Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow upon Soar, Leicestershire
LE12 8LD, United Kingdom

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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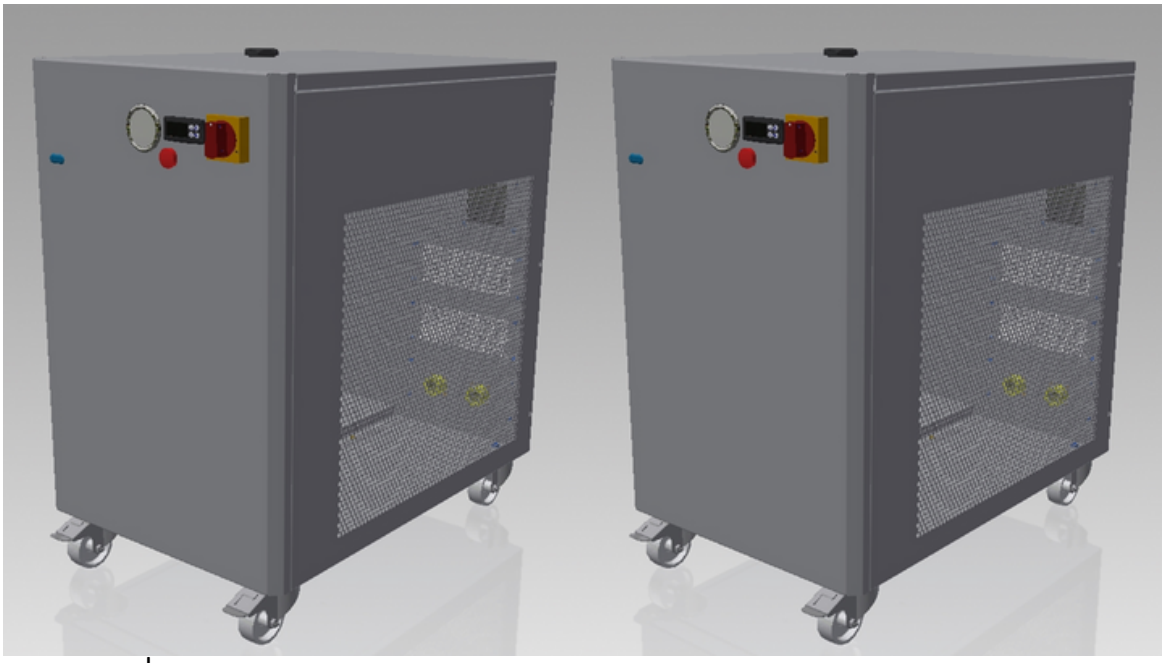
K4, K6, K9 Enclosure example:



K12 Enclosure example:

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39 Hayhill Industrial Estate, Barrow-upon-Soar, Loughborough, LE12 8LD, United Kingdom

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1.0 INTRODUCTION

By selecting a K-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 directly.

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Tel: +44 (0) 1530 839998
E-mail: support@app-therm.com

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1.1 SAFETY NOTICES

For your safety, we draw your attention to the following warning and caution marks throughout the manual Identified by the symbols...

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 remains the responsibility of the operator at all times. 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 or damage caused through misuse 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. If the equipment is used in a manner not specified by ATC, the protection provided by the equipment may be impaired.
	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.

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1.1 SAFETY NOTICES

	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.

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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.

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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 of 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.** (For current ratings see section 2.0) (0-spec) 230Vac ±10% 50Hz 1P+N+E (3-spec) 400Vac ±5% 50Hz 3P+N+E/3P+E (8-spec) 208Vac ±10% 60Hz 3P+E
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 models 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 and specific heat transfer oils (contact ATC for compatibility details). Ensure the connected pipework is suitable for handling the nominal flowrate at system pressure ≥8bar.
9	**Indoor use only.** Altitude up to 2000m above sea level. Ensure the unit has adequate ventilation.

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1.3 SITE REQUIREMENTS

ⓘ	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.

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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 fulfil 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 the warranty period– 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 the fastest response.

f) What happens if my chiller fails 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.

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1.4 WARRANTY REGISTRATION

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.

