, ELINCS	204-696-9
CAS	CAS 124-38-9
content %	1-5
Symbol	---
R-phrases	---
Classification categories / Indications of danger	---
Hazard class/Hazard category	**Hazard statement**

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

35 This material and its container must be disposed of in a safe way.
46 If swallowed, seek medical advice immediately and show this container or label.
51 Use only in well-ventilated areas.
Additions:
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C.
Do not pierce or burn, even after use.
Do not spray on a naked flame or any incandescent material.
Keep away from sources of ignition - No smoking.
Keep out of the reach of children.
Without adequate ventilation, formation of explosive mixtures may be possible.

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.
Without adequate ventilation, formation of explosive mixtures may be possible.
Danger of bursting (explosion) when heated
Hydrocarbons can be harmful to water.
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 (ECHA)	01-2119463258-33-XXXX
Index	---
EINECS, ELINCS	919-857-5
CAS	CAS n.v.
content %	60-80
Symbol	Xn
R-phrases	10-65-66-67
Classification categories / Indications of danger	Flammable, Harmful
Hazard class/Hazard category	**Hazard statement**
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 (ECHA)	--
Index	---
EINECS, ELINCS	204-696-9
CAS	CAS 124-38-9
content %	1-5
Symbol	---
R-phrases	---
Classification categories / Indications of danger	---
Hazard class/Hazard category	**Hazard statement**

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.

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

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
Cool container at risk with water.

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.
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.

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

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
Cool container at risk with water.

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.
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.
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

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.
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.

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

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

WEL-TWA = Workplace Exposure Limit, Long-term exposure limit (8-hour TWA (= time weighted average) reference period)

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.
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

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.
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.

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)	

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BMGV: ---	Other information: ---	

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

Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics						
Use-Area	**Exposure-Route**	**Exposure-Pattern**	**Descriptor**	**Value**	**Unit**	**Note**
Worker	Human - dermal	Long term, systemic effects	DNEL (Derived No Effect Level)	208	mg/kg bw/day	
Worker	Human - inhalation	Long term, systemic effects	DNEL (Derived No Effect Level)	871	mg/m3	
Consumer	Human - oral	Long term, systemic effects	DNEL (Derived No Effect Level)	125	mg/kg bw/day	
Consumer	Human - dermal	Long term, systemic effects	DNEL (Derived No Effect Level)	125	mg/kg bw/day	
Consumer	Human - inhalation	Long term, systemic effects	DNEL (Derived No Effect Level)	185	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)

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.

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.
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Use-Area	**Exposure-Route**	**Exposure-Pattern**	**Descriptor**	**Value**	**Unit**	**Note**
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Worker	Human - inhalation	Long term, systemic effects	DNEL (Derived No Effect Level)	871	mg/m3	
Consumer	Human - oral	Long term, systemic effects	DNEL (Derived No Effect Level)	125	mg/kg bw/day	
Consumer	Human - dermal	Long term, systemic effects	DNEL (Derived No Effect Level)	125	mg/kg bw/day	
Consumer	Human - inhalation	Long term, systemic effects	DNEL (Derived No Effect Level)	185	mg/m3	

8.2 Exposure controls
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Ensure good ventilation. This can be achieved by local suction or general air extraction.
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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.
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Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.
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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
Colour:	Light brown
Odour:	Characteristic
Odour threshold:	Not determined
pH-value:	Not determined
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 Manual Test and Criteria, Part III, 31.5): <= 300 g/m3 (deflagration density)
Flash point:	Enclosed space ignition test (UN Manual Test and Criteria, Part III, 31.5): <= 300 s/m3 (time equivalent)
Flash point:	Ignition distance test (UN Manual Test and Criteria, Part III, 31.4): >= 75 cm
Evaporation rate:	Not determined
Flammability (solid, gas):	Yes
Lower explosive limit:	0,6 Vol-% (Naphtha (petroleum), hydrotreated heavy)
Upper explosive limit:	8,0 Vol-% (Naphtha (petroleum), hydrotreated heavy)
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:	Not determined
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:	Not determined

