TECS 2 HFO

GREEN EFFICIENCY

Air and water cooled chillers with magnetic levitation compressors and HFO 1234ze refrigerant, from 339 kW to 1.364 kW

- Unbeatable efficiency at partial loads
- Compliance with the strictest environmental standards
- 4th generation green refrigerant
- Simplified logistics
- Low in rush current

CLIMAVENETA
SUSTAINABLE COMFORT

“ The ultimate objective of this Convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved with a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. ”

UNFCCC, 1992

United Nations
Framework Convention on Climate Change

The call for climate action

Tackling stratospheric ozone depletion and the greenhouse effect have led to drastic regulatory changes in the HVAC&R industry. Starting from the United Nations Framework Convention on Climate Change UNFCCC, the Member States are progressively setting more challenging targets in order to:

Reduce greenhouse gas emissions (GHG)

Reduction in greenhouse gases and -40% of CO_2 emissions by 2030

Tackle climate change

Keeping global warming within 2°C compared to pre-industrial era (1850)

Promote sustainable development

Increasing use of renewables and efficiency targets for energy related products

This has posed new challenges for the HVAC industry:

Against Global Warming

Refrigerant greenhouse and global warming potential are measured by two parameters:

- **ODP** Ozone Depletion Potential
- **GWP** Global Warming Potential

While in the past the main focus was on reducing ODP values down to 0, new regulations now encourage Member States to work harder on GWP.

Challenging efficiency targets

Countries are becoming more and more aware that environmental targets must be regulated by laws and programs in terms of energy efficiency targets related both to products:

- **ERP** Ecodesign 2009/125/EC
- **MEPS**

and to buildings:

- **LEED**
- **BEAM**
- **Green Mark**
- **Green Star**
- **BREEAM**

Responding to climate change with TECS2 HFO

New generation chillers with magnetic levitation technology and HFO refrigerant embracing an innovative forward-looking concept of sustainability:

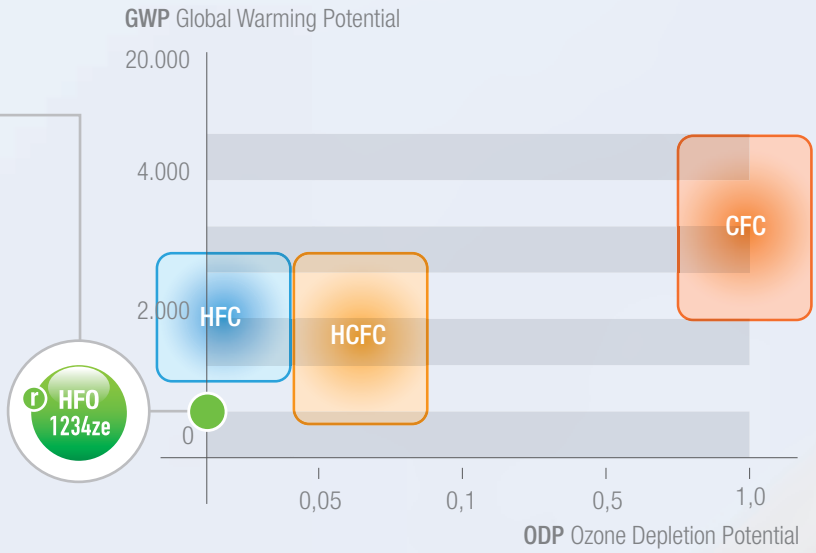
GREEN

GREEN The eco-friendly alternative to HFCs

HFO, the new generation low GWP refrigerant

The 4th generation refrigerant HFOs result in being the perfect solution to keep ODP=0 and GWP levels near zero.

HFO 1234ze is a gas blend characterised by extremely low GWP whilst maintaining high efficiency values. Thanks to its compatibility with standard construction materials and operating performance similar to R134a, the new HFO 1234ze is the perfect alternative to HFC refrigerants.



