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Installation, Operation & Service Manual

EcoMini (EMxxn)

DOCUMENT DETAILS

Date	28/AUG/2020	Author(s)	MJH	Page	1 / 5	Revision	1

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CHANGE LOG

Date	Revision	Page ref	Change
28/AUG/2020	1	All	Pre-manufacture release.

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PRODUCT SPECIFICATIONS

Attribute	Unit	Value
Dimensions (W*D*H)	mm	180*435*380
	inch	7.1*17.1*15
Weight	kg	20
	lbs.	44.1
Heat transfer fluid volume	mL	650
	USGal	0.172
Cooling capacity ($T_{ambient}$ +20°C / +68°F) ($T_{setpoint}$ +20°C / +68°F)	W	500
	BTU/h	1706
	RT	0.142
Standard temp. range	°C	+4 to +35
Optional temp. range	°C	-10 to +65
Power supply requirement	VAC	100-240
	Hz	50/60
	A	1@240VAC 2@115VAC
Sound pressure level	dB	64
Auto-diagnostic functions	Undertemperature cutout Overcurrent cutout Refrigeration overpressure cutout	
Display	Process temperature Compressor active/inactive	
Fluid fittings (standard)	Pushfit 12mm	
Fluid fittings (option)	Valved QR	
Tool-less access	No	
Undertemperature protection	Via display setup	
Overtemperature protection	Hardware limited	
Compressor overload protection	Via PCB function	
Overcurrent protection	Fused, 2* T6.3A H250V	
Rated duty cycle	Continuous	
1st party approvals	CE	
3rd party approvals	UL61010-1 CAN/CSA-C22.2 FCC CFR47 Part 15 Subpart B IEC61000-6-4:2007 +A1:2011 IEC61000-6-2:2005 IEC61000-3-2:2014 IEC61000-3-3:2013	
Compatible heat transfer fluids	DI water Propylene glycol Hexid A4, A6	

Pending data collection
Power consumption curves
Cooling capacity curves
Pump performance curves

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SAFETY NOTICES

For your safety, we draw your attention to the following warning and caution marks throughout the manual; the safe operation of an ATC chiller 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; The high integrity refrigeration system 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 refrigeration system automatically invalidates warranty.
	Warning; Very cold surfaces and gases, lower than -20°C (-40°F). Severe frostbite hazard.
	Warning; Opening the refrigeration system may expose the operator to toxic and corrosive compounds (HFCs). Take protective measures including suitable eye protection.
	Warning; Gases may exceed 15 barg (220psig) during operation.
	Warning; Refrigerant is class A1. It does not support combustion but is oxygen depleting. Review equipment rating label for specific refrigerants and CO_2e.
	Warning; Water and electricity are in close proximity. Always ensure the unit is isolated before service. The R-series is protected from overcurrent by mains fusing. Never bypass these components.
	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.
	Warning; After switching off, the fan blades slow to a stop. Do not open until the fan has stopped rotating.
	Affixed to the chiller’s fan, this symbol printed on yellow background advises of the possible damage to fingers or other extremities from rotating fan blades. Allow blades to stop before service begins.

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INCLUDED ANNEXES

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

Annex A-1 191122 Unpacking - Weighing over 18kg
Annex B-1 191122 Mini site and environmental requirements
Annex C-1 200901 Installation - Mini & EcoMini
Annex D-2 200828 EcoMini fill procedure
Annex E-6 200826 Z31GS Controller & Variable Resistor
Annex F-1 191129 Pres & flow in Mini with centrif pump
Annex G-6 200828 EcoMini, generic initial troubleshooting
Annex H-1 191121 Generic periodic maintenance for end users
Annex I-1 191129 Generic maintenance for technicians
Annex J-1 200901 EcoMini & Mini series EU DoC
Annex J-5 200706 Conflict Minerals compliance statement
Annex J-7 200715 REACH compliance statement
Annex J-8 200827 POPs compliance statement
Annex K-1 200623 Standard warranty terms of ATC
Annex M-1 200828 Recommended spares, Mini & EcoMini
Annex R-1 170621 SDS for refrigerant HFC-R134a
Annex R-3 200203 SDS Hexid A4 v6.3

