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## Installation, Operation & Service Manual

# R10 / R20

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Compiled by | MJH | Page | 1 / 6 | Revision | 1 |
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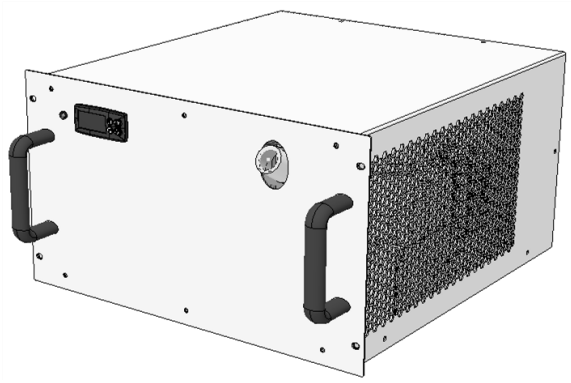

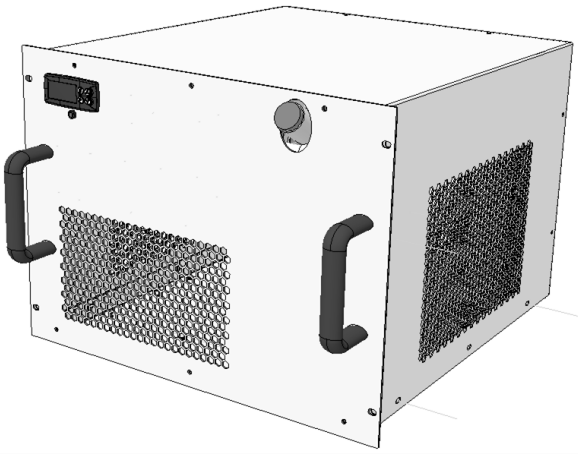

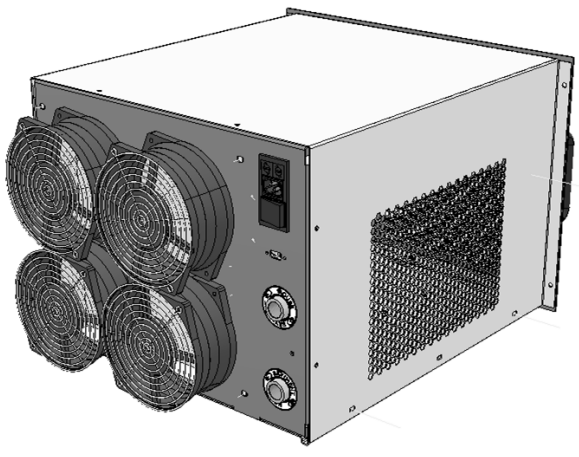

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**CHANGE LOG**

| Date | Revision | Page ref | Change |
|---|---|---|---|
| 9/MAR/2022 | 1 | All | First release |
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## DOCUMENT DETAILS

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## PRODUCT SPECIFICATIONS

| Attribute | R10 | R20 |
|---|---|---|
| Weight | 36kg | 48kg |
| | 79.4lbs | 105.8lbs |
| Heat transfer fluid volume | 4000mL | 7500mL |
| | 1.057USGal | 1.981USGal |
| Cooling capacity ($T_{setpoint}$ +20°C / +68°F) ($T_{ambient}$ +20°C / +68°F) *($T_{ambient}$ +30°C / +86°F) | *1150W | *1900W |
| | *3924BTU/h | *6483BTU/h |
| | *0.327TR | *0.54TR |
| Temperature stability | 0.1±°C | 0.1±°C |
| Temperature resolution | 0.1±°C | 0.1±°C |
| Settable temp. range | +4 to +35°C | +4 to +35°C |
| Optional temp. range | 0 to +65°C | 0 to +65°C |
| Power supply requirement | 230Vac | 230Vac |
| | 50Hz | 50Hz |
| | 1~ | 1~ |
| | 6.5A@230Vac | 7.5A@230Vac |
| Sound pressure level | 63dBa | 63dBa |
| Controller screen size | n/a | n/a |
| Dimensions (W*D*H) | 6U 19” rack<br>560mm / 22.05” deep | 8U 19” rack<br>560mm / 22.05” deep |
| Diagnostic functions | PID refrigeration system utilization, level OK lamp, cooling output active lamp. | PID refrigeration system utilization, level OK lamp, cooling output active lamp. |
| Fluid fittings (standard) | 1/2" BSPPF | 1/2" BSPPF |
| Fluid fittings (option) | Pushfit 12mm | Pushfit 12mm |
| Low fluid level alarm | Pump interlock for empty | Pump interlock for empty |
| Controller | Two-row display IP65-rated | Two-row display IP65-rated |
| Tool-less access | No | No |
| Overtemperature protection | Pump motor thermal c/o<br>Optional HT trip available | Pump motor cutout |
| Compressor overload protection | HP switch | HP switch |
| Overcurrent protection | Fused | Fused |
| Rated duty cycle | Continuous | Continuous |
| Compatible heat transfer fluids | DI water, propylene glycol mixes, Hexid A4 & A6 | DI water, propylene glycol mixes, Hexid A4 & A6 |

