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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

XF004 / XF008 / XF015

DOCUMENT DETAILS

Date	1/APR/2021	Author(s)	MJH	Page	1 / 32	Revision	1

CHANGE LOG

Date	Revision	Page ref	Change
1/APR/2021	1	ALL	First release

DOCUMENT DETAILS

Date	1/APR/2021	Author(s)	MJH	Page	2 / 32	Revision	1

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Date	1/APR/2021	Author(s)	MJH	Page	3 / 32	Revision	1

PRODUCT SPECIFICATIONS

Attribute	XF0040509	XF0081009	XF0151709
Weight			
Heat transfer fluid volume	2.3L 0.6USGallons	2.3L 0.6USGallons	2.3L 0.6USGallons
Cooling capacity (delivery temperature at 10°K above house water supply at nominal flowrate)	4kW 13,649BTU/h 1.137TR	8kW 27,297BTU/h 2.275TR	15kW 51,182BTU/h 4.265TR
Temperature stability	0.1±°C	0.1±°C	0.1±°C
Temperature resolution	0.1±°C	0.1±°C	0.1±°C
Standard temp. range	+4°C to +55°C	+4°C to +55°C	+4°C to +55°C
Standard max return temp.	+65°C	+65°C	+65°C
Optional temp. range	+90°C	+90°C	+90°C
Control method	House water modulation	House water modulation	House water modulation
Temperature sensor	PT100	PT100	PT100
Stability achieved by	PID controller	PID controller	PID controller
Power supply requirement	208-230Vac 50/60Hz 1~ / 2~ 3A@230Vac	208-230Vac 50/60Hz 1~ / 2~ 3A@230Vac	208-230Vac 50/60Hz 1~ / 2~ 4A@230Vac
Design flowrate	5L/min	10L/min	17L/min
Pressure relief valve	Internal, 1-10bar (20-150psi)		
Fluid fittings	1/2" BSPPF		
Sound pressure level	45dBA@1m		
Tool-less access	No		
Anti-backfill protection	Yes		
Overtemperature protection	Yes		
Out of temperature range	Yes, visual, on controller		
Low fluid level alarm	Yes, visual, lamp		
Run-dry protection	Yes		
Low flow warning	Yes, visual, lamp		
Overcurrent protection	Fused, 2* T6.3A H250V		
Rated duty cycle	Continuous		
Compatible heat transfer fluids	DI water, propylene glycol mixes, Hexid A4 & A6		

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DOCUMENT DETAILS

SAFETY NOTICES

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

	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 8 bar during operation.
	Warning; Water and electricity in close proximity to one another. Always ensure the unit is isolated before service. The product is protected from overcurrent by mains fusing. Never bypass this component.
	Warning; 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.

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DOCUMENT DETAILS

INCLUDED ANNEXES

Specific technical product information is provided in the following series of annexes.

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Annex A-1

CRANE OR FORKLIFT NOT TYPICALLY NECCESARY

This guide applies to products that can conceivably be lifted/positioned by one or more persons without the aid of machinery. Upon reviewing recommendations below, you may opt to use machinery. This is at your discretion. ATC are not responsible for injury or death sustained through improper handling procedures.

UNPACKING

1	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.
2	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.
3	Please retain all packaging in the unlikely event that the chiller needs to be returned to our local representatives.

MANUAL HANDLING RECOMMENDATIONS

4 For UL compliance, ATC must make the statement; “as the unit is >18kg, ATC must recommend that 2 persons are used to lift by hand, or a crane”.

5

Your region’s workplace safety regulations may differ. The below information is provided as a guideline only in the absence of any other regulations. It is based on the United Kingdom’s ‘Manual Handling Operations Regulations (1992)’.
Lifting items of any weight can cause injury if handled incorrectly, depending on what the load is and the physicality of the person handling it. Manual handling guidelines suggest that the maximum safe lifting weight for a woman is 16kg and the maximum safe lifting weight for men is 25kg. These recommendations change depending on the height the object is lifted to and how the object is carried, outlined in the tables below.

