Airedale
APPLIED THERMAL INNOVATION

Chiller | Water cooled



TurboChill™ Water Cooled

150kW - 1576kW*

* based on 4 models

+ ESEER up to 8.86
+ Class A EER up to 5.4
+ Up to 111% more cooling kW/m²*
+ 3 module variants (R134a TT300 & TT350, R1234ze TG310)

  * compared with leading competitor units

HFC R134a — HFC R134a
HFO R1234ze — HFO R1234ze
CENTRIFUGAL COMPRESSOR

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BRITISH MANUFACTURER | ENERGY EFFICIENCY | CONTROLS | SERVICE | TRAINING

Unparalleled efficiency

Ultimate in advanced chiller technology

The TurboChill™ Water Cooled is a high capacity, water-cooled, single circuit chiller, which offers exceptional ESEER values of up to 8.86.

With 3 module variants, including the R1234ze TG310 range which has been specifically developed for use with the low Global Warming Potential (GWP) refrigerant R1234ze, the TurboChill™ Water Cooled utilises the latest compressor engineering and benefits from revolutionary new compact evaporator and condenser heat exchanger technology.

- 3 module variants (R134a TT300 & TT350, R1234ze TG310)
- 394kW – maximum capacity per module
- 1 compact case size – 2000mm (H) x 1000m (W) x 1956mm (L)
- Extremely silent operation. 2 sound variants; regular quiet (R) and extra quiet (X)

Centrifugal TurboCor compressors

30-100% variable speed control for tighter setpoint management and unbeatable efficiencies at part load. Total oil-free operation provides quiet, reliable, optimised operation and reduced maintenance costs

Revolutionary compact spray type evaporator with integral subcooler

67% reduced space claim (m^2), 56% reduced refrigerant charge (kg). Delivers the same performance when compared to a traditional flooded shell and tube evaporator of the same nominal capacity

Compact condenser

Discharge gas is dispersed across the water tubes via a top discharge connection. The result is very low approach temperatures of 1.2K with minimal space claim.

Scalable modular design

Multiple TurboChill™ Water Cooled modules can be connected via a common waterside and an integrated multiple module control strategy.

This enables:

Augmentation – plant capacity can grow with demand, easily increasing at a later date by simply adding more modules

Reduced space claim and easy access – component layout is designed to enable several units to be positioned side by side in restricted plant rooms yet still ensure easy access to essential components. This is ideal when standby is required or when cooling duty is to be increased at a later date

Significant cost saving – due to minimised footprint, cost savings can be realised in terms of installation and facility cost per square metre

Easy manoeuvrability – modules can be easily moved via a 2 metre pallet truck

Compact & efficient heat exchanger technology

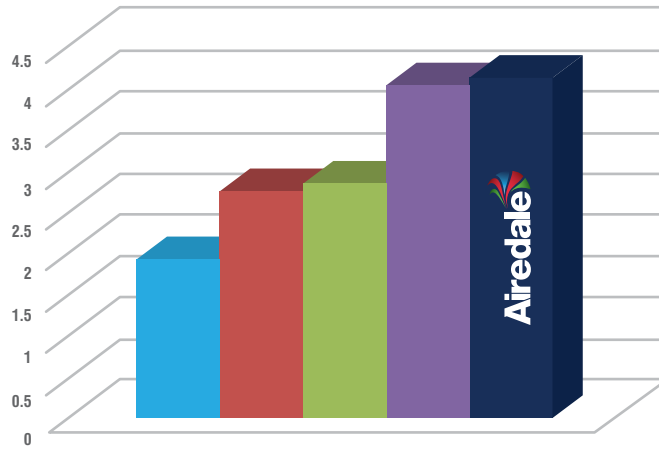
Innovative compact spray evaporator technology means that the TurboChill™ Water Cooled provides reduced space claim and refrigerant charge and the same performance when compared to a traditional flooded shell and tube evaporator of the same nominal capacity.