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**PERFORMANCE CURVES**

| R10 | R20 |
|---|---|
| **TBC** | **TBC** |
| **TBC** | **TBC** |
| **TBC** | **TBC** |

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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. |

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**INCLUDED ANNEXES**

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

Annex A-1 191122 Shipping & Unpacking - Weighing over 18kg without castors
Annex B-13 220309 Site & Environmental Requirements for R10 & R20
Annex C-2 220309 Installation - Generic water-cooled with 0.5inch fittings
Annex C-6 220309 Installation - Generic air-cooled with 0.5inch fittings
Annex D-3 201007 Fluid Handling & Startup Procedures - Generic
Annex E-15 210301 KR1 - how to use
Annex E-15C 210916 KR1 Program General Use K1 thru K12
Annex F-3 201007 PD pump using discrete PRV
Annex G-8 220309 Troubleshooting - Initial help air-cooled K-, R- & G-Series
Annex G-14 220309 Troubleshooting - Initial help water-cooled K-, R- & G-Series
Annex H-1 191121 End-user maintenance - air-cooled units with water as fluid
Annex H-2 210326 End-user maintenance - water-cooled units with water as fluid
Annex I-1 210830 Maintenance for technicians - Generic refrigerated units
Annex J-5 200706 EU Compliance Statement - Conflict Minerals
Annex J-7 200715 EU Compliance Statement - REACH
Annex J-8 200827 EU Compliance Statement - POPs
Annex J-10 201111 EU Compliance Statement - RoHS
Annex J-12 210830 UKCA DoC - R-series
Annex J-13 210830 EU DoC - R-series
Annex K-1 200623 Standard warranty terms of ATC
Annex M-9 220309 Recommended spares, R10 & R20
Annex R-1 170621 SDS Refrigerant HFC-R134a
Annex R-2 120701 SDS Refrigerant HFC-R407C
Annex R-3 200203 SDS Hexid A4 v6.4

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# Annex A-1

**DOCUMENT DETAILS**

| Date | 22/NOV/19 | Author(s) | MJH | Page | 1 / 1 | Revision | 2 |
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**UNPACKING UNITS WEIGHING OVER 18kg (40lbs) WITHOUT CASTORS**

| | |
|---|---|
| **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** | As the unit is >18kg, ATC must recommend that 2 persons are used to lift by hand, or a crane. |
| **3** | 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. |
| **4** | **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-13

**DOCUMENT DETAILS**

| Doc. Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 1 | Revision | 1 |
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**R10 & R20 SITE & ENVIRONMENTAL REQUIREMENTS**

**1** **Rack mount** – this product is only intended to be used with a ventilated standard 19" rack cabinet. R10 is a 6U high unit and R20 is an 8U high unit. Both units are 560mm deep. Both units require 4-off end user-supplied M6 bolts to secure to rack cabinet upright rails. ATC strongly recommends the use of support guides that run from the front upright rail to the back upright rail of the rack cabinet to support the weight of the chiller.

**2** **Clean, dust-free environment** – the R10 & R20 units use external axial frame fans to provide airflow for cooling the pump motor, compressor and condenser. Do not block these vents. The system will shut down in the event the motor high temperature or refrigeration system high pressure switches are triggered.

**3** **Non-condensing ambient temperature** – +5°C to +40°C (+39°F to +104°F). This prevents build-up of moisture on internal components.

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

**5**

| **Electrical supply** | **R10** | | **R20** | |
|---|---|---|---|---|
| ATC power supply specification | -0spec | -9spec | -0spec | -9spec |
| Nominal supply voltage | 230Vac | 208-230Vac | 230Vac | 208-230Vac |
| Voltage fluctuations | ±10% | ±10% | ±10% | ±10% |
| Frequency | 50Hz | 50/60Hz | 50Hz | 50/60Hz |
| Mode of supply | L/N/E | L/N/E or L1/L2/E | L/N/E | L/N/E or L1/L2/E |
| Current draw at 230Vac 50Hz | 5A | *TBC* | 8A | 8.5A |

The power inlet module itself is rated 10A 250V. The user must provide protective earth at IEC type C14 appliance inlet. See product rating label for fuse specification. Mains fuses are typically UL-compliant and T speed rated with high breaking (rupture) capacity. Supply fuses are rear mounted. Secondary fuses protecting individual components are internally-mounted.

**6** **Clearance** – the rack form factor limits clearance considerations to the rear face of the unit. Ensure there is sufficient room at the rear of the product to remove the power cable without obstruction. Ensure bend radius of your chosen hose/tube/pipework is not compromised. The front face of the R10 has no vents, but the R20 does – it is a suction vent. Left and right-hand side clearance is dictated by the rack cabinet, but both R10 & R20 have suction vents on those faces.

**7** **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.

**8** **Indoor use only** – altitude up to 2000m.

**9** **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-2

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 2 | Revision | 3 |
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## 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

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 2 / 2 | Revision | 3 |
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**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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# Annex C-6

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 2 | Revision | 2 |
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## INSTALLATION FOR AIR-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 rejected to air.
- A-Series airblast units, where heatload is rejected to air.

