MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.







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:



Responding to climate change with TECSEHFO

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

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.



GREEN

Negligible GWP

HFO 1234ze GWP100 year < 1 R134a GWP100 year = 1300 (GWP values according to IPCC rev. 5th)

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 the renowned quality of Climaveneta brand solutions. This is TECS2 HFO's key feature for a long-term sustainable solution that satisfies even the strictest environmental requirements.

EFFICIENCY (1)

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 key in 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 brand 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 HF0 EER	3,5	12.20/
TECS2 EER	3,4	+3,370
TECS2-W HFO EER	5,2	1.40/
TECS2-W EER	5,0	+4%

Less annual energy consumption than similar chillers with R134a

TECS2 HFO ESEER	5,6	12 70/
TECS2 ESEER	5,4	+3,7 70
TECS2-W HFO ESEER	8,2	0.00/
TECS2-W ESEER	7,9	+3,8%

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

CLIMAVENETA 06.07

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 internally, 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



Controls for easy and safe access to the unit's setting

Optional touch screen interface



USB port

TECJ2 HFO 0351 - 1053



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.

VSPEED

TECS2 HF0 / SL-CA-E				0351	070	2	1053			
Power supply			V/ph/Hz	400/3/50	400/3	/50	400/3/50			1.1.1
PERFORMANCE										
COOLING ONLY (GROSS VALUE)										
Cooling capacity		(1)	kW	339	679	9	1017			
Total power input		(1)	kW	 96,3	193	2	282	 		
EER		(1)	kW/kW	3,52	3,5	3	3,60			
ESEER		(1)	kW/kW	5,56	5,9	6	6,00			
COOLING ONLY (EN14511 VALUE)									
Cooling capacity		(1)(2)	kW	338	67	7	1014			
EER		(1)(2)		3,48	3,5	0	3,55			
CERTIFIED ESEER		(1)(2)	kW/kW	5,36	5,7	5	5,64			
Cooling energy class				A	A		A			
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN	REFRIGERATION									
Water flow		(1)	m³/h	58,4	11	7	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	790	0	9700			
Β		(5)	mm	2260	226	0	2260			
H		(5)	mm	2430	243	0	2430			
Operating weight		(5)	kg	3130	645	0	7610			
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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

TECJ2-WHF0

0351 - 1414

GREEN EFFICIENCY

TECJ2-UIN

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).



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		1				
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)	1 1 1 1					
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 REFRIGE	RATION					
Water flow	(1) m ³ /h	58,5	116	175	235	
Pressure drop	(1) kPa	32,9	29,0	31,1	33,1	
Water flow	(1) m ³ /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	
В	(5) mm	950	1300	1300	1300	
Н	(5) mm	1900	1800	1800	1990	
Operating weight	(5) kg	1570	3010	4380	5240	

Notes

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)



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 CO₂ emissions, sustainable technology and the highest product efficiency during each manufacturing malting process, were therefore the main objectives of the property owner.

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



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 designed for 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. Resulting from over 10 year of experience in managing the magnetic levitation technology, the success of TECS2 HFO solutions have been already tested 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 HF0/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



Merck Serono SA 2014 - Aubonne (Switzerland)

Plant type: Hydronic System

Application: Office building

Cooling capacity: 1015 kW

Installed machines: 1 TECS2-W HF0



Métropole Lausanne (Switzerland)

Plant type: Hydronic System

Application: Hotels and Resorts

Cooling capacity: 1016 kW

Installed machines. 2 TECS2-W HF0



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

antist University	
chool of Chinese Medicine	
ant type: Hydronic system	
pplication: Schools and universities	THINKI HANNET
poling capacity: 1830 kW	The Design of the local division of the loca
stalled machines: 2x TECS2/SL-CA-E, screw air cooled chiller	hann must
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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

Principal Place







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





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

Installed machines: 18x TECS-W /H



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



Plant type: Hydronic system Application: Institutions Cooling capacity: 4590 kW Installed machines: 4x TECS2 SL-CA

2x TECS2-W/HC

350 Euston Road

Plant type: Hydronic system

Application: Office buildings

Cooling capacity: 1022 kW

Heating capacity: 541 kW

1x TECS2/SL, 1x ClimaPRO

Installed machines: 1x ERACS2-Q

2014 - London

(Great Britain)





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-







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





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





Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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