

# 750 - 1300kW



## > **OptiChill FreeCool**

Flexible, free-cooling chiller solution

Typical applications

- > Precision air conditioning
- > Comfort cooling
- > Process cooling



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**NEW!**  
Free-cooling  
technology

# OptiChill FreeCool

## Specifications

### OptiChill FreeCool

The OptiChill FreeCool is a large capacity, low energy R134a air-cooled screw chiller that meets diverse cooling loads with a flexible, low sound cooling solution. Highly energy efficient, the OptiChill FreeCool offers more than 95% free-cooling over a year (cumulative hours, London, UK) and can save more than 50% of the energy consumed by a conventional chiller thus greatly reducing operational costs. For up to 30% of the year, the OptiChill FreeCool can operate purely in free-cooling mode, leading to Free-cooling EER's\* of up to 75. During any mechanical cooling, excellent part load efficiencies ensure an ESEER (European Seasonal Energy Efficiency Ratio) of up to 3.44.

\* See page 6

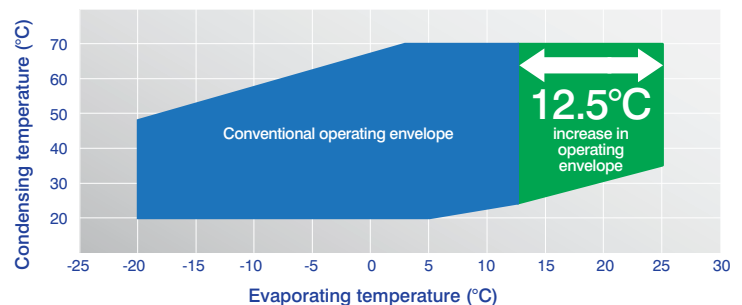


### Flexibility for optimum selection and energy balance

The application of concurrent free-cooling and cutting-edge technology led by smart control logic ensures the OptiChill FreeCool gives the best energy balance for all operating conditions. Configuration flexibility and a choice of over 200 models together with a raft of flexible options allow selection of the optimum specification, making the OptiChill FreeCool ideal for cooling a wide range of applications. The OptiChill FreeCool can be matched with Airedale's precision air conditioning and IT cooling products to provide real end user benefits in reducing power usage.

### OptiChill FreeCool: Increased operating envelope reduces power input

New compressor technology sees a 12.5°C increase in the operational evaporating temperature range allowing supply water temperatures to be increased, raising the free-cooling threshold and giving enhanced compressor efficiency and reduced power input.



### Key technical data

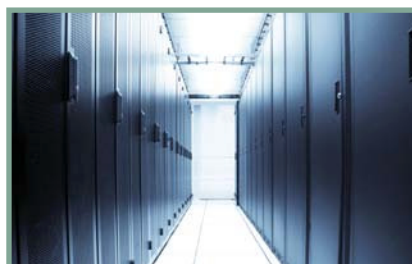
- > 750 to 1300kW nominal cooling capacities
- > Designed and optimised for R134a
- > 4 case sizes; two free-cooling variants, three fan variants\* and two sound level variants in each range, presenting a choice of over 200 model permutations
- > Low sound ranges: Quiet (R) and Extra Quiet (X)
- > Dual independent refrigeration circuits
- > Advanced ACIS controls technology
- > Latest fan technology for reduced sound and power input
- > Intelligent head pressure control
- > Two screw compressors offering 8 stages for optimum efficiency, performance and reliability
- > High efficiency shell and tube evaporator
- > Large surface area condenser coils

\* Standard AC fan, optional EC (Electronically Commutated) fan or high air flow EC fan