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 10.4 to 10.6.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

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Flash point:	47 °C (Liquid concentrate)
Flash point:	Enclosed space ignition test (UN Manual Test and Criteria, Part III, 31.5): <= 300 g/m3 (deflagration density)
Flash point:	Enclosed space ignition test (UN Manual Test and Criteria, Part III, 31.5): <= 300 s/m3 (time equivalent)
Flash point:	Ignition distance test (UN Manual Test and Criteria, Part III, 31.4): >= 75 cm
Evaporation rate:	Not determined
Flammability (solid, gas):	Yes
Lower explosive limit:	0,6 Vol-% (Naphtha (petroleum), hydrotreated heavy)
Upper explosive limit:	8,0 Vol-% (Naphtha (petroleum), hydrotreated heavy)
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:	Not determined
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:	Not determined

9.2 Other information

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

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10.3 Possibility of hazardous reactions
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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 10.4 to 10.6.

See also section 5.2
No decomposition when used as directed.

SECTION 11: Toxicological information

WD-40 Aerosol

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 toxicity data:						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:						Repeated exposure may cause skin dryness or cracking.
Respiratory or skin sensitisation:						Not sensitizising
Germ cell mutagenicity:						Negative
Carcinogenicity:						Negative
Specific target organ toxicity - single exposure (STOT-SE):						May cause drowsiness or dizziness.
Aspiration hazard:						Yes
Symptoms:						unconsciousness, headaches, dizziness, reddening of the skin

Carbon dioxide

Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes

See also section 5.2
No decomposition when used as directed.

SECTION 11: Toxicological information

WD-40 Aerosol

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 toxicity data:						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:						Repeated exposure may cause skin dryness or cracking.
Respiratory or skin sensitisation:						Not sensitizising
Germ cell mutagenicity:						Negative
Carcinogenicity:						Negative
Specific target organ toxicity - single exposure (STOT-SE):						May cause drowsiness or dizziness.
Aspiration hazard:						Yes
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

WD-40 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:							Not readily but inherent biodegradable.(>20 -< 60%, 28d, OECD 310)
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:	NOELR	28d	0,13	mg/l	(Oncorhynchus mykiss)	QSAR	
Toxicity to fish:	LC50	96h	>1000	mg/l	(Oncorhynchus mykiss)	OECD 203 (Fish, Acute Toxicity Test)	
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:	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)	
Toxicity to algae:	EbC50	72h	>1000	mg/l	(Pseudokirchneriella subcapitata)	OECD 201 (Alga, Growth Inhibition Test)	
Persistence and degradability:		28d	80	%		OECD 301 F (Ready Biodegradability - Manometric Respirometry Test)	
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							No PBT substance, No vPvB substance
Other adverse effects:							n.d.a.

Symptoms:						unconsciousness, blisters by skin-contact, vomiting, frostbite, annoyance, palpitations, itching, headaches, cramps, ear noises, dizziness

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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

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Persistence and degradability:		28d	80	%		OECD 301 F (Ready Biodegradability - Manometric Respirometry Test)	
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							No PBT substance, No vPvB substance
Other adverse effects:							n.d.a.

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 2011):	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.

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.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

For the substance / mixture / residual amounts

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Special precautions for user

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Danger code and packing code on request.

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).
VOC 1999/13/EC: ~ 65,5 % w/w

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: 2, 3, 8, 11, 12, 16
The following statements are the indicated R-phrases / H-phrases and classification codes (GHS/CLP) for the ingredients (listed in Section 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.