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

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# Annex C-6

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 2 / 2 | Revision | 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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# Annex D-3

**DOCUMENT DETAILS**

| Date | 7/OCT/2020 | Author(s) | LW, MJH | Page | 1 / 1 | Revision | 1 |
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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-15

## DOCUMENT DETAILS

| Date | 1/MAR/2021 | Author(s) | MJH | Page | 1 / 1 | Revision | 1 |
|---|---|---|---|---|---|---|---|

## BASIC PROGRAMMING GUIDE KR1 (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-15, i.e. Annex E-15A.

## 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).<br>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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**Operating Manual; Controller Operation**

# Annex E-15C

**DOCUMENT DETAILS**

| Date | 16/SEP/2021 | Author(s) | WE | Page | 1 / 2 | Revision | 1 |
|---|---|---|---|---|---|---|---|

**STANDARD KT THRU K12 PROGRAM PURPOSE**

| | |
|---|---|
| **Internal part number** | EA894 |
| **Manufacturer part number** | KR1 |
| **Program purpose** | 1) STANDARD PROGRAM FOR KT THRU K12 |

**PROGRAM**

| Group inP | | Group 'out' | | Group 'AL1' | | Group 'AL2' | |
|---|---|---|---|---|---|---|---|
| **Setting** | **Value** | **Setting** | **Value** | **Setting** | **Value** | **Setting** | **Value** |
| SEnS | Pt1 | o1.F | c.rEG | AL1t | LHdo | AL2t | nonE |
| dP | 1 | o1.AL | *n/a* | Ab1 | 0 | Ab2 | *n/a* |
| SSc | *n/a* | o1.Ac | dir | AL1L | -10.0 | AL2L | *n/a* |
| FSc | *n/a* | o2F | AL | AL1H | 10.0 | AL2H | *n/a* |
| Unit | °c | o2.AL | 1 | AL1 | 10.0 | AL2 | *n/a* |
| FiL | 10 | o2Ac | rEU | HAL1 | 1.0 | HAL2 | *n/a* |
| inE | our | o4F | nonE | AL1d | oFF | AL2d | *n/a* |
| oPE | 100 | o4.AL | *n/a* | AL1o | 0 | AL2o | *n/a* |
| io4.F | out4 | o4Ac | *n/a* | | | | |
| diF1 | oFF | | | | | | |
| diF2 | *n/a* | | | | | | |
| di.A | 0 | | | | | | |

| Group 'AL3' | | Group 'LbA' | | Group 'rEG' | | Group 'SP' | |
|---|---|---|---|---|---|---|---|
| **Setting** | **Value** | **Setting** | **Value** | **Setting** | **Value** | **Setting** | **Value** |
| AL3t | nonE | LbAt | oFF | cont | Pid | nSP | *n/a* |
| Ab3 | *n/a* | LbSt | *n/a* | Auto | 0 | SPLL | 4.0 |
| AL3L | *n/a* | LbAS | *n/a* | tunE | oFF | SPHL | 35.0 |
| AL3H | *n/a* | LbcA | *n/a* | Aut.r | *n/a* | SP | 20 |
| AL3 | *n/a* | | | SELF | *n/a* | SP2 | *n/a* |
| HAL3 | *n/a* | | | HSEt | *n/a* | SP3 | *n/a* |
| AL3d | *n/a* | | | cPdt | *n/a* | SP4 | *n/a* |
| AL3o | *n/a* | | | Pb | 15 | A.SP | SP1 |
| | | | | ti | 60 | SP.rt | trin |
| | | | | td | 1 | SPLr | Loc |
| | | | | Fuoc | 0.42 | SP.u | inF |
| | | | | tcH | *n/a* | SP.d | inF |
| | | | | rcG | 1.00 | | |
| | | | | tcc | 7 | | |
| | | | | rS | 0 | | |
| | | | | Str.t | *n/a* | | |
| | | | | db.S | *n/a* | | |
| | | | | od | *n/a* | | |
| | | | | St.P | 0 | | |
| | | | | SSt | oFF | | |
| | | | | SS.tH | 999.9 | | |

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# Annex E-15C

**DOCUMENT DETAILS**

| Date | 16/SEP/2021 | Author(s) | WE | Page | 2 / 2 | Revision | 1 |
|---|---|---|---|---|---|---|---|

| 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 | tunE | | |
| tr.St | *n/a* | Pr.S1 | *n/a* | diSP | SPF | | |
| | | Pr.G1 | *n/a* | di.CL | 0 | | |
| | | Pr.t1 | *n/a* | AdE | 5 | | |
| | | Pr.b1 | *n/a* | diS.t | oFF | | |
| | | Pr.E1 | *n/a* | FiLd | 0.5 | | |
| | | 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 | *!TESTRIG!* |
| cur | *n/a* | AH.P | 999.9 |
| h.Job | *n/a* | AH.o | *!TESTRIG!* |
| t.Job | *n/a* | | |

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**Operating Manual; Pressure & Flow Adjustment**

