Applied Thermal Control Ltd
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UPDATED GUIDANCE
USE OF TAP WATER IN ATC CHILLERS

Earlier documentation may have indicated that the use of tap water in ATC chillers was permissible under certain conditions. Based on further evaluation and our ongoing commitment to system reliability, we now advise against the use of tap water in any ATC chiller models. This updated recommendation reflects a more comprehensive understanding of global water quality variation.

WHY THIS MATTERS

Water quality can vary widely by region and application. Tap water may contain:

- High mineral content (e.g. calcium, magnesium)
- pH imbalance
- Biological matter (e.g. algae, bacteria)
- Chemical additives (e.g. chlorine, fluoride)

These factors can contribute to:

- Internal corrosion
- Degradation of seals and materials
- Biological fouling
- Reduced heat transfer performance

As such, continued use of unapproved fluids, including untreated tap water, may affect long-term performance in some instances.

CURRENT RECOMMENDATION

To support the ongoing reliability and efficiency of ATC chillers, we recommend using only ATC-approved fluids.

PREFFERED FLUID

Hexid - Providing corrosion protection, freeze protection, algae inhibition, and effective thermal performance.

If Hexid is not available in your region, please contact ATC for guidance.

SUPPORT

For questions regarding coolant compatibility or fluid selection for your specific system, please contact ATC Technical Support.

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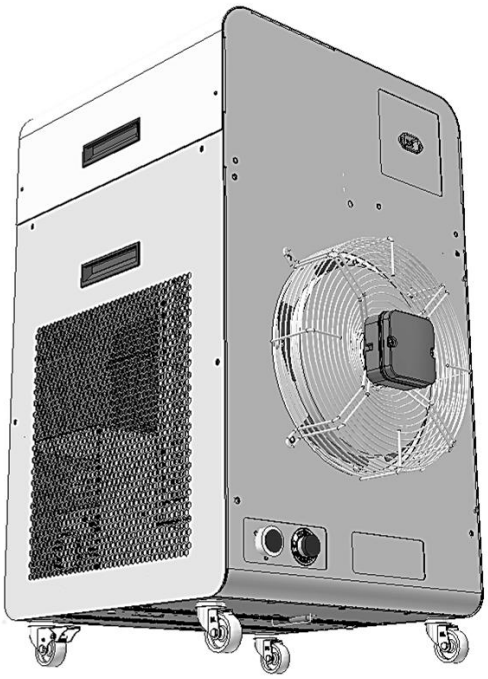
Installation, Operation & Service Manual

G04/K04

Rev 1 – 05/04/23



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1.0 INTRODUCTION

By selecting a K04/G04 series chiller you have invested in many years of experience in the design and manufacture of precision temperature control instrumentation.

ATC has built your chiller without compromise to meet the objectives of performance and reliability. Please read this manual carefully to ensure you understand the operation of the machine and how to use the unit safely and efficiently.

If you have any questions regarding installation or repair of this unit, please contact ATC direct.

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1.1 SAFETY NOTICES

GENERAL SAFETY INFORMATION	
For your safety, we draw your attention to the following warning and caution marks throughout the manual. Warning symbols can be found on the unit. Ensure you have read through all warnings before starting the unit. The safe operation of ATC products always remains the responsibility of the operator. This equipment is intended to be used as a liquid temperature conditioning device – it requires no external pump, nor any further manipulation of temperature. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Failure to comply with a 'warning' may result in personal injury or death. ATC does not accept any liability for injury caused through use of this equipment.	
	Caution: Failure to comply with a caution will invalidate product warranty and absolve ATC from any liability, howsoever caused, and could result in permanent damage to equipment.
	Caution: Filling/topping up of the tank should only be undertaken with the unit switched off, to prevent back-filling of the fluid.
	Caution: This product contains no user-serviceable parts. Repair and service requires specialized knowledge and tools to be provided by ATC or its local agent. Any unauthorized tampering with the heat exchanger system automatically invalidates warranty.
	Warning: Hot and cold surfaces are present during operation. Take caution and care when touching pump during operation.
	Warning: Water pressures of up to 10 bar during operation.
	Warning; Water and electricity near one another. Always ensure the unit is isolated before service. The product is protected from overcurrent by fuses. Never bypass this component.
	During fault diagnostics and maintenance, it may be necessary to remove panels, which expose the operator to the dangers of pressurized systems, hot or cold pipes and electrical circuits. Only qualified personnel who are aware and equipped to deal with these systems should only carry out such work.
	Any temporary electrical supply to the chiller should be correctly earthed and connected through an earth leakage trip.
	In case of unexpected coolant leakage, safety glasses should always be worn when the chiller is operated with the covers removed.
	Under no circumstances leave the cooler unattended with the side panels removed.
	Never alter settings of pressure switches, overloads, circuit breakers or any safety device without first consulting Applied Thermal Control.

1.2 UNPACKING UNITS WEIGHING OVER 60kg(133lbs) ON CASTORS

Please check that both the packaging and the unit are undamaged. If there is any doubt, it is vital that you inform both ATC and the carrier. There are no hidden shipping bolts or other fixings. You should inspect the packaging for signs of transit damage before signing for the unit, and if possible, unpack the unit before signing. Once you have signed for the goods, ATC cannot be held responsible for any transit damage subsequently found.

As the unit weighs >60kg, ATC recommends it should be lifted with slings through the underside, using a forklift or overhead crane. ATC highly recommends that it is not manually lifted, and that safe slinging and lifting practices are adhered to.

Remove the unit from its original packaging and ensure that there is no packaging left around the cooling ducts. There is no internal product packaging that requires the chiller to be opened.

Please retain all packaging in the unlikely event that the chiller needs to be returned to our local representatives.

1.3 SITE REQUIREMENTS

1	**Storage temperature range.** Without process fluids, -20°C to +70°C.
2	**Storage humidity range.** Non-condensing, relative humidity 5% to 95%. Before starting product, allow product to acclimate for 24h in location of use when storing outside *operating* humidity range.
3	**Operating temperature range.** With appropriate process fluids, +4°C to +65°C.
4	**Operating humidity range.** 80% for ambient temperatures up to +31°C (+88°F), decreasing linearly to 50% relative humidity at +40°C (+104°F) ambient temperature.
5	**Hard, level surface**. A level surface is important for ensuring proper filling and allowing air to escape.
6	**Electrical supply** 230V ±10% (50Hz) single phase[1]. The Internal circuit breaker is rated at 15 Amps, normal operating current is 9 Amps. For the K04 the Internal circuit breaker is also rated at 15 Amps with normal operating current at 11 Amps.
7	**Clearance.** Clearance is required to: a) Provide unobstructed access to the electrical box door to use overload handle in case of emergency. b) Fit hoses and electrical supply to the side of the unit allowing recommended bending radii. c) Allow maintenance access points on side panels to be removed. d) Allow process to take place – all models require the coolest, cleanest air that can be provided to achieve the best performance. This model draws air in from the left-hand side (when viewing from the front of the unit) and reject heated air from the right-hand side. e) 0.5m clearance is recommended on air-on and air-off sides.
8	**Plumbing.** Tubing, piping or hose must be clean and compatible with the fluid to be used. The product is compatible with deionized water, tap water and water-glycol mixtures such as Hexid A4 and A6. Ensure the connected pipework is suitable for handling the nominal flowrate at system pressure ≥6bar.

9	**Indoor use only.** Altitude up to 2000m above sea level. Ensure the unit has adequate ventilation.
	Caution: Always use ATC recommended fluids in our products – many sealing compounds and materials are present and unapproved fluids have the potential to corrode your application and damage seals.
	Caution: Do not use inadequately rated wiring. Consult an electrician if you are unsure.
	Caution: The safety of any system incorporating the equipment is the responsibility of the assembler of the system.
	Caution; Do not replace detachable mains cords with inadequately rated cords. Contact ATC for appropriately rated products.

1.4 WARRANTY REGISTRATION

Please visit the website warranty registration page to ensure ATC can offer you the best possible support.

https://www.app-therm.com/warranty-registration/

a) **For how long is my ATC product under warranty?**
ATC provides a comprehensive return to base 2-year parts, 1-year labour warranty from delivery as standard on all new equipment, provided it has been installed and operated in accordance with the manual.

b) **Where will ATC fulfill the product warranty?**
ATC's standard warranty terms are Return to Base (RTB) – issues with chillers are often easily solvable over the phone or email, or by reviewing ATC's technical guidance on the web and in the product manual. On occasion, at the discretion of ATC, goods may be serviced on site FOC or a service loan unit may be supplied. Warranty cover excludes the cost of travel by engineers and loan unit rental charges. Obtaining onsite service for a product, even in full warranty, is a chargeable service.

c) **Who is liable for shipping charges in the event of warranty failure?**
During the **first year** of the warranty period, freight costs to and from ATC are covered by ATC. During the **second year** of the warranty, freight costs to and from ATC are payable by the customer.

d) **I'm experiencing problems with my chiller. It's within warranty – what do I do next?**
Contact ATC to discuss the issue you are having on +44(0)1530 839998 or support@app-therm.com. Be sure to have your model number and serial number on-hand to aid those attempting to solve remotely.

e) **Telephone support couldn't fix my chiller – what do I do next?**
An RMA form must be completed. This allows both the end-user and ATC to clarify your details, to set the party responsible for shipping costs, and to set a different return address if desired. Shipping advice is provided, and the end-user must sign a declaration that states the unit is safe to handle. Return the form by email for fastest response.

f) **What happens if my chiller failed outside warranty or requires non-warranty repair work?**
A purchase order will be requested to cover an initial inspection – this will only be invoiced if the inspection shows there is no fault. If packaging is required, i.e. a crate, a separate charge will be levied. If the end user prefers ATC to arrange a collection, a shipping charge may be levied.

g) **Our process must continue running – can we have a loan unit whilst our chiller is in repair?**
ATC hold several standard air-cooled chillers at the factory for the sole purpose of offering for loan. These are available on a first come, first-serve basis. Models up-to 3kW capacity are available.