### Typical applications



Process cooling



Precision air conditioning



Comfort cooling



## Energy saving benefits

EER<sup>1</sup> up to 3.06 ESEER<sup>2</sup> up to 3.44

- > Free-cooling virtually all year round
- > Economisers, each with dedicated EEV, to enhance compressor performance at full and part load operation (option)
- > Interactive head pressure setpoint management to achieve optimum EER
- > EC fan for ultimate system efficiency (option)
- > Efficient shell and tube evaporator with freeze protection offers high evaporating temperatures
- > Large surface area condenser coil with enhanced tube and fin for improved heat exchange and low noise
- > Inverter-controlled pump with flow monitoring and water filter for optimum constant water flow control (option)
- > Two sizes of free-cooling coil (2 and 3 rows) for increased annual efficiencies
- > Electronic expansion valves increase ESEER by 30%
- > Closed transition avoids high transient changeover current peaks (option)
- > Compressor power factor correction to 0.95 (option)
- > Automatic rescheduling of chilled water setpoint
- > Chiller Sequence Manager integrates up to 8 chillers into a single, efficient operating system (option)
- > Energy Manager for local and remote energy analysis and monitoring (option)

<sup>1</sup> EER (Energy Efficiency Ratio) @ 15/10°C, 35°C  
<sup>2</sup> ESEER (European Seasonal Energy Efficiency Ratio)

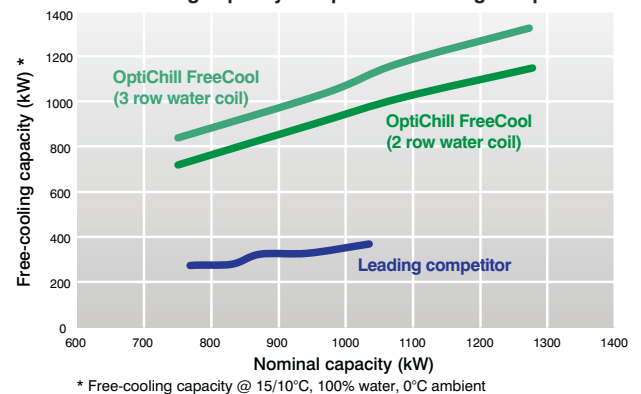
## Key feature: Free-cooling for over 95% of the year

Making use of the ambient air for cooling when the outdoor temperature is lower than the room saves vast amounts of energy. For concurrent free-cooling to operate, the temperature difference between the ambient air and hotter return water can be as little as 1°C. The system controls of the OptiChill FreeCool constantly monitor the temperature differences and will only switch on the mechanically-driven compressor when extra cooling is needed, introducing a mixture of free-cooling and/or mechanical cooling. In a concurrent free-cooling system, free-cooling will always take priority over DX cooling to ensure best system operating efficiency. In this way, the OptiChill FreeCool can save more than 50% of the energy consumed by a conventional chiller.

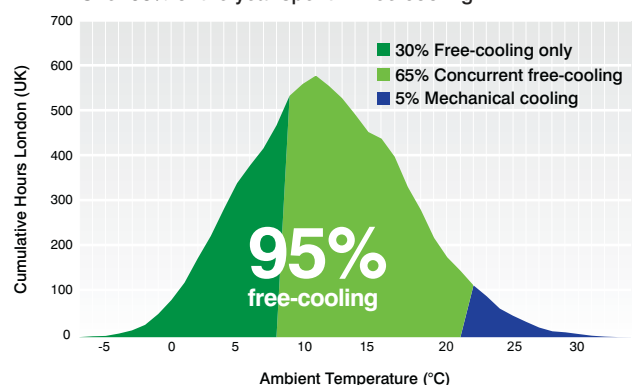
Concurrent free-cooling allows the OptiChill FreeCool to achieve a higher proportion of free-cooling than most of our competitors and twice as much free-cooling compared with an 'on/off' free-cooling system. The majority of models in the range will match the design capacity in free-cooling mode at an ambient of 3°C with a return water temperature of 15°C.

When the OptiChill FreeCool is linked with an air handling unit or rack-mounted unit in a 24/7 data centre with a typical room temperature of 24°C, over 95% of the year can be spent with free-cooling active (cumulative hours, London, UK).

