

Climaveneta Technical Documentation
TECS2-W_HFO_0351_1414_201802_ML

REGULATION (EU) N. 2016/2281 FOR COMFORT CHILLERS

Ecodesign requirements for cooling products

WATER COOLED CHILLERS

TECS2-W HFO 0351 - 1414

Cooling Capacity Range 339 - 1361 [kW] - (EN14511 VALUE)
Nominal Cooling Capacity at TdesignC Range 339 - 1361 [kW]



1. REGULATION (EU) N. 2016/2281 FOR COMFORT CHILLERS	
1.1 Scope of the document	3
1.2 REGULATION (UE) N. 2016/2281 description	3
1.3 Description of the data declared by Mitsubishi Electric Hydronics & IT Cooling Systems	3
2. CLIMAVENETA CONTENTS UNIT	
2.1 Table index	4
3. TECHNICAL PARAMETERS	
3.1 TECS2-W HFO /HC	5



1. REGULATION (EU) N. 2016/2281 FOR COMFORT CHILLERS

1.1 Scope of the document

This document is compliant with the Commission Regulation (EU) N. 2016/2281 regarding "REQUIREMENTS FOR PRODUCT INFORMATION" (Annex II, Point 5). In particular, it deals with comfort chillers and contains information required by Table 10 of the above-mentioned regulation, which is entitled "Information requirements for comfort chillers".

1.2 REGULATION (EU) N. 2016/2281 description

The COMMISSION REGULATION (EU) N. 2016/2281 of 30 November 2016, implementing Directive 2009/125/EC of the European Parliament and of the Council, establishes eco-design requirements for the placing on the market and/or putting into service of: air heating products with a rated heating capacity which does not exceed 1MW, cooling products and high temperature process chillers with a rated cooling capacity which do not exceed 2 MW, and all fan coil units. All these energy-related products are defined in Article 2 of the Regulation in question.

1.3 Description of the data declared by Mitsubishi Electric Hydronics & IT Cooling Systems

- Comfort chiller: a cooling product designed with the aim of attaining and maintaining the desired indoor temperature for the thermal comfort of human beings, whose evaporator extracts heat from a water-based cooling system designed to operate at leaving chilled water temperatures greater than or equal to +2°C.
- Rated cooling capacity (Prated,c): the cooling capacity of a comfort chiller when providing space cooling at standard rating conditions, expressed in kW.
- Low temperature application: application where the comfort chiller delivers its declared capacity for cooling at an indoor heat exchanger outlet temperature of 7°C.
- Medium temperature application: application where the comfort chiller delivers its declared capacity for cooling at an indoor heat exchanger outlet temperature of 18°C.
- Seasonal energy efficiency of the space cooling ($\eta_{s,c}$): ratio between the space cooling demand pertaining to the designated cooling season, and the annual energy consumption required to meet this demand, expressed in %.
- Seasonal Energy Efficiency Ratio (SEER): the overall energy efficiency ratio of the comfort chiller, representative for the cooling season, calculated as the reference annual cooling demand divided by the annual energy consumption for cooling.
- Degradation coefficient for chillers: measure of efficiency loss due to cycling of the chiller.
- Off mode: a condition in which the chiller is connected to the main power source and is not providing any function.
- Thermostat off-mode: condition corresponding to the hours with no cooling load and activated cooling function, whereby the cooling function is switched on but the chiller is not operational.
- Crankcase heater mode: condition in which a heating device is activated to avoid the refrigerant migrating to the compressor so as to limit the refrigerant concentration in oil when the compressor is started.
- Standby mode: condition where the chiller is connected to the mains power source and depends on energy input from the mains power source to work as intended. The unit provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display.
- Capacity control: the ability of a chiller to change its cooling capacity by changing the volumetric flow rate of at least one of the fluids needed to operate the refrigeration cycle.
- Sound power level (LWA): the A-weighted sound power level, indoors and/or outdoors, expressed in dB.
- Global warming potential (GWP) of the refrigerant: the 100-year climatic warming potential of one kilogram of a greenhouse gas relative to one kilogram of dioxide (CO₂).