Recommendations for Men

Height Object is Lifted	Max Weight Held Close to Body	Max Weight at Arm's Length
Head Height	10kg	5kg
Shoulder Height	20kg	10kg
Elbow Height	25kg	15kg
Knuckle Height	20kg	10kg
Mid-Lower Leg Height	10kg	5kg

Recommendations for Women

Height Object is Lifted	Max Weight Held Close to Body	Max Weight at Arm's Length
Head Height	7kg	3kg
Shoulder Height	13kg	7kg
Elbow Height	16kg	10kg
Knuckle Height	13kg	7kg
Mid-Lower Leg Height	7kg	3kg

When two people are lifting an item, the approximate rule is that you should not exceed 2/3rds of the sum of both individual’s lifting limits. If two men who can carry a maximum of 25kg each are lifting an object together, then the object should not weigh more than around 33kg. If three people are lifting an object, the maximum weight of this object should not exceed half the sum of all individual’s lifting limits.

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Operating Manual; Site & Environmental Requirements

Annex B-4

DOCUMENT DETAILS

Doc. Date	8/SEP/2022	Author(s)	MJH	Page	7 / 32	Revision	1

SITE & ENVIRONMENTAL REQUIREMENTS FOR XF004 XF008 XF015

This guide applies to XF004, XF008 and XF015 water-to-water heat exchangers and describes the requirements for all services and conditions necessary for years of trouble-free running. If you require more detail, please contact ATC for support on sales@app-therm.com or using the phone numbers in the head of this document.

GUIDANCE

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, -20°C to +40°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.** XF004, XF008 and XF015-based products (including non-standard numbers) can accept

	-0spec	**-2spec**	**-3spec**	**-9spec**
Voltage range	230V	220V	400V	208-230Vac
Voltage fluctuations about nominal	±10%	±10%	±5%	±10%
Maximum current draw	4.5A@230Vac	4.7A@230Vac	2.6A@400Vac	4.5A@230Vac
Mode of supply	1P+N+E	1P+N+E or 2P+E	3P+E	1P+N+E or 2P+E
Frequency	50Hz	60Hz	50Hz	50-60Hz
Overload protection	DPST 5A	DPST 5A	GV2 4-6.3A	DPST 5A
Internal fuse for controller	T0.5A H250V	T0.5A H250V	T0.5A H250V	T0.5A H250V
Appliance inlet	IEC C20 16A	IEC C20 16A	Terminal block	IEC C20 16A

Mains supply via an earth leakage detecting residual current device (RCD) is recommended.

7 **Clearance.** Clearance is required as follows;

a) Ensure the on/off switch on the front face is unobstructed to allow access in case of emergency.
b) Fitting of hoses and electrical supply to the rear of the unit to allow recommended bending radii.
c) Maintenance access points require top and side panels to be removed.
d) It is possible to site multiple machines of the same type side-by-side.

The exact amount of clearance can be determined by the OEM or end user as process is not affected as it would be in an air-cooled product. Access for maintenance is the primary consideration.

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 flowrate of the fitted pump at a system pressure ≥6bar.

9 **Indoor use only.** Altitude up to 2000m above sea level. Ensure the unit has adequate ventilation.

10 **Installation category.** Transient overvoltage category II; Pollution degree 2. Temporary overvoltages occurring on mains supply are acceptable within limits defined in the aforementioned categories.


Caution; Always use ATC recommended fluids in your chiller – 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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Annex C-2

INSTALLATION FOR WATER-COOLED UNITS WITH 1/2" BSPPF FITTINGS

This guide applies to the following product groups;

- K-Series, R-Series and G-Series refrigerated units, where heatload is carried away by water supply.
- XR- and XF-Series water-to-water heat exchangers, where heatload is carried away by water supply.

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.

CONNECTING ADPATERS 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, for both application/process and house/primary water supply. 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 outlets mean fluid leaves the product and must be connected to the process inlet or house water return line.
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.

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Annex C-2

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.

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FILLING A SYSTEM

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) Turn your attention to the main power switch.
- i) Immediately after toggling this switch assuming that the power cord is connected and turned on at the wall the product will begin to pump water.
- ii) Leave the product to run until it cuts out on the level switch interlock.
- iii) Turn the unit off at the mains switch.
- iv) Fill the tank again to lift the level switches.
- v) Start the product again until the unit cuts out again.

Caution; Do not run the pump dry. Do not deadhead the pump.

d) Repeat steps at c) until the chiller tank water level (if visible) doesn't drop, and the chiller doesn't cut-out on its level switches.

e) With the unit now 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.

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

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Annex E-5

BASIC PROGRAMMING GUIDE KR3 (ALL MODELS)

This guide may apply to your product if you require general navigation advice and help accessing settings. If you are planning to change the settings in any way, you may need a copy of the existing settings which are model dependent, signified by a letter on the end of Annex E-5, i.e. Annex E-5A.

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.

