PURESTREAM

BY FRIULAIR

CWB-FC CHILLERS

TM

Rugged Dependability For The Canadian Climate

DESCRIPTION

The PURESTREAM CWB FC chiller series are specifically designed for industrial processing plants which require cooling throughout the year. Energy savings and reducing of cooling costs are the key benefits of the PURESTREAM CWB FC (FREE COOLING) integrated chiller. Chiller and free cooling aeraulic sections are completely separated, this allows to maximize the regulation of the two working modes. The PURESTREAM CWB FC range of chillers are available in eight models with a cooling capacity from 22 Tons to 68 Tons (80 kW-240 kW) All frame and cabinet cover material are made of powder coated galvanized steel, making the CWB FC range of chillers specifically suited for outdoor installation and protection against harsh environments.

REFRIGERANT CIRCUIT
- Manufactured conforming to PED directive 2014/68/EU
- Electronic expansion valve
- Refrigerant solenoid valve
- Sight glass flow indicator
- High and low pressure switch
- High and low pressure gauges and plugs

COMPRESSORS
- Scroll hermetic compressors
- Quiet operation with high efficiency
- Mounted on rubber anti-vibration blocks
- Crankcase heaters as standard
- Phase sequence protection device

EVAPORATOR
- Copper brazed stainless steel plates heat exchanger
- Compact size with high efficiency
- Antifreeze protection managed by the electronic controller
- Equipped with differential pressure switch

FREE COOLING SYSTEM
The Free cooling equipment allows to supply completely or partially the cooling capacity normally performed by the refrigerant cycle. When the external ambient temperature is at least 5K less the water returning from the plant, the free cooling coils can pre-cool or fully cool the water flow. The free cooling operation provides an energy savings which improves as the difference between the water to be cooled and the external ambient temperature increases.

SUMMER MODE - FREE COOLING OFF
During the summer months and when the ambient temperature is higher than the temperature of the water returning from the plant, the CWB FC unit works like a conventional chiller.

INTERMEDIATE MODE - FREE COOLING + CHILLER
When the ambient temperature is lower than the temperature returning from the plant, the CWB FC works in partial free cooling. Free cooling coils pre-cool the water flow and after the chiller side cools, the water flows to the desired outlet water temperature.

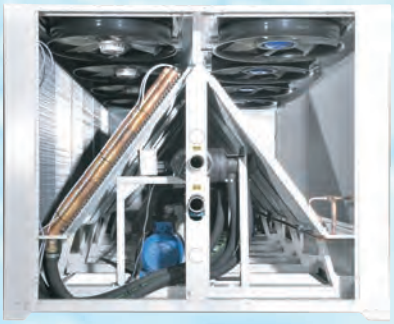
WINTER MODE - 100% FREE COOLING
During the cold seasons and when the ambient temperature is lower than the temperature of the water returning from the plant, the CWB FC can work in free cooling mode up to 100%.

HYDRAULIC CIRCUIT
- Standard models are equipped with stainless steel brazed plates evaporator without tank and pump
- Three way valve and actuator for Free Cooling optimization
- Low and medium head pressure pumps are available as options
- Temperature probes for setpoint control
- Suitable to work with mixtures up to 50% of ethylene glycol

FREE COOLING SECTION
- Copper tubes and aluminum fins water coils
- ON/OFF axial fans

CONDENSERS
- Microchannel aluminium coils
- Less refrigerant charge
- Free from risk of galvanic corrosion

FANS
- Axial fans with electronic speed regulation
- Equipped with protection grid and class F insulation



CONTROL PANEL

Control panel complying with EN 60204 EC, as well as CSA standard approval for use in Canada, with door lock disconnector (blocks access to control panel when it is live) and watertight door to access electronic control.

Includes circuit breaker protectors for compressors and pump, contactors, autotransformers, compressor rotation direction control devices; panel wires are numbered to make use easier. On/Off switch is standard on the front door panel.

- Temperature probes: to control and display evaporator inlet and outlet water temperatures, for the anti-freeze function;
- High pressure switch: blocks the machine if it reaches abnormal pressures on the refrigerant circuit's high pressure side; manual reset is required;
- Low pressure transducer: blocks the machine if refrigerant pressures are too low; reset is automatic;
- High pressure transducer: registers high refrigeration system pressure allowing step fan regulation;
- Water differential pressure switch:blocks machine if water flow is too low;
- Compressor heating resistor: avoid refrigerant gas in compressor migrating when the machine is off, resulting in oil being dragged out of them when it starts up again;
- Phase sequence control: stops the machine starting if the electric power phase sequence is wrong to avoid compressor rotating in the opposite direction to the one set.

Technical Performance Data

Performances at requested conditions [1]		CWB FC 60Hz CWB100FC_60Hz	CWB FC 60Hz CWB135FC_60Hz	CWB FC 60Hz CWB150FC_60Hz	CWB FC 60Hz CWB160FC_60Hz	CWB FC 60Hz CWB190FC_60Hz	CWB FC 60Hz CWB225FC_60Hz	CWB FC 60Hz CWB255FC_60Hz	CWB FC 60Hz CWB285FC_60Hz
Pump selection		P3	P3	P3	P3	P3	P3	P3	P3
Air temperature	[°F]	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0
Inlet water temperature	[°F]	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Outlet water temperature	[°F]	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Ethylene glycol percentage	---	30%	30%	30%	30%	30%	30%	30%	30%
Cooling capacity / Heating capacity	[Tons]	23.29	28.26	32.34	39.48	48.39	54.06	64.45	68.71
Compressors power input	[kW]	16.51	21.69	26.65	37.53	41.29	50.66	51.66	63.32
Total power input	[kW]	23.85	30.21	39.00	49.88	55.59	64.96	71.59	83.25
Total absorbed current	[A]	33.45	42.29	55.16	69.32	76.76	90.15	100.12	116.59
Energy efficiency (pump excluded)	COP[Btu/Btu]	4.01	3.88	3.72	3.35	3.61	3.36	3.81	3.40
Water flow	[gal/min]	67.78	82.21	94.10	114.87	140.79	157.30	187.52	199.91
Evaporator pressure drop	[psig]	---	---	---	---	---	---	---	---
Available pressure	[psig]	47.6	57.9	70.3	69.2	62.6	58.2	55.9	53.8