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Annex A-1

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UNPACKING

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 is >18kg, ATC must recommend that 2 persons are used to lift by hand, or a crane. 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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Operating Manual; Site & Environmental Requirements

Annex B-1

DOCUMENT DETAILS

Date	November 2019	Compiled by	MJH	Revision	1

SITE & ENVIRONMENTAL REQUIREMENTS

a) **Hard, level surface** – Feet on the Mini provide a degree of friction on most work surfaces to prevent sliding. A level surface is important for ensuring proper filling and allowing air to escape.

b) **Clean, dust-free environment** – air-cooled chillers move large volumes of air, and large amounts of air-borne contamination will result in fouling of the condenser, reducing the capacity of the unit and in extreme cases causing a system shut-down.

c) **Non-condensing ambient** – +5°C to +40°C (+39°F to +104°F). Capacity is lost above +30°C (+86°F).

d) **Humidity** - 80% for ambient temperatures up to +31°C (+88°F), decreasing linearly to 50% relative humidity at +40°C (+104°F) ambient temperature.

e) **Electrical supply** – the Mini comes with a Switch Mode Power Supply capable of accepting;
   a. Voltage fluctuations of ±10% of the nominal voltage.
   b. Frequency of 47Hz to 63Hz inclusive.
   c. Maximum current draw of 5.8A@100VAC; mains fusing is rated 6.3A, accessible from rear.
      i. See product rating label for fuse specification.
      ii. Two modes of supply are acceptable; **L1 / N / E** or **L1 / L2 / E**
      iii. The inlet module itself is rated 10A 250V.
      iv. Protective earth must be provided by user at IEC type C14 appliance inlet.

f) **Clearance** – left and right of the unit require clearance of ≥300mm (≥11.8”). Care must be taken to prevent the recirculation of rejected hot air, back into the condenser. This will result in damage if repeated. Ensure there is sufficient room at the rear of the product to remove the power cable without obstruction.

g) **Plumbing** – tubing, piping or hose must be clean and compatible with the fluid to be used. The chiller is compatible with deionized water and water-glycol mixtures such as Hexid fluid.

h) **Indoor use only** – altitude up to 2000m.

i) **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 other anti-freeze mixtures have the potential to corrode your application and to damage seals in the chiller.

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Annex C-1

DOCUMENT DETAILS

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INSTALLATION

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;

a) **Short in length** – this reduces friction-based pressure drop and addition ambient heat load

b) **Large diameter bore** – at least 8mm (5/16”).

c) **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 can also reduce electrical energy consumption.

d) **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 a human.

e) **Opaque, ideally black** – to inhibit light passing through the tube and algae building up. Alternatively, solid ABS or copper pipe can be used.

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

The Mini and EcoMini are supplied with quick release fittings by default either of the CPC or push fit variety. The former of these have built-in valves to prevent loss of fluid when disconnecting but other types may not. The mating halves of these connectors are available in a variety of fitting types, i.e. barb, quick release, compression. Sealing guidelines should be followed for each specific type of fitting.

Ensure that the system is correctly connected, with the chiller outlet connected to the application inlet, and application outlet connected to chiller inlet. Check all joints are tight and leak free.

Where this product is incorporated into other equipment, it is the responsibility of the assembler to ensure safety.

Caution; Do not replace detachable mains cords with inadequately rated cords. Contact ATC for appropriately rated products.