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2.0 PRODUCT SPECIFICATION

MODEL	K4	K6	K9	K12
Weight	125kg (275lbs)	125kg (275lbs)	125kg (275lbs)	135kg (298lbs)
Form factor	Floor standing	Floor standing	Floor standing	Floor standing
Dimension	L775 x W510 x H850mm (L30.5 x W20.1 x H35.5”)	L775 x W510 x H850mm (L30.5 x W20.1 x H35.5”)	L775 x W510 x H850mm (L30.5 x W20.1 x H35.5”)	L775 x W510 x H1130mm (L30.5 x W20.1 x H44.5”)
Noise level	68dB(A)@1m	68dB(A)@1m	85dB(A)@1m	85dB(A)@1m
Toolless access	Partial	Partial	Partial	Partial
Technology	Vapor compression	Vapor compression	Vapor compression	Vapor compression
Cooling capacity (Ambient temperature at +30°C with setpoint of +20°C)	4kW 15,355BTU/h 1.28TR 1TR	6kW 20,473BTU/h 1.7 TR	9kW 30,709BTU/h 2.56TR	12kW 40,945BTU/h 3.41TR
Refrigerant	R470C	R470C	R470C	R407C
Temperature range	+4°C to +35°C (standard)	+4°C to +35°C (standard)	+4°C to +35°C (standard)	+4°C to +35°C (standard)
	-20°C to +65°C (extended)	-20°C to +65°C (extended)	-20°C to +65°C (extended)	-20°C to +65°C (extended)
Control method	PID, Hot Gas Bypass	PID, Hot Gas Bypass	PID, Hot Gas Bypass	PID, Hot Gas Bypass
Stability	±0.1°C	±0.1°C	±0.1°C	±0.1°C
Resolution	0.1°C	0.1°C	0.1°C	0.1°C
Sensor type	PT100	PT100	PT100	PT100
System volume	5L (with 2.2L tank)	5L (with 2.2L tank)	5L (with 2.2L tank)	14L (with 11L tank)
Pump options	P17 Positive displacement P25, P40 Centrifugal	P17 Positive displacement P25, P40 Centrifugal	P17 Positive displacement P25, P40 Centrifugal	P17 Positive displacement P25, P40 Centrifugal

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2.0 PRODUCT SPECIFICATION

MODEL	K4	K6	K9	K12
Pressure relief	Internal, PRV, 20-150psi (Not available on P25, P40)	Internal, PRV, 20-150psi (Not available on P25, P40)	Internal, PRV, 20-150psi (Not available on P25, P40)	Internal, PRV, 20-150psi (Not available on P25, P40)
Process fittings	½" BSPPF, 1" BSPPF	½" BSPPF, 1" BSPPF	½" BSPPF, 1" BSPPF	½" BSPPF, 1" BSPPF
Supply (0-spec)	230Vac 50Hz 1~ 13A	230Vac 50Hz 1~ 13A	230Vac 50Hz 1~ 20A	
Supply (3-spec)	400Vac 50Hz 3~ 6A	400Vac 50Hz 3~ 7A	400Vac 50Hz 3~ 10A	400Vac 50Hz 3~ 13A
Supply (8-spec)		208Vac 60Hz 3~ 7.5A	208Vac 60Hz 3~ 17.5A	208Vac 60Hz 3~ 23A
1st party approvals	CE, UKCA	CE, UKCA	CE, UKCA	CE, UKCA
3rd party approvals	UL OK on 8 & 3 spec (Subject to standard option configuration)	UL OK on 8 & 3 spec (Subject to standard option configuration)	UL OK on 8 & 3 spec (Subject to standard option configuration)	UL OK on 8 & 3 spec (Subject to standard option configuration)
Empty fluid tank alarm	Safety interlock	Safety interlock	Safety interlock	Safety interlock
Low fluid flow alarm	N/A	N/A	N/A	N/A
Temp range alarm	Indicator on controller	Indicator on controller	Indicator on controller	Indicator on controller
Fridge HP switch	Standard	Standard	Standard	Standard
Motor thermal cutout	Standard	Standard	Standard	Standard
Overcurrent protection	Standard, vie MCB	Standard, vie MCB	Standard, vie MCB	Standard, vie MCB
Overcurrent restart	Manual	Manual	Manual	Manual
Interlock restored mode, restart mode	Manual by default. Specify 'A' suffix for automatic	Manual by default. Specify 'A' suffix for automatic	Manual by default. Specify 'A' suffix for automatic	Manual by default. Specify 'A' suffix for automatic
Emergency off	Not present	Not present	Not present	Not present

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2.0 PRODUCT SPECIFICATION

MODEL	K4	K6	K9	K12
Warranty options	2-year parts, 1-year labour Enhanced on request	2-year parts, 1-year labour Enhanced on request	2-year parts, 1-year labour Enhanced on request	2-year parts, 1-year labour Enhanced on request
Rated duty cycle	S1 Continuous	S1 Continuous	S1 Continuous	S1 Continuous