Flam. Liq.-Flammable liquid
Asp. Tox.-Aspiration hazard
STOT SE-Specific target organ toxicity - single exposure - narcotic effects

Legend:

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
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

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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
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
LMBG Lebensmittel- und Bedarfsgegenständegesetz (= Foodstuffs and Commodities Law)
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
PC product category (= 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)
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

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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)
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

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, Wöbbeler Straße 2-4, D-32839 Steinheim, Tel.: +49 5233 94 17 0, Fax: +49 5233 94 17 90

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COSHH assessment

Multi Surface Cleaner

Overview

- **Reference:** 17022
- **Composition:** ISOTRIDECANOLETHOXYLATE,POLYMER(8 MOLE EO AVERAGE)

Hazards

First aid

Eyes	Bathe the eye with running water for 15 minutes. Transfer to hospital for specialist examination.
Skin	Rinse skin with water.
Inhalation	N/A
Ingestion	Wash out mouth with water. If conscious, give half a litre of water to drink immediately.

Handling precautions and PPE

Respiratory	N/A
Hand	N/A
Skin	N/A
Eye	Safety glasses. Ensure eye bath is to hand.

- **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:** N/A
- **Storage precautions:** Store in a cool, well ventilated area.
- **Flashpoint:** N/A
- **Transport precautions:** N/A
- **Disposal precautions:** Dispose of as normal industrial waste. The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.
- **Spill procedures:** Transfer to a suitable container.

AGS1

Multi-Purpose Cleaner

Doors | Chairs | Tables | Office Furniture
Laminates | Hand Rails | Mirrors | Windows

ENVIRONMENTAL ACCREDITATION

USES

A surface safe multi-surface cleaner, which cleans, freshens and enhances all hard surfaces without leaving a residue. Available both as a concentrate in 5L and as a ready-diluted formulation in a 750ml trigger spray pack.

A viscous, blue liquid with a fresh fragrance and a controlled foam level for easy application, AGS1 is ideal for the daily cleaning of general interior surfaces such as desks, chairs, windows, doors, etc.

Suitable for use on wood, glass, plastic, aluminium, stainless steel and other water washable surfaces.

FOR USE ON


Offices


Doors


Chairs


Tables


Windows


Floors

METHOD OF USE

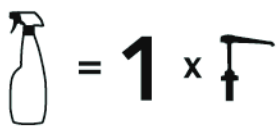

Spray Cleaning


Wet Wiping

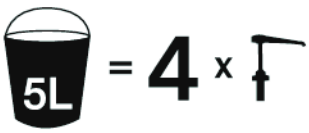

Mopping

Apply diluted solution using a cloth or trigger spray, work into surface and then rinse or wipe clean.

DILUTIONS



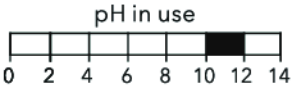
600ml Trigger Bottle
30ml



5 Litre Bucket
120ml

Dilute with hot or cold water.

pH in use



Manufactured for:
ANCHOR GROUP SERVICES
Seasons House | Lakeside | Saltney
St Davids Park | Ewloe | Deeside | CH5 3YE
Tel: 01244 354700 www.anchorgroupservices.co.uk

SAFETY DATA SHEET

AGS1

Compilation date: 01/08/2008

Revision date: 18/03/2015

Revision No: 4

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

1.1. Product identifier

Product name: Multi Surface Cleaner

Product code: AGS1

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

Use of substance / mixture: PC35: Washing and cleaning products (including solvent based products).

1.3. Details of the supplier of the safety data sheet

Company name: Anchor Group Services
Seasons House
Lakeside Business Village
St Davids Park
Ewloe, Deeside
CH5 3YE
United Kingdom

Tel: +44 (0) 1244 354700

Email: info@anchorgroupservices.co.uk

1.4. Emergency telephone number

Manufacturer: Clover Chemicals Ltd
Clover House
Macclesfield Road
Whaley Bridge, High Peak
Derbyshire
SK23 7DQ
UK

Tel: +44 (0) 1663 733114

Fax: +44 (0) 1663 733115

Email: technical@cloverchemicals.com

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Eye Dam. 1: H318

Most important adverse effects: Causes serious eye damage.

[cont...]