Preventing Backfilling – In situations where the chiller is situated physically lower than the application being cooled it is possible that upon stopping the pump the effect of gravity on the process fluid can cause it to leave the application.
In this scenario, the fluid falls back into the chiller, placing pressure from the water column upon all chiller water circuit faces. The weakest point in terms of sealing is the tank lid, and this is typically where fluid will escape the unit, overflowing into the chiller.
For this reason, it’s always a good idea to situate the chiller higher than the application so that when the pump is turned off, the tank is the highest point in the system and the liquid will flood into the application which should be sealed.
If this is not possible, a non-return solenoid valve kit can be installed as an optional standard assembly. Please raise any questions with the sales team on sales@app-therm.com.

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Date	28/AUG/2020	Author(s)	AMI	Page	1 / 1	Revision	1

ECOMINI FILLING PROCEDURE

The EcoMini chiller has a different fill procedure to ATC's other products. Please read the entire passage before starting and familiarize yourself with the process.

a) Check all application valves are open, including solenoid valves and variable position valves.
- i) The chiller 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 chiller.
- i) Fill the tank to leave 10-20mm (0.4-0.8") of air between water line and where the lid seals.

c) Turn your attention to the power inlet rocker switch on the back of the chiller.
- i) Immediately after toggling this switch assuming that the power cord is connected and turned on at the wall the chiller will begin to pump water.
- ii) Leave the chiller running until the water line drops to just above the lower outlet port, then turn it off, this will only take a couple of seconds is the water is able to flow freely and there is air in the system.

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

d) Repeat steps c) i) and d) until the level no longer drops when the pump is run.

e) Start the chiller by once again toggling the mains inlet rocker switch on the back of the chiller.
- 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.

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.

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Annex E-6

DOCUMENT DETAILS

Date	28/AUG/2020	Author(s)	AMI, MJH	Page	1 / 2	Revision	1

Z31-GS CONTROLLER & VARIABLE RESISTOR

Controller Z31GS is used as a temperature display and low temperature cutout device. It is used in conjunction with compressor RA282, whose controller PCB accepts a resistor value to control the RPM of the compressor. ATC fit a variable resistor and a fixed value resistor in series with one another to ensure the correct behavior.

This type of control prevents the compressor running when cooling demand is low and allows the user to set the duty they wish the unit to perform when load is high.

In contrast, previous products (ATC KTR-series) would have the compressor run continuously onto a low temperature limiting mechanical valve. Without load, the unit would run at its coldest until load returned, where it ran at nominal capacity. If load was lower than nominal capacity, the unit would pull down to the low temperature valve setting.

SETTING MINIMUM TEMPERATURE & CALIBRATION VALUE ON Z31-GS

Navigation

Upon first powering on, the chiller will arrive at this display after a loading sequence is complete. Process cooling will start automatically on the fridge and water circuit.

1. The display will show the current water temperature leaving the chiller but will take some time to stabilize if the unit has been switched off for some time.
2. The up and down buttons are used for increasing or decreasing the low temperature cutoff and for programming the controller.
3. The ‘P’ button is used for in conjunction with the arrow buttons to change the low temperature cutoff (single press) or for entering the settings menu (5s hold).
4. The ‘U’ button is used for returning to normal mode when in programming mode.

Changing low temperature cutoff

1. From the main display press the ‘P’ button and release it immediately this will show ‘SP’ on the display and alternate between this and the set low temperature cutoff.
2. Use the up and down arrows to change the desired temperature cutoff.
3. Once you are happy do not press any buttons and the display will return to normal operation.

Entering the programming menu

1. From the main display press and hold the ‘P’ button for 5 seconds.
2. Use the up and down arrows to scroll through the menu of editable parameters.
3. Holding the ‘U’ button for 5 seconds will exit and return to the main display

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SETTING UNIT DUTY ON SPEED DIAL

1	The speed dial controls the duty of the compressor within the chiller. This directly translates to how hard the chiller works at cooling. Turning the speed dial to its extent in a counterclockwise direction will cause the compressor to stop, preventing any cooling effect. Turning it to its extent in a clockwise direction will cause the compressor to run at maximum speed offering the most cooling.
2	There are dead zones at both ends of the rotation where the compressor cannot work any harder (clockwise) or will not start (counterclockwise). Setting the dial somewhere in between will vary the speed to match the load of the heat generating application.
3	Any change in load will require the speed dial to be adjusted to match.
4	Regardless of the position of the speed dial, the low temperature cutoff controller will stop the compressor if the process water temperature falls below its set value and will not start again until it rises above it.