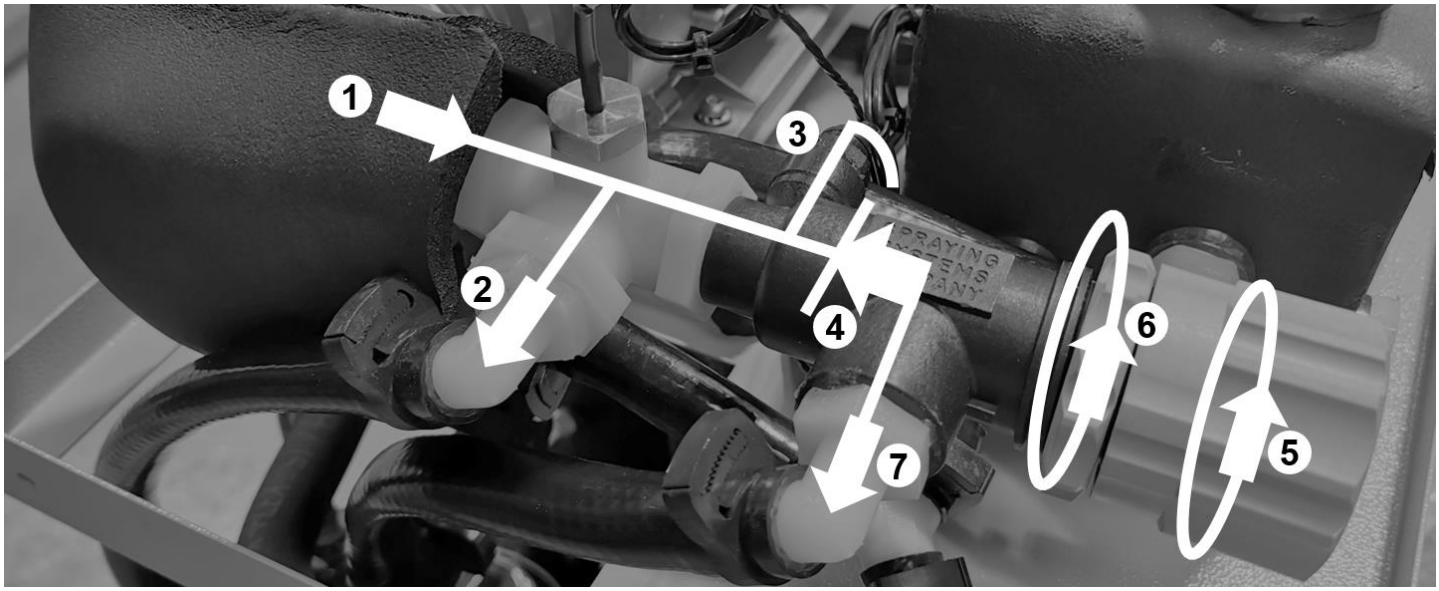
# Annex F-3

**DOCUMENT DETAILS**

| Date | 7/OCT/2020 | Author(s) | MJH | Page | 1 / 2 | Revision | 1 |
|---|---|---|---|---|---|---|---|

## 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

**DOCUMENT DETAILS**

| Date | 7/OCT/2020 | Author(s) | MJH | Page | 2 / 2 | Revision | 1 |
|---|---|---|---|---|---|---|---|

## 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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# Annex G-8

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 1 | Revision | 2 |
|---|---|---|---|---|---|---|---|

**AIR-COOLED K-, G-, R-SERIES INITIAL TROUBLESHOOTING**

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

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# Annex G-14

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 1 | Revision | 2 |
|---|---|---|---|---|---|---|---|

**WATER-COOLED K-, G-, R-SERIES INITIAL TROUBLESHOOTING**

| # | SYMPTOM | CAUSES |
|---|---|---|
| **1** | Compressor or pump motor not running whilst control remains illuminated. | Level switch may have been tripped – check level and top-up to resolve. |
| | | High pressure switch may have been tripped;<br>a) Check for sufficient flowrate and pressure of house water.<br>b) Assess whether the house water temperature is too high.<br>c) Assess whether any fouling of condenser plate heat exchanger has occurred.<br>d) Assess whether new equipment has been added to a shared water supply and contributed to either a lack of water flow (through flow splitting) or whether additional thermal load has been added to the central water's chiller/cooler. |
| | | If fitted, a low-pressure switch may have been tripped – this indicates refrigerant loss. A multimeter is required to test this. |
| | | If running at a high setpoint, or if operating conditions have changed and raised the fluid temperature, it is possible the compressor has turned itself on high temperature internal protection. |
| **2** | Noisy operation | Pump motor bearings may have failed. |
| | | Pump head vane or seal may have failed. |
| | | In a 3-phase system, phase rotation may be incorrect. |
| **3** | High fluid pressure / low flowrate | Fluid lines may have become fouled through solid debris or biological growth.<br>Ensure biocides or pre-mixed biocidal process fluids are being used.<br>Ensure hoses are not transparent or translucent – UV light entering prompts growth. |
| | | General fluid leak can lead to flow rate failure. |
| | | Excess fittings, too many sharp direction changes, too small a diameter hose for flowrate or hoses too long at the wrong diameter. |
| **4** | Fluid collecting or leaking | Leaks are impossible to diagnose remotely, but usually you will see a pool of fluid on a lower surface. Do not confuse this with condensation from cold parts of the fridge. |
| | | Review the chemical compatibility of your fluid with the chiller. Contact ATC if you are unsure. |
| **5** | Poor cooling performance | Excess thermal load applied.<br>Assess whether the ambient temperature is too high.<br>Assess whether house water temperature is too high.<br>Assess whether house water flowrate is too low.<br>Assess whether surrounding equipment is adding load or taking flow from the house water inlet to the ATC product. |