67% reduction in m² compared to a standard evaporator system – unit only 1000mm wide

56% reduction in kg of refrigerant compared to a standard flooded evaporator system - resulting in cost reductions and environmental benefits

More cooling per square metre

Optimised for use with three different compressor models (1.96m² footprint per module), the TurboChill™ Water Cooled provides up to 111% more cooling per square metre than our nearest competitors.



Up to 111% more cooling per square metre than our nearest competitors

Competitor 1 Competitor 2 Competitor 3 Competitor 4 Airedale

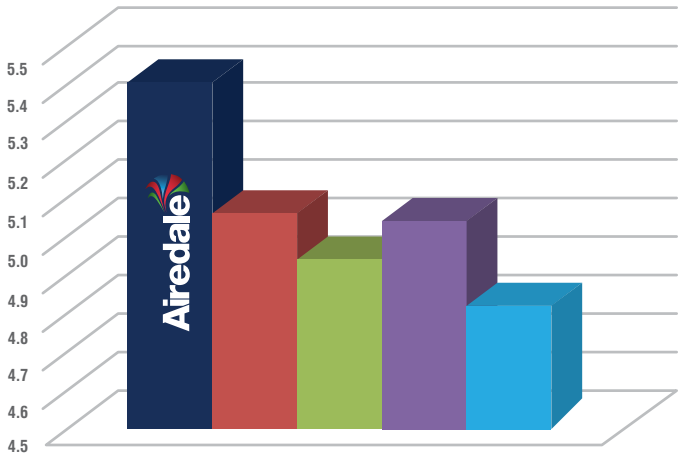
y axis: Footprint m² x axis: Leading competitors circa 300kW nominal capacity

Reduced operating costs

Minimal environmental impact

Class A EER up to 5.4

Offering market leading energy efficiency, the TurboChill™ Water Cooled provides a 7% increase in EER when compared with other leading competitor units.



Up to a 7% increase in EER compared to our nearest competitors

Airedale · Competitor 1 · Competitor 2 · Competitor 3 · Competitor 4

y axis: EER x axis: leading competitors circa 300kW nominal capacity

BREEAM

BREEAM aims to reduce the life cycle impact of new buildings on the environment by awarding points for products used within the building's design which minimise the building's carbon footprint.

The TurboChill™ Water Cooled (TCW) range contributes to a building potentially achieving an additional two BREEAM points. Points can be achieved in the following ways:

1. TurboChill™ Water Cooled (TCW) models which use the new R1234ze refrigerant automatically receive two BREEAM points as the refrigerant has a global warming potential of less than one.
2. TurboChill™ Water Cooled (TCW) models which feature the refrigerant R134a qualify for one BREEAM point automatically. They can also receive a further BREEAM point if the leak detection and refrigerant pump down option is selected.

HFO R1234ze

Low GWP refrigerants

The R1234ze TG310 range has been specifically developed for use with the refrigerant R1234ze.

R1234ze significantly reduces environmental impact and has a low global warming potential (GWP) of under one*. This means that the time taken for the refrigerant to break down and for it to be absorbed into the atmosphere is minimised. Therefore, the lifespan of the refrigerant R1234ze is just 16 days.

*As rated by the International Panel for Climate Change (IPCC).

Next generation

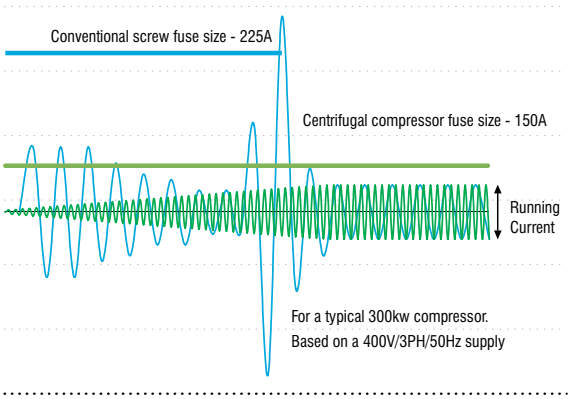
Oil-free compressor technology

The TurboChill™ Water Cooled range utilises oil-free centrifugal compressors (TT300/TT350/R134a) and the new TG310 compressor, which operates using the next generation low, global warming potential refrigerant R1234ze.