REMARKS ON COMPRESSOR BEHAVIOR WHEN MAKING ADJUSTMENTS TO SPEED DIAL

5	If the speed dial is set to zero or the controller's low temperature cutoff stops the compressor automatically, then the compressor controller will wait 60 seconds before starting back up. This lets pressure equalize to ensure longevity of the compressor.
6	The compressor will also automatically slowly ramp up or down its speed when the speed control is altered to allow for proper oil distribution throughout the refrigeration system. Compressor minimum speed is 20RPS (revolutions per second) and maximum of 100RPS. It takes 1 second per 1RPS for the speed of the compressor to change. For example; if the speed dial is rotated from its lowest speed to its highest, it will take 80 seconds to arrive at maximum speed. The same applies in the other direction.
7	The low temperature cutoff controller does not directly alter the speed of the compressor - it simply prevents the chiller from cooling below a set temperature.

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PRESSURE AND FLOW ADJUSTMENT IN MINI CHILLER WITH CENTRIFUGAL PUMP

The Mini is available with a range of pump options. Low pressure requirements are best served by the quieter and mechanically looser centrifugal types – the flow of these items is dictated by the backpressure of the pipework through which it must pump. Reviewing the pump flow curve can indicate the flow expected. Centrifugal pumps have such a limited maximum pressure, that the water circuit components alone can hold the pressure, and no pressure relief valve is fitted.

If further limitation of pressure is required, a flow control valve can be fitted to either the outlet or inlet of the chiller, depending on whether the application is to be pressurized or not.

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DOCUMENT DETAILS

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ECOMINI GENERIC INITIAL TROUBLESHOOTING

Symptom	Potential Cause(s)
Compressor not running	Ensure that the minimum temperature cutoff value on the low temperature cutoff controller is not higher than the current liquid temperature.
	Ensure that the speed dial is not positioned within the compressor stop region which is to its left most extremity.
	Check the connection of the compressor power plug situated on top of the compressor itself.
	Check the connection of the signal line from the controller to the compressor PCB control board.
	When the compressor has been running for any length of time and then has been issued a stop signal either by manually turning the speed control all the way counter-clockwise of via the low temperature cutoff controller the compressor will remain stopped for 60 seconds to allow system pressure to equalize.
	The compressor has built-in logic issued via its PCB control board – board error states are communicated to the main touchscreen controller.
Noisy operation	Usually bearing failure in rotating machinery causes noise – this might be the cooling fan, the compressor or the pump. Pay attention to specific components to identify the source of noise.
	If there is an air pocket within the water circuit or not enough liquid in the tank, the pump could be running dry, this can cause rapid degradation of the pump, top up the tank immediately if the water level is low this will also help to remove air pockets.
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	Your 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. Contact ATC to discuss alternative materials and parts in water circuit construction.
	If there is too much liquid in the system due to backfilling when turned off or air pockets it is possible that is could have leaked out around the tank cap, check the water level in the tank periodically to ensure that it is not overflowing.
Poor cooling capacity (undercooling)	Check for any error states on the compressor controller PCB – the blinking LED will indicate if an error has occurred and alter blink rate based on error number.
	This can be caused by 1) excess application thermal heat load, 2) excess ambient temperature, 3) fan failure, or 4) controller issues with compressor control.