2.2. Label elements

Label elements:

Hazard statements: H318: Causes serious eye damage.

Hazard pictograms: GHS05: Corrosion

Signal words: Danger

Precautionary statements: P102: Keep out of reach of children.
P280: Wear eye protection.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

ISOTRIDECANOLETHOXYLATE,POLYMER(8 MOLE EO AVERAGE)

EINECS	CAS	PBT / WEL	CLP Classification	Percent
-	69011-36-5	-	Acute Tox. 4: H302; Eye Dam. 1: H318	1-10%

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Rinse skin with water.

Eye contact: Bathe the eye with running water for 15 minutes. Transfer to hospital for specialist examination.

Ingestion: Wash out mouth with water. If conscious, give half a litre of water to drink immediately.

4.2. Most important symptoms and effects, both acute and delayed

Skin contact: There may be mild irritation at the site of contact.

Eye contact: There may be irritation and redness.

Ingestion: There may be irritation of the throat.

Inhalation: No symptoms.

Delayed / immediate effects: Immediate effects can be expected after short-term exposure.

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

Immediate / special treatment: Not applicable.

[cont...]

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Water.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details. Turn leaking containers leak-side up to prevent the escape of liquid.

6.2. Environmental precautions

Environmental precautions: Do not discharge into drains or rivers. Contain the spillage using bunding.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Transfer to a suitable container.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area.

Suitable packaging: Polyethylene. Stainless steel.

7.3. Specific end use(s)

Specific end use(s): No data available.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Workplace exposure limits: No data available.

DNEL/PNEC Values

DNEL / PNEC No data available.

8.2. Exposure controls

Respiratory protection: Respiratory protection not required.

Eye protection: Safety glasses. Ensure eye bath is to hand.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquid

Colour: Blue

Odour: Pleasant

Evaporation rate: Moderate

Oxidising: Non-oxidising (by EC criteria)

Solubility in water: Soluble

Viscosity: Viscous

Boiling point/range°C: 100

Melting point/range°C: 0

Flammability limits %: lower: Not applicable.

upper: Not applicable.

Flash point°C: Not applicable.

Part.coeff. n-octanol/water: Not applicable.

Autoflammability°C: Not applicable.

Vapour pressure: Not applicable.

Relative density: 1.015

pH: 11.4

VOC g/l: 0

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.

10.4. Conditions to avoid

10.5. Incompatible materials

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

Section 11: Toxicological information

11.1. Information on toxicological effects

Hazardous ingredients:

ISOTRIDECANOLETHOXYLATE,POLYMER(8 MOLE EO AVERAGE)

ORAL	RAT	LD50	500-2000	mg/kg

Relevant hazards for product:

Hazard	Route	Basis
Serious eye damage/irritation	OPT	Hazardous: calculated

Symptoms / routes of exposure

Skin contact: There may be mild irritation at the site of contact.

Eye contact: There may be irritation and redness.

Ingestion: There may be irritation of the throat.

Inhalation: No symptoms.

Delayed / immediate effects: Immediate effects can be expected after short-term exposure.

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

ISOTRIDECANOLETHOXYLATE,POLYMER(8 MOLE EO AVERAGE)

FISH	96H LC50	1-10	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable. The surfactants contained in this preperation comply with the biodegradability criteria as laid down in regulation (EC) No.648/2004 on detergents.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Soluble in water.

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Negligible ecotoxicity.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal of packaging: Dispose of as normal industrial waste.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

Transport class: This product does not require a classification for transport.

Section 15: Regulatory information

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

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: H302: Harmful if swallowed.

H318: Causes serious eye damage.