These intelligent, self-optimising compressors enable variable speed control and minimise input power with near silent operation. Magnetic bearings within the centrifugal compressor levitate the compressor shaft and with no mechanical contact or friction between mating surfaces, the need for lubrication is eliminated.

Low current start

By removing the transient starting “spikes” normally associated with screw chillers of this capacity, electrical supply components need not be oversized on the site.

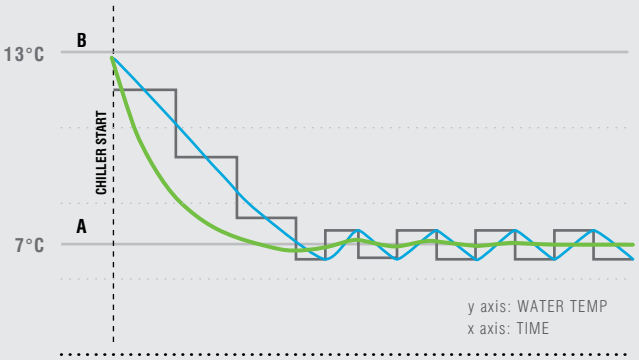


Integral low current start (2A)

Centrifugal compressor Conventional screw

Excellent reliability: No operational wear and tear

With virtually no vibration and fewer moving parts within the compressor, there is no operational wear and tear. Costly bearing replacement is therefore avoided and equipment life extended. In the event of a power failure, the compressor acts as a generator and powers itself down in a controlled manner.



30-100% modulating TurboChill™ vs. staged screw chiller

TurboChill modulating supply water temperature
Conventional screw chiller water temperature
Step control conventional screw chiller - 4 stages of cooling

A = Supply temperature setpoint B = Actual water temperature

Exact capacity match

Variable speed compressor control ranging from 30 – 100% allows the TurboChill™ Water Cooled to save substantial amounts of energy when operating at part load. Variable speed control facilitates accurate supply water set point control. It enables the TurboChill™ Water Cooled to react to system load fluctuations and exactly match cooling demand.

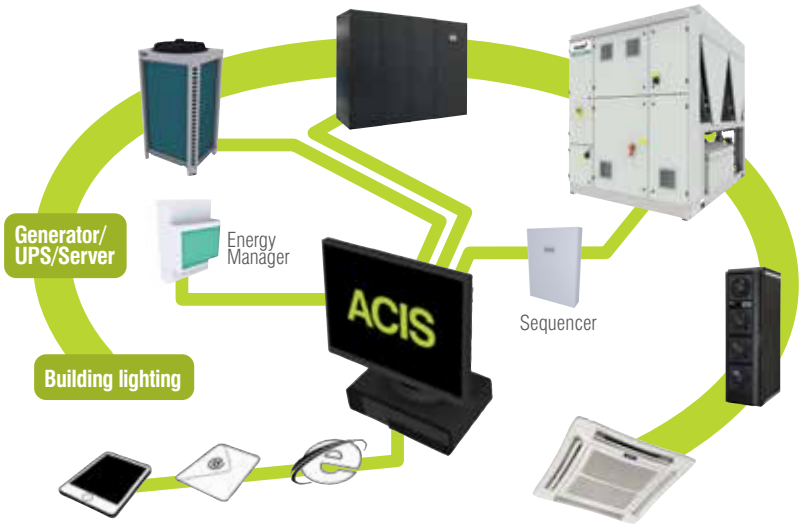
Intelligent controls

Seamlessly managing your system

The control centre of each of our cooling systems is a sophisticated electronic microprocessor specially developed by Airedale. The intelligent microprocessor uses sensors which allow active components to interact. By integrating and sequencing components, the controller manages and optimises the system's performance, availability and power draw, giving the operator complete system control.