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Annex H-1

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PERIODIC MAINTENANCE REQUIREMENTS BY END USER

	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 I-1

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GENERIC MAINTENANCE FOR TECHNICIANS

	Warning; Opening the refrigeration system may expose the operative to toxic and corrosive compounds (HF). Take protective measures including suitable eye protection.
	Warning; Gases may exceed 300 psi (20 bar) during operation.
	Warning; All refrigerants do not support combustion and are asphyxiating gases.
	Warning; After switching off, the condenser cooling fan blades continue to rotate. Do not attempt servicing whilst the blades are rotating.
	Warning; All chillers contain water and electricity in close proximity. Ensure the unit is isolated before service. The Mini is protected from overcurrent by fuses on the mains inlet. Never bypass the fuses.

Following service or repair by a trained technician;

a) Ensure any electrical connections that may have been disturbed are given the ‘tug-test’

b) Ensure earth bonding conductors are re-attached.

c) Ensure the correct fuses are in place.

d) Ensure the mains cord being used is to specification, and is free from damage

e) Subject the unit to a PAT test to ensure the unit is safe before running.

f) Ensure there are no leaks inside or outside the unit.

g) Using the wiring schematic for guidance, simulate faults to check each interlock’s function.

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EU DECLARATION OF CONFORMITY

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

REGISTERED BUSINESS ADDRESS

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AUTHORISATION TO COMPILE THE TECHNICAL FILE

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

DESCRIPTION & IDENTIFICATION OF MACHINERY

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

NOTIFIED BODY

Not applicable

QUALITY ASSURANCE SYSTEM

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

DECLARATION

The manufacturer declares that the machinery described above fulfils all the relevant provisions of the;

- Machinery Directive 2006/42/EC.
- EMC Directive 2014/30/EU, via harmonised standards;
  - IEC 61000-6-2:2005 (Immunity for industrial environments).
  - IEC 61000-6-4:2006 +A1:2011 (Emission for industrial environments).
- Low Voltage Directive 2014/35/EU.
- RoHS Directive 2011/65/EU (*RoHS 2*);
  - The machinery above contains no Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr6+), Polybrominated Biphenyls (PBB) or Polybrominated Diphenyl Ether (PBDE).
- RoHS Directive (EU) 2015/863 (*RoHS 3*);
  - Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
  - Benzyl butyl phthalate (BBP): < 1000 ppm
  - Dibutyl phthalate (DBP): < 1000 ppm
  - Diisobutyl phthalate (DIBP): < 1000 ppm

PERSON EMPOWERED TO DRAW UP DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 6/JAN/2020

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Annex J-5

DOCUMENT DETAILS

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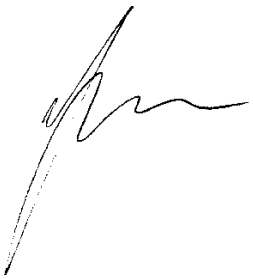
CONFLICT MINERALS COMPLIANCE STATEMENT

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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Annex J-7

DOCUMENT DETAILS

Date	15/JUL/2020	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 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.

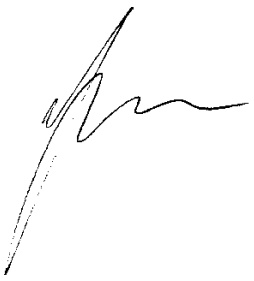
Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

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
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Annex J-8

DOCUMENT DETAILS

Date	27/AUG/2020	Author(s)	MJH	Page	1 / 1	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.

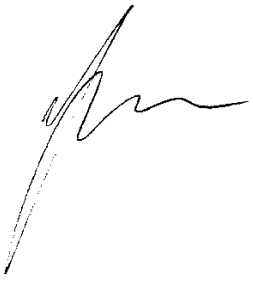
POPs LISTED UNDER AMENDMENT 2020/784

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

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 K-1

DOCUMENT DETAILS

Date	23/JUN/2020	Author(s)	RW, MJH	Page	1 / 1	Revision	2

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-1

DOCUMENT DETAILS

Date	1/SEP/2020	Compiled by	AMI	Page	1 / 1	Revision	1

RECOMMENDED SPARES FOR ATC MINI (M-SERIES) AND ECOMINI (EM-SERIES) CHILLERS

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.