2.0 PRODUCT SPECIFICATION

Model	G04/K04
Weight	90kg 198lbs
Form factor	Floorstanding
Dimensions	L600 x W513 x H888mm L23.6 x W20.2 x H35”
Noise level	53dB(A)@1m
Toolless access	No
Technology	Vapor Compression
Cooling capacity (Ambient temperature at +30°C with setpoint of +20°C)	3.5kW 11,942BTU/h 0.995TR
Refrigerant	G04: R290 (Propane) K04: R407C
Temperature range	+4°C to +35°C (standard)
	-20°C to +65°C (extended)
Control method	PID via Hot Gas Bypass
Stability	±0.1°C
Resolution	0.1°C
Sensor type	PT100
System volume	3L
PD pump options	P5, P10, P17
Pressure relief	Internal, PRV, 20-150psi
Process fittings	1/2" BSPPF
Supply (-0spec)	230Vac 50Hz 1~ 9A
Supply (-2spec)	220Vac 60Hz 1~/2~ 9A
1st party approvals	CE, UKCA
Empty fluid tank alarm	Visual, lamp
Low fluid flow alarm	Visual, lamp
Temp range alarm	Visual, lamp
Fridge HP switch	Standard
Motor thermal cutout	Standard
Overcurrent protection	Standard, via MCB
Overcurrent restart	Manual
Emergency off	Not present
Warranty options	2-year parts, 1-year labor Enhanced on request
Rated duty cycle	S1 Continuous

3.0 QUICK START GUIDE

	QUICK START GUIDE
1	Remove all the packaging (Section 1.2)
2	Connect chiller's outlet and inlet process to your application
3	Fill up the chiller with appropriate coolant
4	Use the name plate on the back of the chiller to verify the appropriate voltage and supply the power using provided cables.
5	Turn the power switch ON
6	Slowly add more coolant as process lines fill and the coolant is circulated around the process system.
7	Using the controller, set the desired temperature.

4.0 INSTALLATION

4.1 HOSE RECOMMENDATIONS

Having ensured that your installation meets all site requirements, it is best practice that the fluid lines between your application and the chiller have the following characteristics.

1	**Short in length** – this reduces friction-based pressure drop and addition ambient heat load.
2	**Large diameter bore** – at least 12mm (1/2”).
3	**Free from 90° bends** – to limit the effects of water hammer. If this cannot be avoided, sharp changes of direction should be minimized so far as possible. Doing this correctly can yield higher pump performance and extend time between maintenance intervals. It will also reduce electrical energy consumption.
4	**Clean** – If your installation is to existing pipe work, it is good practice to flush the system with either a commercially available central heating cleaner or 5% acetic acid solution. The system should be flushed clean with tap water to remove all traces of cleaner prior to filling the system. Failing this, it is recommended to use a domestic bleach in solution with tap water, diluted to the point where the bleach can longer be smelled by human nose.
5	**Opaque, ideally black** – to inhibit light passing through the tube and algae building up. Alternatively, solid ABS or copper pipe can be used where application chemistry allows.
6	**Insulation, where low temperature process is planned** – the process line from chiller to application contains the feed of low temperature fluid. Insulation prevents heat from entering this line and can promote better stability. Uninsulated return lines are helpful where free cooling can be obtained by allowing heat to transfer to air – likewise, insulating the return line is helpful if the fluid temperature is below ambient.

	Caution; Never use transparent tubing. UV light will pass through, prompting growth of organic contamination.

4.2 CONNECTING ADAPTERS TO PRODUCT BULKHEAD FITTINGS

1	Standard units are supplied with 1/2” British Standard Pipe Parallel Female (BSPPF) threads (also known as G threads (ISO228)) by default. These fittings are not valved and will ‘drop’ the volume of the system if left open to atmosphere.
2	Ensure the appropriate thread sealants are used in the fitting of adapters to hose. For metallic mating parts, we recommend Loctite 577. For plastic adaptors such as those supplied with the product, we recommend using ~8-12mm wide PTFE tape, wrapped around the male thread before tightening.
3	Ensure that the system is correctly connected. The ‘donut’ labels around the ports are clearly marked with inlet and outlet symbols and function in both English and French language. Ports marked as outlet means fluid leaves the product and must be connected to the process inlet.
4	Check all joints are tight and leak free.
5	Where this product is incorporated into other equipment, it is the responsibility of the assembler to ensure safety

4.3 BACKFILLING

1	In situations where the chiller is situated physically lower than the application being cooled, fluid will apply pressure to the water circuit of the product.
2	The weakest seal is normally the tank lid, and this is typically where fluid will escape the unit.
3	Ideally, the product will be located higher or level with the product waterline. If this is not possible, a non-return solenoid valve kit can be installed as an optional standard assembly.
4	Please raise any questions with the sales team on sales@app-therm.com.

4.4 VOLTAGE SELECTION

ⓘ	Different chillers will have different requirement for electrical supply. The specification and requirement can be found on the back plate of the chiller. Please ensure that the voltage supply and number of phases are correct on the site and your power supply can handle the stated current draw.

4.4 FILLING PROCEDURES

a) Check all application valves are open, including solenoid valves and variable position valves.

i) The product will require an open water circuit to pump into.

ii) Any obstructions can increase the time, or entirely prevent the bleeding of air from the system.

b) Remove the cap from the tank lid on the top of the product.

i) Fill the tank to just underneath the bottom of the filling port.

c) Switch the unit on

i) Immediately after toggling this switch (assuming the power cord is connected and switched on), the pump will start running.

ii) Keep the unit running until the water level in the tank drops and cuts out on the level switch interlock.

iii) Turn the unit off at the main switch.

iv) Fill the tank again to lift the level switch.

v) Start the product

ⓘ	**Caution: Do not run the pump dry. Do not deadhead the pump.**

d) Repeat step c) until the chiller does not cut out on the level switch.

e) Now with the unit running:

i) Leave the cap off the tank for >30mins to allow air to escape, or very loosely screwed on to prevent water splashing out of the tank if the unit has a ‘flow through’ design.

f) Check the application and tubing for signs of leaks whilst the chiller is running.

i) Replace the tank lid fully when satisfied the system is full and bled of air and no abnormal sound can be heard from the pump

4.5 DRAINING A SYSTEM

a) Isolate the unit. Have a suitable bucket or drain on-hand.
   i) Remove the tank lid to allow air into the system.
   ii) Disconnect hoses individually. Be aware hoses as well as the unit are filled with fluid.
   iii) Use tank drain tap (If fitted)
   iv) Consider using the red transport plugs to block product ports to give yourself time to empty hoses before continuing to empty the product.

b) Local rules affect where fluid can be disposed of.

Ensure hazardous products do not enter the water course and are reclaimed from the unit for professional disposal.

5.0 OPERATION

K04/G04 series chillers are fitted with a high performance KR1 PID controller, which can control temperature to within 0.1°C of set point. In addition, there is a high and low temperature warning via the LED on the display of the controller, which is triggered if the temperature deviates more than 10°C from the set point.

	DISPLAY CONTENTS DURING NORMAL OPERATION	
1	Physical navigation buttons, up, down, return and enter.	
2	8888.8 is the actual read value on input sensor.	
3	888.8 is the setpoint value.	
4	Rectangles bottom left 1-4 display when output is active.	
5	MAN LED shows in manual mode (fixed output value).	
6	°C or °F shows units as settable in the 'inP' group.	
7	AL LED appears when output is beyond a set alarm point.	
	ACCESS TO SETTINGS	
8	Push the return button for more than 5 seconds. The upper display will show PASS while the lower display will show 0.	
9	Using up and down buttons set the programmed password – full access is granted by entering '40'. ATC are not responsible for damage either to the chiller or the connected equipment as a result of changing parameters without ATC's oversight.	
10	During parameter modification the instrument continues to perform process control. In certain conditions, when a configuration change can produce a significant change to the process, it is advisable to temporarily stop the controller from controlling during the programming procedure (control outputs will be OFF). A password equal to 2000 + the programmed value (i.e. 2000 + 40 = 2040). The control will restart automatically when the configuration procedure will be manually closed.	
11	Push the return button. If the password is correct the display will show the acronym of the first parameter group 'inP'. Push button for more than 5 seconds, the instrument will come back to the "standard display".	
12	The configuration parameters are collected in various groups. Every group defines all parameters related with a specific function (control, alarms, output functions).	
13	Push return button for more than 5 seconds, the instrument will come back to the "standard display". For specific settings and guidance, review the controller datasheets provided by ATC. If you are not in receipt of these, please contact ATC using the information in the header of this document.	
	GENERAL NAVIGATION	
14	Return button; A short press allows to exit from the current parameter group and select a new parameter group. A long press allows you to close the configuration parameter procedure (the instrument will come back to the "standard display").	
15	Enter button; When the upper display is showing a group and the lower display is blank, this key allows to enter in the selected group. When the upper display is showing a parameter and the lower display is showing its value, this key allows to store the selected value for the current parameter and access the next parameter within the same group.	
16	Up button; Allows to increase the value of the selected parameter.	
17	Down button; Allows to decrease the value of the selected parameter.	
18	Pushing both Return and Enter buttons moves back to the previous group. Press return first to start. The selection of the group is cyclic (on a carousel), so it is possible to move back around to the group you require.	