Legal disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

COSHH assessment

2007/000 CELLULOSE THINNERS

Overview

- **Reference:** 10087
- **Composition:** ACETONE, BUTANOL-norm, BUTYL ACETATE -norm, PROPAN-1-OL, TOLUENE

Hazards

First aid

Eyes	Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Contact physician if irritation persists.
Skin	Remove affected person from source of contamination. Remove contaminated clothing. Wash the skin immediately with soap and water. Get medical attention if irritation persists after washing.
Inhalation	Move the exposed person to fresh air at once. For breathing difficulties oxygen may be necessary. If breathing stops, provide artificial respiration. Keep the affected person warm and at rest. Get prompt medical attention.
Ingestion	DO NOT INDUCE VOMITING! Remove victim immediately from source of exposure. Rinse mouth thoroughly. Provide rest, warmth and fresh air. Get medical attention immediately! If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Handling precautions and PPE

Respiratory	Respiratory protection must be used if air contamination exceeds acceptable level.
Hand	Use protective gloves.
Skin	Wear appropriate clothing to prevent any possibility of liquid contact and repeated or prolonged vapour contact.
Eye	Use approved safety goggles or face shield.

- **Maximum/workplace exposure limit:**
  - **Long term exposure limit (LTEL 8hr TWA):** ACETONE: 500 ppm, 1210 mg/m3, BUTYL ACETATE -norm: 150 ppm, 724 mg/m3, PROPAN-1-OL: 200 ppm, 500 mg/m3, TOLUENE: 50 ppm, 191 mg/m3
  - **Short term exposure limit (STEL 15min TWA):** ACETONE: 1500 ppm, 3620 mg/m3, BUTANOL-norm: 50 ppm, 154 mg/m3, BUTYL ACETATE -norm: 200 ppm, 966 mg/m3, PROPAN-1-OL: 250 ppm, 625 mg/m3, TOLUENE: 150 ppm, 574 mg/m3
- **Factors which increase risks:** Avoid heat, avoid contact with oxidisers or reducing agents.
- **Storage precautions:** Flammable/combustible - Keep away from oxidisers, heat and flames. Store in tightly closed original container in a dry, cool and well-ventilated place. Keep in original container.
- **Flashpoint:** 6 °C
- **Transport precautions:** Proper Shipping Name: PAINT OR PAINT RELATED PRODUCTS.
- **Disposal precautions:** Dispose of waste and residues in accordance with local authority requirements.
- **Spill procedures:** Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate. Clean-up personnel should use respiratory and/or liquid contact protection. Absorb in vermiculite, dry sand or earth and place into containers.

SAFETY DATA SHEET
2007/000 CELLULOSE THINNERS

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

1.1. Product identifier

Product Name: 2007/000 CELLULOSE THINNERS

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

Identified uses: Industrial wood coating.

1.3. Details of the supplier of the safety data sheet

Supplier:

Morrells Woodfinishes Ltd
Wellington Works
Mill Lane, Woodley
Stockport
England
SK6 1RN
0161 406 5300
0161 406 6276
enquiries@morrells.co.uk

1.4. Emergency telephone number

0161 406 5300 DURING OFFICE HOURS

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical	Flam. Liq. 2 - H225
Health	Skin Irrit. 2 - H315;Eye Dam. 1 - H318;Repr. 2 - H361d;STOT Single 3 - H336;STOT Rep. 2 - H373;Asp. Tox. 1 - H304
Environmental	Not classified.

Classification (1999/45): Xn;R48/20, R65. Repr. Cat. 3;R63. Xi;R38, R41. F;R11. R67.

2.2. Label elements

Contains: TOLUENE

Label In Accordance With (Ec) No. 1272/2008

Signal Word: Danger

Hazard Statements

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/container to …

Supplementary Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/…/equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P264	Wash … thoroughly after handling.
P301+310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302+352	IF ON SKIN: Wash with plenty of soap and water.
P303+361+353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+313	IF exposed or concerned: Get medical advice/attention.
P310	Immediately call a POISON CENTER or doctor/physician.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P314	Get medical advice/attention if you feel unwell.
P321	Specific treatment (see … on this label).
P331	Do NOT induce vomiting.
P332+313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
P370+378	In case of fire: Use … for extinction.
P403+233	Store in a well-ventilated place. Keep container tightly closed.
P403+235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