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3.0 QUICK START GUIDE

1	Remove all the packaging (Section 1.2)
2	Connect the chiller process inlet and outlet to your application.
3	Fill up the chiller fluid tank with appropriate coolant.
4	When filling a system fitted with a centrifugal pump (P25, P40), it is necessary to prime the pump head prior to switching the chiller on. This can be achieved by using a 5/8" spanner or socket to loosen the pump bleed screw by approximately 1.5 turns (do not remove fully). The bleed screw is situated at the top of the pump head to allow any air to bleed from the system, when air is purged and coolant is present tighten the bleed screw by hand, do not overtighten.
5	Use the name plate on the back of the chiller to verify the appropriate voltage and supply the power using provided cables.
6	Turn the power switch ON
7	Slowly add more coolant as process lines fill and the coolant is circulated around the process system. The chiller will automatically stop if the low tank level interlock is triggered. In this instance, refill the tank and restart the chiller. If the chiller has a positive displacement pump (P5, P10, P17) run the unit with the tank full and the cap removed for approximately 20mins to allow any air to escape the system. When all air has been removed the fluid in the tank should be free from air bubbles and foam. If the chiller has a centrifugal pump (P25, P40), it may be required to isolate the chiller and repeat step 4 to bleed any remaining air from the system. Repeat this process with the tank full and the cap removed for approximately 20mins to allow any air to escape the system. When all air has been removed the fluid in the tank should be free from air bubbles and foam and the pump will become quieter during continuous operation.
8	Check the fluid pressure gauge and verify the correct pressure is being supplied. Normal running pressure is between 2.5barg (36psig) and 3.5barg (50psig).
9	Using the controller, set the desired temperature.

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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 minimizes exposure to 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. ATC can offer commercial-grade cleaning solutions – contact us for information.
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.**

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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 water-line. 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

ℹ	Different chillers will have different requirements for electrical supply. The specifications can be found on the back plate of the chiller and in sections 1.3 & 2.0. Please ensure that the voltage supply and number of phases are correct on the site and your power supply is sufficient for stated current draw.

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4.5 FILLING PROCEDURES FOR POSITIVE DISPLACEMENT PUMPS

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

1	**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 taken, or entirely prevent the bleeding of air from the system.
2	**Remove the cap from the fluid tank.** i) Fill the tank to just underneath the bottom of the filling port.
3	**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) Run the unit until the water level in the tank drops and cuts out via 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 unit.
4	**Repeat step (3) until the chiller does not cut out on the level switch.**
5	**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.
6	**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 no abnormal sounds can be heard from the pump.

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4.5 FILLING PROCEDURES FOR CENTRIFUGAL PUMPS

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

1	**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 taken, or entirely prevent the bleeding of air from the system.
2	**Remove the cap from the fluid tank.** i) Fill the tank to just underneath the bottom of the filling port.
3	**Bleed the air from the pump head.** **i) Ensure the pump is not running before undertaking the air bleed procedure.** ii) Using a 5/8" spanner (wrench) or socket, loosen the pump bleed screw by approximately 1.5 turns (do not fully remove). The bleed screw is situated at the top of the pump head. iii) When air is purged and coolant is present tighten the bleed screw. Do not overtighten
4	**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) Run the unit until the water level in the tank drops and cuts out via the low level switch interlock. iii) Turn the unit off at the main switch. iv) Fill the tank to just underneath the bottom of the filling port. v) Start the unit. vi) Repeat steps (3) to (4) as required to bleed air from the system.
5	**Check the application and tubing for signs of leaks whilst the chiller is 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. ii) Replace the tank lid fully when satisfied the system is full and bled of air no abnormal sounds can be heard from the pump.

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4.6 DRAINING A SYSTEM

1	**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 the unit ports to give yourself time to empty the hoses before continuing to empty the product.
2	**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.

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5.0 OPERATION

K-series chillers are fitted with a high performance 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.	

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Installation, Operation & Service Manual

K4, K6, K9, K12

5.0 OPERATION

	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 will allow entry to 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

	ACHEIVING 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 to moderate the fan RPM.

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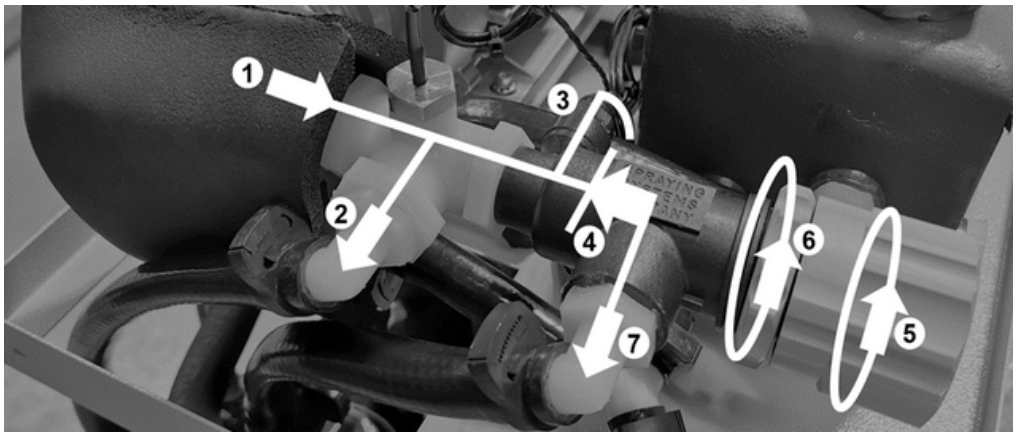
5.2 REGULATING PRESSURE/FLOW

POSITIVE DISPLACEMENT PUMPS & DISCRETE BYPASS VALVE	
This arrangement comprises of a positive displacement rotary vane pump and a needle valve bypass to provide fine adjustment to the process flow outlet. The bypass valve allows fluid to be biased between the pump outlet and the process return. This action creates a differential in flow at the process outlet.	
	