Negligible GWP

HFO 1234ze GWP=7
R134a GWP=1430

Rapid molecule disintegration in the atmosphere

HFO 1234ze =2 weeks
R134a =14 years

Approved by international standards (ASHRAE 34, ISO 817)

HFO 1234ze classification=A2L (non toxic, mildly flammable), safety group 2 for PED (same as R134a)

Compatible with common construction materials

No special components
No extra cost

In-line with F-Gas regulation objectives

No future retrofit required

All the advantages of an eco-friendly refrigerant combined with high performing magnetic levitation technology, together with Climaveneta's renowned experience providing sustainable and highly efficient solutions. This is TECS2 HFO's key feature for a long-term sustainable solution that satisfies even the strictest environmental requirements.

EFFICIENCY

EFFICIENCY The ultimate technology for unbeatable performance

High performance magnetic levitation technology

TECS2 HFO is the latest technology of chillers with magnetic levitation compressor optimised for HFO 1234ze refrigerant.

The new chiller optimised for HFO is even more performing than its predecessor working with R134a, displaying an increased efficiency value of 3% if considering the same cooling capacity.

Reliability and extended life cycle

Reliability is a key concept for units meant to be forerunners. Thanks to a decade of experience in magnetic levitation compressor units and thousands units installed all over the world, Climaveneta represents the best proof of total reliability, significant cost savings and longer life cycle (HFO doesn't need any future retrofit due do refrigerant legislation compliance).

Higher efficiency than similar chillers with R134a

TECS2 HFO EER	3,5	+3,3%
TECS2 EER	3,4	
TECS2-W HFO EER	5,2	+4%
TECS2-W EER	5,0	

Less annual energy consumption than similar chillers with R134a

TECS2 HFO ESEER	5,6	+3,7%
TECS2 ESEER	5,4	
TECS2-W HFO ESEER	8,2	+3,8%
TECS2-W ESEER	7,9	

Average values of the series, according to EN14511:2011

Technological choices

Magnetic levitation compressor specifically designed for HFO

TECS2 HFO is the result of a smart combination between the centrifugal compressor with magnetic levitation technology and the HFO 1234ze refrigerant.
It is well known that the efficiency levels achieved by the magnetic levitation compressors are far superior to those with traditional volumetric compressors.

Besides the reduction of weight and dimensions with respect to traditional compressors, this is a solution that permits the compressor to operate without any oil at all, allowing a significant improvement in the heat exchange performance. Vibrations are virtually eliminated together with possible jolts due to inrush current in the start up phase: the unit's wear is minimised.

The new HFO magnetic levitation compressor is 3% more efficient than similar technology working with R134a.

New generation EC fans

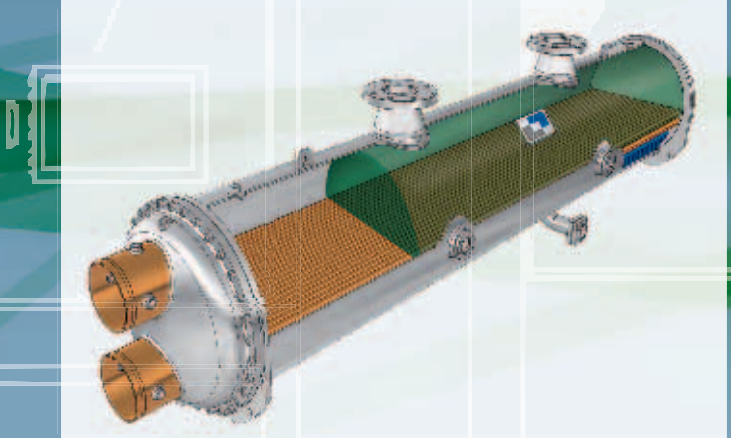
EC electronic commutation fans are characterised by high efficiency motor and, according to Regulations 327/2011, their Efficiency Grade is far superior to any other AC fan.