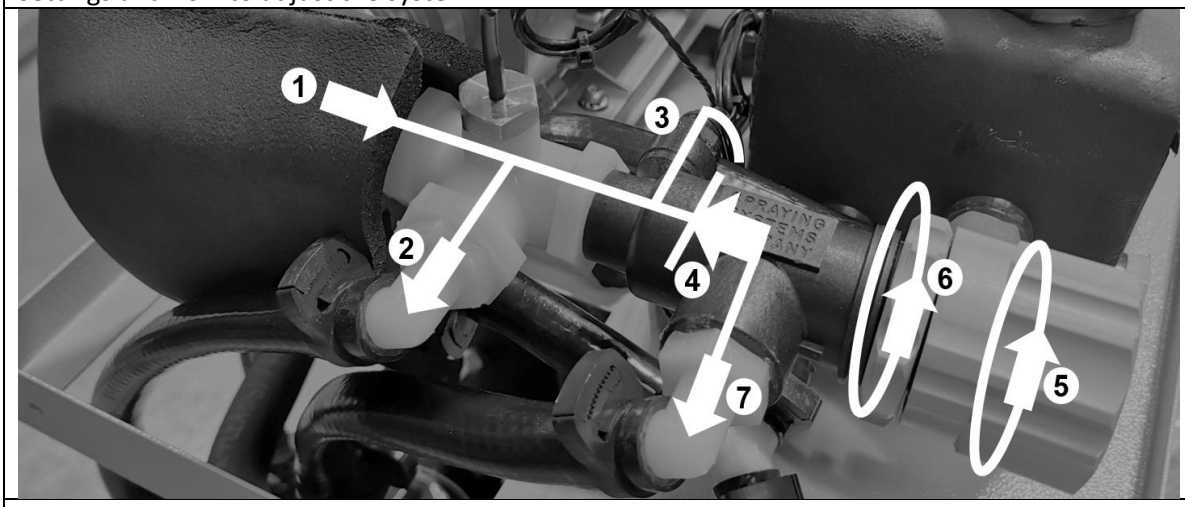
5.1 CHANGING SET POINT

	ACHIEVING DESIRED SET POINT
1	Push and hold the enter button ↵ until it shows “SP 1”
2	Use the up and down arrows to set the temperature
3	Press enter button ↵ again to set the temperature
4	The set value now will be activated, and the chiller will start

5.2 REGULATING PRESSURE/FLOW

POSITIVE DISPLACEMENT PUMPS & DISCRETE PRESSURE RELIEF VALVE

This arrangement comprises a positive displacement pump (most commonly a rotary vane type) with a spring-loaded pressure relief valve to provide better overpressure setting control with minimal flow losses compared to fixed orifice bypasses/reliefs. This annex describes ATC’s default settings and how to adjust the system.



It is important to understand the basic principle that all else being equal, higher flow results in a higher demand for pressure. The motor generates the power required to turn the pump head and create that pressure. The more restrictive a water circuit is, the higher the pressure required to maintain flowrate. Positive displacement pumps are designed to generate high pressure and are mechanically tight - their RPM dictates flowrate. See image above.

1	**Pump discharge** – fluid leaves the pump head and enters the gauge-tee assembly. It passes the temperature sensor at the tee, and when the pressure relief is inactive, fluid heads towards no. 2.
2	**Outlet to process** – fluid heads out of the product to the application. Whatever restrictions lie downstream, fluid leaving this point has not passed through the pressure relief valve.
3	**Pressure gauge connection** – connection to a pressure gauge on the front panel of the product. This displays the pressure in the water circuit, *at the pump outlet, not the application which will be lower.*
4	**Pressure Relief Valve (PRV)** – spring tension in the body of the PRV determines whether fluid travels through point 2 or passes through to point 7.

5	**PRV adjustment knob** – rotate clockwise to increase maximum delivery pressure. Rotate anti-clockwise to limit maximum delivery pressure.
6	**PRV adjustment locknut** – release this locknut to adjust no.5. Ensure it is tightened once adjustments are made. If it is not, vibration may cause the adjustment knob to move on itself.
7	**Bypass flow outlet** – where the pressure requirement to overcome restrictions downstream of no.2 rises to be higher than the setting at no.5, the spring inside no.4 will compress and allow liquid to start bleeding through to no.7. It is important to understand that the nature of the spring means there can be no black and white point for pressure relief setting – the spring will slowly compress and bleed flow until all flow passes through no.7. When fully bypassing, all flow stays inside the chiller to protect the application.

SETTING PRESSURE RELIEF VALVE(BYPASS)	
Unless otherwise agreed at point of sale, the default setting for this type of pump and PRV arrangement is 3.33bar (50psi). If the relief valve has been interfered with and you would like to bring the chiller back to its default pressure setting. Follow the instruction below:	
1	**Isolate the chiller**
2	**Disconnect from the application if connected**- Review draining process from Section 4.5
3	**Connect the chiller's process inlet to process outlet** – a short run hose around 1-2m (3-6ft) will be adequate.
4	**Start the chiller and follow the fill procedure from Section 4.4** - fluid will now be running through a short loop with very low pressure required to overcome the restriction.
5	**With the chiller running, very slowly kink the short run of hose fitted above** – this simulates a blocked application – this is known as 'deadheading' the pump. Without PRV, the pump motor would stall or hoses might blow off. Watch the pressure gauge climb as you apply the kink.
6	**The pressure gauge will eventually stop climbing with the hose fully kinked** – note the value; this is the setting of the PRV where all flow is bypassed.
7	Contact ATC if you're unsure over whether your desired setting is reasonable for the product you have.

6.0 BASIC TROUBLESHOOTING

AIRCOOLED CHILLER TROUBLESHOOTING		
#	**SYMPTOM**	**CAUSES**
1	Compressor or pump motor not running. Large condenser fan is running, and control illuminated.	Level switch may have been tripped – Fill the tank up again to resolve the issue
		High pressure switch may have been tripped: a) Check fan spins freely and that condenser is clear of debris. b) Assess whether the ambient temperature is too high. c) Assess whether ventilation/air circulation is poor. d) Assess whether surrounding equipment is generating hot air and feeding it into the chiller air intakes.
		If fitted, a low-pressure switch may have been tripped – this indicates refrigerant loss. A multimeter is required to test this.
		If running at a high setpoint, or if operating conditions have changed and raised the fluid temperature, it is possible the compressor has turned itself on high temperature internal protection.
2	Noisy Operation	Pump motor or fan motor bearings may have failed.
		Pump head vane or seal may have failed.
		In a 3-phase system, phase rotation may be incorrect.
3	High fluid pressure/low flow rate	Fluid lines may have become fouled through solid debris or biological growth. Ensure biocides or pre-mixed biocidal process fluids are being used. Ensure hoses are not transparent or translucent – UV light entering prompts growth.
		General fluid leak can lead to flow rate failure.
		Excess fittings, too many sharp direction changes, too small a diameter hose for flowrate or hoses too long at the wrong diameter.
4	Fluid collecting or leaking	Leaks are impossible to diagnose remotely, but usually you will see a pool of fluid on a lower surface. Do not confuse this with condensation from cold parts of the fridge.
		Review the chemical compatibility of your fluid with the chiller. Contact ATC if you are unsure.
5	Poor Cooling Performance	Check if the fans are running. Clean the condenser coil. Excess thermal load applied. Assess whether the ambient temperature is too high. Assess whether ventilation/air circulation is poor. Assess whether surrounding equipment is generating hot air and feeding it into the chiller air intakes.
Please contact ATC if you could not find the information you were looking for or still have an issue with the unit		

7.0 END USER MAINTANANCE

	Caution: Failure to carry out service at the specified intervals may permanently damage your equipment.

Print this sheet out and display close to the chiller to maximize the visibility of maintenance requirements.

Weekly	Week 1	Week 2	Week 3	Week 4
Check Fluid Level – Top up as required				

Monthly	J	F	M	A	M	J	J	A	S	O	N	D
Check the condenser is free from dust or accumulation of debris												

Annually	Y1	Y2	Y3	Y4	Y5	Y6
Drain process fluid and replace with fresh fluid						
Check for fluid leaks throughout chiller and application						
Clear any debris from inside the chiller						

A vacuum cleaner is recommended for cleaning out the condenser, while soft cloths and IPA are recommended for cleaning metallic surfaces. If any spillages have occurred, best practice is to allow the water to evaporate off and wipe up remaining glycol residue with a cloth. Always clean with power supply isolated.