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Annex E-5D

DOCUMENT DETAILS

Date	23/NOV/2021	Author(s)	MJH	Page	12 / 32	Revision	2

PROGRAM PURPOSE

Internal part number	EA798 (mains) or 61-591 (24Vdc)
Manufacturer part number	KR3
Program purpose	1) Provide a relative band alarm to control lamp on front panel (and if fitted, the VFC for temperature range). 2) Provide a PID-controlled analogue output to maintain setpoint. 3) Set all other values to safe limits.

XF004, XF008, XF015 STANDARD PROGRAM FOR KR3

Group inP		Group 'out'		Group 'AL1'		Group 'AL2'	
Setting	**Value**	**Setting**	**Value**	**Setting**	**Value**	**Setting**	**Value**
SEnS	PT1	o1.t	2.10	AL1t	LHdo	AL2t	nonE
dP	1	o1.F	CrEG	Ab1	*n/a*	Ab2	*n/a*
SSc	*n/a*	A.o1L	*n/a*	AL1L	-10.0	AL2L	*n/a*
FSc	*n/a*	A.o1H	*n/a*	AL1H	10.0	AL2H	*n/a*
Unit	°C	o1.AL	*n/a*	AL1	*n/a*	AL2	*n/a*
FiL	oFF	o1.Ac	dir	HAL1	0.5	HAL2	*n/a*
inE	our	o2F	AL	AL1d	oFF	AL2d	*n/a*
oPE	100	o2.AL	1	AL1o	*n/a*	AL2o	*n/a*
io4.F		o2Ac	rEU				
diF1		o3F	nonE				
diF2		o3.AL	*n/a*				
di.A		o3Ac	*n/a*				
		o4F	nonE				
		o4.AL	*n/a*				
		o4Ac	*n/a*				

Group 'AL3'		Group 'LbA'		Group 'rEG'		Group 'SP'	
Setting	**Value**	**Setting**	**Value**	**Setting**	**Value**	**Setting**	**Value**
AL3t	nonE	LbAt	oFF	cont	PID	nSP	1
Ab3	*n/a*	LbSt	*n/a*	Auto	0	SPLL	10
AL3L	*n/a*	LbAS	*n/a*	Aut.r	*n/a*	SPHL	40
AL3H	*n/a*	LbcA	*n/a*	SELF	no	SP	20
AL3	*n/a*			HSEt	1	SP2	*n/a*
HAL3	*n/a*			cPdt	*n/a*	SP3	*n/a*
AL3d	*n/a*			Pb	19.5	SP4	*n/a*
AL3o	*n/a*			ti	54	A.SP	*n/a*
				td	1	SP.rt	trin
				Fuoc	0.5	SPLr	loc
				tcH	*n/a*	SP.u	inF
				rcG	*n/a*	SP.d	inF
				tcc	1		
				rS	*n/a*		
				Str.t	*KM3 only*		
				db.S	*KM3 only*		
				od	oFF		
				St.P	0		
				SSt	oFF		
				SS.tH	999.9		

Group 'tin'		Group 'PrG'		Group 'PAn'		Group 'Ser'	
Setting	**Value**	**Setting**	**Value**	**Setting**	**Value**	**Setting**	**Value**
tr.F	nonE	Pr.F	nonE	PAS2	20	Add	1
tr.u	*n/a*	Pr.u	*n/a*	PAS3	40	bAud	9600
tr.t1	*n/a*	Pr.E	*n/a*	PAS4	300	trSP	nonE
tr.t2	*n/a*	Pr.Et	*n/a*	uSrb	nonE		
tr.St	*n/a*	Pr.S1	*n/a*	diSP	SPo		
		Pr.G1	*n/a*	di.CL	0		
		Pr.t1	*n/a*	AdE	2.0		
		Pr.b1	*n/a*	diS.t	oFF		
		Pr.E1	*n/a*	FiLd	oFF		
		Pr.S2	*n/a*	dSPu	AS.Pr		
		Pr.G2	*n/a*	oPr.E	ALL		
		Pr.t2	*n/a*	oPEr	Auto		
		Pr.b2	*n/a*				
		Pr.E2	*n/a*				
		Pr.S3	*n/a*				
		Pr.G3	*n/a*				
		Pr.t3	*n/a*				
		Pr.b3	*n/a*				
		Pr.E3	*n/a*				
		Pr.S4	*n/a*				
		Pr.G4	*n/a*				
		Pr.t4	*n/a*				
		Pr.b4	*n/a*				
		Pr.E4	*n/a*				
		Pr.St	*n/a*				