### OptiChill FreeCool: Free-cooling capacity compared to leading competitor



### OptiChill FreeCool: Over 95% of the year spent in free-cooling



# OptiChill FreeCool

## Features and options

### Key feature: Modulating screw compressors to match cooling load

Top-of-the-range twin screw compressors offer high performance coupled with low sound and vibration levels. The compressors offer eight stages for optimum efficiency, performance and reliability and are complemented by optional economisers to produce a significant increase in cooling capacity.

Optimised for part load, the compressors give an improved ESEER and are applied in a way that ensures system design is fully integrated and the efficiency is maximised. The increased operating envelope of the compressors allows higher water temperatures and enhanced efficiency. A 1°C increase in fluid temperature can give a 10% increase in chiller energy efficiency.

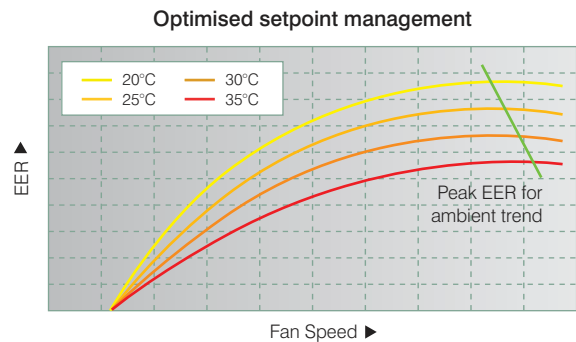


### Key feature: Interactive head pressure setpoint management for energy optimisation

When applying interactive head pressure setpoint management, the controls strategy for the OptiChill FreeCool modulates the fans to achieve the optimum efficiency (peak EER) for the unit at any ambient temperature. Where EC fans are featured, the optimum efficiency is greater.

The graph (right) illustrates the optimised setpoint management of the OptiChill FreeCool within the ambient range 20 - 35°C. The procedure is not restricted to this ambient range but applied wherever possible.

An additional benefit of interactive head pressure setpoint management, is that sound levels are reduced, particularly during part load operation. (See next section)

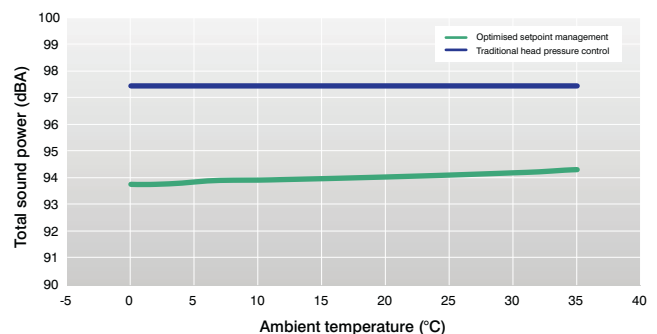


### Key feature: Low sound

Optimised setpoint management has the added benefit of reducing the sound levels of the chiller throughout its operating ambient temperature range, as illustrated in the graph (right).

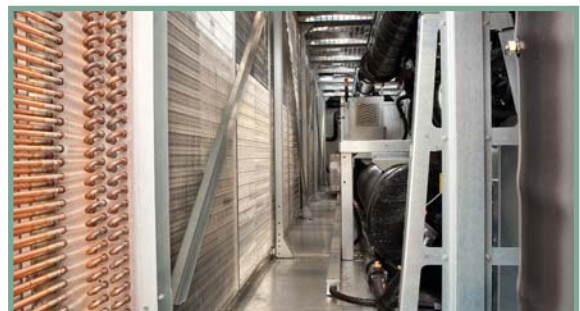
The OptiChill FreeCool offers two sound ranges – Quiet (R) and Extra Quiet (X). Acoustically-lined compressor enclosures are featured as standard on Extra Quiet models and as an option on Quiet units. Low sound levels have been a prime consideration throughout the design process of the OptiChill FreeCool and the selection of components. Vibration has been minimised and contained at source to prevent transfer through the system, so reducing sound for end user applications.