2.3. Other hazards

This product does not contain any PBT or vPvB Substances.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

ACETONE 5-10%

CAS-No.: 67-64-1 EC No.: 200-662-2

Classification (EC 1272/2008)	Classification (67/548)
Flam. Liq. 2 - H225	F;R11
EUH066	Xi;R36
Eye Irrit. 2 - H319	R66
STOT Single 3 - H336	R67

BUTANOL-norm 5-10%

CAS-No.: 71-36-3 EC No.: 200-751-6

Classification (EC 1272/2008)	Classification (67/548)
Flam. Liq. 3 - H226	R10
Acute Tox. 4 - H302	Xn;R22
Skin Irrit. 2 - H315	Xi;R37/38,R41
Eye Dam. 1 - H318	R67
STOT Single 3 - H335	
STOT Single 3 - H336	

BUTYL ACETATE -norm 5-10%

CAS-No.: 123-86-4 EC No.: 204-658-1

Classification (EC 1272/2008)	Classification (67/548)
Flam. Liq. 3 - H226	R10
EUH066	R66
STOT Single 3 - H336	R67

PROPAN-1-OL 1-5%

CAS-No.: 71-23-8 EC No.: 200-746-9

Classification (EC 1272/2008)	Classification (67/548)
Flam. Liq. 2 - H225	F;R11
Eye Dam. 1 - H318	Xi;R41
STOT Single 3 - H336	R67

TOLUENE 60-100%

CAS-No.: 108-88-3 EC No.: 203-625-9

Classification (EC 1272/2008)	Classification (67/548)
Flam. Liq. 2 - H225	F;R11 Repr.Cat.3;R63
Skin Irrit. 2 - H315	Xn;R48/20,R65
Repr. 2 - H361d	Xi;R38
STOT Single 3 - H336	R67
STOT Rep. 2 - H373	
Asp. Tox. 1 - H304	

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Information

NOTE! Keep affected person away from heat, sparks and flames! Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.

Inhalation.

Move the exposed person to fresh air at once. For breathing difficulties oxygen may be necessary. If breathing stops, provide artificial respiration. Keep the affected person warm and at rest. Get prompt medical attention.

Ingestion

DO NOT INDUCE VOMITING! Remove victim immediately from source of exposure. Rinse mouth thoroughly. Provide rest, warmth and fresh air. Get medical attention immediately! If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Skin Contact

Remove affected person from source of contamination. Remove contaminated clothing. Wash the skin immediately with soap and water. Get medical attention if irritation persists after washing.

Eye Contact

Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Contact physician if irritation persists.

4.2. Most important symptoms and effects, both acute and delayed

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

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Extinguishing Media

Fire can be extinguished using: Foam. Dry chemicals, sand, dolomite etc.

5.2. Special hazards arising from the substance or mixture

5.3. Advice for firefighters

Special Fire Fighting Procedures

Avoid breathing fire vapours. Cool containers exposed to flames with water until well after the fire is out. Keep run-off water out of sewers and water sources. Dike for water control.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.2. Environmental precautions

6.3. Methods and material for containment and cleaning up

Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate. Clean-up personnel should use respiratory and/or liquid contact protection. Absorb in vermiculite, dry sand or earth and place into containers.

6.4. Reference to other sections

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid spilling, skin and eye contact. Keep away from heat, sparks and open flame. Ventilate well, avoid breathing vapours. Use approved respirator if air contamination is above accepted level. Use explosion proof electric equipment.

7.2. Conditions for safe storage, including any incompatibilities

Flammable/combustible - Keep away from oxidisers, heat and flames. Store in tightly closed original container in a dry, cool and well-ventilated place. Keep in original container.

Storage Class

Flammable liquid storage.