Group 'COn'		Group 'CAL'	
Setting	**Value**	**Setting**	**Value**
Co.tY	oFF	AL.P	0
UoLt	*n/a*	AL.o	*!TEST RIG!*
cur	*n/a*	AH.P	999.9
h.Job	*n/a*	AH.o	*!TEST RIG!*
t.Job	0		

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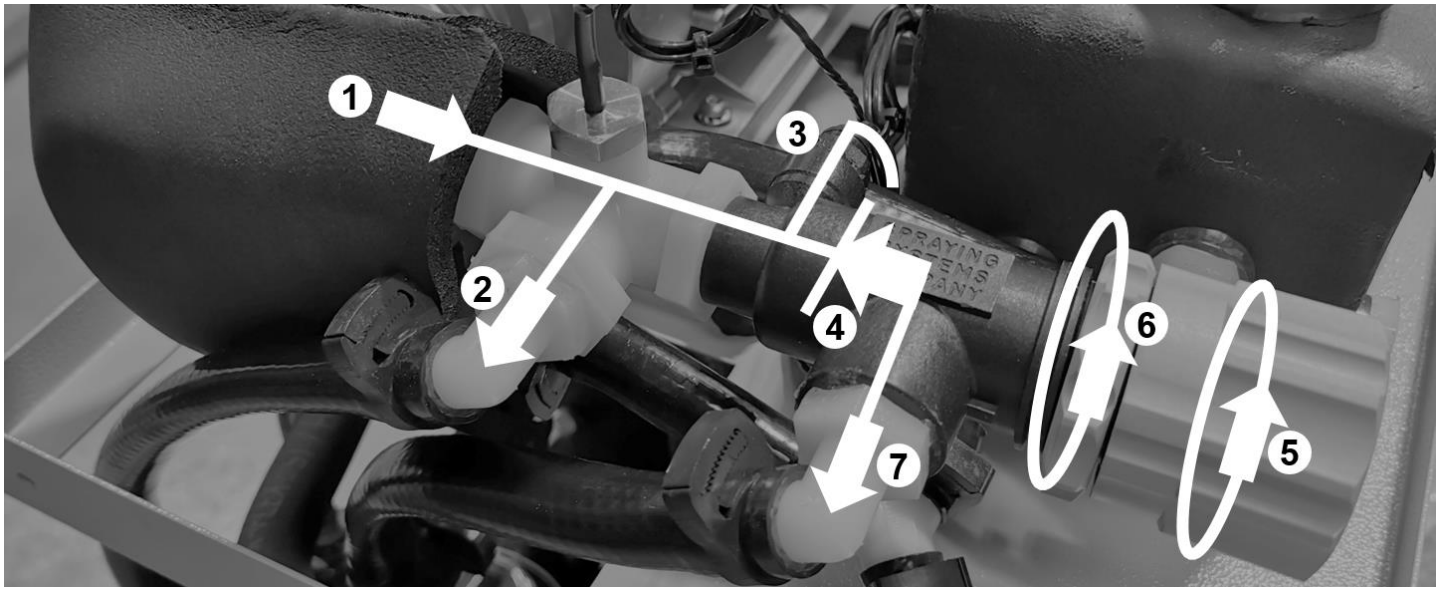
Annex F-3

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;

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.

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Annex F-3

SETTING THE 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). In the absence of external calibrated pressure gauges, it's possible to use the chiller itself to set this value;

8) **Isolate the chiller** – always isolate before performing work.

9) **Disconnect from the application if already connected** – review the draining procedure in Annex D.

10) **Connect the chiller's process inlet to process outlet** – a short run of hose around 1-2m (3-6ft) will be adequate.

11) **Start the chiller and follow the fill process from Annex D** – fluid will now be running through a short loop with very low pressure required to overcome the restriction.

12) **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.

13) **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.

14) **Refer to points 5) and 6) above to adjust if required** – contact ATC if you're unsure over whether your desired setting is reasonable for the product you have.