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# Annex H-1

**DOCUMENT DETAILS**

| Date | November 2019 | Compiled by | MJH | Revision | 1 |
|---|---|---|---|---|---|

**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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**Operating Manual; Maintenance for End-Users**

# Annex H-2

**DOCUMENT DETAILS**

| Date | 26/MAR/2021 | Author(s) | MJH | Page | 1 / 1 | 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-1

**DOCUMENT DETAILS**

| Date | 30/AUG/2021 | Author(s) | MJH | Page | 1 / 1 | Revision | 3 |
|---|---|---|---|---|---|---|---|

**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; Refrigerants do not support combustion (A1-class), but do displace air (oxygen), presenting asphyxiation risk. |
|  | 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. This product is protected from overcurrent by fuses (or MCB) on the mains inlet. Never bypass the overcurrent protection. |

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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# Annex J-5

**DOCUMENT DETAILS**

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

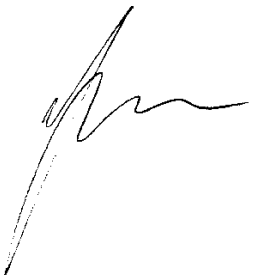
## CONFLICT MINERALS COMPLIANCE STATEMENT

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

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

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

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



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

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# Annex J-7

**DOCUMENT DETAILS**

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

## WHAT IS THE REACH REGULATION 1907/2006?

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

## REACH 'ARTICLE' COMPLIANCE CONSIDERATIONS

### REACH ANNEX XVII COMPLIANCE

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

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

### REACH ANNEX XIV COMPLIANCE

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

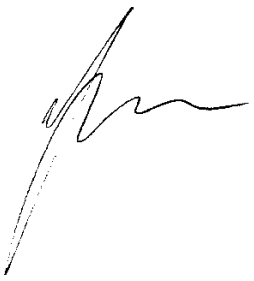
Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

### SVHC LIST COMPLIANCE

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

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

## DECLARATION



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

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Support@app-therm.com



# Annex J-8

**DOCUMENT DETAILS**

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

## WHAT IS THE POPs REGULATION 2019/1021?

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

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

## POPs LISTED UNDER INITIAL REGULATION 2019/1021

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

**Industrial Chemicals;**
Hexachlorobenzene, Polychlorinated Biphenyls (PCBs).

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

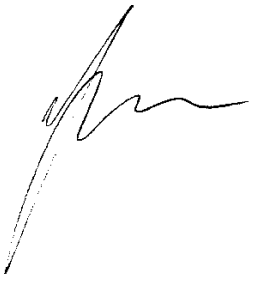
## POPs LISTED UNDER AMENDMENT 2020/784

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

## POPs COMPLIANCE STATEMENT

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

## DECLARATION



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

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# Annex J-10

**DOCUMENT DETAILS**

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

## WHAT IS THE RoHS DIRECTIVE?

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

## RoHS 1 2002/95/EC

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

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

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

## RoHS 2 2011/65/EU

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

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

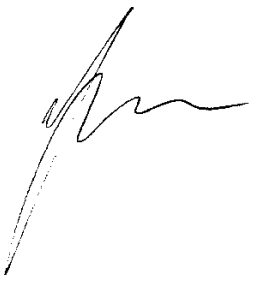
## RoHS 3 2015/863/EU

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

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

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

## DECLARATION



Mitchell Howard, Technical Manager
Signed in Barrow-upon-Soar, UK, date 11/NOV/2020

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# Annex J-12

| DOCUMENT DETAILS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 30/AUG/2021 | Author(s) | MJH | Page | 1 / 1 | Revision | 1 |

## UKCA DECLARATION OF CONFORMITY (DoC)

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

## REGISTERED BUSINESS ADDRESS

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

## AUTHORISATION TO 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; | R-Series |
| Function; | Recirculating chiller |
| Model; | All with ‘R’ 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 is in conformity with the relevant statutory requirements applicable to the specific product. The manufacturer takes full responsibility for the product’s compliance.

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

## PERSON EMPOWERED TO DRAW UP DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 30/AUG/2021

**Applied Thermal Control Ltd**
39 Hayhill Industrial Estate
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# Annex J-13

## DOCUMENT DETAILS

| Date | 30/AUG/2021 | Author(s) | MJH | Page | 1 / 1 | Revision | 1 |
|---|---|---|---|---|---|---|---|

## EU DECLARATION OF CONFORMITY

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

## REGISTERED BUSINESS ADDRESS

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

## AUTHORISATION TO COMPILE THE TECHNICAL FILE

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

## DESCRIPTION & IDENTIFICATION OF MACHINERY

| | |
|---|---|
| Generic denomination; | R-Series |
| Function; | Recirculating chiller |
| Model; | All with ‘R’ 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 30/AUG/2021

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Service@thermalexchange.co.uk
Support@app-therm.com



# Annex K-1

**DOCUMENT DETAILS**

| Date | 03/FEB/2021 | Author(s) | RW, MJH | Page | 1 / 1 | Revision | 02 |
|---|---|---|---|---|---|---|---|

**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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**Operating Manual; Recommended Spares**

# Annex M-9

**DOCUMENT DETAILS**

| Date | 9/MAR/2022 | Author(s) | MJH | Page | 1 / 1 | Revision | 2 |
|---|---|---|---|---|---|---|---|

**RECOMMENDED SPARES FOR R10 & R20**

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 service@thermalexchange.com.