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 fluid circuit is, the higher the pressure required to maintain the flowrate. Positive displacement pumps are designed to generate high pressure and are mechanically tight - the RPM of a rotary vane pump dictates flowrate.	
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.

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5.2 REGULATING PRESSURE/FLOW

	POSITIVE DISPLACEMENT PUMPS & DISCRETE BYPASS VALVE
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 PRC where all flow is bypassed.
7	**Contact ATC if you're unsure over whether your desired setting is reasonable for the product you have.**
	**Caution: Observe centrifugal pump back pressure requirements.**
When fitted, centrifugal pumps (P25, P40, P80, P120) require a constant working back pressure of ≥1.8barg (26psig). **Failure to provide minimum back pressure can result in leaking seals and/or pump failure.** The working pressure of the pump outlet can be monitored via the pressure gauge fitted to the front of the unit. Fitting an external valve to the process outlet to restrict the flow rate will allow adjustment of the back pressure in balance with the external process system.	

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6.0 BASIC TROUBLESHOOTING

AIR COOLED 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 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. Assess whether surrounding equipment is generating hot air and feeding it into the chiller air intakes.
		If fitted, a low-pressure switch may have 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 onto high temperature internal protection.
2	Noisy operation	Pump motor or fan motor bearings may have failed.
		Pump head vanes or seals 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 promotes biological growth.
		General fluid leaks 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 difficult 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.

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6.0 BASIC TROUBLESHOOTING

AIR COOLED CHILLER TROUBLESHOOTING		
#	**SYMPTOM**	**CAUSES**
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		

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7.0 END USER MAINTENANCE

	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	Y7	Y8
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 mains lead is lost or damaged, contact ATC who will be able to supply a replacement of the correct specification.

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ANNEX J-2

Date	06/APR/2022	Author(s)	MJH	Page	1/2	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

AUTHORISATION TO COMPILE THE TECHNICAL FILE

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

AUTHORISATION TO COMPILE THE TECHNICAL FILE

Not applicable

QUALITY ASSURANCE SYSTEM

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

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ANNEX J-2

Date	06/APR/2022	Author(s)	MJH	Page	2/2	Revision	1

EU DECLARATION OF CONFORMITY

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

Operating Manual; Declarations & Approvals

ANNEX J-5

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

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

Operating Manual; Declarations & Approvals

ANNEX J-7

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

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 safely be 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 01/JUN/2007.

REACH 'ARTICLE' COMPLICANCE 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 of 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 lists in concentrations of >0.1% by weight.

REACH ANNEX XIV COMPLIANCE
Substances under Annex XIC 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 of 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 lists 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 of 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 lists in concentrations of >0.1% by weight.

DECLARATION

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

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ANNEX J-8

Date	03/FEB/2021	Author(s)	MJH	Page	1/2	Revision	1

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.

Operating Manual; Declarations & Approvals

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Date	03/FEB/2021	Author(s)	MJH	Page	2/2	Revision	1

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

Operating Manual; Declarations & Approvals

ANNEX J-10

Date	03/FEB/2021	Author(s)	MJH	Page	1/2	Revision	2

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.

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Date	06/APR/22	Author(s)	MJH	Page	2/2	Revision	1

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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Date	06/06/2023	Author(s)	WSE	Page	1/2	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;	V-Series
Function;	Oil Cooler
Model;	All with 'V' prefix
Type;	Airblast
Serial Number;	
Commercial name;	As above

NOTIFIED BODY

Not applicable

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ANNEX J-15

Date	06/06/2023	Author(s)	WSE	Page	2/2	Revision	1

QUALITY ASSURANCE SYSTEM

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

EU DECLARATION OF CONFORMITY

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

Operating Manual; Declarations & Approvals

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Date	02/MAR/2022	Author(s)	MJH	Page	1/2	Revision	1

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 complete the Technical File	Mitchell Howard, address as above.