2. CLIMAVENETA CONTENTS UNIT

2.1 Table index

WATER COOLED CHILLERS

TECS2-W HFO 0351 - 1414

Cooling Capacity Range 339 - 1361 [kW]

Nominal Cooling Capacity at TdesignC Range 339 - 1361 [kW]

Units	Version	Size				Pag.
TECS2-W HFO	HC	0351	0712	1053	1414	5

TECS2-W HFO /HC /0351			
Outdoor side heat exchanger of chiller	air or water/brine		Water/brine
Indoor side heat exchanger chiller	water		Water
Type	compressor driven vapour compression or sorption process		Compressor driven vapour compression
Driver of compressor	electric motor or fuel driven, gaseous or liquid fuel, internal or external combustion engine		Electric motor
Rated cooling capacity	Prated,c	[kW]	338,6
Seasonal energy efficiency of the space cooling	$\eta_{s,c}$	[%]	320,0
Declared cooling capacity for part load at given outdoor temperatures Tj			
Declared cooling capacity at given outdoor temperatures Tj = 35°C	Pdc	[kW]	339
Declared cooling capacity at given outdoor temperatures Tj = 30°C	Pdc	[kW]	249
Declared cooling capacity at given outdoor temperatures Tj = 25°C	Pdc	[kW]	160
Declared cooling capacity at given outdoor temperatures Tj = 20°C	Pdc	[kW]	104
Degradation coefficient for chillers	Cdc		0,9
Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures Tj			
Declared energy efficiency ratio at given outdoor temperatures Tj = 35°C	EERd	[%]	5,18
Declared energy efficiency ratio at given outdoor temperatures Tj = 30°C	EERd	[%]	7,15
Declared energy efficiency ratio at given outdoor temperatures Tj = 25°C	EERd	[%]	10,20
Declared energy efficiency ratio at given outdoor temperatures Tj = 20°C	EERd	[%]	11,20
Power consumption in modes other than "active mode"			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	2,358
Crankcase heater mode	PCK	[kW]	0,000
Standby mode	PSB	[kW]	0,151
Other items			
Capacity control	fixed/staged/variable		Staged
Sound power level, outdoor	LWA	[dB(A)]	92,0
GWP of the refrigerant		[Kg CO2eq]	7,00
For air-to-water comfort chillers: air flow rate, outdoor measured		[m³/h]	-
For water/brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger		[m³/h]	69
Standard rating conditions used:	low temperature application/medium temperature application		Low temperature application

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via L. Seitz 47 - 31100 Treviso - Italy

TECS2-W HFO /HC /0712			
Outdoor side heat exchanger of chiller	air or water/brine		Water/brine
Indoor side heat exchanger chiller	water		Water
Type	compressor driven vapour compression or sorption process		Compressor driven vapour compression
Driver of compressor	electric motor or fuel driven, gaseous or liquid fuel, internal or external combustion engine		Electric motor
Rated cooling capacity	Prated,c	[kW]	674,5
Seasonal energy efficiency of the space cooling	$\eta_{s,c}$	[%]	321,0
Declared cooling capacity for part load at given outdoor temperatures Tj			
Declared cooling capacity at given outdoor temperatures Tj = 35°C	Pdc	[kW]	674
Declared cooling capacity at given outdoor temperatures Tj = 30°C	Pdc	[kW]	497
Declared cooling capacity at given outdoor temperatures Tj = 25°C	Pdc	[kW]	320
Declared cooling capacity at given outdoor temperatures Tj = 20°C	Pdc	[kW]	142
Degradation coefficient for chillers	Cdc		0,9
Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures Tj			
Declared energy efficiency ratio at given outdoor temperatures Tj = 35°C	EERd	[%]	5,17
Declared energy efficiency ratio at given outdoor temperatures Tj = 30°C	EERd	[%]	7,14
Declared energy efficiency ratio at given outdoor temperatures Tj = 25°C	EERd	[%]	9,89
Declared energy efficiency ratio at given outdoor temperatures Tj = 20°C	EERd	[%]	10,90
Power consumption in modes other than "active mode"			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	3,984
Crankcase heater mode	PCK	[kW]	0,000
Standby mode	PSB	[kW]	0,264
Other items			
Capacity control	fixed/staged/variable		Staged
Sound power level, outdoor	LWA	[dB(A)]	94,0
GWP of the refrigerant		[Kg CO2eq]	7,00
For air-to-water comfort chillers: air flow rate, outdoor measured		[m³/h]	-
For water/brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger		[m³/h]	138
Standard rating conditions used:	low temperature application/medium temperature application		Low temperature application

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via L. Seitz 47 - 31100 Treviso - Italy