Their extraordinary efficiency, together with really low inrush current, improves chiller performance, especially at partial loads, and contributes to the overall reliability of the unit and thus to relevant running cost savings.

The ability to continuously modulate the rotational speed and perfectly adapt to the plant requirements, provides great advantages in terms of:

- Minimised sound levels and energy consumption at any load condition
- Large running cost savings
- Premium efficiency, especially when all year round operation is required

Efficiency, reliability, silent operation. But also great care to the environmental effects of its components. All of these premises have led to the creation of TECS2-HFO: the most advanced and eco-compatible solution available on the market.



Innovative design of the heat exchangers

The flooded evaporator, fully designed and built by Climaveneta, together with the shell and tube condenser (in water source units), present an exclusive design aimed at maximising the cooling capacity and optimising the operation of the compressors.

The shell and tube condenser is designed to ensure reduced pressure drops on the water side and to decrease the pumping costs as much as possible. In the evaporator the complete flooding of the tubes is also guaranteed during partial load conditions by an electronic expansion valve, managed by proprietary control logics.

On the evaporator the presence of the refrigerant fluid in the shell side and water in the tube side allows:

- Minimisation of pressure drops
- Perfect unified temperature as well as complete refrigerant evaporation
- No surface for the over-heating
- Easy cleaning operations

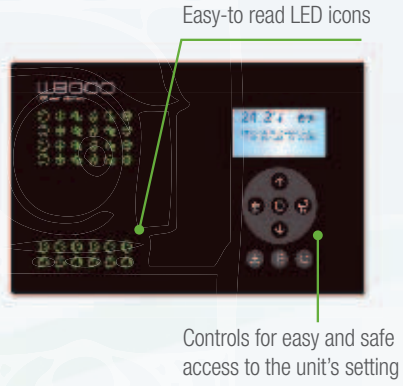
Advanced controller

The new controller features proprietary settings which ensure fast adaptive responses to different dynamics. The interface is intuitive and user-friendly thanks to the adoption of LED icons for a full and immediate status display of the various circuits.

As an option, a touch screen interface is available with:

- 7” color display
- USB port, for quick and easy application updates and download of all registered variables in graphic form.

Standard interface



Optional touch screen interface

TECS2 HFO

0351 - 1053

GREEN EFFICIENCY

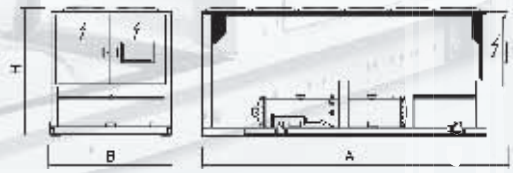
High efficiency air cooled chiller for outdoor installation (339-1017 kW)

Units for outdoor installation, characterised by an extremely compact layout and 4th generation refrigerant HFO 1234ze. TECS2 HFO units easily adapt to different thermal load conditions thanks to the precise thermoregulation together with the use of inverter technology.

COOLING · CENTRIFUGAL · EC FAN · FLOODED · ENERGY CLASS · EUROVENT CERTIFIED PERFORMANCE · NEW! · VPF · VSPEED · HFO 1234ze

TECS2 HFO / SL-CA-E			0351	0702	1053
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50
PERFORMANCE					
COOLING ONLY (GROSS VALUE)					
Cooling capacity	(1)	kW	339	679	1017
Total power input	(1)	kW	96,3	192	282
EER	(1)	kW/kW	3,52	3,53	3,60
ESEER	(1)	kW/kW	5,56	5,96	6,00
COOLING ONLY (EN14511 VALUE)					
Cooling capacity	(1)(2)	kW	338	677	1014
EER	(1)(2)		3,48	3,50	3,55
CERTIFIED ESEER	(1)(2)	kW/kW	5,36	5,75	5,64
Cooling energy class			A	A	A
EXCHANGERS					
HEAT EXCHANGER USER SIDE IN REFRIGERATION					
Water flow	(1)	m³/h	58,4	117	175
Pressure drop	(1)	kPa	27,4	23,1	45,7
COMPRESSORS					
Compressors nr.		N°	1	2	3
No. Circuits		N°	1	1	2
NOISE LEVEL					
Noise Pressure	(3)	dB(A)	58	59	60
Noise Power	(4)	dB(A)	90	92	93
SIZE AND WEIGHT					
A	(5)	mm	4000	7900	9700
B	(5)	mm	2260	2260	2260
H	(5)	mm	2430	2430	2430
Operating weight	(5)	kg	3130	6450	7610