	Caution: Never blow out the condenser with compressed air
	Caution: If the main lead is lost or damaged, contact ATC who will be able to supply correct specification replacement.

8.0 DECLARATION AND APPROVALS

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Annex J-5

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01

CONFLICT MINERALS COMPLIANCE STATEMENT

Applied Thermal Control (ATC) adheres to and embraces the ethical values that support our everyday activities. As an expression of these principles and ethical values, ATC adheres to the principle of responsible sourcing of components containing precious and non-precious metals and metal salts in compliance with applicable laws and regulations.

The metals considered are Tantalum (Ta), Tungsten (W), Tin (Sn) and Gold (Au). ATC actively sources components from suppliers known to be reputable and could demonstrate compliance upon request with the Conflict Minerals acts and guidelines.

ATC uses Gold and Tin in electrical components, on PCBs and in rotating machinery, as governed by technical requirements of products. These metals could potentially originate from conflict mineral sites. As many of our suppliers do not purchase these metals direct from smelters, both they and ATC must rely heavily on information that will be provided by their suppliers to determine the source and chain of the metals in those products.

ATC is committed to working with its customers and supply chain to meet the customer's specification and requirements with regards to traceability, sourcing requirements and restrictions. ATC commits that, to the best of our knowledge, our suppliers are complying with the conflict minerals act as stated in their documentation. These statements are reviewed, and updates obtained as required.

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021

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Operating Manual; Declarations & Approvals

Annex J-7

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01

WHAT IS THE REACH REGULATION 1907/2006?

REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. REACH places the burden of proof on companies. To comply with the regulation, companies must identify and manage the risks linked to the substances they manufacture and market in the EU. They have to demonstrate to ECHA how the substance can be safely used, and they must communicate the risk management measures to the users. If the risks cannot be managed, authorities can restrict the use of substances in different ways. In the long run, the most hazardous substances should be substituted with less dangerous ones. REACH stands for Registration, Evaluation, Authorization and Restriction of Chemicals. It entered into force on 1/JUN/2007.

REACH 'ARTICLE' COMPLIANCE CONSIDERATIONS

REACH ANNEX XVII COMPLIANCE

Substances under Annex XVII are restricted either in full (not to be used at all) or for specific uses (can be used in some uses but cannot be used in identified uses).

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

REACH ANNEX XIV COMPLIANCE

Substances under Annex XIV require authorization to use in the EU after sunset date, require communication to downstream recipients when over threshold (0.1% w/w at article level) and require notification to ECHA when SVHC over threshold and imported over 1000kg annually and use not already registered.

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

SVHC LIST COMPLIANCE

Substances of Very High Concern (SVHC) require communication to downstream recipients when over threshold (0.1% w/w at the article level), notification to the European Chemicals Agency (ECHA) when SVHC over threshold and when imported over 1000kg annually and use not already registered.

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021

Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; Declarations & Approvals

Annex J-8

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01

WHAT IS THE POPs REGULATION 2019/1021?

POPs stands for persistent organic pollutants. In Europe, the global Stockholm Convention is implemented through POPs legislation. POPs are organic substances that persist in the environment, accumulate in living organisms and pose a risk to our health and the environment. They can be transported by air, water or migratory species across international borders, reaching regions where they have never been produced or used. International risk management is necessary as no region can manage the risks posed by these substances alone.

The European Parliament (and Council) issued regulation 2019/1021 on 20/JUN/2019, and further amended (regulation 2020/784) on 8/APR/2020.

POPs LISTED UNDER INITIAL REGULATION 2019/1021

Pesticides;
Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene.

Industrial Chemicals;
Hexachlorobenzene, Polychlorinated Biphenyls (PCBs).

Industrial Chemical Byproducts;
Hexachlorobenzene byproducts;
Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), and PCBs.

POPs LISTED UNDER AMENDMENT 2020/784

Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds.

POPs COMPLIANCE STATEMENT

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully POPs compliant in accordance with regulations and amendments above mentioned.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021

Applied Thermal Control Ltd
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Operating Manual; Declarations & Approvals

Annex J-10

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	02

WHAT IS THE RoHS DIRECTIVE?

The RoHS Directive places restrictions on the use of certain hazardous substances in electrical and electronic equipment (EEE). RoHS compliance has been required for many years, however in 2014 it became a mandatory requirement under CE Marking. ATC products do not clearly fall within any of the existing categories of equipment, but as of 23/JUL/2019, all EEE not covered falls within scope of the directive. In contrast to RoHS 1, RoHS 2 is a CE marking Directive, and requires, for finished EEE, the use of the CE mark on the product to show compliance. The responsibility for affixing the CE mark resides with the manufacturer.

RoHS 1 2002/95/EC

Adopted in February 2003 by the EU and taking effect on 1/JUL/2006, RoHS 1 restricted the use of 6 hazardous materials;

1) Lead (Pb)
2) Mercury (Hg)
3) Cadmium (Cd)
4) Hexavalent Chromium (Cr6+)
5) Polybrominated Biphenyls (PBB)
6) Polybrominated Diphenyl Ether (PBDE)

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 1 compliant.

RoHS 2 2011/65/EU

Adopted in July 2011 by the EU and taking effect on 2/JAN/2013, RoHS 2 expands the scope of RoHS 1 by adding new categories. RoHS 2 compliance is required to CE mark the product. Compliance with RoHS 2 is mandatory from 22/JUL/2019.

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 2 compliant.

RoHS 3 2015/863/EU

Adopted in 2015 by the EU and taking effect from 22/JUL/2019, RoHS 3 adds four additional substances to RoHS 1's list.

1) Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
2) Benzyl butyl phthalate (BBP): < 1000 ppm
3) Dibutyl phthalate (DBP): < 1000 ppm
4) Di-isobutyl phthalate (DIBP): < 1000 ppm

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 3 compliant.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021

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Annex J-2

DOCUMENT DETAILS

Date	6/APR/2022	Author(s)	MJH	Page	1 / 1	Revision	1

EU DECLARATION OF CONFORMITY

Document layout;	Governed by Machinery Directive 2006/42/EC, Annex II.

REGISTERED BUSINESS ADDRESS

Applied Thermal Control Ltd, 39 Hayhill Industrial Estate, Barrow-upon-Soar, Loughborough, LE12 8LD, UK.

AUTHORISATION TO COMPILE THE TECHNICAL FILE

Mitchell Howard, address as above

DESCRIPTION & IDENTIFICATION OF MACHINERY

Generic denomination;	K-Series
Function;	Recirculating chiller
Model;	All with ‘K’ prefix.
Type;	Air-cooled or water-cooled vapour compression-based.
Serial number;	
Commercial name;	As above.

NOTIFIED BODY

Not applicable

QUALITY ASSURANCE SYSTEM

QMS International Ltd, Muspole Court, Muspole Street, Norwich, NR3 1DJ, UK. ASCB Registered; 201409-2

DECLARATION

Applied Thermal Control declares that the machinery described above fulfils all the relevant provisions of the directives and standards below.

Directive	**Harmonised Standards applied**
Machinery Directive 2006/42/EC (inclusive Low Voltage Directive 2014/35/EU)	EN ISO 12100:2010 (MD) BS EN 61010-1:2010+A1:2019 (LVD)
EMC Directive 2014/30/EU	IEC 61000-6-2:2005 IEC 61000-6-4:2006 +A1:2011
RoHS Directive 2011/65/EU (*RoHS 2*) RoHS Directive (EU) 2015/863 (*RoHS 3*)	EN IEC 63000:2018
Pressure Equipment Directive (2014/68/EC)	Out of Scope. Sound Engineering Practice (SEP) applied.

PERSON EMPOWERED TO DRAW UP DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 6/APR/2022

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Operating Manual; Declarations & Approvals

Annex J-20

DOCUMENT DETAILS

Date	20/DEC/2022	Author(s)	WSE	Page	1 / 1	Revision	1

UKCA

UKCA DECLARATION OF CONFORMITY (DoC)

Demand created by;	The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019

REGISTERED BUSINESS ADDRESS

Applied Thermal Control Ltd, 39 Hayhill Industrial Estate, Barrow-upon-Soar, Loughborough, LE12 8LD, UK.

AUTHORISATION TO COMPILE THE TECHNICAL FILE

Mitchell Howard, Applied Thermal Control Ltd, 39 Hayhill Industrial Estate, Barrow-upon-Soar, Loughborough, LE12 8LD, UK.

DESCRIPTION & IDENTIFICATION OF MACHINERY

Generic denomination;	K-Series
Function;	Water Heat Exchanger
Model;	All with 'K' prefix.
Type;	Water cooled heat exchanger.
Serial number;	
Commercial name;	As above.