Fully-programmable via the control panel's user-friendly display, the microprocessor can be linked with all standard BMS protocols to:

- **Trigger alarm messages**
- **Send alarm/service messages via email or SMS using an interface**
- **Operate time scheduling**
- **Allow adjustment of temperature setpoints**

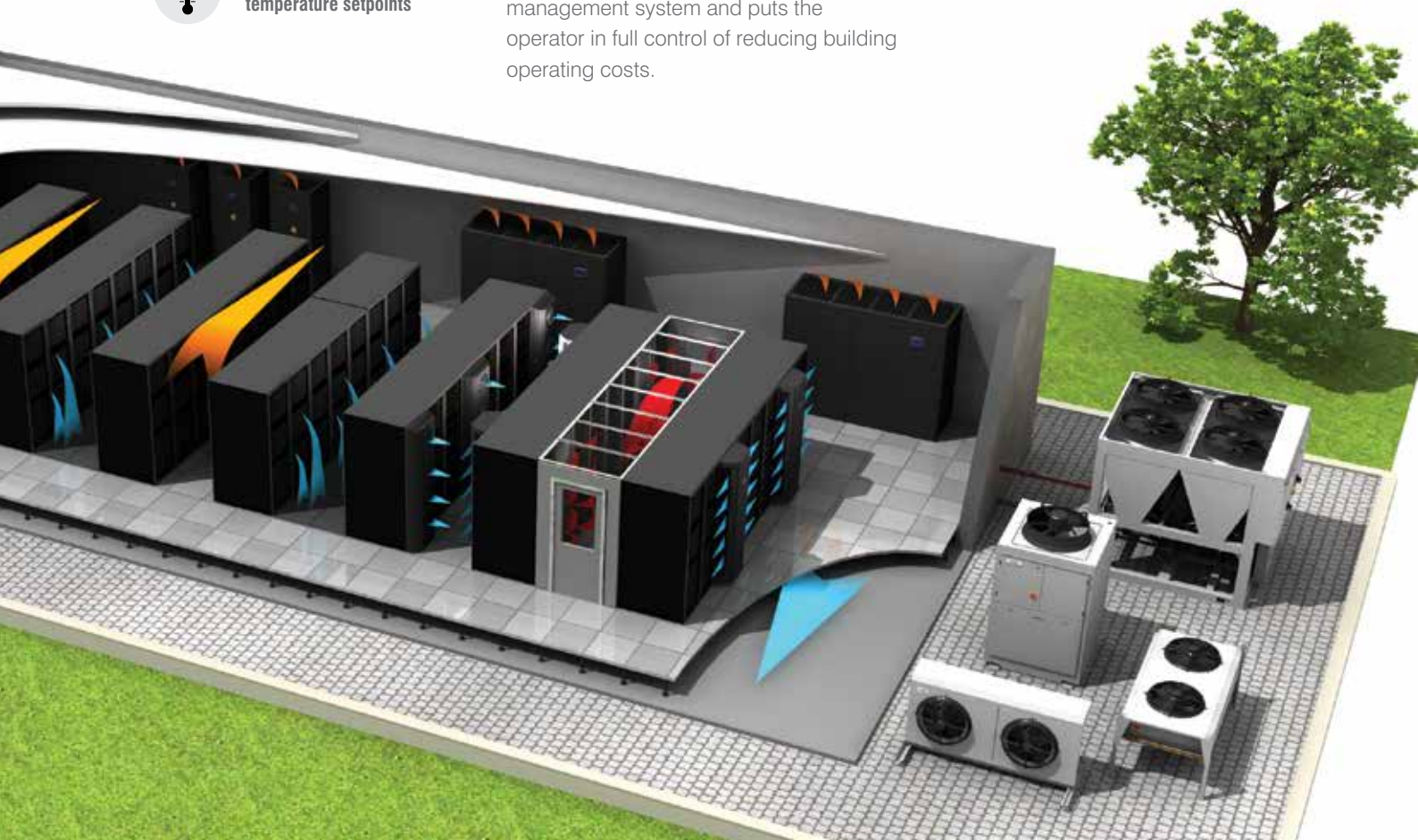


ACIS™

ACIS™ is a building management system developed by Airedale, which enables smart cooling and other building services, from any manufacturer, to be managed through a single, integrated solution across multiple sites and communication protocols.

ACIS™ sits at the front end of a building management system and puts the operator in full control of reducing building operating costs.