DESCRIPTION & IDENTIFICATION OF MACHINERY

Generic denomination;	V-Series
Function;	Oil Cooler
Model;	All with 'V' prefix
Type;	Airblast
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

Operating Manual; Declarations & Approvals

ANNEX J-16

Date	02/MAR/2022	Author(s)	MJH	Page	1/2	Revision	1

DECLARATION

The manufacture 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
2/MAR/2022

Safety Data Sheet;
HARP® R407C

HARP INTERNATIONAL

ANNEX R-2

Date	JULY/2012	Author(s)	HARP INTERNATIONAL	Page	1/8	Revision	CLP01

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

Product name	R407C
REACH registration numbers	1,1,1,2-Tetrafluoroethane 01-2119459374-33 Pentafluoroethane 01-2119485636-25 Difluoromethane Deadline not yet expired
Company	Harp International Ltd Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX Tel: +44 (0) 1443 842255 Fax: +44 (0) 1443 841805 Email: harp@harpintl.com
Emergency phone number	+44 (0) 1270 502891 (24 hour)
Use	Refrigeration

2. Hazards identification

EC Classification	EC Directive 67/548/EEC or 1999/45/EC Not classified as hazardous
	Regulation (EC) No. 1272/2008 (CLP) Gases under pressure – Liquefied gas
Label Elements	
Name on label	
Hazardous components	1,1,1,2-Tetrafluoroethane (R134a) Pentafluoroethane (R125) Difluoromethane (R32)
Hazard statement(s)	H280: Contains gas under pressure; may explode if heated
Signal word(s)	Warning
Hazard pictogram(s)	
Precautionary statement(s)	
Storage	P410 + P403: Protect from sunlight. Store in a well-ventilated place.

3. Composition / information on ingredients

Concentration			
Substance name	**CAS No.**	**EC No.**	**Concentration**
1,1,1,2-Tetrafluoroethane (R134a)	811-97-2	212-377-0	ca. 52%
Pentafluoroethane (R125)	354-33-6	206-557-8	ca. 25%
Difluoromethane (R32)	75-10-5	200-839-4	ca. 23%
Hazardous components according to Regulation (EC) 1272/2008 as amended			
Substance name	**Hazard class**	**Hazard category**	**H Phrases**
1,1,1,2-Tetrafluoroethane (R134a)	Gases under pressure	Liquefied gas	H280
Pentafluoroethane (R125)	Gases under pressure	Liquefied gas	H280
Difluoromethane (R32)	Flammable gases	Category 1	H220
	Gases under pressure	Liquefied gas	H280
Hazardous components according to European Directive 67/548/EEC or 1999/45/EC as amended			
Substance name	**Classification**	**Hazard category**	**R-phrase(s)**
Difluoromethane (R32)	F+	Extremely flammable	R12

4. First aid measures

Inhalation	Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call a physician.
Skin contact	Allow to evaporate. Wash off with warm water. If symptoms persist, call a physician.
Eye contact	Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.
Ingestion	Unlikely route of exposure.

4. First aid measures continued.

Most important symptoms/effects, acute and delayed	
Inhalation	In case of higher concentrations: narcosis, asphyxia, may cause cardiac arrhythmia.
Skin contact	Contact with liquid or refrigerated gas can cause cold burns and frostbite. Prolonged skin contact may defat the skin and produce dermatitis.
Eye contact	Causes frostbite burns to eyes. Symptoms: Lachrymation, redness, swelling of tissue, frostbite, burn.
Ingestion	Gas. Not applicable.

5. Fire-fighting measures

Extinguishing media	
Suitable extinguishing media	As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.
Unsuitable extinguishing media	None.
Specific hazards arising from the chemical	The product is not flammable. Hazardous decomposition products formed under fire conditions.
Special protective actions for Fire-Fighters	Wear self-contained breathing apparatus and protective suit Wear chemical resistant over-suit Special protective actions for fire-fighters In case of fire, use water spray Keep product and empty container away from heat and sources of ignition

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	
Advice for non-emergency personnel	Prevent further leakage or spillage if safe to do so Keep away from incompatible products

6. Accidental release measures continued.

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

7. Handling and storage

Precautions for safe handling	Use only in well-ventilated areas Use only clean and dry utensils Keep away from water Preferably transfer by pump or gravity Keep away from incompatible products
Conditions for storage, including incompatibilities	
Storage	Keep only in the original container Store in a receptacle equipped with a vent Keep containers tightly closed in a cool, well-ventilated place Keep in properly labelled containers Keep in a bunded area Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep away from incompatible products

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7. Handling and storage continued.

Packing material	Suitable material – steel cylinder
Specific use(s)	For further information, please contact supplier.