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DOCUMENT DETAILS

XF- & XR004, XF- & XR008, XF- & XR015 GENERIC INITIAL TROUBLSHOOTING

SYMPTOM	POSSIBLE CAUSE
Unit not running	Check the tank is filled past the level switch to ensure it can run.
	Check temperature of fluid and pump motor. In the case of these reaching temperatures that could cause damage the unit will switch off.
	Check MCB state (XF-Series), mains inlet fuses (XR-Series) any internal fuses (both XF- & XR-Series) to ensure excessive current in-rush has not blown a fuse in the unit.
Noisy operation	Air in the system the has not purged. Bearing failure in rotating machinery causes noise. Pay attention to specific components to identify the source of noise.
Fluid lines becoming fouled / containing biological matter	Not using opaque tubing can lead to UV light passing through the tubing, prompting growth of organisms.
	Not following maintenance schedule for cleaning/flushing.
Fluid seen leaking from system	Fluid may be incompatible with the materials used in chiller construction. Contact ATC to ensure the fluid is compatible.
	Rapid changes in system temperature can cause some materials to change shape at a faster rate than others and open leak paths. Contact ATC to discuss alternative materials and parts in water circuit construction if your temperature range goes beyond the standard for this product range.
Poor cooling capacity (undercooling)	Excess application thermal heat load. See Annex G-2 for a description on how to calculate this.
	House/primary water temperature has increased from nominal requirement, or flow has reduced.
	Water regulating valve is not opening correctly or blocked by debris restricting water flow.
Excess cooling capacity (overcooling)	A reduction in flow of application water can lead to overcooling. Check for constrictions in the application lines. Review pressure gauge position for values typically seen in normal satisfactory operation.
	Check value that controller presents for outlet liquid temperature. A value reported that is higher than actual will force the controller to cool without need.
	Water regulating valve could be stuck open, allowing excess heat to be removed from the process water circuit.

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Annex H-2

DOCUMENT DETAILS

Date	26/MAR/2021	Author(s)	MJH	Page	17 / 32	Revision	3

PERIODIC MAINTANENCE FOR WATER-COOLED PRODUCTS

This guide may apply to your unit if you have a water-condensed refrigerated unit, or a water-cooled water-to-water heat exchanger. These units do not rely on large/multiple cooling fans to reject heat to air, but instead reject heat into a house/primary/building/city water supply.

SCHEDULE & RECOMMENDED ACTIONS

	Caution: Failure to carry out service at the specified intervals may permanently damage your equipment.
	Caution: If the mains wiring becomes damaged, contact ATC or a qualified electrician who will be able to supply a replacement of the correct specification.
	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.
	Print this sheet out and display close to the product to maximize the visibility of maintenance requirements.

Weekly

Check fluid level – top up as required.

1		2		3		4		5		6		7	
8		9		10		11		12		13		14	
15		16		17		18		19		20		21	
22		23		24		25		26		27		28	
29		30		31		32		33		34		35	
36		37		38		39		40		41		42	
43		44		45		46		47		48		49	
50		51		52									

Annually

Drain process fluid and replace with fresh fluid.	
Check for fluid leaks throughout product and application.	
Check filters for accumlation of particulate matter.	
Clear any dust and debris from inside the product.	
Vacuum out electrical box	

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Annex I-5

DOCUMENT DETAILS

MAINTENANCE FOR TECHNICIANS; GENERIC NON-REFRIGERATED UNITS

This guide may apply to your product if you have an X-Series (X, XF, XR) or A-Series product. The guidance below is designed to be non-specific and to raise awareness of potential dangers for a trained engineer carrying out service work.

GUIDANCE

	Warning; during operation component temperatures can exceed +70°C, take care when opening unit.
	Warning; After switching off, the cooling fan blades continue to rotate (A-Series only). Do not attempt servicing whilst the blades are rotating.
	Warning; All products contain water and electricity in close proximity. Ensure the unit is isolated before service. Never bypass overcurrent protection on the mains supply. Never bypass fuses or circuit breakers.

1	Following service or repair by a trained technician, ensure any electrical connections that may have been disturbed are given the ‘tug-test’.
2	Ensure earth bonding conductors are re-attached.
3	Ensure the correct fuses are in place.
4	Ensure the mains cord being used is to specification and is free from damage.
5	Subject the unit to a PAT test to ensure the unit is safe before running.
6	Ensure there are no leaks inside or outside the unit.
7	Using the wiring schematic for guidance, simulate faults to check each interlock’s function.

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Annex J-3

DOCUMENT DETAILS							
Date	6/APR/2022	Author(s)	MJH	Page	19 / 32	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;	X-Series
Function;	Water Heat Exchanger
Model;	All with ‘X’, ‘XR’ and ‘XF’ 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, 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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Annex J-5

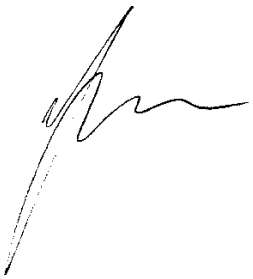
CONFLICT MINERALS COMPLIANCE STATEMENT

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.