### Reduced sound levels achieved with optimum setpoint management



### Key feature: Efficient heat exchangers for improved system efficiency

The large surface area of the condenser coils provides greater heat exchange and improved air flow configuration. The shell and tube evaporator offers an extremely high evaporating temperature for a given supply water temperature. Cleverly-designed sickle-bladed axial fans present a revolutionary new blade design for optimum aerodynamic performance, reduced power input and lower noise levels. Higher air velocity is achieved without increase in sound and pipe work is optimised to harness the heat exchanger benefits. All these factors combine to enhance compressor performance and improve system efficiency.





**Key option: Electronically commutated (EC) fans\***

Offered as an option in the OptiChill FreeCool for ultimate condenser efficiency at full and part load, cleverly-designed axial fans use the latest electronically commutated (EC) motor technology. EC technology combines AC and DC voltages to bring the best of both technologies and give increased performance at reduced power input. At certain conditions an EC fan gives energy savings of more than 80% compared with an AC fan.

Featuring low motor temperature, the EC fan has a longer life than an AC equivalent; electronic and power transformation are completely integrated within the motor and fan control is simple and precise, based on exact feedback from the motor.

\*Optional high air flow version available



**Key option: Closed transition star/delta starting**

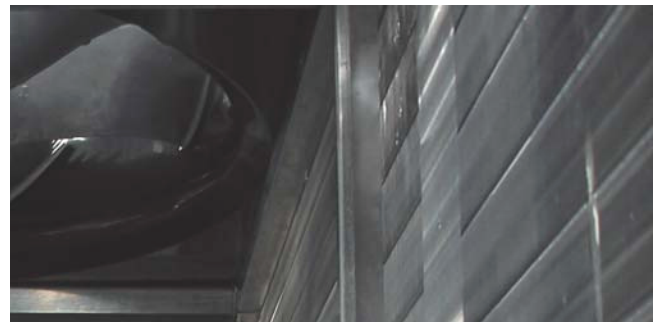
During normal star delta starting of a motor, a split-second disconnection occurs between the star and delta steps which can cause high peak currents when the delta step is initiated.

Normal star delta start



Closed transition star delta starting fills the gap with a resistive load, thereby vastly reducing delta current peak and promoting a longer lifespan of the compressor motor.

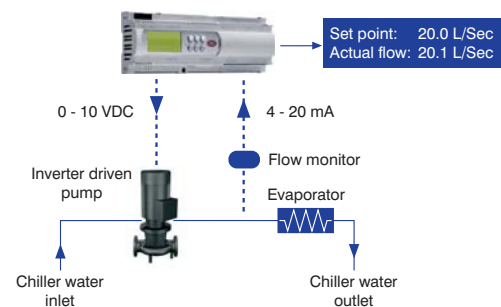
Closed transition star delta start



**Key option: Inverter controlled pump with electronic flow meter**

An optional inverter-driven pump coupled with flow monitoring offers the ultimate in water flow control. Based on a signal from the on-board flow monitor, the inverter-driven pump will speed up and down to maintain the design flow rate and in addition, offer low flow protection.

Significant energy savings can be made by running the pump to achieve exactly the right flow for the application. The desired flow rate is simply entered into the microprocessor and the system will maintain that flow rate, simplifying commissioning and allowing the chiller flow rate to be continually monitored.



**More features**

- > Filter drier, sight glass and liquid and discharge ball valves for full refrigeration system integrity
- > Victaulic water connections for simple, quick installation
- > Separate busbar chamber with optional positioning of cable entry allows for on-line maintenance
- > Maintainable dual pressure relief valve assembly
- > Electrical supply phase rotation protection
- > Operation up to 35°C ambient at full load, 40°C at reduced load

**More options**

- > Modem link for remote monitoring
- > Leak detection system for F Gas compliance
- > Corrosion-resistant condenser coils for aggressive atmospheres
- > Coil guards to help prevent fin damage
- > Condenser fan air discharge plenum – choice of two heights
- > Anti-vibration mounts
- > Low ambient kit for operation in ambients as low as -30°C

# OptiChill FreeCool

AireTronix controls

## Intelligent Controls

OptiChill FreeCool chillers are equipped with intelligent Airetronix microprocessors specially developed by Airedale to facilitate automation and optimisation of the system. The fully programmable microprocessors are linked with key components within the cooling system, allowing sophisticated, modulating and self-optimising control for increased energy efficiency.