Through the click of a button on a PC, tablet or phone, intelligent information can be retrieved automatically allowing informed, data driven decisions to be made. With 24/7 access, ACIS™ provides an ideal solution for remote monitoring and maintenance, including live PUE, EER and COP calculations and power distribution monitoring.



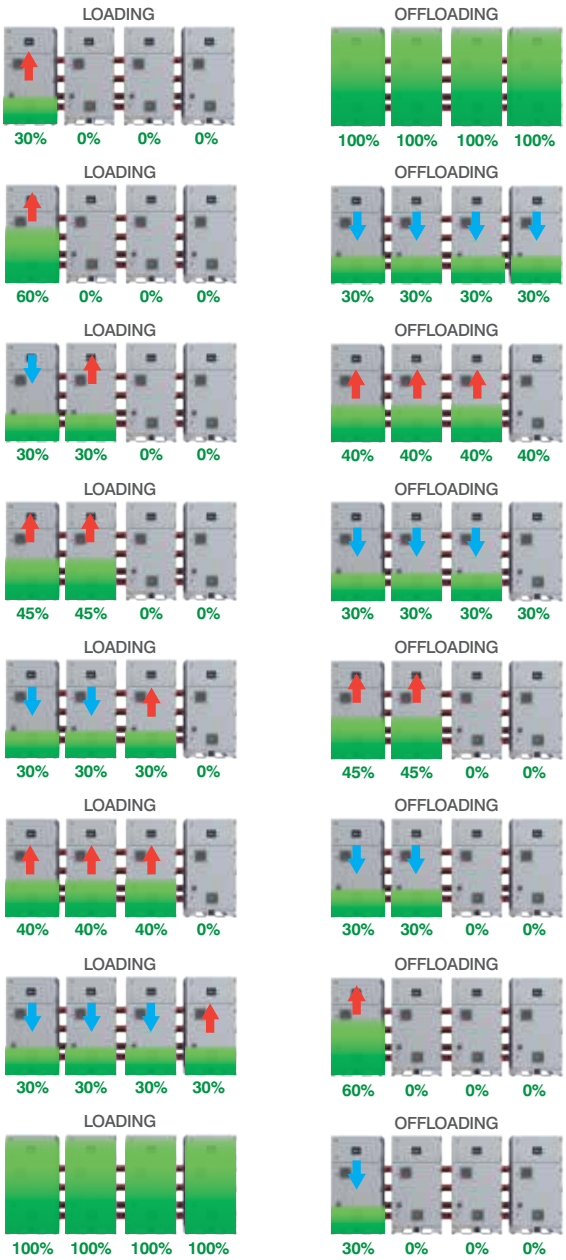
Specifications at a glance

Sequencing chillers for increasing the system EER

The ultra-efficient sequencer of the TurboChill™ Water Cooled integrates up to eight modules (circa 3MW) into a single, seamless operating system. The loading sequence maximises the system EER for a given load, where multiple modules will share the load evenly when possible.

As can be seen in the above illustration a single module ramps up to 60% demand, the second module becomes active and ramps up to 30% (minimum), at the same time the first module now ramps down to 30, the load is now shared. This same process is continued up to the 4 modules shown.

Once all modules are active they will load up equally as the system load increases. This loading strategy allows each module to operate at part load as much as possible, maximising efficiency. The offloading strategy is the reverse of this.



Environment

- TurboChill™ Water Cooled range available with R134a refrigerant (1 BREEAM credit) and the new low GWP refrigerant R1234ze (2 BREEAM credits)
- Two sound variants; Regular Quiet (R), Extra Quiet (X)
- Centrifugal compressor technology offers near silent compressor operation
- Acoustically lined compressor enclosures minimising sound emission
- Compact and efficient heat exchanger technology - 56% reduction in kg of refrigerant compared to a standard flooded evaporator system
- Leak detection as standard for F Gas compliance