TECS2-W HFO /HC /1053			
Outdoor side heat exchanger of chiller	air or water/brine		Water/brine
Indoor side heat exchanger chiller	water		Water
Type	compressor driven vapour compression or sorption process		Compressor driven vapour compression
Driver of compressor	electric motor or fuel driven, gaseous or liquid fuel, internal or external combustion engine		Electric motor
Rated cooling capacity	Prated,c	[kW]	1013,0
Seasonal energy efficiency of the space cooling	$\eta_{s,c}$	[%]	326,0
Declared cooling capacity for part load at given outdoor temperatures Tj			
Declared cooling capacity at given outdoor temperatures Tj = 35°C	Pdc	[kW]	1013
Declared cooling capacity at given outdoor temperatures Tj = 30°C	Pdc	[kW]	746
Declared cooling capacity at given outdoor temperatures Tj = 25°C	Pdc	[kW]	480
Declared cooling capacity at given outdoor temperatures Tj = 20°C	Pdc	[kW]	213
Degradation coefficient for chillers	Cdc		0,9
Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures Tj			
Declared energy efficiency ratio at given outdoor temperatures Tj = 35°C	EERd	[%]	5,19
Declared energy efficiency ratio at given outdoor temperatures Tj = 30°C	EERd	[%]	7,12
Declared energy efficiency ratio at given outdoor temperatures Tj = 25°C	EERd	[%]	10,10
Declared energy efficiency ratio at given outdoor temperatures Tj = 20°C	EERd	[%]	11,00
Power consumption in modes other than "active mode"			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	5,213
Crankcase heater mode	PCK	[kW]	0,000
Standby mode	PSB	[kW]	0,382
Other items			
Capacity control	fixed/staged/variable		Staged
Sound power level, outdoor	LWA	[dB(A)]	96,0
GWP of the refrigerant		[Kg CO2eq]	7,00
For air-to-water comfort chillers: air flow rate, outdoor measured		[m³/h]	-
For water/brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger		[m³/h]	207
Standard rating conditions used:	low temperature application/medium temperature application		Low temperature application

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TECS2-W HFO /HC /1414			
Outdoor side heat exchanger of chiller	air or water/brine		Water/brine
Indoor side heat exchanger chiller	water		Water
Type	compressor driven vapour compression or sorption process		Compressor driven vapour compression
Driver of compressor	electric motor or fuel driven, gaseous or liquid fuel, internal or external combustion engine		Electric motor
Rated cooling capacity	Prated,c	[kW]	1361,0
Seasonal energy efficiency of the space cooling	$\eta_{s,c}$	[%]	342,0
Declared cooling capacity for part load at given outdoor temperatures Tj			
Declared cooling capacity at given outdoor temperatures Tj = 35°C	Pdc	[kW]	1361
Declared cooling capacity at given outdoor temperatures Tj = 30°C	Pdc	[kW]	1003
Declared cooling capacity at given outdoor temperatures Tj = 25°C	Pdc	[kW]	645
Declared cooling capacity at given outdoor temperatures Tj = 20°C	Pdc	[kW]	287
Degradation coefficient for chillers	Cdc		0,9
Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures Tj			
Declared energy efficiency ratio at given outdoor temperatures Tj = 35°C	EERd	[%]	5,29
Declared energy efficiency ratio at given outdoor temperatures Tj = 30°C	EERd	[%]	7,37
Declared energy efficiency ratio at given outdoor temperatures Tj = 25°C	EERd	[%]	10,40
Declared energy efficiency ratio at given outdoor temperatures Tj = 20°C	EERd	[%]	12,00
Power consumption in modes other than "active mode"			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	5,976
Crankcase heater mode	PCK	[kW]	0,000
Standby mode	PSB	[kW]	0,495
Other items			
Capacity control	fixed/staged/variable		Staged
Sound power level, outdoor	LWA	[dB(A)]	97,0
GWP of the refrigerant		[Kg CO2eq]	7,00
For air-to-water comfort chillers: air flow rate, outdoor measured		[m³/h]	-
For water/brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger		[m³/h]	277
Standard rating conditions used:	low temperature application/medium temperature application		Low temperature application