Notes:
1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2011.
3 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
4 Sound power on the basis of measurements made in compliance with ISO 9614.
5 Unit in standard configuration/execution, without optional accessories.



Accessories:

- VPF (Variable Primary Flow) kit: variable flow pumps with on board regulation
- Electromagnetic compatibility (EMC) - EN6100-6-3 for residential environments
- Compressors' power factor correction 0.95
- Remote control keyboard (distance up to 200m or up to 500m, available with standard or touch screen keyboard)
- Hydronic group
- Set-up for remote connectivity with ModBus/Echelon protocol cards

TECS2-W HFO

0351 - 1414

GREEN EFFICIENCY

High efficiency water cooled chiller for indoor installation (340-1364 kW)

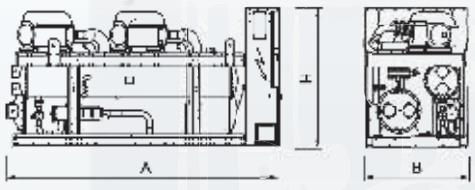
Units for indoor installation, characterised by a minimum footprint and 4th generation refrigerant HFO 1234ze. Conceived to be extremely flexible and reliable units, TECS2-W HFO are also available with the /H function (heat pump reversible on hydraulic side).

COOLING · CENTRIFUGAL · HEATING · FL FLOODED · A ENERGY CLASS · EUROVENT CERTIFIED PERFORMANCE · NEW! · VPF · VSPEED · HFO 1234ze

TECS2-W HFO / HC			0351	0712	1053	1414
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE						
COOLING ONLY (GROSS VALUE)						
Cooling capacity	(1)	kW	340	676	1015	1364
Total power input	(1)	kW	63,0	127	190	251
EER	(1)	kW/kW	5,39	5,34	5,35	5,43
ESEER	(1)	kW/kW	9,01	9,40	9,32	9,51
COOLING ONLY (EN14511 VALUE)						
Cooling capacity	(1)(2)	kW	339	674	1013	1361
EER	(1)(2)		5,18	5,17	5,19	5,29
CERTIFIED ESEER	(1)(2)	kW/kW	7,83	8,12	8,22	8,50
Cooling energy class			A	A	A	A
EXCHANGERS						
HEAT EXCHANGER USER SIDE IN REFRIGERATION						
Water flow	(1)	m³/h	58,5	116	175	235
Pressure drop	(1)	kPa	32,9	29,0	31,1	33,1
Water flow	(1)	m³/h	69,1	138	207	277
Pressure drop	(1)	kPa	40,8	39,6	32,0	23,0
COMPRESSORS						
Compressors nr.		N°	1	2	3	4
No. Circuits		N°	1	1	1	1
NOISE LEVEL						
Noise Pressure	(3)	dB(A)	74	76	77	78
Noise Power	(4)	dB(A)	92	94	96	97
SIZE AND WEIGHT						
A	(5)	mm	2990	3490	4990	5450
B	(5)	mm	950	1300	1300	1300
H	(5)	mm	1900	1800	1800	1990
Operating weight	(5)	kg	1570	3010	4380	5240

Notes:

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
2 Values in compliance with EN14511-3:2011.
3 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
4 Sound power on the basis of measurements made in compliance with ISO 9614.
5 Unit in standard configuration/execution, without optional accessories.