## User-friendly display

The controller's in-built display allows viewing of the unit's operating status and its multi-button keypad enables adjustment to control parameters by giving the operator easy access to a menu system. The control panel is accessible while the chiller is in operation.



### Standard microprocessor features

- > 8 x 20 LCD backlit display
- > 24 MHz 16 bit CPU
- > 2 MB FLASH program memory
- > 512 kB RAM data memory
- > Remote on / off capability
- > Compressor anti-cycle control
- > Compressor rotation
- > Compressor hours run log and reset
- > Visual alarm display
- > Password protection

## Key option: Energy Manager



A compact, space-saving analyser with easily readable LCD display enables you to monitor the OptiChill FreeCool's energy consumption locally and remotely via BMS connections.

## Remote supervision



### ACIS

The latest technology BMS software, ACIS is a powerful, intelligent, programme which integrates multi-unit systems managed by intuitive AireTronix controllers and located on one or more sites, into a single, proactive control platform. With the click of a button, information can be pulled back automatically and used for remote monitoring and control including 24/7 alarm indication; time scheduling and adjustment of temperature setpoints for system optimisation and energy efficiency.

## Integration

The network-capable AireTronix controller can be integrated with a wide range of BMS protocols.

Modbus®

ECHELON  
THE LONWORKS COMPANY

BACnet™

PlantVisorPRO

TREND

META-SYS  
COMPATIBLE



### pCOWeb Ethernet solution

pCOWeb supervisory plug-in cards make communicating with the OptiChill FreeCool purely a matter of logging onto the office intranet or the web. Based on ethernet TCP/IP secure technology, BACnet and SNMP features, pCOWeb requires no proprietary cabling or monitoring software, little or no set-up on site and is pre-programmed with an IP address.

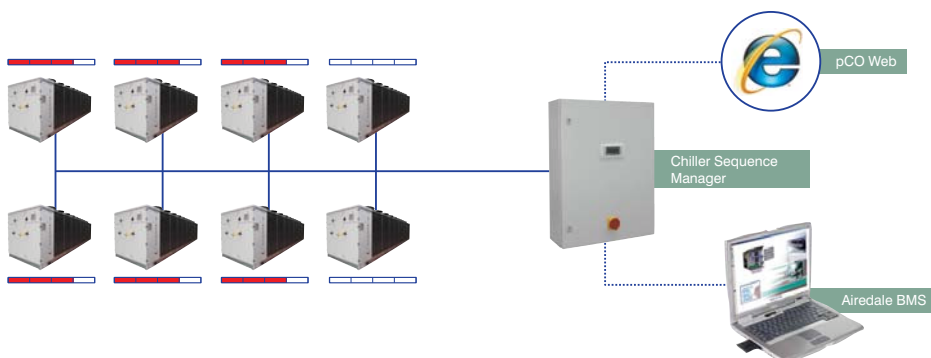
## Airedale - additional services

- > Software program design that will manage everything in the air conditioning system, fine-tuning it for energy efficiency
- > Remote monitoring facility – an internet-based bureau service for customers with critical sites
- > After-sales including chiller sequencing, network setup and integration
- > Live demonstration and training centre

For more information visit [www.airedale.com](http://www.airedale.com)

## Key option: Chiller Sequence Manager

A super-intelligent control system, the Chiller Sequence Manager can integrate up to eight OptiChill FreeCool chillers into a single operating system pre-programmed to run as master/slave or run/standby. The master controller will 'play' the cooling system for the most energy-efficient solution ensuring equal wear on compressors. It allows remote or time zone set point adjustment across the sequence and will react immediately to critical alarms and network failure.