**R10**

| PN | Description | QTY |
|---|---|---|
| EA512 | FUSE – T6.3A H250V UL-OK (FS1+2) | 2 |
| EA514 | FUSE – T1.6A H250V UL-OK (FS3) | 1 |
| EA517 | MOTOR – Standard 1/2~ P2=370W pump motor for P5 P10 P17 | 1 |
| EA781 | SWITCH – level switch threaded | 1 |
| 63-500 | FAN – Ø150mm, 1400RPM | 2 |
| WA679 | COUPLING – bronze double flat male-to-male pump-to-motor | 1 |
| WA333 | PUMP – P3 rotary vane | 1 |
| WA335 | PUMP – P5 rotary vane | 1 |
| WA319 | PUMP – P17 rotary vane | 1 |
| WA318 | PUMP – P10 rotary vane | 1 |
| EA894 | CONTROLLER – Ascon Tecnologic KR1 | 1 |
| EA586 | SENSOR – PT100 | 1 |
| RA210 | COMPRESSOR – KT1 / R10 1kW nominal duty (-0spec model) | 1 |
| EA898 | RELAY – Solid state relay (SSR) DIN rail mount | 1 |
| EA496 | RELAY – Power relay 30A | 1 |
| EA737 | COIL – Solenoid valve coil | 1 |
| EA044 | CORDSET – UK BS1363 to C13, 2m, right angle head (to suit appliance C14) | 1 |

**R20**

| PN | Description | QTY |
|---|---|---|
| EA847 | FUSE – T10A H250V UL-OK (FS1+2) | 2 |
| EA769 | FUSE – T4A H250V UL-OK (FS3) | 1 |
| EA512 | FUSE – T6.3A H250V UL-OK (FS4) | 1 |
| EA506 | FUSE – T2A H250V UL-OK (FS5) | 1 |
| EA517 | MOTOR – Standard 1/2~ P2=370W pump motor for P5 P10 P17 | 1 |
| EA781 | SWITCH – level switch threaded | 1 |
| 63-500 | FAN – Ø150mm, 1400RPM | 4 |
| WA679 | COUPLING – bronze double flat male-to-male pump-to-motor | 1 |
| WA333 | PUMP – P3 rotary vane | 1 |
| WA335 | PUMP – P5 rotary vane | 1 |
| WA319 | PUMP – P17 rotary vane | 1 |
| WA318 | PUMP – P10 rotary vane | 1 |
| EA894 | CONTROLLER – Ascon Tecnologic KR1 | 1 |
| EA586 | SENSOR – PT100 | 1 |
| RA226 | COMPRESSOR – K1 / R20 2kW nominal duty (-0spec model) | 1 |
| EA898 | RELAY – Solid state relay (SSR) DIN rail mount | 1 |
| EA496 | RELAY – Power relay 30A | 1 |
| EA737 | COIL – Solenoid valve coil | 1 |
| EA044 | CORDSET – UK BS1363 to C13, 2m, right angle head (to suit appliance C14) | 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;<br>-----<br>[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<br>Pontypridd<br>Rhondda Cynon Taff<br>CF37 5SX<br>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<br>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 |

### 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.<br>Elimination: See chapter 13. |

### 6.4. Reference to other sections

| | |
|---|---|
| | See section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION for further information.<br>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

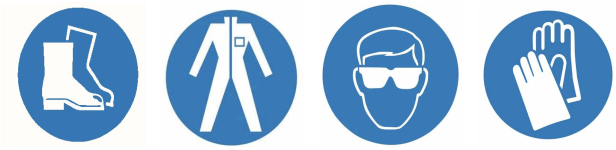
| | |
|---|---|
| | Occupational exposure controls. |

### 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.<br>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

Revision 0
Revision date 2017-06-21

### 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).<br>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. |

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

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

## 2. Hazards identification

### EC Classification

| | |
|---|---|
| EC Directive 67/548/EEC or 1999/45/EC | Not classified as hazardous |
| Regulation (EC) No. 1272/2008 (CLP) | Gases under pressure – Liquefied gas |

### Label Elements

| | |
|---|---|
| Name on label<br>Hazardous components | 1,1,1,2-Tetrafluoroethane (R134a)<br>Pentafluoroethane (R125)<br>Difluoromethane (R32) |
| Hazard statement(s) | H280: Contains gas under pressure; may explode if heated |
| Signal word(s) | Warning |
| Hazard pictogram(s) |  |
| Precautionary statement(s)<br>Storage | P410 + P403: Protect from sunlight. Store in a well-ventilated place. |