COMMON TO BOTH MINI AND ECOMINI

PN	Description	QTY
WA697	Water Pump	1
RA282	Fridge Compressor	1
RA282	Compressor Controller	1
EA787	Compressor Cooling Fan	2
RA287	Fridge Condenser Fan	1
EA512	Power Inlet Fuse	2
EA769	Pump Fuse	1
EA764	DIN Rail Fuse Holder	1
WA643	Self-Sealing Water Bulkhead (SA00016)	2
WA644	Self-Sealing Water Connectors (SA00016)	2
WA642	12mm Push Fit Water Bulkhead	2
WA652	12mm Push Fit Plug	2
EA044	IEC Cordset	1
EA770	Power Inlet Connector Module	1
MA310	Rubber Mounting Feet	4
WA641	Fluid Tank Assembly	1

COMMON TO MINI ONLY

PN	Description	QTY
EA754	Power Supply	1
EA760	USB Port	1
EA755	Touch Screen Controller NON-RS485	1
EA778	Touch Screen Controller WITH-RS485	1
EA513	Controller Fuse	1
EA762	Pump Relay	1
EA759	Optical Level Switch	2
EA757	Pressure Transducer	1
EA586	RTD Temperature Probe PT100	1
RA285	Solenoid Coil	1

COMMON TO ECOMINI ONLY

PN	Description	QTY
EA815	Power Supply	1
EA019	NTC Temperature Probe assembly	1
EA812	Speed Control Potentiometer	1
EA813	Speed Control Dial	1
EA816	Low Temperature Cutoff Controller	1

SAFETY DATA SHEET

according to Regulation (EU) 2015/830

Harp® 134a

Revision 0

Revision date 2017-06-21

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

1.1. Product identifier

Product name	Harp® 134a
REACH Registration Number	01-2119459374-33
CAS No.	811-97-2
EC No.	212-377-0

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

Product Use	[SU3] Industrial uses: Uses of substances as such or in preparations at industrial sites; ----- [SU22] Professional uses: Public domain (administration, education, entertainment, services, craftsmen);
Restricted use	[SU21] Consumer uses: Private households (= general public = consumers);
Description	Gas.

1.3. Details of the supplier of the safety data sheet

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

1.4. Emergency telephone number

Emergency telephone number	+44 (0) 1270 502891 24 Hours

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.2. Classification - EC 1272/2008	Compressed gas: H280;

2.2. Label elements

Hazard pictograms	

Harp® 134a

2.2. Label elements

Signal Word	Warning
Hazard Statement	Compressed gas: H280 - Contains gas under pressure; may explode if heated.
Precautionary Statement: Storage	P410+P403 - Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

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

SECTION 3: Composition/information on ingredients

3.1. Substances

67/548/EEC / 1999/45/EC

Chemical Name	Index No.	CAS No.	EC No.	REACH Registration Number	Conc. (%w/w)	Classification	M-factor.
Harp® 134a (1,1,1,2-Tetrafluoroethane (HFC 134a))		811-97-2	212-377-0	01-2119459374-33	90 - 100%		

EC 1272/2008

Chemical Name	Index No.	CAS No.	EC No.	REACH Registration Number	Conc. (%w/w)	Classification	M-factor.
Harp® 134a (1,1,1,2-Tetrafluoroethane (HFC 134a))		811-97-2	212-377-0	01-2119459374-33	90 - 100%	Compressed gas: H280;	

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

Inhalation	Seek medical attention if irritation or symptoms persist.
Eye contact	Seek medical attention if irritation or symptoms persist.
Skin contact	Frostbite: treat as thermal burns.
Ingestion	Ingestion is not considered a potential route of exposure.

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

Inhalation	If you feel unwell, seek medical advice (show the label where possible).
Eye contact	Seek medical attention if irritation or symptoms persist.
Skin contact	Seek medical attention if irritation or symptoms persist.
Ingestion	Ingestion is not considered a potential route of exposure.