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TECS2-W HFO

ENGLISH	ITALIANO	FRANCAISE	DEUTSCH	ESPAÑOL
Outdoor side heat exchanger of chiller	Refrigeratore a scambiatore di calore esterno	Echangeur de chaleur côté extérieur du refroidisseur	Wärmetauscher des Kühlers (außen)	Intercambiador de calor de exterior de la enfriadora
Indoor side heat exchanger chiller	Refrigeratore a scambiatore di calore interno	Echangeur de chaleur côté intérieur du refroidisseur	Wärmetauscher des Kühlers (innen)	Intercambiador de calor de interior de la enfriadora
Type	Tipo	Type	Bauart	Tipo
Driver of compressor	Tipo di azionamento del compressore	Type d'entraînement du compresseur	Antrieb des Verdichters	Accionamiento del compresor
Rated cooling capacity	Capacità di raffreddamento nominale	Puissance frigorifique nominale	Nennkühlleistung	Potencia nominal de refrigeración
Seasonal energy efficiency of the space cooling	Efficienza energetica stagionale del raffreddamento d'ambiente	Efficacité énergétique saisonnière pour le refroidissement des locaux	Raumkühlungs-Jahresnutzungsgrad	Efficiencia energética estacional de refrigeración de espacios
Declared cooling capacity for part load at given outdoor temperatures Tj	Capacità di raffreddamento dichiarata a carico parziale a temperature esterne date Tj	Puissance frigorifique déclarée à charge partielle pour des températures extérieures données Tj	Angegebene Kühlleistung bei Teillast und bestimmten Außentemperaturen Tj	Potencia de refrigeración declarada para carga parcial a las temperaturas exteriores dadas Tj
Declared cooling capacity at given outdoor temperatures Tj = 35°C	Capacità di raffreddamento dichiarata a temperatura esterna Tj = 35°C	Puissance frigorifique déclarée à la température extérieure Tj = 35°C	Angegebene Kühlleistung bei Teillast und einer Außentemperatur Tj = 35°C	Potencia de refrigeración declarada para carga parcial a la temperatura exterior Tj = 35°C
Declared cooling capacity at given outdoor temperatures Tj = 30°C	Capacità di raffreddamento dichiarata a temperatura esterna Tj = 30°C	Puissance frigorifique déclarée à la température extérieure Tj = 30°C	Angegebene Kühlleistung bei Teillast und einer Außentemperatur Tj = 30°C	Potencia de refrigeración declarada para carga parcial a la temperatura exterior Tj = 30°C
Declared cooling capacity at given outdoor temperatures Tj = 25°C	Capacità di raffreddamento dichiarata a temperatura esterna Tj = 25°C	Puissance frigorifique déclarée à la température extérieure Tj = 25°C	Angegebene Kühlleistung bei Teillast und einer Außentemperatur Tj = 25°C	Potencia de refrigeración declarada para carga parcial a la temperatura exterior Tj = 25°C
Declared cooling capacity at given outdoor temperatures Tj = 20°C	Capacità di raffreddamento dichiarata a temperatura esterna Tj = 20°C	Puissance frigorifique déclarée à la température extérieure Tj = 20°C	Angegebene Kühlleistung bei Teillast und einer Außentemperatur Tj = 20°C	Potencia de refrigeración declarada para carga parcial a la temperatura exterior Tj = 20°C
Degradation coefficient for chillers	Coefficiente di degradazione per i refrigeratori	Coefficient de dégradation pour les refroidisseurs	Minderungsfaktor von Kühlern	Coefficiente de degradación de las enfriadoras
Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures Tj	Indice di efficienza energetica dichiarato o efficienza dell'uso del gas/fattore di energia ausiliaria a carico parziale alle temperature esterne date Tj	Coefficient d'efficacité énergétique déclaré ou rendement de la consommation de gaz/indice énergétique auxiliaire à charge partielle pour des températures extérieures données Tj	Angegebene Leistungszahl oder Gaswirkungsgrad/Hilfsenergiefaktor bei Teillast und bestimmten Außentemperaturen Tj	Factor de eficiencia energética declarado o eficiencia del uso de gas o factor de energía auxiliar para carga parcial a las temperaturas exteriores dadas Tj
Declared energy efficiency ratio at given outdoor temperatures Tj = 35°C	Indice di efficienza energetica dichiarato con temperatura esterna Tj = 35°C	Coefficient d'efficacité énergétique déclaré à la température extérieure Tj = 35°C	Angegebene Leistungszahl bei Teillast und einer Außentemperatur Tj = 35°C	Factor de eficiencia energética declarado a la temperatura exterior Tj = 35°C
Declared energy efficiency ratio at given outdoor temperatures Tj = 30°C	Indice di efficienza energetica dichiarato con temperatura esterna Tj = 30°C	Coefficient d'efficacité énergétique déclaré à la température extérieure Tj = 30°C	Angegebene Leistungszahl bei Teillast und einer Außentemperatur Tj = 30°C	Factor de eficiencia energética declarado a la temperatura exterior Tj = 30°C
Declared energy efficiency ratio at given outdoor temperatures Tj = 25°C	Indice di efficienza energetica dichiarato con temperatura esterna Tj = 25°C	Coefficient d'efficacité énergétique déclaré à la température extérieure Tj = 25°C	Angegebene Leistungszahl bei Teillast und einer Außentemperatur Tj = 25°C	Factor de eficiencia energética declarado a la temperatura exterior Tj = 25°C
Declared energy efficiency ratio at given outdoor temperatures Tj = 20°C	Indice di efficienza energetica dichiarato con temperatura esterna Tj = 20°C	Coefficient d'efficacité énergétique déclaré à la température extérieure Tj = 20°C	Angegebene Leistungszahl bei Teillast und einer Außentemperatur Tj = 20°C	Factor de eficiencia energética declarado a la temperatura exterior Tj = 20°C
Power consumption in modes other than "active mode"	Consumo di energia in modi diversi dal «modo attivo»	Consommation d'énergie dans les modes autres que le mode actif	Stromverbrauch in anderen Betriebsarten als dem „aktiven Betrieb“	Consumo de energía en modos distintos del modo activo
Off mode	Modo «spento»	Mode arrêt	AUS-Zustand	Modo desactivado
Thermostat-off mode	Modo «termostato spento»	Mode arrêt par thermostat	Thermostat-AUS- Zustand	Modo desactivado por termostato
Crankcase heater mode	Modo «riscaldamento del carter»	Mode résistance de carter active	Betriebszustand mit Kurbelwannenheizung	Modo de calentador del cárter activado
Standby mode	Modo «stand-by»	Mode veille	Bereitschaftszustand	Modo de espera
Other items	Altri elementi	Autres caractéristiques	Sonstige Produktdaten	Otros elementos
Capacity control	Dispositivo di controllo della capacità	Régulation de la puissance	Leistungsregelung	Control de la potencia
Sound power level, outdoor	Livello di potenza sonora esterno	Niveau de puissance acoustique, à l'extérieur	Schallleistungspegel, außen	Nivel de potencia acústica (exterior)
GWP of the refrigerant	GWP del refrigerante	PRP du fluide frigorigène	Treibhausgaspotenzial des Kältemittels	PCA del refrigerante
For air-to-water comfort chillers: air flow rate, outdoor measured	Per i refrigeratori d'ambiente aria-acqua: flusso d'aria, misurato all'esterno	Pour les refroidisseurs de confort air-eau: débit d'air, mesuré à l'extérieur	Bei Luft-Wasser- Komfortkühlern: Luftdurchsatz, außen gemessen	Enfriadoras de confort aire-agua: caudal de aire (exterior)
For water/brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger	Per i refrigeratori acqua/salamoia-acqua: flusso d'acqua o salamoia nominale, scambiatore di calore esterno	Pour les refroidisseurs eau/eau glycolée-eau: débit nominal d'eau glycolée ou d'eau,	Bei Wasser/Sole-Wasser-Kühlern: Wasser- oder Sole- Nenndurchsatz, Wärmetauscher außen	Enfriadoras agua-agua/ salmuera-agua: caudal nominal de salmuera o agua, intercambiador de calor de exterior