7.3. Specific end use(s)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Name	STD	TWA - 8 Hrs		STEL - 15 Min		Notes
ACETONE	WEL	500 ppm	1210 mg/m3	1500 ppm	3620 mg/m3	
BUTANOL-norm	WEL			50 ppm(Sk)	154 mg/m3(Sk)	
BUTYL ACETATE -norm	WEL	150 ppm	724 mg/m3	200 ppm	966 mg/m3	
PROPAN-1-OL	WEL	200 ppm(Sk)	500 mg/m3(Sk)	250 ppm(Sk)	625 mg/m3(Sk)	
TOLUENE	WEL	50 ppm(Sk)	191 mg/m3(Sk)	150 ppm(Sk)	574 mg/m3(Sk)	

WEL = Workplace Exposure Limit.

Ingredient Comments

WEL = Workplace Exposure Limits

8.2. Exposure controls

Protective Equipment

Engineering Measures

Provide adequate general and local exhaust ventilation.

Respiratory Equipment

Respiratory protection must be used if air contamination exceeds acceptable level.

Hand Protection

Use protective gloves.

Eye Protection

Use approved safety goggles or face shield.

Other Protection

Wear appropriate clothing to prevent any possibility of liquid contact and repeated or prolonged vapour contact.

Hygiene Measures

DO NOT SMOKE IN WORK AREA! Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly with soap & water if skin becomes contaminated. Promptly remove any clothing that becomes contaminated. Use appropriate skin cream to prevent drying of skin. When using do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Liquid
Odour	Characteristic
Initial Boiling Point and Boiling Range:	97
Flash Point (°C)	6

9.2. Other information

Volatile Organic Compound (VOC)	857 g/litre

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

10.2. Chemical stability

Stable under normal temperature conditions.

10.3. Possibility of hazardous reactions

10.4. Conditions to avoid

Avoid heat. Avoid contact with oxidisers or reducing agents.

10.5. Incompatible materials

10.6. Hazardous decomposition products

Fire creates: Toxic gases/vapours/fumes of: Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

General Information

Prolonged and repeated contact with solvents over a long period may lead to permanent health problems.

Inhalation

Vapours may cause headache, fatigue, dizziness and nausea. Vapour may irritate respiratory system or lungs.

Ingestion.

Harmful: may cause lung damage if swallowed. Pneumonia may be the result if vomited material containing solvents reaches the lungs. Narcotic effect.

Skin Contact

Acts as a defatting agent on skin. May cause cracking of skin, and eczema. Prolonged or repeated exposure may cause severe irritation.

Eye Contact

Irritating to eyes. Vapour or spray may cause temporary (reversible) eye damage.

Route of entry

Inhalation. Ingestion. Skin and/or eye contact.

Target Organs

Respiratory system, lungs

Medical Symptoms

High concentrations of vapours may irritate respiratory system and lead to headache, fatigue, nausea and vomiting.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:

There are no data on the ecotoxicity of this product.

12.1. Toxicity

12.2. Persistence and degradability

12.3. Bioaccumulative potential

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Dispose of waste and residues in accordance with local authority requirements.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number

UN No. (ADR/RID/ADN)	1263

14.2 UN Proper Shipping Name

PAINT OR PAINT RELATED MATERIAL

Proper Shipping Name	PAINT OR PAINT RELATED PRODUCTS

14.3 Transport hazard class(es)

ADR/RID/ADN Class	3
ADR/RID/ADN Class	Class 3: Flammable liquids.
ADR Label No.	3

Transport Labels

14.4. Packing group

ADR/RID/ADN Packing group	II

14.5. Environmental hazards

Environmentally Hazardous Substance/Marine Pollutant

No.

14.6. Special precautions for user

Tunnel Restriction Code	(D/E)

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

SECTION 15: REGULATORY INFORMATION

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

Statutory Instruments

The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (S.I 2009 No. 716). Control of Substances Hazardous to Health.

Approved Code Of Practice

Classification and Labelling of Substances and Preparations Dangerous for Supply.

Guidance Notes

Workplace Exposure Limits EH40. Introduction to Local Exhaust Ventilation HS(G)37. CHIP for everyone HSG(108).