NOTIFIED BODY

Not applicable

QUALITY ASSURANCE SYSTEM

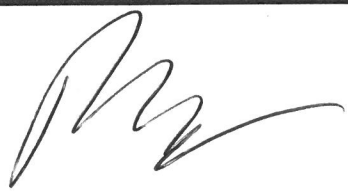
QMS International Ltd, Muspole Court, Muspole Street, Norwich, NR3 1DJ, United Kingdom.
ASCB Registered; 201409-2

DECLARATION

The manufacturer declares that the machinery described above is in conformity with the relevant statutory requirements applicable to the specific product. The manufacturer takes full responsibility for the product's compliance.

- Supply of Machinery (Safety) Regulations 2008
- Electromagnetic Compatibility Regulations 2016
- Electrical Equipment (Safety) Regulations 2016
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

PERSON EMPOWERED TO DRAW UP DECLARATION



Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 20/DEC/2022

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

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

1.1.	Product Name	Hexid A4
1.2.	Manufacturer	Applied Thermal Control Limited 39 Hayhill Industrial Estate, Barrow upon Soar, Leicestershire, LE12 8LD. United Kingdom. www.app-therm.com
1.3.	Telephone Number	+44(0)1530 839998
1.4.	Email	sales@app-therm.com
1.5.	Emergency Telephone Number	+44(0)1530 839998
1.6.	Intended/Recommended Use	Heat Transfer Fluid

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture
The product is not classified as dangerous according to Regulation (EC) No. 1272/2008.
This mixture is not classified as dangerous according to Directive 1999/45/EC.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1.	Chemical Nature	Water (CAS 7732-18-5), not classified. Propylene glycol (CAS 57-55-6) (REACH 01-2119456809-23) (EINECS 200-338-0) not classified. Fluorescein (trace) and biocide (trace) not classified.
3.2.	Food Grade	

SECTION 4: FIRST AID MEASURES

	General advise	No special precautions required. Treat symptomatically.
4.1.	Eye Contact	Rinse thoroughly with plenty of water, also under the eyelids. Remove contact lenses after a few minutes and continue rinsing. If symptoms persist, call a physician.
4.2.	Skin Contact	Wash off immediately with plenty of water. If skin irritation persists, call a physician.
4.3.	Inhalation	Remove to fresh air. If symptoms persist, call a physician.
4.4.	Ingestion	Rinse mouth with water. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water spray, foam, dry powder or CO2. Alcohol-resistant foam

5.2 Unsuitable extinguishing Media
High volume water jet. Do not use a solid water stream as it may scatter and spread fire.

5.3 Specific hazards during firefighting
In fire conditions, toxic decomposition products may be formed (see also section 10). In combustion, emits fumes, smoke, carbon dioxide (CO2) and carbon monoxide (CO). Heating will cause a pressure rise - with severe risk of bursting and explosion, Violent steam generation or eruption may occur upon application of direct water to hot liquids.

5.4. Advice for firefighters
In the event of fire, wear self-contained breathing apparatus. Wear personal protective equipment. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Keep containers cool by spraying with water if exposed to fire. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Burning fluids may be extinguished by dilution with water

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions
Use personal protective equipment. Avoid contact with skin and eyes. Keep unnecessary and unprotected personnel from entering the area.

6.2. Precaution to protect the environment
Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

6.3 Clean-up procedures
Contain the spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal. Dike the area of spill to prevent spreading and pump liquid to salvage tank. Treat recovered material as described in section 13 Disposal considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling
Keep container tightly closed. Handle in accordance with good industrial hygiene and safety practice. Spills of these organic materials on hot fibrous insulations may lead to lowering of the auto-ignition temperatures possibly resulting in spontaneous combustion.

7.2. Conditions for safe storage
Keep only in the original container.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters
Component: Propane-1,2-diol CAS-No. 57-55-6
Other Occupational Exposure Limit Values EH40 WEL, Time Weighted Average (TWA):, Total vapour and particulates.150 ppm, 474 mg/m3
EH40 WEL, Time Weighted Average (TWA):, Particulate.10 mg/m3
ELV (IE), Time Weighted Average (TWA):, Total vapour and particulates.150 ppm, 470 mg/m3
ELV (IE), Time Weighted Average (TWA):, Particulate.10 mg/m3

8.2. Exposure controls/Appropriate engineering controls

Local exhaust.	If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
Personal protective equipment	
Respiratory protection	Suitable respiratory protective device Combination filter: A-P2
Filter Type	Combined particulates and organic vapour type
Hand protection	Category short time exposure Break through time> 10 min
Protective index	Class 1 When prolonged exposure is expected: Break through time> 120 min
Protective index	Class 4 Observe the information of the glove manufacturers on permeability. Protective gloves should be chosen according to Workplace Safety Assessment. Gloves recommended according to EN 374 (protection against chemicals).
Material	Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1	Appearance at 20°C	Fluorescent green clear liquid
9.2	Odour	Almost odourless
9.3	Flash point	Boils without flashing
9.4	Ignition temperature	Not Available
9.5	Flammability Limit	Not Available
9.6	Oxidizing Properties	Not Available
9.7	Auto flammability	450°C
9.8	Density at 25°C	~1.036g/cm^3
9.9	pH (as is)	7
9.10	Boiling point	102°C
9.7	Auto flammability	450°C
9.8	Solubility in water	Miscible
9.9	Freezing point	-21°C
9.10	Specific Heat Capacity	3.78kJ/kg °K
9.11	Viscosity, Kinetic, at 25°C	3.51mPa.s

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity
Stable under recommended storage conditions. No dangerous reaction known under conditions of normal use.

10.2. Chemical stability
No decomposition if stored and applied as directed. Stable under recommended storage conditions. Hygroscopic.

10.3. Hazardous reactions
Hazardous polymerisation does not occur.

10.4. Conditions to avoid
Generation of gas from decomposition causes pressure in closed systems. Keep away from direct sunlight. Avoid high temperatures. Avoid temperatures exceeding the decomposition temperature. Avoid UV light.

10.5. Materials to avoid
Strong acids, Strong bases, Strong oxidizing agents.

10.6. Hazardous decomposition products
Aldehydes, Alcohols, Ether, Organic acids.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Toxicity Oral
LD50 : > 20000 mg/kg (rat) This product can present a small hazard if large quantities are swallowed.

11.2. Inhalation
LC50 : 6.15 mg/l (rat; 4 h; vapour) At ambient temperature the exposure to vapours is minimal due to a low volatility rate. Inhalation may cause irritation to the nose, throat, upper respiratory tract and lungs. No deaths occurred

11.3. Dermal
LD50 : > 20000 mg/kg (rabbit) Prolonged skin contact is unlikely to result in absorption of harmful amounts. Skin irritation by prolonged exposure is unlikely. Repeated contact may cause flaking and softening of skin.

11.4. Eyes
Slight irritation is possible. Direct contact with eyes may cause temporary irritation. Corneal injury is unlikely.

11.5. Sensitisation
Patch test on human volunteers did not demonstrate sensitisation properties.

11.6. CMR Carcinogenicity
Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.

11.7. Mutagenicity
No data available.

11.8. Reproductive toxicity
No data available.

11.9. Specific Target Organ Toxicity
Single exposure no data available. Repeated exposure no data available.

11.10. Other toxic properties
Repeated dose toxicity. In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects. Aspiration hazard Due to its physical properties, the substance does probably not pose any aspiration hazard.

11.11. Other relevant toxicity information
Handle in accordance with good industrial hygiene and safety practice.

11.12. Experience with human exposure
Health injuries are not known or expected under normal use.

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

SECTION 12: ECOLOGICAL INFORMATION

12.1. Acute toxicity
Fish - LC50 : 40613 mg/l (Oncorhynchus mykiss; 96 h) (static test)
Daphnia and other aquatic invertebrates - LC50 : 18340 mg/l (Ceriodaphnia Dubia (water flea); 48 h) (static test)
Algae - ErC50 : 19000 mg/l (Pseudokirchneriella subcapitata (green algae); 96 h) (Growth inhibition)
Bacteria - NOEC : > 20000 mg/l (Pseudomonas putida; 18 h)Chronic toxicity
Aquatic invertebrates - NOEC : 13020 mg/l (Ceriodaphnia Dubia (water flea); 7 d) (semi-static test)

12.2. Persistence and degradability
Biodegradability 81 % (anaerobic; Exposure Time: 28 d)(OECD 301 F)
Readily biodegradable 96 % (anaerobic; Exposure Time: 64 d)(OECD 306.)

12.3. Bioaccumulative potential
BCF - 0.09 estimated Low bioaccumulative potential

12.4. Mobility
Estimated Koc < 1, indicating very high soil mobility.

12.5. PBT and vPvB assessment
Not a PBT or vPvB substance or mixture

12.6. Other adverse effects
Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. This substance is not in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATION

13.1. Waste treatment methods
Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

13.2. Contaminated packaging
Empty contaminated packaging thoroughly. They can be recycled after thorough and proper cleaning. Packaging that cannot be cleaned are to be disposed of in the same manner as the product.

13.3. European Waste Catalogue Number
No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: TRANSPORT INFORMATION

Not dangerous goods for ADR, RID, IMDG and IATA.