8. Exposure controls / personal protection

Control parameters - Exposure limit values		
Storage	**Harp acceptable exposure limit**	**EH40 workplace exposure limits**
1,1,1,2-Tetrafluoroethane	TWA = 1000 ppm	TWA = 1000 ppm / 4240 mg/m3
Pentafluoroethane	TWA = 1000 ppm	Not listed
Difluoromethane	TWA = 1000 ppm	Not listed
Exposure controls		
Appropriate engineering controls	Ensure adequate ventilation Apply technical measures to comply with the occupational exposure limits	
Respiratory protection	Self-contained breathing apparatus (EN 133) Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions Use only respiratory protection that conforms to international / national standards	
Hand protection	Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact). Protective gloves Suitable material: Fluoroelastomer	
Eye protection	Tightly fitted safety goggles	
Skin and body protection	Wear suitable protective clothing If splashes are likely to occur, wear: apron, boots, Neoprene	

8. Exposure controls / personal protection

Exposure controls	
Hygiene measures	Eye wash bottles or eye wash stations in compliance with applicable standards When using do not eat, drink or smoke Gloves, overalls and boots have to be double layered (protection against cold temperature). Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Dispose of rinse water in accordance with local and national regulations.

9. Physical and chemical properties

Form	Compressed liquefied gas
Colour	Colourless
Odour	Ether-like
pH	Neutral
pKa	Not applicable
Melting point/freezing point	-103°C (Pentafluoroethane)
Boiling point/boiling range	-44 to -37°C
Flash point	Not applicable
Evaporation rate	No data
Flammability (solid, gas)	The product is not flammable
Flammability	Not applicable
Explosive properties	Not explosive
Vapour pressure	10.35 bar at 20°C 21.94 bar at 50°C (Pentafluoroethane)
Vapour density	3.45
Density	Not applicable
Relative density	1.17 at 20°C

9. Physical and chemical properties continued.

Bulk density	Not applicable
Solubility	430 mg/l at 25°C, water (Pentafluoroethane)
Solubility/qualitative	No data available
Partition coefficient: n-octanol/water	log Pow: 1.48, 20°C (pentafluoroethane)
Auto-ignition temperature	No data available
Decomposition temperature	No data
Viscosity	Not applicable
Oxidizing properties	Non oxidizer

10. Stability and reactivity

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

11. Toxicological information

Acute toxicity	
Acute oral toxicity	Not applicable
Acute inhalation toxicity	LC50, 4 h, >2,080,000 mg/m3 (1,1,1,2-Tetrafluoroethane)
Acute dermal toxicity	Not applicable

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11. Toxicological information continued.

Skin corrosion/irritation	Not applicable
Solubility	Not applicable
Serious eye damage/eye irritation	No data available
Respiratory or skin sensitization	Guinea pig, did not cause sensitization on laboratory animals
Mutagenicity	In vitro tests did not show mutagenic effects (Pentafluoroethane) In vivo tests did not show mutagenic effects (Pentafluoroethane)
Carcinogenicity	Negative (1,1,1,2-Tetrafluoroethane)
Toxicity for reproduction	Developmental toxicity, rat, no observed effect (1,1,1,2-Tetrafluoroethane)
Repeated dose toxicity	Inhalation, after a single exposure, dog, cardiac sensitization following adrenergic stimulation Inhalation, rat, >=50000ppm, NOAEL (1,1,1,2-Tetrafluoroethane) Inhalation, repeated exposure, rat, >=50000ppm, NOAEL (Pentafluoroethane) Inhalation, 90-day, rat, 108 mg/m3, NOAEL (Difluoromethane)
Other information	No data available

12. Ecological information

Toxicity					
Fishes	Brachydanio rerio	LC50	96 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Fishes	Brachydanio rerio	LC50	96 h	Ca. 200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	EC50	48 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	NOEC	48 h	200 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Selenastrum capricornutum	NOEC	72 h	13.2 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Selenastrum capricornutum	EC50	72 h	>114 mg/l	1,1,1,3,3-pentafluorobutane
Terrestrial plants		NOEC	growth	>=6 g/m3	

12. Ecological information continued.

Persistence and degradability	
Abiotic degradation	Air, indirect photo-oxidation. T ½ from 4.16 – 28.2 y Conditions: sensitizer: OH radicals. Degradation products: carbon dioxide (CO2) / hydrofluoric acid / TFA
Biodegradation	Aerobic, tested according to closed bottle test, chemical degradation, 2-5% after 28 d. Result: not readily biodegradable Aerobic, tested according to biodegradation by methane oxidation. Result: not readily biodegradable (1,1,1,2-Tetrafluoroethane)
Bioaccumulative potential	Bioaccumulative potential: log Pow 0.21-1.48. Result: does not bioaccumulate
Mobility	Soil/sediments, adsorption, log KOC: from 1.05 – 1.7. Conditions: calculated value Air, Henry's law constant (H), from 19.7 – 150 hPa.m3/mol, 20°C. Conditions: calculated value, considerable volatility
Other adverse effects	Ozone depletion potential = 0 Result = no effect on stratospheric ozone Ozone depletion potential; ODP; (R11 = 1) Global Warming Potential = 0.25 Halocarbon global warming potential; HGWP; (R11 = 1) (1,1,1,2-Tetrafluoroethane)