15.2. Chemical Safety Assessment

No chemical safety assessment has been carried out.

SECTION 16: OTHER INFORMATION

Revision Date	28/06/2013
Revision	2
Supersedes Date	23/06/2011

Risk Phrases In Full

R10	Flammable.
R11	Highly flammable.
R22	Harmful if swallowed.
R36	Irritating to eyes.
R37/38	Irritating to respiratory system and skin.
R38	Irritating to skin.
R41	Risk of serious damage to eyes.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R63	Possible risk of harm to the unborn child.
R65	Harmful: may cause lung damage if swallowed.
R66	Repeated exposure may cause skin dryness or cracking.
R67	Vapours may cause drowsiness and dizziness.

Hazard Statements In Full

EUH066	Repeated exposure may cause skin dryness or cracking.
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs <<Organs>> through prolonged or repeated exposure.

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 2024

Expiry Date: 28 September 2027

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 is a BESA Group Company

Hazardous Waste Registration Report

Details of the company (or individual) providing hazardous waste registration information

Mr Stephen Jones

Contact name: Mr Stephen Jones
Telephone:
e-mail: steve@sjjsystemservices.com

Number of sites successfully registered: 1

Expected Payment (£) : 18.00

Payment Type: Credit/Debit Card

Payment Made (£) : 18.00

Sites successfully registered *(Previous registration numbers which could not be validated are shown in brackets - you must use the new registration number given from the start dates shown)*

Registration Number	Business Name	Address from application	Start Date	Expiry Date
CAM622	sjj system services ltd	Unit 20 Tredegar NP22 5RL	30/09/2024	29/09/2025

Certificate of Registration under the Waste (England and Wales) Regulations 2011

Regulation authority

Name	Environment Agency
Address	National Customer Service Centre 99 Parkway Avenue Sheffield S9 4WF
Telephone number	03708 506506

The Environment Agency certify that the following information is entered in the register which they maintain under regulation 28 of the Waste (England and Wales) Regulations 2011.

Carriers details

Name of registered carrier	SJJ System Services Ltd
Registered as	a lower tier waste carrier, broker and dealer
Registration number	CBDL68089
Address of place of business	S J J SYSTEM SERVICES LTD HEADS OF THE VALLEY INDUSTRIAL ESTATE RHYMNEY TREDEGAR NP22 5RL
Telephone number	01685840305
Date of registration	Sunday 27th September 2015

Making changes to your registration

Your registration will last indefinitely so does not need to be renewed but you must update your registration details if they change, within 28 days of the change.

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 SB28483063

2. Name of policy holder SJJ System Services Ltd

3. Date of commencement of insurance policy 22/10/2024

4. Date of expiry of insurance policy 22/10/2025

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

Nadia Côté
Commercial Managing Director UK

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: 18/12437

Date printed: 25/09/2024

Gallagher

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VERIFICATION OF INSURANCE

To Whom it May Concern

We, the undersigned Insurance Brokers hereby confirm that the following described insurance **is in force at this date**.

Policyholder: SJJ System Services

Public & Products Liability

Insurer:	Allianz Insurance Plc/AIG Europe Ltd
Policy No:	SB28483063
Renewal Date:	22nd October 2025
Indemnity Limit:	£5,000,000

Employers Liability

Insurer:	Allianz Insurance Plc
Policy No:	SB28483063
Renewal Date:	22nd October 2025
Indemnity Limit:	£10,000,000

Professional Indemnity

Insurer:	Allianz Insurance Plc
Policy No:	BQ13325104
Renewal Date:	22nd October 2025
Indemnity Limit:	£1,000,000

Please let us know if any further information is required. **This document is furnished to you as a matter of information only.**

SIGNED: *Owen David*

DATED: 18th October 2024

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 2025

Certificate / Reference No.

250021

Expiry Date

31st December 2025

Signature

David J Roome
F-Gas Registration

2025

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