14.1. EEC Regulations
UNNO None Class None Packing Group None
Road & Rail Transport (ADR & RID) NoneIMDG Not Applicable ICOA None

14.2. Export commodity code
39074000
Classification - Polycarbonates.

14.3. Weight and dimensions
5Kg per 5 litre container. 19x14x29cm.

14.4. Manufactured in the United Kingdom

SECTION 15: REGULATORY INFORMATION

15.1	Classification	Not classified as hazardous to users.
15.2.	CAS No.	57556
15.3.	Risk or Safety phrases	None
15.4.	Labelling	None

SECTION 16: OTHER INFORMATION

Key literature references and sources for data taken from supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet. Other information - The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.
The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

SAFETY DATA SHEET
according to Regulation (EU) 2015/830

HARP® 407C

Revision: 1
Revision date: May 2020

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

1.1 Product identifier

Product name	R407C
REACH registration number	See section 3: Composition/information on ingredients
CAS No.	See section 3: Composition/information on ingredients
EC No.	See section 3: Composition/information on ingredients

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

Product use	Refrigerant Industrial uses: Uses of substances as such or in preparations at industrial sites Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Restricted use	Consumer uses: Private households (= general public = consumers)
Description	Gas

1.3 Details of the supplier of the safety data sheet

Company	Harp International Limited
Address	Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX UK
Web	www.harpintl.com
Telephone	+44 (0) 1443 842 255
Fax	+44 (0) 1443 841 805
Email	harp@harpintl.com
Email of competent person	safety@harpintl.com

1.4 Emergency telephone number

Emergency telephone number	+44 (0) 1270 502 891 24 hours

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification – EC 1272/2008	Compressed gas: H280

2.2 Label elements

Hazard pictograms	
Signal word	Warning
Hazard statement	H280 – Contains gas under pressure; may explode if heated
Precautionary statement	P410+P403 – Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

Other hazards	Asphyxiant in high concentrations. May cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients

3.1 Substances

EC 1272/2008

Chemical name	CAS No.	EC No.	REACH registration number	Concentration (%w/w)	Classification
1,1,1,2-Tetrafluoroethane (R134a)	811-97-2	212-377-0	01-2119459374-33	ca. 52	Compressed gas: H280
Pentafluoroethane (R125)	354-33-6	206-557-8	01-2119485636-25	ca. 25	Compressed gas: H280
Difluoromethane (R32)	75-10-5	200-839-4	01-2119471312-47	ca. 23	Flam. Gas 1: H220 Compressed gas: H280

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation	Move the exposed person to fresh air
Eye contact	Rinse immediately with plenty of water
Skin contact	Frostbite: treat as thermal burns
Ingestion	Ingestion is not considered a potential route of exposure

4.2 Most important symptoms and effects, both acute and delayed

Inhalation	Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Respiratory arrest.
Eye contact	Contact with liquefied gas can cause damage due to evaporative cooling
Skin contact	Contact with liquefied gas can cause damage due to evaporative cooling
Ingestion	Ingestion is not considered a potential route of exposure

4.3 Indication of any immediate medical attention and special treatment needed

Inhalation	If you feel unwell, seek medical advice
Eye contact	Seek medical attention if irritation or symptoms persist
Skin contact	Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
Ingestion	Ingestion is not considered a potential route of exposure

SECTION 5: Firefighting measures

5.1 Extinguishing media

	This product is not flammable in air under ambient conditions of temperature and pressure. Use extinguishing media appropriate to the surrounding fire conditions.

5.2 Special hazards arising from the substance or mixture

	At high temperature, toxic and/or corrosive fumes may be produced by thermal decomposition (gaseous hydrogen fluoride (HF), carbon oxides).

5.3 Advice for firefighters

	Wear self-contained breathing apparatus and protective clothing. Heat may cause the containers to explode. Keep fire exposed containers cool by spraying with water. Fire exposed containers may vent contents through pressure relief devices. In case of fire nearby, remove exposed containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

	Ensure adequate ventilation of the working area. Avoid contact with skin and eyes. Evacuate personnel to a safe area. Wear self-contained breathing apparatus and protective clothing. Vapours are heavier than air. Prevent from entering sewers, basements or workpits. Do not enter confined spaces where gas may have accumulated.

6.2 Environmental precautions

	Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and clean up

	Allow to evaporate. Provide adequate ventilation.

6.4 Reference to other sections

	See section 8 Exposure controls / personal protection See section 13 Disposal considerations

SECTION 7: Handling and storage

7.1 Precautions for safe handling

	Only experienced and properly instructed persons should handle gases under pressure. Protect containers from physical damage. Do not drag, roll, slide or drop. Do not remove or deface labels. Adopt best manual handling considerations when handling, carrying and dispensing. Secure cylinders in an upright position at all times. Close valves when not in use and when empty. Ensure adequate ventilation of the working area. Do not allow backfeed into the container. Avoid contact with skin and eyes. When using, do not eat, drink or smoke. Never use direct flame or electrical heating device to raise the pressure of the container.

7.2 Conditions for safe storage, including any incompatibilities

	Keep containers tightly closed. Keep in a cool, dry, well-ventilated area. Store in correctly labelled containers. Keep away from sources of ignition – no smoking. Store out of direct sunlight.
Suitable packaging	Stainless steel, steel.

7.3 Specific end use(s)

	See section 1.2 Relevant identified uses of the substance or mixture and uses advised against for further information.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters – exposure limit values

Component	CAS No.	Value type (form of exposure)	Exposure limit values	Source
1,1,1,2-Tetrafluoroethane	811-97-2	TWA	1000ppm / 4240mg/m^3	EH40
Pentafluoroethane	354-33-6	Not listed in EH40		
Difluoromethane	75-10-5	Not listed in EH40		

8.2 Exposure controls

Appropriate engineering controls	Ensure adequate ventilation of the working area. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leaks.
Individual protection measures	Wear protective clothing
Eye/face protection	Approved safety goggles
Skin & body protection	Wear suitable gloves. Wear safety shoes when handling containers.
Respiratory protection	Wear suitable respiratory protection equipment when necessary
Occupational exposure controls	Keep away from food, drink and animal feedstuffs.
Hygiene protection	Good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance - Physical state	Gas
Appearance - Form	Liquefied gas
Colour	Colourless
Odour	Slight ethereal
Odour threshold	No data available
pH	Not applicable
Melting point	No data available
Boiling point / range	-43.6°C
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	This product is not flammable
Upper explosion limit / Lower flammability limit	Not applicable
Vapour pressure	1,190.3 kPa (25°C)
Vapour density	3.03 (air = 1)
Relative density	No data available
Solubility(ies) **Water solubility**	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	Not applicable
Decomposition temperature	No data available
Viscosity **Viscosity, kinematic**	No data available
Explosive properties	Not applicable
Oxidising properties	Not applicable

SECTION 10: Stability and reactivity

10.1 Reactivity

	Stable under normal conditions

10.2 Chemical stability

	Stable under normal conditions. The gaseous product in the presence of air can form, under certain conditions of temperature and pressure, a flammable mixture.

10.3 Possibility of hazardous reactions

	No data is available on this product

10.4 Conditions to avoid

	Keep away from heat and sources of ignition. Avoid contact with flames and red hot metallic surfaces.

10.5 Incompatible materials

	Alkaline hydroxides, alkaline earth metals, strong oxidizing agents, finely divided metals.

10.6 Hazardous decomposition products

	Under normal conditions of storage and use, hazardous decomposition products should not be produced. At high temperature, thermal decomposition can give rise to toxic and corrosive products.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity	As with other volatile aliphatic halogenated compounds, through vapour accumulation and/or inhalation of large quantities, the product can cause loss of consciousness and cardiac disorders aggravated by stress and lack of oxygen. Risk of mortality.
Skin corrosion/irritation	Ejection of liquefied gas: frostbite possible
Serious eye damage/irritation	Ejection of liquefied gas: frostbite possible
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	No data available
Carcinogenicity	No data available
Reproductive toxicity	No data available
STOT single exposure	No data available
STOT repeated exposure	No data available
Aspiration hazard	No data available
Repeated or prolonged exposure	No data available

SECTION 12: Ecological information

12.1 Toxicity

	No data available

12.2 Persistence and degradability

	Not applicable to gases and gas mixtures

12.3 Bioaccumulative potential

	Expected to biodegrade and not expected to persist for long periods in an aquatic environment

12.4 Mobility in soil

	Unlikely to cause ground or water pollution due to its high volatility

12.5 Results of PBT and vPvB assessment

	Not classified as PBT or vPvB

12.6 Other adverse effects

	Contains fluorinated greenhouse gases. When discharged in large quantities may contribute to the greenhouse effect. Global warming potential: 1774

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Revision date: May 2020

SECTION 13: Disposal considerations

13.1 Waste treatment methods

	Dispose of in accordance with all local and national regulations. Avoid discharges to atmosphere. Refer to manufacturer/supplier for information on recovery/recycling. Dispose of container via supplier only. EWC code: 14 06 01* Chlorofluorocarbons, HCFC, HFC

SECTION 14: Transport information

Hazard pictograms

	

14.1 UN number

	UN 3340

14.2 UN proper shipping name

	REFRIGERANT GAS R407C

14.3 Transport hazard class(es)

ADR/RID	
Class	2
Labels	2.2
Hazard No. (ADR)	20
Tunnel category	(C/E)
Emergency action code	2TE
IMDG	
Class	2.2
EmS No.	F-C, S-V
IATA	
Class	2.2
Packing instruction	200

14.4 Packing group

	-

14.5 Environmental hazards

Environmental hazards	Not applicable
Marine pollutant	Not classified as a marine pollutant

14.6 Special precautions for user

	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure container valves are closed, not leaking and caps in place. Ensure containers are firmly secured. Ensure adequate air ventilation.