Optional

- Anti-vibration mounts reduce sound levels transmitted to building

Mechanical

- 3 module variants (R2134a TT300 & TT350, R1234ze TG310)
- 394kW – maximum capacity per module
- 1 case size – 2000mm (H) x 1000m (W) x 1956mm (L)
- Compact spray type evaporator with integral subcooler
- Easy access to components for maintenance and only 1000mm wide to allow access through a standard door
- Condenser can be isolated, facilitating maintenance
- Modular construction – enables easy augmentation and reduces space claim
- Grooved pipework for simpler installation

Optional

- Suction shut off valve allowing each compressor to be individually isolated
- Optimised leak detection

Nomenclature explained

TCW	1	1	R	C1	E1	-	S

TCW	TurboChill™ Water Cooled
1	Number of Circuits
1-3	Number of Compressors
R/X	Noise Variant (Regular R or Extra X Quiet)
C1	Condenser Code (C1)
E1	Evaporator Code (E1)
S/L/G	Compressor Code (S,L,G)

Compressor Allocations				Min Capacity (kW)	Max Capacity (kW)
1	2	3	4	100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600	
1	TCW-S	-	-	-	315kW
	TCW-G	-	-	-	
	TCW-L	-	-	-	394kW
2	TCW-S	TCW-S	-	-	630kW
	TCW-G	TCW-G	-	-	
	TCW-L	TCW-L	-	-	788kW
3	TCW-S	TCW-S	TCW-S	-	945kW
	TCW-L	TCW-L	TCW-L	-	
	TCW-L	TCW-L	TCW-L	-	1182kW
4	TCW-S	TCW-S	TCW-S	TCW-S	1260kW
	TCW-G	TCW-G	TCW-G	TCW-G	
	TCW-L	TCW-L	TCW-L	TCW-L	1576kW

* Based on nominal design conditions 12/7°C Evaporator water , 30/35°C Condenser water

Electronics & controls

- Advanced controls technology to manage and optimise performance
- Ultra-efficient sequencer – integrates up to eight modules into a single, seamless operating system.
- PGD1 display
- 400V/50Hz/3 phase supply
- Accessible control panel, even when the unit is operational
- Single point of isolation for ease of maintenance
- Control panel ventilation
- Ventilated compressor enclosure (TG310/R1234ze version)

Optional

- Flow switch for flow rate detection
- Power monitoring to manage energy consumption
- 7" PGD touch screen display
- Interface cards

Energy-saving

- ESEER up to 8.86
- Centrifugal TurboCor compressors - 30-100% variable speed control for tighter setpoint management and unbeatable efficiencies at part load
- Class A EER up to 5.4 - provides a 7% increase in EER when compared with other leading competitor units
- Oil-free operation enhances heat exchanger efficiency
- Compact footprint: Up to 111% more cooling kW/m^2 (compared with leading competitor units)
- In-built low current start (2A)
- Electronic Expansion Valves increase ESEER by 30% and guarantee ideal evaporator operation

Optional

- Economiser circuit for increased capacity and efficiency

Technical specifications

Model no.	Refrigerant	Nominal cooling (kW) [1]	EER	ESEER [2]	SEER	Sound pressure @ 10m (dBA)	Dimensions** (H x W x L)(mm)
Regular Quiet - Single Circuit - Air Cooled							
TCW11RC1E1-S	R134a	315	5.42	8.86	8.47	57.0	2000 x 1000 x 1956
TCW11RC1E1-G	R1234ze	315	5.24	8.19	7.88	57.8	2000 x 1000 x 1956
TCW11RC1E1-L	R134a	394	5.03	7.83	7.54	57.8	2000 x 1000 x 1956
Regular Quiet - Dual Circuit - Air Cooled							
TCW11XC1E1-S	R134a	315	5.42	8.86	8.47	47.0	2000 x 1000 x 1956
TCW11XC1E1-G	R1234ze	315	5.24	8.19	7.88	47.8	2000 x 1000 x 1956
TCW11XC1E1-L	R134a	394	5.03	7.83	7.54	47.8	2000 x 1000 x 1956

(1) Nominal cooling capacity and EER is based on 7/12°C evaporator water Evaporator and 30/35°C condenser water*
(2) ESEER based on Eurovent standard calculation method***
* Based on compressor input power only
** Does not include external valve work
*** Does not include pump power

Performance tested

and proven

Quality is assured by our on-site, world-class testing facilities that set the standard as one of the most advanced testing centres of its kind within the global air conditioning industry.