13. Disposal considerations

Waste disposal methods	In accordance with local and national regulations Refer to manufacturer/supplier for information on recovery/recycling
Contaminated packaging	To avoid treatments, as far as possible, use dedicated containers Where possible recycling is preferred to disposal or incineration

14. Transport information

International transport regulations

IATA-DGR	
UN number	UN 3340
Class	2.2
ICAO-Labels	2.2 - Non-flammable, non-toxic gas
Proper shipping name	REFRIGERANT GAS R407C

IMDG	
UN number	UN 3340
Class	2.2
IMDG-Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	3340
EmS	F-C, S-V
Proper shipping name	REFRIGERANT GAS R407C

ADR	
UN number	UN 3340
Class	2
ADR/RID Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	20 / 3340
Proper shipping name	REFRIGERANT GAS R407C

14. Transport information

International transport regulations

RID	
UN number	UN 3340
Class	2
ADR/RID Labels	2.2 - Non-flammable, non-toxic gas
HI/UN No.	20 / 3340
Proper shipping name	REFRIGERANT GAS R407C

ADN	
UN number	UN 3340
Class	2
ADR/RID Labels	2.2 - Non-flammable, non-toxic gas
Proper shipping name	REFRIGERANT GAS R407C

15. Regulatory information

Applicable Laws or Regulations:

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

15. Regulatory information continued.

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

16. Other information

Full text of H-Statements referred to under section 3

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

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

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID

ANNEX R-3

Date	Jan 2023	Author(s)	ATC	Page	1/9	Version	6.4

Conforming to Directive 1907/2006/EC

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

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

SECTION 2: HAZARDS IDENTIFICATION

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

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.
Food Grade	

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HEXID A4 HEAT TRANSFER FLUID

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SECTION 4: FIRST AID MEASURES

General Advice	No special precautions required. Treat symptomatically.
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.
Skin Contact	Wash off immediately with plenty of water. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If symptoms persist, call a physician.
Ingestion	Rinse mouth with water. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: FIREFIGHTING MEASURES

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

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HEXID A4 HEAT TRANSFER FLUID

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SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions	Use personal protective equipment. Avoid contact with skin and eyes. Keep unnecessary and unprotected personnel from entering the area.
Precaution to protect the environment	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
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

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

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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

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HEXID A4 HEAT TRANSFER FLUID

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SECTION 8 CONTINUED: EXPOSURE CONTROLS/PERSONAL PROTECTION

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.

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID

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Conforming to Directive 1907/2006/EC

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C	Fluorescent green clear liquid
Odour	Almost odourless
Flash Point	Boils without flashing
Ignition Temperature	Not Available
Flammability Limit	Not Available
Oxidising Properties	Not Available
Auto flammability	450°C
Density at 25°C	~1.036 g/cm3
pH (as is)	7
Boiling Point	102°C
Auto flammability	450°C
Solubility in Water	Miscible
Freezing Point	-21°C
Specific Heat Capacity	3.78kJ/kg °K
Viscosity, Kinetic, at 25°C	3.51mPa.s

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Stable under recommended storage conditions. No dangerous reaction known under conditions of normal use.
Chemical Stability	No decomposition if stored and applied as directed. Stable under recommended storage conditions. Hygroscopic.
Hazardous Reactions	Hazardous polymerisation does not occur.
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.

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID

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Conforming to Directive 1907/2006/EC

SECTION 10 CONTINUED: STABILITY AND REACTIVITY

Materials to Avoid	Strong acids, Strong bases, Strong oxidizing agents.
Hazardous Decomposition Products	Aldehydes, Alcohols, Ether, Organic acids.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicity Oral	LD50 : > 20000 mg/kg (rat) This product can present a small hazard if large quantities are swallowed.
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.
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.
Eyes	Slight irritation is possible. Direct contact with eyes may cause temporary irritation. Corneal injury is unlikely.
Sensitisation	Patch test on human volunteers did not demonstrate sensitisation properties.
CMR Carcinogenicity	Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.
Mutagenicity	No data available.
Reproductive Toxicity	No data available.
Specific Target Organ Toxicity	Single exposure no data available. Repeated exposure no data available.
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.

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SECTION 11 CONTINUED: TOXICOLOGICAL INFORMATION

Other relevant toxicity information	Handle in accordance with good industrial hygiene and safety practice.
Experience with human exposure	Health injuries are not known or expected under normal use.

SECTION 12: ECOLOGICAL INFORMATION

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)
Persistence and degradability	Biodegradability 81 % (anaerobic; Exposure Time: 28 d)(OECD 301 F) Readily biodegradable 96 % (anaerobic; Exposure Time: 64 d)(OECD 306.)
Bioaccumulative potential	BCF - 0.09 estimated Low bioaccumulative potential
Mobility	Estimated Koc < 1, indicating very high soil mobility.
PBT and vPvB assessment	Not a PBT or vPvB substance or mixture
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.