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

	Not applicable

SECTION 15: Regulatory information

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

Regulations	REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

15.2 Chemical safety assessment

	No CSA has been carried out

SECTION 16: Other information

Other information

Text of Hazard Statements in Section 3	H280: Contains gas under pressure; may explode if heated. H220: Extremely flammable gas
Reference materials	HSE publication EH40/2005 Workplace exposure limits (latest edition)
Changes from previous versions	-

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 of 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. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the material in the user's end product, if applicable.

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Safety Data Sheet

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

1.1 Product identifier

Product Name	CoolFlow EG

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

Identified uses	Industrial grade secondary refrigerant with antifreeze and inhibitor functions designed for use in process cooling, refrigeration and HVAC systems.
Uses advised against	This product is not recommended for any industrial, professional or consumer use other than the identified uses above.

1.3 Details of the supplier of the Safety Data Sheet

Supplier	Applied Thermal Control Ltd 39 Hayhill Industrial Estate Barrow Upon Soar leicestershire LE12 8LD +44 (0) 01530 839998 sales@app-therm.com
1.4 Opening Hours	Monday-Thursday - 08:00 - 17:00 Friday – 08:00 – 14:00

Section 2: Hazards identification

2.1 Classification of the substance or mixture

Classification - Regulation (EC) No. 1272/2008 (CLP)

Physical and chemical hazards	Not classified as a physical or chemical hazard
Human health	Acute Tox. 4 - H302, STOT RE 2 - H373
Environment	Not classified as an environmental hazard

2.2 Label elements

EC No. N/A
Labelling - Regulation (EC) No. 1272/2008 (CLP)
Pictograms

Signal Word - Warning

Hazard statements
H302 - Harmful if swallowed
H373 - May cause damage to organs - Kidneys - through prolonged or repeated exposure if swallowed.

Precautionary statements
P260 - Do not breathe dust/fumes/gas/mist/vapours/spray
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P301+P312 - IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

2.3 Other hazards
This product does not meet the PBT/vPvB criteria of REACH, annex XIII.

Section 3: Composition/information on ingredients

3.2 Mixtures

Component - Monoethylene glycol (ethane-1, 2-diol)

Concentration	80-95%
EC No.	203-473-3
CAS No.	107-21-1
Reach registration No.	01-2119456816-28

Classification - Regulation (EC) No. 1272/2008 (CLP)
Acute Tox. 4 - H302
STOT RE 2 - H373

Component - Ethanol

Concentration	1-5%
EC No.	200-578-6
CAS No.	64-17-5
Reach registration No.	01-211945719-43

Classification - Regulation (EC) No. 1272/2008 (CLP)
Flam. Liq. 2 - H225
Eye Irrit. 2 - H319

Component - Sodium nitrite

Concentration	<0.25%
EC No.	231-555-9
CAS No.	7632-00-0
Reach registration No.	01-2119471836-27

Classification - Regulation (EC) No. 1272/2008 (CLP)
Ox. Sol. 3 - H272
Acute Tox. 3 - H301
Eye Irrit. 2 - H319
Aquatic Acute 1 - H400

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Section 4: First aid procedures

4.1 Description of first aid procedures

General Information	When safe to do so remove the victim from the source of exposure giving consideration as to whether this may cause further discomfort to the victim.
Inhalation	Move the affected person to fresh air at once. Keep warm in a position comfortable for breathing. If breathing becomes difficult, properly trained personnel may assist the victim by supplying oxygen to ease breathing. Get medical attention if any discomfort continues.
Ingestion	Do NOT induce vomitting and seek medical attention immediately. Move victim to fresh air and keep warm and at rest in a position comfortable for breathing. Give victim approximately 250 mL of water however, do not give victim anything to drink if not fully conscious. If medical advice is delayed and an adult has consumed several ounces of this chemical, give approximately 100 mL of hard liquor (for children give 2 mL per kilogram of body weight).
Skin Contact	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if any discomfort continues.
Eye Contact	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.

4.2 Most important symptoms and effects, both acute and delayed

General Information	The following symptoms are listed in case of exposure to the 100% neat product.
Inhalation	Inhalation of vapours may cause mild irritation of the upper respiratory tract.
Ingestion	Initial symptoms may include an upset stomach, nausea, vomiting and diarrhoea. Symptoms may progress to hyperventilation, metabolic acidosis, cardiovascular dysfunction and acute kidney failure depending on the extent of poisoning.
Skin Contact	Prolonged and repeated contact may cause mild irritation of the skin.
Eye Contact	Direct eye contact may cause reddening of the eyes.

4.3 Indication of immediate medical needs or special treatment

If several ounces (> 50 mL) of this product have been ingested, early administration of ethanol may help to counteract the toxic side effects such as metabolic acidosis, cardiovascular dysfunction and in severe cases kidney failure. Consider haemodialysis or peritoneal dialysis and thiamine 100 mg plus pyridoxine 50 mg intravenously every 6 hours. If ethanol is used a therapeutically effective blood concentration in the range of 100-150 mg/dL may be achieved by a rapid loading dose followed by a continuous intravenous fusion.

Respiratory symptoms such as pulmonary edema, may be delayed. Victims receiving significant exposure should be kept under observation for 24-48 hours for signs of respiratory distress. In the case of severe poisoning, respiratory support with mechanical ventilation and oxygenation of the patient.

Notes for the doctor

No specific recommendations in addition to the suggestions in Sections 4.1 and 4.3. Treat symptomatically.

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Section 5: Firefighting measures

5.1 Extinguishing media

Extinguish with alcohol-resistant foam, carbon dioxide (CO2), dry chemicals, sand and dolomite or water fog.

5.2 Special hazards arising from the substance or mixture

Specific Hazards	When heated and in the case of a fire, harmful vapours/gases (such as carbon monoxide and carbon dioxide) may be formed.
Unusual fire and explosion hazards	Exposure to extreme heat may cause product containers to explode.

5.3 Advice for firefighting

Protective actions during firefighting	Move containers away from fire area if this can be done without risk. Keep people away, isolate the fire and deny unnecessary entry. Use water fog to keep fire-exposed containers cool and disperse vapours. Runoff water should be prevented from entering sewers and watercourses.
Specialist protective equipment for	Wear positive-pressure self-contained breathing apparatus (SCBA) and full Fire fighters protective clothing.

Section 6: Procedure for unwanted emissions

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions
Avoid flames, sparks, heat and smoking.
In the case of inadequate ventilation, use respiratory protection.

Protective Equipment
Wear protective clothing as described in Section 8 of this Safety Data Sheet.

Emergency Procedures
Stop leak/release if possible to do so without risk.
Extinguish all ignition sources if safe to do so.
Warn everybody of potential danger and evacuate if necessary.

6.2 Environmental precautions

Do not discharge into drains, water courses or onto the ground.
Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3 Methods and materials for containment and clean up

Absorb spillage with inert, damp, non-combustible material, then flush the contaminated area with water.
Containers with collected spillage should be appropriately labelled with the correct contents and hazard labels.
Collect and place in suitable waste disposal containers and seal securely. For waste disposal, see Section 13.

6.4 Reference to other sections

Wear protective clothing as described in Section 8 of this Safety Data Sheet.
Collect and dispose of spillage as indicated in Section 13.

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Section 7: Handling and storage

7.1 Precautions for safe handling

Avoid spilling and contact with the skin and the eyes as well as direct inhalation of sprays and mists.
Provide good ventilation.
Do not eat, drink or smoke in work areas and wash hands after handling this product.

7.2 Conditions for safe storage including any compatibilities

Store in tightly-closed, original containers.
Keep separate from food, feedstuffs, fertilisers and other sensitive material.
Do not store near heat sources or expose to high temperatures.
Keep away from heat, sparks and open flame.