## OptiChill FreeCool unit identification

OFC 100 R 20 - 9 9 H S3

<b>OFC</b>	OptiChill FreeCool
<b>750-1250</b>	Nominal Capacity (x10 kW, i.e. 1000kW)
<b>R / X</b>	Noise Variant - Regular Quiet / Extra Quiet
<b>16 - 22</b>	Number of Fans
<b>6,7,8,9,0,1</b>	Circuit One Compressor Code
<b>6,7,8,9,0,1</b>	Circuit Two Compressor Code
<b>M / H</b>	Suitable for Medium / High Water Temperatures
<b>Airedale use</b>	Evaporator Code

In the table below, a number of units from 750 - 1266kW have been pre-selected from over 200 models.

Technical specifications							
Model no.	Nominal cooling (kW) <sup>1</sup>	EER <sup>2</sup>	ESEER <sup>3</sup>	Free-cooling <sup>4</sup> (kW)	Free-Cooling EER	Sound pressure @ 10m (dBA)	Dimensions (H x W x L)(mm)
<b>Regular Quiet 2 FC</b>							
OFC076R16-66HS1	750.8	2.90	3.16	582.7	44.98	68.1	2600 x 2200 x 9850
OFC081R16-76MS2	810.1	2.89	3.20	596.9	29.83	68.8	2600 x 2200 x 9850
OFC087R18-77HS2	853.3	2.86	3.12	671.7	39.30	68.6	2600 x 2200 x 10850
OFC091R18-87MS4	916.5	2.84	3.24	687.0	32.04	69.6	2600 x 2200 x 10850
OFC095R18-88HS4	959.4	2.82	3.30	696.7	33.02	70.0	2600 x 2200 x 11850
OFC099R20-88MS6	998.4	2.86	3.22	772.7	37.33	69.7	2600 x 2200 x 11850
OFC104R22-99HS5	1073.0	2.80	3.30	857.0	37.69	68.8	2600 x 2200 x 12850
OFC108R22-99HS6	1115.6	2.86	3.26	866.7	37.44	68.9	2600 x 2200 x 12850
OFC119R22-00MS7	1174.6	2.57	2.89	878.8	29.75	71.0	2600 x 2200 x 12850
OFC126R22-11MS8	1266.8	2.53	3.11	894.8	27.44	73.1	2600 x 2200 x 12850
<b>Regular Quiet 3 FC</b>							
OFC076R16-66MS1	750.5	2.85	3.19	653.4	43.41	68.2	2600 x 2200 x 9850
OFC082R18-76HS2	805.8	2.87	3.09	742.1	37.55	68.4	2600 x 2200 x 10850
OFC087R18-77MS2	860.9	2.89	3.21	761.3	38.21	68.7	2600 x 2200 x 10850
OFC092R20-87HS4	910.8	2.84	3.24	850.3	39.21	69.2	2600 x 2200 x 11850
OFC095R20-87MS6	946.8	2.90	3.16	862.8	38.74	69.3	2600 x 2200 x 11850
OFC099R20-88HS6	993.1	2.88	3.23	877.9	39.83	69.8	2600 x 2200 x 11850
OFC104R22-99HS5	1069.0	2.76	3.25	976.8	39.73	68.9	2600 x 2200 x 12850
OFC108R22-99HS6	1111.4	2.82	3.20	989.5	39.62	69.0	2600 x 2200 x 12850
OFC119R22-00MS7	1170.2	2.53	2.84	1005.3	31.71	71.1	2600 x 2200 x 12850
OFC126R22-11MS8	1262.3	2.49	3.06	1026.0	29.27	73.2	2600 x 2200 x 12850
<b>Extra Quiet 2 FC</b>							
OFC073X16-66HS1	722.0	2.79	3.13	488.8	44.98	64.0	2600 x 2200 x 9850
OFC076X20-66MS1	748.3	2.97	3.35	600.7	65.79	63.9	2600 x 2200 x 11850
OFC081X20-76HS2	792.8	2.92	3.17	609.7	47.22	63.7	2600 x 2200 x 11850
OFC085X20-77MS2	845.3	2.92	3.30	619.7	46.92	63.6	2600 x 2200 x 11850
OFC091X22-87HS4	895.1	2.88	3.32	684.0	74.51	62.9	2600 x 2200 x 12850
OFC093X22-87MS6	926.4	2.93	3.23	690.0	45.47	62.9	2600 x 2200 x 12850
OFC101X22-99HS5	1036.7	2.69	3.28	708.8	46.06	63.6	2600 x 2200 x 12850
OFC104X22-99HS7	1071.3	2.75	3.31	714.0	46.32	63.6	2600 x 2200 x 12850
<b>Extra Quiet 3 FC</b>							
OFC073X16-66HS1	715.3	2.73	3.07	536.2	47.95	64.0	2600 x 2200 x 9850
OFC080X18-76MS2	779.5	2.81	3.18	610.1	48.39	63.8	2600 x 2200 x 10850
OFC084X18-77HS2	815.1	2.71	3.05	617.9	48.80	63.6	2600 x 2200 x 10850
OFC085X20-77MS2	838.4	2.87	3.24	684.0	48.52	63.6	2600 x 2200 x 11850
OFC092X20-87HS6	900.4	2.80	3.12	697.9	49.49	62.9	2600 x 2200 x 11850
OFC098X22-88HS6	964.9	2.84	3.25	774.4	49.61	62.1	2600 x 2200 x 12850
OFC101X22-99HS5	1027.7	2.64	3.22	787.4	49.88	63.6	2600 x 2200 x 12850
OFC104X22-99HS7	1061.7	2.69	3.25	793.8	50.15	63.6	2600 x 2200 x 12850