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HEXID A4 HEAT TRANSFER FLUID

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SECTION 13: DISPOSAL CONSIDERATION

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.
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.
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.	
EEC Regulations	UNNO - None Class - None Packing Group - None Road & Rail Transport (ADR & RID) - None IMDG - Not Applicable ICOA - None
Export commodity code	39074000
Classification	Polycarbonates
Weight and dimensions	5Kg per 5 litre container. 19 x 14 x 29c,
Manufactured in the United Kingdom	

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HEXID A4 HEAT TRANSFER FLUID

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SECTION 15: REGULATORY INFORMATION

Classification	Not classified as hazardous to users
CAS No.	57556
Risk or Safety phrases	None
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
HEXID A6 HEAT TRANSFER FLUID

ANNEX R-4

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Conforming to Directive 1907/2006/EC

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

Product Name	Hexid A6
Manufacturer	Applied Thermal Control Limited 39 Hayhill Industrial Estate, Barrow upon Soar, Leicestershire, LE12 8LD. United Kingdom. www.app-therm.com
Telephone Number	+44(0)1530 839998
E-Mail	sales@app-therm.com
Emergency Telephone Number	+44(0)1530 839998
Intended/Recommended Use	Heat Transfer Fluid

SECTION 2: HAZARDS IDENTIFICATION

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

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.
Food Grade	

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HEXID A6 HEAT TRANSFER FLUID

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SECTION 4: FIRST AID MEASURES

General Advice	No special precautions required. Treat symptomatically.
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.
Skin Contact	Wash off immediately with plenty of water. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If symptoms persist, call a physician.
Ingestion	Rinse mouth with water. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: FIREFIGHTING MEASURES

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

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SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions	Use personal protective equipment. Avoid contact with skin and eyes. Keep unnecessary and unprotected personnel from entering the area.
Precaution to protect the environment	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
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

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

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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

SAFETY DATA SHEET
HEXID A6 HEAT TRANSFER FLUID

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Conforming to Directive 1907/2006/EC

SECTION 8 CONTINUED: EXPOSURE CONTROLS/PERSONAL PROTECTION

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.

SAFETY DATA SHEET
HEXID A6 HEAT TRANSFER FLUID

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Conforming to Directive 1907/2006/EC

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C	Fluorescent pink clear liquid
Odour	Almost odourless
Flash Point	Boils without flashing
Ignition Temperature	Not Available
Flammability Limit	Not Available
Oxidising Properties	Not Available
Auto flammability	450°C
Density at 25°C	~1.06 g/cm3
pH (as is)	7
Boiling Point	102°C
Auto flammability	450°C
Solubility in Water	Miscible
Freezing Point	-45°C

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Stable under recommended storage conditions. No dangerous reaction known under conditions of normal use.
Chemical Stability	No decomposition if stored and applied as directed. Stable under recommended storage conditions. Hygroscopic.
Hazardous Reactions	Hazardous polymerisation does not occur.
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.
Materials to Avoid	Strong acids, strong bases, strong oxidising agents.
Hazardous decomposition products	Aldehydes, Alcohols, Ether, Organic acids.

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HEXID A6 HEAT TRANSFER FLUID

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Conforming to Directive 1907/2006/EC

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicity Oral	LD50 : > 20000 mg/kg (rat) This product can present a small hazard if large quantities are swallowed.
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.
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.
Eyes	Slight irritation is possible. Direct contact with eyes may cause temporary irritation. Corneal injury is unlikely.
Sensitisation	Patch test on human volunteers did not demonstrate sensitisation properties.
CMR Carcinogenicity	Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.
Mutagenicity	No data available.
Reproductive Toxicity	No data available.
Specific Target Organ Toxicity	Single exposure no data available. Repeated exposure no data available.
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.
Other relevant toxicity information	Handle in accordance with good industrial hygiene and safety practice.
Experience with human exposure	Health injuries are not known or expected under normal use.

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SECTION 12: ECOLOGICAL INFORMATION

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)
Persistence and degradability	Biodegradability 81 % (anaerobic; Exposure Time: 28 d)(OECD 301 F) Readily biodegradable 96 % (anaerobic; Exposure Time: 64 d)(OECD 306.)
Bioaccumulative potential	BCF - 0.09 estimated Low bioaccumulative potential
Mobility	Estimated Koc < 1, indicating very high soil mobility.
PBT and vPvB assessment	Not a PBT or vPvB substance or mixture
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.

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SECTION 13: DISPOSAL CONSIDERATION

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

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SECTION 15: REGULATORY INFORMATION

Classification	Not classified as hazardous to users
CAS No.	57556
Risk or Safety phrases	None
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.