## 3. Composition / information on ingredients

**Concentration**

| Substance name | CAS No. | EC No. | Concentration |
|---|---|---|---|
| 1,1,1,2-Tetrafluoroethane (R134a) | 811-97-2 | 212-377-0 | ca. 52% |
| Pentafluoroethane (R125) | 354-33-6 | 206-557-8 | ca. 25% |
| Difluoromethane (R32) | 75-10-5 | 200-839-4 | ca. 23% |

**Hazardous components according to Regulation (EC) 1272/2008 as amended**

| Substance name | Hazard class | Hazard category | H Phrases |
|---|---|---|---|
| 1,1,1,2-Tetrafluoroethane (R134a) | Gases under pressure | Liquefied gas | H280 |
| Pentafluoroethane (R125) | Gases under pressure | Liquefied gas | H280 |
| Difluoromethane (R32) | Flammable gases | Category 1 | H220 |
| | Gases under pressure | Liquefied gas | H280 |

**Hazardous components according to European Directive 67/548/EEC or 1999/45/EC as amended**

| Substance name | Classification | Hazard category | R-phrase(s) |
|---|---|---|---|
| Difluoromethane (R32) | F+ | Extremely flammable | R12 |

## 4. First aid measures

**Inhalation** Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call a physician.

**Skin contact** Allow to evaporate. Wash off with warm water. If symptoms persist, call a physician.

**Eye contact** Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.

**Ingestion** Unlikely route of exposure.

**Most important symptoms/effects, acute and delayed**

**Inhalation** In case of higher concentrations: narcosis, asphyxia, may cause cardic arrhythmia.

**Skin contact** Contact with liquid or refrigerated gas can cause cold burns and frostbite. Prolonged skin contact may defat the skin and produce dermatitis.

**Eye contact** Causes frostbite burns to eyes. Symptoms: Lachrymation, redness, swelling of tissue, frostbite, burn.

**Ingestion** Gas. Not applicable.

## 5. Fire-fighting measures

**Extinguishing media**

Suitable extinguishing media: As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.

Unsuitable extinguishing media: None.

| | |
|---|---|
| **Specific hazards arising from the Chemical** | The product is not flammable.<br>Hazardous decomposition products formed under fire conditions. |
| **Special protective actions for Fire-Fighters** | Wear self-contained breathing apparatus and protective suit<br>Wear chemical resistant oversuit<br>Special protective actions for fire-fighters<br>In case of fire, use water spray<br>Keep product and empty container away from heat and sources of ignition |

## 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

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

## 7. Handling and storage

| | |
|---|---|
| **Precautions for safe handling** | Use only in well-ventilated areas<br>Use only clean and dry utensils<br>Keep away from water<br>Preferably transfer by pump or gravity<br>Keep away from incompatible products |

**Conditions for storage, including incompatibilities**

| | |
|---|---|
| Storage | Keep only in the original container<br>Store in a receptacle equipped with a vent<br>Keep containers tightly closed in a cool, well-ventilated place<br>Keep in properly labelled containers<br>Keep in a bunded area<br>Keep away from heat/sparks/open flames/hot surfaces. No smoking.<br>Keep away from incompatible products |
| Packing material | Suitable material – steel cylinder |
| **Specific use(s)** | For further information, please contact supplier. |

## 8. Exposure controls / personal protection

**Control parameters**

Exposure limit values

| Substance | Harp acceptable exposure limit | EH40 workplace exposure limits |
|---|---|---|
| 1,1,1,2-Tetrafluoroethane | TWA = 1000 ppm | TWA = 1000 ppm / 4240 mg/m$^3$ |
| Pentafluoroethane | TWA = 1000 ppm | Not listed |
| Difluoromethane | TWA = 1000 ppm | Not listed |

**Exposure controls**

| | |
|---|---|
| Appropriate engineering controls | Ensure adequate ventilation<br>Apply technical measures to comply with the occupational exposure limits |
| Respiratory protection | Self-contained breathing apparatus (EN 133)<br>Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions<br>Use only respiratory protection that conforms to international / national standards |
| Hand protection | Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact).<br>Protective gloves<br>Suitable material: Fluoroelastomer |
| Eye protection | Tightly fitted safety goggles |
| Skin and body protection | Wear suitable protective clothing<br>If splashes are likely to occur, wear: apron, boots, Neoprene |
| Hygiene measures | Eye wash bottles or eye wash stations in compliance with applicable standards<br>When using do not eat, drink or smoke<br>Gloves, overalls and boots have to be double layered (protection against cold temperature).<br>Handle in accordance with good industrial hygiene and safety practice |
| Environmental exposure controls | Dispose of rinse water in accordance with local and national regulations. |