SECTION 5: Firefighting measures

5.1. Extinguishing media

	Use extinguishing media appropriate to the surrounding fire conditions.

5.2. Special hazards arising from the substance or mixture

	This product is not flammable in air under ambient conditions of temperature and pressure. Certain mixtures of the product and air under pressure may be flammable. At high temperature :, Thermal decomposition giving toxic and corrosive products :, Gaseous hydrogen fluoride (HF)., Carbon oxides.

5.3. Advice for firefighters

	Wear self contained breathing apparatus and protective clothing. Cool containers / tanks with water spray. Ensure a system for the rapid emptying of containers. In case of fire nearby, remove

Harp® 134a

5.3. Advice for firefighters

	exposed containers.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

	Ensure adequate ventilation of the working area. Avoid contact with skin and eyes. Evacuate personnel to a safe area. Wear self contained breathing apparatus and protective clothing. Vapours are heavier than air.

6.2. Environmental precautions

	Do not release into the environment.

6.3. Methods and material for containment and cleaning up

	Recovery: Allow to evaporate. Elimination: See chapter 13.

6.4. Reference to other sections

	See section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION for further information. See section 13. DISPOSAL CONSIDERATIONS for further information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

	Ensure adequate ventilation of the working area. Avoid contact with eyes and skin. Adopt best Manual Handling considerations when handling, carrying and dispensing. Keep away from sources of ignition - No smoking. Do not eat, drink or smoke in areas where this product is used or stored. When using do not eat or drink. Wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

	Keep containers tightly closed. Keep in a cool, dry, well ventilated area. Store in correctly labelled containers. Keep away from sources of ignition - No smoking. Store out of direct sunlight. Storage temperature: <45°C.
Suitable packaging	Stainless steel. Steel.

7.3. Specific end use(s)

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

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

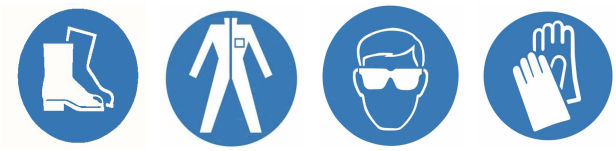
	Occupational exposure controls.

8.1.1. Exposure Limit Values

Harp® 134a (1,1,1,2-Tetrafluoroethane (HFC 134a))	**WEL 8-hr limit ppm:** 1000	**WEL 8-hr limit mg/m3:** 4240
	WEL 15 min limit ppm: -	**WEL 15 min limit mg/m3:** -
	WEL 8-hr limit mg/m3 total inhalable dust: -	**WEL 15 min limit mg/m3 total inhalable dust:** -
	WEL 8-hr limit mg/m3 total respirable dust: -	**WEL 15 min limit mg/m3 total respirable dust:** -

8.2. Exposure controls

8.2. Exposure controls

	
8.2.1. Appropriate engineering controls	Ensure adequate ventilation of the working area.
8.2.2. Individual protection measures	Wear protective clothing.
Eye / face protection	Approved safety goggles.
Skin protection - Handprotection	Wear suitable gloves.
Skin protection - Other	Wear suitable protective clothing.
Respiratory protection	Wear suitable respiratory equipment when necessary.
Occupational exposure controls	Keep away from food, drink and animal feedingstuffs.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Gas
Colour	Colourless
Odour	Slight
Odour threshold	No data available
Freezing Point	No data available
Evaporation rate	No data available
Water solubility	No data available
Fat Solubility	No data available
Soluble in	No data available
Partition coefficient (n-octanol/water)	No data available
Partition coefficient	No data available
Autoignition temperature	> 743 °C
Decomposition temperature	> 370 °C
Vapour pressure	= 0.574 MPa
Vapour density	= 4.24 kg/m3
Relative density	= 1.21 (H2O = 1 @ 20 °C)
Initial boiling point	- 26 °C
Melting point	- 108 °C
Flash point	Not applicable.
pH	Not applicable.
Flammability (solid, gas)	Not applicable.
Viscosity	Not applicable.
Explosive properties	Not applicable.
Oxidising properties	Not applicable.
Solubility	No data available

9.2. Other information

9.2. Other information

VOC (Volatile organic compounds)	Not relevant
Conductivity	No data available
Surface tension	No data available
Gas group	No data available
Benzene Content	No data available
Lead content	No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

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

10.3. Possibility of hazardous reactions

No data is available on this product.