Accessories:

- Electromagnetic compatibility (EMC) - EN6100-6-3 for residential environments
- /H version (heat pump reversible on hydraulic side)
- VPF or VPF.D signal
- Condensing pressure control devices
- Integral acoustic enclosure


“Experience is by far the best proof”
Sir Francis Bacon
British philosopher
(1561 - 1626)

Malteurop Group

2015 – Metz (France)

Application:
Process Cooling

Plant type:
Hydronic System

Cooling capacity: 1546 kW
Heating capacity: 1176 kW

Installer: DALKIA France

Machines installed:
1 x FOCS2-W/H/CA
2 x TECS2-W HFO/HC/H/S 1414

Project

Malteurop Group is leader in the malt industry working with traditional and specialty breweries, brewing groups, and whisky distilleries, together with malt-based and agribusiness industries. Labelled as an environmentally green company, one of the main points of Malteurop Group's mission is "to make sure that all agricultural, industrial, and economic activities are respectful of the environment."

Challenge

For a group completely committed to making the environment their first priority, the choice of the HVAC system was not only a need but also a responsibility. Extremely reduced CO_2 emissions, sustainable technology and the highest product efficiency during each manufacturing malting process, were therefore the main objectives of the property owner.

Solution

To be in line with the strict Malteurop environmental standards, 2 water cooled TECS-W HFO chillers combined with a FOCS2-W unit were the perfect cooling package provided by Climaveneta to the malt industry.
TECS2-W HFO/H in heat pump configuration, were selected for the dehumidification of the malt, utilising water recovered from other processes occurring within the same plant for the source side heat exchange.

After 10 years of in-depth knowledge in the field of magnetic levitation technology and sustainable green HVAC systems, Climaveneta has already tested the success of TECS2 HFO units in several renowned projects.

Because experience is not only a matter of prestige but also the best proof to provide its customers with the highest quality levels and no-compromise reliability for all kinds of applications.

Genève Plage

2015 - Cologny
(Switzerland)

Plant type:
Hydronic System

Application:
Gyms/Swimming pools

Cooling capacity: 680 kW
Heating capacity: 341 kW

Installed machines:
2 TECS2-W HFO/HC/H/S 0351

Ammeraal Beltech AG

2014 - Rapperswill-Jona
(Switzerland)

Plant type:
Hydronic System

Application:
Mixed-used building

Cooling capacity: 676 kW

Installed machines:
1 TECS2-W HFO

Métropole
Lausanne
(Switzerland)

Plant type:
Hydronic System

Application:
Hotels and Resorts

Cooling capacity: 1016 kW

Installed machines:
2 TECS2-W HFO

Merck Serono SA
2014 - Aubonne
(Switzerland)

Plant type:
Hydronic System

Application:
Office building

Cooling capacity: 1015 kW

Installed machines:
1 TECS2-W HFO

Geschäftshaus Lindbergh Allee
2014 - Opfikon
(Switzerland)

Plant type:
Hydronic System

Application:
Office building

Cooling capacity: 1015 kW

Installed machines:
1 TECS2-W HFO

More than 1000 projects all over the world

Baptist University
School of Chinese Medicine
2014 - Hong Kong

Plant type: Hydronic system

Application: Schools and universities

Cooling capacity: 1830 kW

Installed machines: 2x TECS2/SL-CA-E, 1x screw air cooled chiller

Principal Place
THE UN SQUARE MILE
2015 - London
(Great Britain)

Plant type: Hydronic system

Application: Mixed-use buildings

Cooling capacity: 9243 kW

Heating capacity: 478 kW

Installed machines: 6x TECS2-W/LC, 1x FOCS2-W/R/CA-E

Singapore Sports Hub
2014 - Singapore

Plant type: Hydronic system

Application: Sport facilities

Constructor: BYME Singapore

Designer: ARUP

Cooling capacity: 35000 kW

Installed machines: 8x TECS2-W/LC, 8x FOCS2-W/D/CA-E, 7x FOCS2-W/CA-E, 4x ACU, 4x AXU