ENGLISH	ITALIANO	FRANCAISE	DEUTSCH	ESPAÑOL
Standard rating conditions used:	Condizioni nominali standard	Conditions de performance	Norm-Prüfbedingungen:	Condiciones estándar utilizadas:
Notes:	Note:	Remarques:	Hinweise:	Notas:
The parameters are declared for application at medium temperature, except in the case of low temperature heat pumps. For low temperature heat pumps, the parameters are declared for application at low temperature.	I parametri sono dichiarati per l'applicazione a temperatura media, tranne per le pompe di calore a bassa temperatura. Per le pompe di calore a bassa temperatura, i parametri sono dichiarati per l'applicazione a bassa temperatura.	Les paramètres sont déclarés pour l'application à moyenne température, excepté pour les pompes à chaleur basse température. Pour les pompes à chaleur basse température, les paramètres sont déclarés pour l'application à basse température.	Die Parameter sind für eine Mitteltemperaturanwendung anzugeben, außer für Niedertemperatur-Wärmepumpen. Für Niedertemperatur-Wärmepumpen sind die Parameter für eine Niedertemperaturanwendung anzugeben.	Los parámetros se declararán para aplicaciones de media temperatura, excepto si se trata de bombas de calor de baja temperatura. En el caso de las bombas de calor de baja temperatura, los parámetros se declararán para aplicaciones de baja temperatura.
Unit in standard configuration/execution, without optional accessories.	Unità in configurazione ed esecuzione standard, priva di accessori opzionali.	Unité en configuration et exécution standard, sans accessoires optionnels.	Gerät mit Standard-Konfiguration und -Ausführung, ohne wunschweises Zubehör.	Unidad en configuración y ejecución estándar, sin accesorios opcionales.



for a greener tomorrow

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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