10.4. Conditions to avoid

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

10.5. Incompatible materials

Alkaline hydroxides. Alkaline earth metals. Strong oxidising agents. Finely divided metals.

10.6. Hazardous decomposition products

At high temperature :, Thermal decomposition giving toxic and corrosive products :, Gaseous hydrogen fluoride (HF)., Carbon oxides. Decomposition temperature: >370°C.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

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

11.1.4. Toxicological Information

No data available

SECTION 12: Ecological information

Harp® 134a

12.1. Toxicity

	No data available

12.2. Persistence and degradability

	Not readily biodegradable.

12.3. Bioaccumulative potential

	Does not bioaccumulate.

Partition coefficient

	Harp® 134a No data available

12.4. Mobility in soil

	No data is available on this product.

12.5. Results of PBT and vPvB assessment

	This substance is not considered to be persistent, bioaacumulating, toxic (PBT), nor very persistent, very bioaccumulating (vPvB).

12.6. Other adverse effects

	Global warming potential (GWP): Global warming potential with respect to CO2 = 1430 (IPCC Assessment Report 4). Ozone depletion potential: Ozone depletion potential; ODP; (R-11 = 1), Value:.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

	Dispose of in compliance with all local and national regulations.

Disposal methods

	Contact a licensed waste disposal company.

SECTION 14: Transport information

Hazard pictograms

14.1. UN number

	UN3159

14.2. UN proper shipping name

	1,1,1,2-TETRAFLUOROETHANE

14.3. Transport hazard class(es)

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

14.4. Packing group

Packing group	-

Harp® 134a

14.5. Environmental hazards

Environmental hazards	No
Marine pollutant	No

14.6. Special precautions for user

	No data is available on this product.

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

	No data is available on this product.

ADR/RID

Hazard ID	20
Tunnel Category	(C/E)

IMDG

EmS Code	F-C S-V

IATA

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

SECTION 15: Regulatory information

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

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

15.2. Chemical safety assessment

	No data is available on this product.

SECTION 16: Other information

Other information

Text of Hazard Statements in Section 3	Compressed gas: H280 - Contains gas under pressure; may explode if heated.

Further information

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

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

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

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID

Conforming to Directive 1907/2006/EC

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions

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

6.2. Precaution to protect the environment

Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

6.3 Clean-up procedures

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

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

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

7.2. Conditions for safe storage

Keep only in the original container.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

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

8.2. Exposure controls/Appropriate engineering controls

Local exhaust.	If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Personal protective equipment

Respiratory protection	Suitable respiratory protective device Combination filter: A-P2
Filter Type	Combined particulates and organic vapour type
Hand protection	Category short time exposure Break through time> 10 min
Protective index	Class 1 When prolonged exposure is expected: Break through time> 120 min
Protective index	Class 4 Observe the information of the glove manufacturers on permeability. Protective gloves should be chosen according to Workplace Safety Assessment. Gloves recommended according to EN 374 (protection against chemicals).
Material	Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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

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Conforming to Directive 1907/2006/EC

SECTION 10: STABILITY AND REACTIVITY

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

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

10.3. Hazardous reactions
Hazardous polymerisation does not occur.

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

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

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

SECTION 11: TOXICOLOGICAL INFORMATION

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

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

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

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

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

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

11.7. Mutagenicity
No data available.

11.8. Reproductive toxicity
No data available.

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

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

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

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

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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.

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.