Cajamar Almeria
2014 - Almeria
(Spain)

Plant type: Hydronic system

Application: Financial buildings

Cooling capacity: 1805 kW

Heating capacity: 856 kW

Installed machines: 2x TECS2/SL-CA-E, 1x i-FX-Q/SL, 1x ClimaPRO

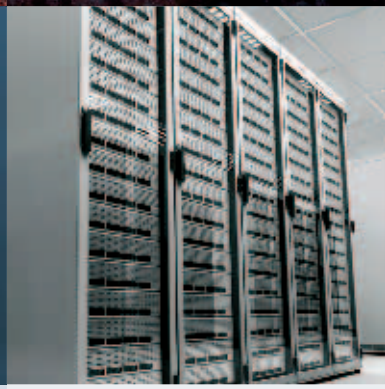
Wuxi National Super Computing Data Center
2015 - Jiangsu Province
(China)

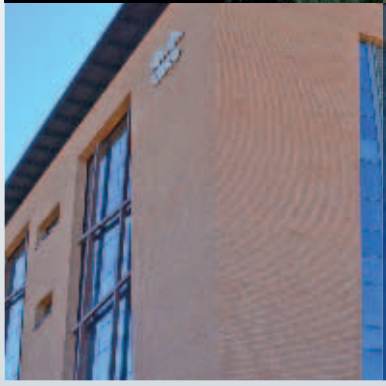
Plant type: Hydronic system

Application: Data center

Cooling capacity: 25000 kW

Installed machines: 18x TECS-W /H





Cisco Systems Vimercate
2014 - Milan
(Italy)

Plant type: Hydronic system

Application: Office buildings

Cooling capacity: 4505 kW

Heating capacity: 459 kW

Installed machines: 1x TECS2/SL-CA-E, 2x TECS-W, 1x ERACS2-WQ, 2x FOCS/SL-CA-E, 1x FX-FC, 1x ClimaPRO, several AC close control units

TECS2 HFO is just one of the latest Climaveneta innovation in the range of chillers with magnetic levitation technology. The company portfolio includes countless prestigious projects, selected for their renowned quality and prestige.

AIRBUS MILITARY TABLADA
2013 - Sevilla
(Spain)

Plant type: Hydronic system

Application: Military airports

Investor: EADS Group

Designer: Savener Proyectos

Cooling capacity: 3531 kW

Installed machines: 3x TECS2/SL-CA-E

Department of Justice
2013 - Hong Kong

Plant type: Hydronic system

Application: Institutions

Cooling capacity: 4590 kW

Installed machines: 4x TECS2 SL-CA, 2x TECS2-W/HC

Volkswagen Plant
2014 - Emden
(Germany)

Plant type: Hydronic system

Application: Automotive

Cooling capacity: 4180 kW

Installed machines: 4x TECS2-W/H

Kings Avenue Mall
2014 - Paphos
(Cyprus)

Plant type: Hydronic system

Application: Shopping centre

Cooling capacity: 5082 kW

Heating capacity: 1082 kW

Installed machines: 2x ERACS2-Q/SL-CA, 3x TECS2/SL-CA-E, 2x i-AXO

350 Euston Road
2014 - London
(Great Britain)

Plant type: Hydronic system

Application: Office buildings

Cooling capacity: 1022 kW

Heating capacity: 541 kW

Installed machines: 1x ERACS2-Q, 1x TECS2/SL, 1x ClimaPRO

Palais de l'Europe
2013 - Strasbourg
(France)

Plant type: Hydronic system

Application: Institutions

Cooling capacity: 9952 kW

Heating capacity: 3764 kW

Installed machines: 4x ERACS2-WQ, 4x TECS2-W/HC

CLIMAVENETA
SUSTAINABLE COMFORT

A Group Company of MITSUBISHI ELECTRIC

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