This facility is integral to our development process and ensures our team of designers and engineers conduct a rigorous test program to produce and improve each of our manufactured units.

Designed and built to exceed stringent international standards, our test centre is capable of testing a complete range of air conditioning equipment including precision air conditioning to 250kW and chillers up to 2MW.

We apply a consistent design philosophy which combines innovative sustainability with premium performance and efficiency across each range. Our state-of-the-art, on-site R&D laboratory is BS EN 14511 and BS EN 13053 compliant and allows us to test units for every application.

Our air conditioning units consistently offer some of the industry's leading proven environmental and cost performance figures, combined with the highest quality, reliability and service.

TurboChill™ Water Cooled

in action

High efficiency cooling at John Lewis

TurboChill™ FreeCool with low GWP refrigerant R1234ze is currently cooling shoppers visiting the new £15 million John Lewis store in York.

John Lewis was built on the principles of being a responsible business and as part of its wider corporate social responsibility strategy, is committed to reducing its carbon footprint. The TurboChill™ system was selected, as it provided the best solution for John Lewis, creating perfect synergy to a range of stringent sustainable design requirements.

National Gallery, London

> Airedale ticked all the boxes in terms of footprint, build quality, new technology such as the centrifugal compressor, and high efficiency. The National Gallery is a high user of energy because of its large areas of air conditioned space. The Gallery's goal is to reduce energy consumption and the TurboChill™ assists that.
>
> **Martin Goswell**
> Project Engineer, Troupe, Bywaters and Anders

Iceland Frozen Foods

> By using an Airedale solution, over 500 stores have been upgraded to date, with energy costs reduced on average by £3,000 per store p.a. Across the whole group this equates to a saving of over £1.5m and a CO2 reduction of 9,890 tonnes
>
> **Graham Ireland**
> Building Services Manager, Iceland Frozen Food

Total support

Whenever you need it

At Airedale, we don't just manufacture and supply cooling and refrigeration products; we also provide a broad range of supporting services to ensure our customers receive the best possible aftersales care.

With more than 40 years' experience in business critical cooling, investing in an Airedale cooling or refrigeration solution means that you can benefit from our advice, expertise and technical support too. From design and selection, through to commissioning and beyond, we make sure your system reduces your total cost of ownership, whilst providing maximum availability and longevity.

Service plans

Maximising your system's effectiveness 24/7

An Airedale service plan provides a planned, preventative maintenance package to sustain the optimum efficiency of your system, enabling the user to see real savings in energy costs and reduced carbon emissions.

With Airedale, you can rest assured that help is never far away. Our 24/7 emergency helpline and call out service is available 365 days of the year, ensuring that we are always on hand to provide expert advice and immediate help, day or night.

A guaranteed emergency response time means that a qualified Airedale engineer will be with you in no time, therefore maximising your system's uptime. Service plans also ensure F Gas compliance and incorporate a full parts and labour warranty for the first 12 months.

For more information visit **www.airedale.com**

* For customers outside the UK, our international distributors trained by Airedale would be pleased to offer service on Airedale units

Talk directly with an experienced engineer

Find out how we design our systems to reduce your whole life costs. Our highly experienced engineers are adept at tailoring our systems to suit your requirements.

+44 (0)113 239 1000

Have complete control of your site

Customers with critical sites can benefit from our remote monitoring facility. Aftersales services include chiller sequencing, network setup and integration as well as a live demonstration and training centre at our head office.

24/7 support; maintenance and spares

Immediate help on hand to keep your critical cooling system operational. Realise the full potential of your system; improve its longevity and efficiency and be F Gas compliant. Avoid downtime with our fast, efficient spares service.

Develop your skills

Learn more about your cooling system by attending an air conditioning and refrigeration course in our purpose-built training school. Train on high-tech cooling systems and fully operational rigs in our dedicated workshops. Industry recognised courses also available. Email **training@airedale.com** for further details.

Distributed by:

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A MODINE Company