Mitchell Howard, Technical Manager
Signed in Coalville, UK, date 6/JUL/2020

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DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	21 / 32	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.

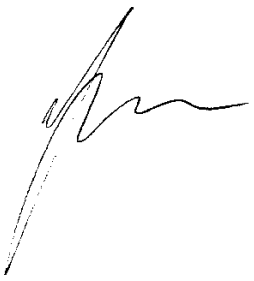
Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

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



Mitchell Howard, Technical Manager
Signed in Barrow-upon-Soar, UK, date 15/JUL/2020

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Annex J-8

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.

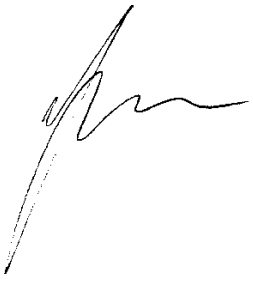
POPs LISTED UNDER AMENDMENT 2020/784

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



Mitchell Howard, Technical Manager
Signed in Barrow-upon-Soar, UK, date 27/AUG/2020

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Annex J-8

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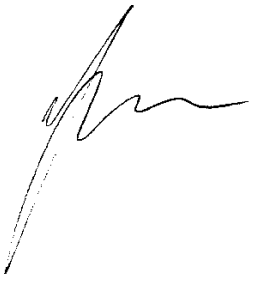

Mitchell Howard, Technical Manager
Signed in Barrow-upon-Soar, UK, date 27/AUG/2020

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Annex K-1

WARRANTY TERMS

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 warrantied?**
ATC provides a comprehensive return to base 2-year parts, 1-year labor 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 for shipping to ATC are for the customer's account. Freight costs for shipping from ATC are for ATC's account.
During the **second year** of the warranty, freight costs to and from ATC are for the customer's account.

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. The contact details in the header of this document are an ideal place to start. 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.

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Annex M-8

DOCUMENT DETAILS

Date	7/OCT/2022	Author(s)	WSE	Page	25 / 32	Revision	2

RECOMMENDED SPARES FOR XF004 XF008 XF015 & NON-STANDARDS

Recommended spares include all rotating machinery (i.e. motors, fans), all sacrificial elements (i.e. fuses) and parts that users interact with (dials, fittings). Pricing is available from sales@app-therm.com.

XF008 XF008 XF015 STANDARD MODELS

PN	Description	QTY
EA435	Flow Switch	1
EA507	Fuse; T5A H250V UL-OK	1
EA517	Motor; Pump; 0.37kW	1
EA781	Switch-Level 1/2" BSPTM	1
EA793	PSU; 100-240Vac input	1
EA794	Rotary Actuator; 2 Nm	1
EA798	Controller - KR3 100-230V	1
EA818	Circuit Breaker; 5A	1
WA038	Pressure Relief Valve;1/2"	1
WA308	Pressure gauge w/ clamp - 63mm oil-filled 0-11bar	1
WA318	Pump; S/S - 17 LPM	1
WA729	Belimo Control Valve - 1.6kvs; 17L/min 0.5bar	1
63-202	PUMP P25	1
72-1024	Valve; gate; SS 316 - 3/4" BSP	1
EA358	Circuit Breaker; 5A	1
EA496	Relay; DCPO; 30A 230V	1
EA806	Switch-Flow 7.5-10L/min - 3/4" BSPPF Paddle type	1

X004N403

PN	Description	QTY
EA513	FUSE - T0.5A L250V UL-OK	1
EA818	Circuit Breaker, 5A	1
EA358	Circuit Breaker - 5A	1
EA517	MOTOR – Pump motor 370W	1
EA781	SWITCH – level switch threaded	2
EA425	RELAY – 230Vac coil, DPCO 8A contacts	1
61-348	SWITCH-flow, SS	1
EA798	CONTROLLER – Ascon Tecnologic KR3	1
EA586	SENSOR – PT100	1
EA794	ACTUATOR – Valve driver for flow control	1
WA679	COUPLING – bronze double flat male-to-male pump-to-motor	1
EA517	Pump Motor 50/60HZ	1
RA016	Heat Exchanger	1

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.	**Supplier**	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

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID

Conforming to Directive 1907/2006/EC

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

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

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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	

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.

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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.

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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) None **IMDG** Not Applicable **ICOA** None

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.