## 9. Physical and chemical properties

| | |
|---|---|
| **Form** | Compressed liquefied gas |
| **Colour** | Colourless |
| **Odour** | Ether-like |
| **pH** | Neutral |
| **pKa** | Not applicable |
| **Melting point/freezing point** | -103°C (Pentafluoroethane) |
| **Boiling point/boiling range** | -44 to -37°C |
| **Flash point** | Not applicable |
| **Evaporation rate** | No data |
| **Flammability (solid, gas)** | The product is not flammable |
| **Flammability** | Not applicable |

| | |
|---|---|
| **Explosive properties** | Not explosive |
| **Vapour pressure** | 10.35 bar at 20°C<br>21.94 bar at 50°C (Pentafluoroethane) |
| **Vapour density** | 3.45 |
| **Density** | Not applicable |
| **Relative density** | 1.17 at 20°C |
| **Bulk density** | Not applicable |
| **Solubility** | 430 mg/l at 25°C, water (Pentafluoroethane) |
| **Solubility/qualitative** | No data available |
| **Partition coefficient: n-octanol/water** | log Pow: 1.48, 20°C (pentafluoroethane) |
| **Auto-ignition temperature** | No data available |
| **Decomposition temperature** | No data |
| **Viscosity** | Not applicable |
| **Oxidizing properties** | Non oxidizer |

## 10. Stability and reactivity

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

## 11. Toxicological information

| | |
|---|---|
| **Acute toxicity** | |
| Acute oral toxicity | Not applicable |
| Acute inhalation toxicity | LC50, 4 h, >2,080,000 mg/m$^3$ (1,1,1,2-Tetrafluoroethane) |
| Acute dermal toxicity | Not applicable |
| **Skin corrosion/irritation** | Not applicable |
| **Serious eye damage/eye irritation** | Not applicable |
| **Respiratory or skin sensitization** | Guinea pig, did not cause sensitization on laboratory animals |
| **Mutagenicity** | In vitro tests did not show mutagenic effects (Pentafluoroethane)<br>In vivo tests did not show mutagenic effects (Pentafluoroethane) |
| **Carcinogenicity** | Negative (1,1,1,2-Tetrafluoroethane) |
| **Toxicity for reproduction** | Developmental toxicity, rat, no observed effect (1,1,1,2-Tetrafluoroethane) |
| **Repeated dose toxicity** | Inhalation, after a single exposure, dog, cardiac sensitization following adrenergic stimulation<br>Inhalation, rat, >=50000ppm, NOAEL (1,1,1,2-Tetrafluoroethane)<br>Inhalation, repeated exposure, rat, >=50000ppm, NOAEL (Pentafluoroethane)<br>Inhalation, 90-day, rat, 108 mg/m$^3$, NOAEL (Difluoromethane) |
| **Other information** | No data available |

## 12. Ecological information

**Toxicity**

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

**Persistence and degradability**

Abiotic degradation: Air, indirect photo-oxidation. T ½ from 4.16 – 28.2 y
Conditions: sensitizer: OH radicals.
Degradation products**:** carbon dioxide (CO2) / hydrofluoric acid / TFA

Biodegradation: Aerobic, tested according to closed bottle test, chemical degradation, 2-5% after 28 d. Result: not readily biodegradable
Aerobic, tested according to biodegradation by methane oxidation. Result: not readily biodegradable (1,1,1,2-Tetrafluoroethane)

**Bioaccumulative potential**: Bioaccumulative potential: log Pow 0.21-1.48. Result: does not bioaccumulate

**Mobility**: Soil/sediments, adsorption, log KOC: from 1.05 – 1.7. Conditions: calculated value
Air, Henry's law constant (H), from 19.7 – 150 hPa.m$^3$/mol, 20°C. Conditions: calculated value, considerable volatility

**Other adverse effects**: Ozone depletion potential = 0
Result = no effect on stratospheric ozone
Ozone depletion potential; ODP; (R11 = 1)
Global Warming Potential = 0.25
Halocarbon global warming potential; HGWP; (R11 = 1) (1,1,1,2-Tetrafluoroethane)

## 13. Disposal considerations

**Waste disposal methods**: In accordance with local and national regulations
Refer to manufacturer/supplier for information on recovery/recycling

**Contaminated packaging**: To avoid treatments, as far as possible, use dedicated containers
Where possible recycling is preferred to disposal or incineration

## 14. Transport information

**International transport regulations**

**IATA-DGR**

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

**IMDG**

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

**ADR**

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

**RID**

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

**ADN**

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

## 15. Regulatory information

**Applicable Laws or Regulations**

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

**Notification status**

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

## 16. Other information

**Full text of H-Statements referred to under section 3**

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

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

Information in this publication is believed to be accurate and is given in good faith but it is for the user to satisfy itself of the suitability for its own particular purpose. Accordingly, Harp International Limited gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition, statutory or otherwise, is excluded except to the extent that such exclusion is prevented by law. Freedom under Patent, Copyright and Designs cannot be assumed. HARP® is a trademark, the property of Harp International Ltd.

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# 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<br>39 Hayhill Industrial Estate, Barrow upon Soar,<br>Leicestershire, LE12 8LD. United Kingdom.<br>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.<br>Propylene glycol (CAS 57-55-6) (REACH 01-2119456809-23)<br>(EINECS 200-338-0) not classified.<br>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 |

# SAFETY DATA SHEET
# HEXID A4 HEAT TRANSFER FLUID

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| | | |
|---|---|---|
| 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.

# SAFETY DATA SHEET
# HEXID A4 HEAT TRANSFER FLUID

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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.