All data relates to units fitted with EC fans.  
 1) Nominal cooling capacity at 10/15°C water 20% ethylene glycol and 35°C ambient temperature  
 2) EER at 10/15°C water 20% ethylene glycol and 35°C ambient temperature based on TOTAL input power of compressors and fans  
 3) ESEER based on standard Eurovent calculation method  
 4) Free-cool capacity at 15°C return water 20% ethylene glycol and 3°C ambient temperature  
 5) Free-cooling EER at 15°C return water; 20% ethylene glycol; 3°C ambient temperature and based on TOTAL input power of fans. Free-cooling is available for up to 95% of the year  
 ETL listing is pending

# OptiChill FreeCool

Your chiller efficiency

## Airedale energy efficiency



At Airedale we work with our customers to deliver quality, reliable, energy-efficient cooling solutions that are right for each application and for the environment. Dedicated research and innovative design combined with a vast pool of knowledge and a state-of-the-art Test Centre mean that Airedale technology never stands still and is continually moving forward. Our committed team of engineers are constantly developing new products for improved performance balanced with even better energy efficiency.



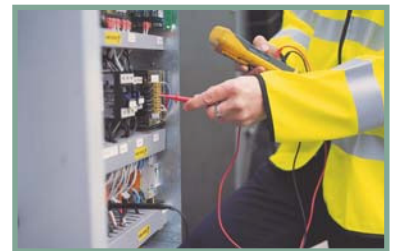
## ChillerGuard Service Plan – maintaining your chiller's efficiency

The OptiChill Freecool is a highly efficient chiller. To make sure its full efficiency is realised after leaving our factory, we recommend a **ChillerGuard** Service Plan. This provides a planned, preventative maintenance package to sustain the optimum efficiency of the OptiChill FreeCool and enable the user to see real savings in energy costs and reduced carbon emissions.

A priority, 24/7 emergency helpline; professional support and call-out service is on hand throughout the year with guaranteed response by a fully qualified Airedale engineer. **ChillerGuard** also ensures F Gas compliance and incorporates a full parts and labour warranty for the first 12 months.

For more information visit [www.airedale.com](http://www.airedale.com)

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



- > For the latest information on our products please visit: [www.airedale.com](http://www.airedale.com)
- > Please refer to the technical manuals for more detailed information

Your nearest Airedale distributor is:



**Airedale International  
Air Conditioning Limited**

Leeds Road, Rawdon  
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