7.3 Specific end use(es)

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

Section 8: Exposure controls / Personal protection

8.1 Control parameters

Name	STD	TWA-8 Hrs	STEL-15 Min
Monoethylene glycol (ethane-1, 2-diol)	WEL	52 mg/m³	104 mg/m³

DNEL
Industry, Inhalation - Long term local effects: 35mg/m³
Industry, Dermal - Long term systemic effects: 106mg/m³
Consumer, Inhalation - Long term local effects: 7mg/m³
Consumer, Dermal - Long term systemic effects: 7mg/m³

PNEC
Fresh water: 10 mg/L
Marine water: 1mg/L
STP: 199.5 mg/L
Sediment fresh water: 20.9 mg/kg
Soil: 1.53 mg/kg

Name	STD	TWA-8 Hrs	STEL-15 Min
Ethanol	WEL	1920 mg/m³	Not available

DNEL
Industry, Inhalation - Short term local effects: 1900 mg/m³
Industry, Dermal - Long term systemic effects: 343 mg/kg/day
Industry, Inhalation - Long term systemic effects: 950 mg/m³
Consumer, Inhalation - Short term local effects: 950 mg/m³

Consumer, Dermal - Long term systemic effects: 206 mg/kg/day
Consumer, Inhalation - Long term systemic effects: 114 mg/m³
Consumer, Oral - Long term systemic effects: 87 mg/kg/day

PNEC
Fresh water: 0.96 mg/L

Marine water: 0.79 mg/L

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Intermittent release: 2.75 mg/L
STP: 580 mg/L
Sediment fresh water: 3.6 mg/kg
Sediment marine water: 2.9 mg/kg
Soil: 0.63 mg/kg

Name	STD	TWA-8 Hrs	STEL-15 Min
Sodium nitrite	WEL	Not available	Not available

DNEL
Industry, Inhalation - Long term systemic effects: 2 mg/m³
Industry, Inhalation - Short term systemic effects: 2 mg/m³

PNEC
Fresh water: 0.0054 mg/L
Marine water: 0.00616 mg/L
Intermittent release: 0.0054 mg/L
Sediment (fresh water): 0.0195 mg/kg
Sediment (marine water): 0.0223 mg/kg
STP: 21 mg/L

8.2 Exposure controls

Technical procedures

Engineering measures	Methods to prevent or control exposure are preferred. Provide adequate ventilation to minimise the risk of inhalation of sprays and mists.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practices. Wash hands after handling this product and at the end of each work shift. Routinely wash work clothing and personal protective equipment to remove possible contaminants.
Respiratory equipment	Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Hand protection	PVC/butyl rubber/neoprene gloves are recommended.
Eye protection	Wear approved chemical goggles or face shield.
Skin Protection	Wear rubber apron or protective clothing in case of contact.
Other Protection	Wear suitable protective clothing/footwear as protection against splashing or contamination.

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Thermal Hazards	No specific measures required.
Environmental Exposure Controls	Product not classified as an environmental hazard - no specific environmental exposure controls required.

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	Blue liquid
Odour	Non-pungent but characteristic aroma
Odour Threshold	Not applicable
pH	7.5 - 10.5 depending on inhibitor formulation
Melting point / Pour point	-40°C
Initial boiling point	>180°C
Flash point	>64°C
Evaporation Rate	No test data available
Flammability	Product is not classified as flammable
Flammability / explosion limits	Upper limit: 13% Lower limit: 3%
Vapour pressure	No test data available
Vapour density (air = 1)	No test data available
Relative density of the mixture	1.04 - 1.2
Solubility	Soluble in water
Partition coefficient: n-octanol / water	No test data available
Auto-ignition temperature	>390°C
Decompostion temperature	No test data available
Viscosity	See product data sheet
Explosive properties	Not applicable - product is not classified as an explosive
Oxidising properties	Not applicable - product is not classified as an oxidising agent

9.2 Other information
Not determined.

Section 10: Stability and reactivity

10.1 Reactivity
There are no known reactivity hazards associated with this product.

10.2 Chemical stability
Stable at normal ambient temperatures and when used as recommended.
Product is hygroscopic and will absorb water by contact with the moisture in the air.

10.3 Possibility of hazardous reactions
There are no known hazardous reactions associated with this product.

10.4 Conditions to avoid
Avoid temperatures >180°C for prolonged periods of time, flames and sources of ignition.

10.5 Incompatible materials
Strong acids, strong alkalis and strong oxidising agents.

10.6 Hazardous decomposition products

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No known hazardous decomposition products. Potentially hazardous products released due to fire are listed in Section 5.2 of this Safety
Data Sheet.

Section 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
This product has not been tested as a whole for acute toxicity health effects. For this reason, the acute toxicity values for the main components of this mixture are listed below.

Acute toxicity values for monoethylene glycol:
LD50, oral, rat: 4700 mg/kg bw
LD50, dermal, rabbit: >10,600 mg/kg bw
LD50, dermal, mouse: >3500 mg/kg bw
LC50, inhalation (vapours), rat: >2.5 mg/L

Oral toxicity of monoethylene glycol is expected to be moderate in humans despite animal testing showing a lower degree of toxicity. The estimated lethal dose in humans of NEAT MONOETHYLENE GLYCOL is expected to be approximately 100mL.

Acute toxicity values for ethanol:
LD50, oral, rat: 10,470 mg/kg bw
LD50, dermal rabbit: 17,100 mg/kg bw

Skin corrosion/ irritation	Skin irritation is not expected when this product is used/handled correctly.
Serious eye damage/ irritation	Eye irritation is not expected when this product is used/handled correctly.
Respiratory/ skin sensitisation	Product not classified as a skin/respiratory sensitiser.
Germ cell mutagenicity	Product is not expected to be mutagenic.
Carcinogenicity	Product is not expected to be carcinogenic.
Reproductive toxicity	Product is not expected to damage the reproductive system or harm a developing fetus.
Evaluation of CMR properties	No test data available.
STOT-single exposure	No test data available.
STOT-repeated exposure	No test data available.
Aspiration hazard	No test data available.

General information

See Section 4.2 of this Safety Data Sheet.

Inhalation	Inhalation of vapours may cause mild irritation of the upper respiratory tract.
Ingestion	Initial symptoms may include an upset stomach, nausea, vomiting and diarrhoea. Symptoms may progress to hyperventilation, metabolic acidosis, cardiovascular dysfunction and acute kidney failure depending on the extent of poisoning.
Skin contact	Prolonged and repeated contact may cause mild irritation of the skin.
Eye contact	Direct eye contact may cause reddening of the eyes.

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Section 12: Ecological information

Ecotoxicity
The product is not classified as hazardous to the environment.

12.1 Toxicity

LC50, 96 hours, fish:	>100 mg/L - not classified as harmful to fish
EC50, 48 hours, daphnia magna:	>100 mg/L - not classified as harmful to daphnia
EC50, 96 hours, aquatic plants:	>100 mg/L - not classified as harmful to aquatic plants

12.2 Persistence and degradability
This product is readily biodegradable (90% over 10 days).

12.3 Bioaccumulative potential
Will not bio-accumulate.
Partition coefficient - not determined.

12.4 Mobility in soil
Product is mobile in soil as it is water soluble.

12.5 Results of PBT and vPvB assessment
This product does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6 Other adverse effects
Not determined.

Section 13: Advice on disposal

General information
Waste to be treated as controlled waste. Disposal to licensed waste disposal site in accordance with Local Waste Disposal Authority.

Disposal methods
Dispose of waste and residues in accordance with local authority and/or local sewage treatment plant requirements.

Section 14: Transport information

14.1 UN number
Product not hazardous for transport - no information required.

14.2 UN proper shipping name
Product not hazardous for transport - no information required

14.3 Transport hazard class(es)
Product not hazardous for transport - no information required.

Transport labels
Product not hazardous for transport - no information required.

14.4 Packing group
Product not hazardous for transport - no information required.

14.5 Environmental hazards

Product not classed as an environmentally hazardous substance or marine pollutant.

14.6 Special precautions for user
Product not hazardous for transport - no information required.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Product not hazardous for transport - no information required.

Section 15: Regulatory information

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

EU legislation
Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

Guidance notes
CHIP for everyone HSG228. Approved Classification and Labelling Guide (Sixth edition) L131. Safety Data Sheets for substances and preparations.

15.2 Chemical safety assessment
No chemical safety assessment for this mixture has been carried out.

Section 16: Other information

Issued by Thermal Exchange Ltd
Revision Date 21/03/2018
Approved by Graham Wade
Revision Comments Review in line with CLP regulation

Hazard statements in full
The following hazard statements are the hazard statements 'in full' for the components of this mixture. They are not the hazard statements associated with the final classification of this product.

H302 - Harmful if swallowed
H373 - May cause damage to organs - Kidneys - through prolonged or repeated exposure if swallowed
H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation
H272 - May intensify fire; oxidiser

H301 - Toxic if swallowed
H400 - Very toxic to aquatic life

Further classification and composition comments
No further classification or composition comments required.

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(i) Indication of changes
Safety Data Sheet updated to comply with the new requirements as set out in Regulation (EC) No. 1272/2008 (CLP).

(ii) Abbreviations and acronyms
bw: bodyweight
CAS No: Chemical Abstracts Service number
CLP: Classification Labelling and Packaging Regulation
DNEL: Derived No-Effect Level
EC: European Commission
EC No: European Chemical number: EINECS, ELINCS or NLP
ECHA: European Chemicals Agency
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
LC50: Lethal Concentration, 50%
LD50: Median Lethal Dose

PBT: Persistent, Bioaccumalative & Toxic
PNEC: Predicted No Effect Concentration
REACH: Registration, Evaluation, Authorisation & restrictions of Chemicals
SDS: Safety Data Sheet
vPvB: Very Persistent and Very Bioaccumalative
WEL: Workplace Exposure Limit

(iii) Training advice
Product should only be handled by trained operators.

(iv) Additional information
The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give advice about the safe handling of the product named in this Safety Data Sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with products or in the case of processing, the information on this Safety Data Sheet is not necessarily valid for the new made-up material.