Electrical Data [2] [3]									
Maximum power input (total)	[kW]	34.44	42.56	52.46	64.78	80.28	90.35	100.11	110.18
Maximum absorbed current (total)	[A]	47.22	58.37	72.53	88.90	111.33	126.16	138.44	153.26
Starting current	[A]	150.75	180.07	224.70	263.89	277.48	362.89	373.35	380.76
Fan power	[kW]	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Fan current	[A]	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74
Number of fans	[#]	2	2	2	2	3	3	4	4
Pump power input	[kW]	3.44	4.62	8.45	8.45	8.45	8.45	12.13	12.13
Pump absorbed current	[A]	4.80	6.30	11.40	11.40	11.40	11.40	17.30	17.30
Power supply	[V/Ph/Hz]	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60
IP protection degree	---	IP54	IP54	IP54	IP54	IP54	IP54	IP54	IP54

Technical Data									
Refrigerant	---	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Compressor type	---	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Evaporator type	---	Brazed plates	Brazed plates	Brazed plates	Brazed plates	Brazed plates	Brazed plates	Brazed plates	Brazed plates
Condenser type	---	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
N° of compressors	[#]	2	2	2	2	2	2	2	2
N° of refrigerant circuits	[#]	por	1	1	1	1	1	1	1
Air flow	[cfm]	25,897	25,897	25,897	25,897	38,846	38,846	51,795	51,795
Sound pressure level at 10 m in free field [4]	[dbA]	60.5	60.5	59.5	61.5	61.5	61.5	61.5	61.5
Water connections size	[inch]	3"	3"	3"	3"	3"	3"	3"	3"
Tank capacity	[gal]	106	106	106	106	106	106	106	106
Expansion vessel capacity	[gal]	5	5	5	5	5	5	5	5
Width	[inch]	87	87	87	87	87	87	87	87
Depth	[inch]	118	118	118	118	158	158	197	197
Height	[inch]	78	78	78	78	78	78	78	78
Weight - standard version	[lb]	3,990	4,034	4,079	4,079	5,049	5,049	5,842	5,842

FREE COOLING PERFORMANCE AT REQUESTED CONDITION									
Cooling Capacity [5]	[Tons]	22.49	24.43	32.91	34.11	44.02	47.61	64.04	65.43
% of cooling capacity[6]	---	0.97	0.86	1.02	0.86	0.91	0.88	0.99	0.95
FREE COOLING ON 100%									
Cooling Capacity [7]	[Tons]	23.3	28.3	32.4	39.5	48.4	54.1	64.5	68.7
Total Power Input	[kw]	3.8	3.8	3.8	3.8	5.7	5.7	7.6	7.6
% reduction of total power input[6]	---	-0.81	-0.85	-0.88	-0.91	-0.88	-0.90	-0.87	-0.89
FC ambient temperature	[F]	-0.5	-2.35	0.26	-2.45	-1.5	-2.05	-0.1	-0.75

- [1] Data referred to: water temp. in/out: 15/10°C - ambient air temp. 30°C - Ethylene Glycol 30%
- [2] Data referred to unit without pump
- [3] Data related to most heavy condition allowed by safety devices
- [4] Referred at 10 m and at a height of 1.5 m in free field
- [5] Performance at: 0°C ambient temperature, 15°C inlet water temperature and 30% ethylene glycol.
- [6] Referred to chiller performance at 30° ambient temperature, 15/10°C in/out water temperature and 30% ethylene glycol.
- [7] Performance at: 15°C inlet water temperature and 30% ethylene glycol.

Options

Single P2 Pump	P2
Single P3 Pump	P3
Non ferrous water piping for single pump units	WP [1]
Pressurized Water Tank	TP [2]
Non ferrous pressurized water circuit (AISI304 stainless steel water tank)	TPI [2]
Condenser with e-coating protection	OEC
Shut-off compressor valve	VSC
Condensing Control: Electronic fans	CE
Compressors soft starter	SFS
Electrical switchboard anti-condensation resistor	RS
Electric board: 230V electric plug on	EBS
Electronic controller sun/rain protection	SRP
Acoustic shield for compressors	AI1
Condenser Air Filters	FP
Flanged Water Connections (EN1092-1)	WC1
Threaded Water Connections (GAS)	WC2
Control panel roof	FPR
Leveling feet	FF
Rubber anti-vibration mountings for no tank units	FA1
Rubber anti-vibration mountings for units with tank	FA2
Net biter	ENB
Remote Panel	ER
Wooden Basement	PWB
Container loading	PCL
Packing with barrier bag	PBB

- [1] WP option provides piping and connections in AISI304 stainless steel. Combine WP with an option P2, P3 but it's not available with TP, TPI.
- [2] To combine with an option P2, P3.