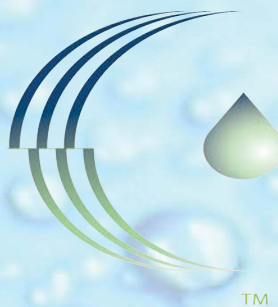


PURESTREAM

BY FRIULAIR

CWB CHILLERS



CWB-R
Air-cooled water chillers

Technical Manual
Cooling Capacity from 40 to 160 tons
Scroll compressors-R410 Refrigerant

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The CWB-R Series: Overview

The new CWB-R range was specifically designed to meet the application requirements of industry by offering precise control of refrigerated water temperature while operating over long time periods with varying load demands.

The range includes 12 models with refrigerating power going from 140 to 570 kW and was designed to be installed outdoors.

All units are equipped with:

- Tandem scroll hermetic compressors;
- Ecological refrigerant gas R410A;
- Brazed plate evaporator;
- Finned, aluminium micro-channel batterie;
- Axial fans;
- Microprocessor controller;
- Electronic expansion valve;
- Solenoid valve on liquid refrigerant piping;
- Water filter at the inlet of evaporator.

Frame and cabinet covering

All frame and cabinet cover material is made from galvanized steel that is then powder coated. Making the CWB-R suited for outdoor installation and for protection in the harsh Canadian winter.

All fasteners are either stainless steel or electro- galvanized.

The CWB-R was designed so that all parts, particularly those requiring maintenance and cleaning, are easy to access without interfering with chiller operations or creating a safety hazard for the operator.

The compressor cabinet is accessible on three sides to make control and maintenance easy.

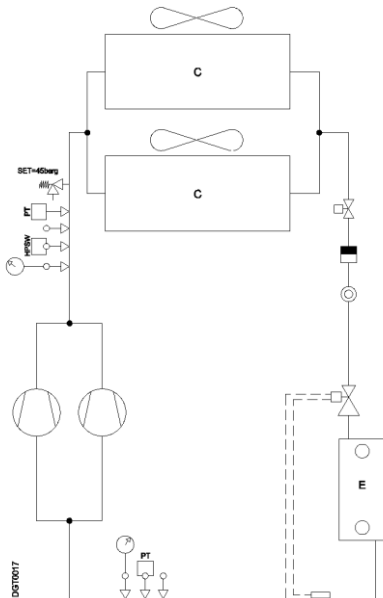
It is separate from the fan cabinet and allows operators to work on the machine while it is operating.

The hydraulic section is also easily accessible.

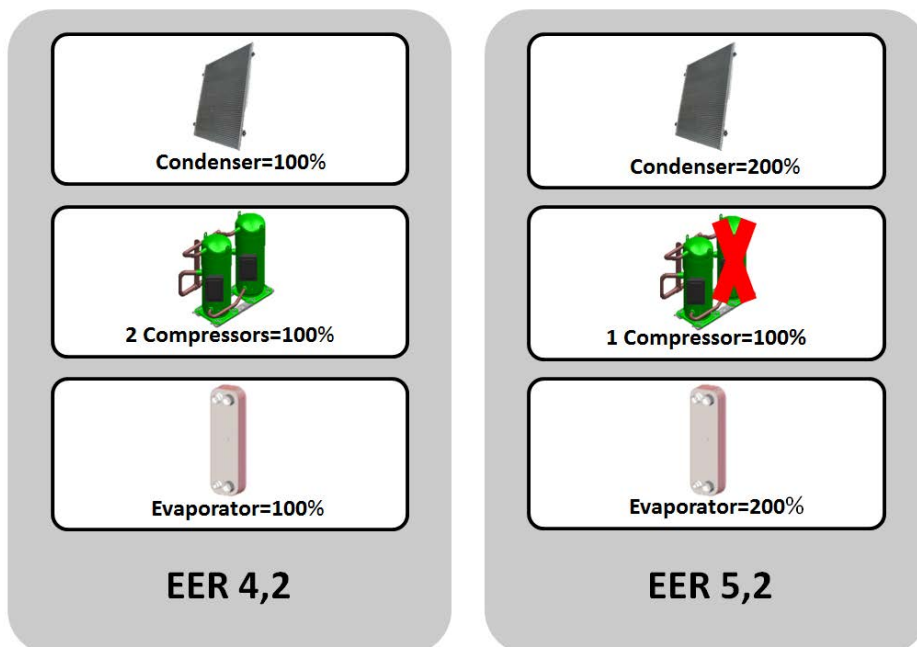


The twin compressor choice

The two compressors configuration for each refrigerant circuit, allows the chiller to assure important advantages in comparison with a single compressor - per circuit unit.



- a. **More efficiency (higher EER) during partial loads:** the chiller is generally sized for the maximum output required, but this condition rarely occurs and only for limited periods; during split operations (that is only a part of the compressors working) chiller efficiency (EER) can increase by over 25% compared to full power; this means that at an expense of 1 electric kW, you have for example 3,7kW chilling instead of 3 kW and considerable energy cost savings.



When the machine is operating at partial load i.e. with only some of the compressors on, operation occurs with the exchangers which are actually oversized.

Machines with several compressors in the same circuit can achieve much better efficiency levels (EER) compared with machines with just one compressor per circuit.

- b. Lower start up current in-rush and increase in the average life of the compressors;
c. Better adapt to the load required at any time, starting the right number of compressors.

Refrigerant gas



Due to its thermodynamic performance, the R410A refrigerant gas allows the refrigeration system to operate at highest efficiency.
The higher operating pressure of R410A allows for development of a more compact line.

Compressors

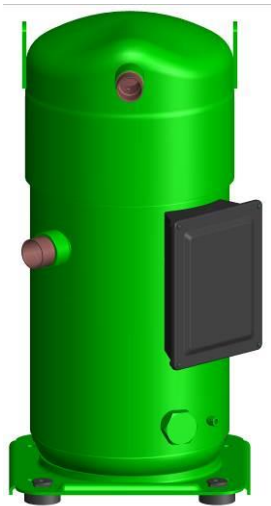
CWB-R chillers use scroll hermetic compressors.

These are the highest technological level on this product range; they are noted for reliability and efficiency through their widespread use in the air conditioning sector. The scroll compressor has the additional benefits of quiet operations, no vibration and the ability to adsorb liquid returns.

Compressors are all equipped with heating resistor for the carter which comes on when the compressors are switched off as long as the machine is still powered.

Compressors are mounted on rubber anti-vibration blocks to reduce noise even further.

They are also protected by an electronic device controlling phase sequences to avoid any contrary rotation.



Condensers

Micro-channel aluminium plate condensers: guarantee a greater exchange surface than the traditional copper tube condenser and also mean the refrigerant charge can be minimised (from 30% to 35% less than a traditional condenser).

The all-aluminium structure frees these condensers of any galvanic corrosion risks.

On the whole range of condensers is available the ElectroFin® E-coat treatment, that provide corrosion resistance and UV protection.



Fans

With 6 pole, axial motors and an external rotor.

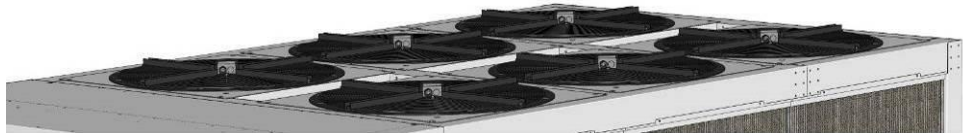
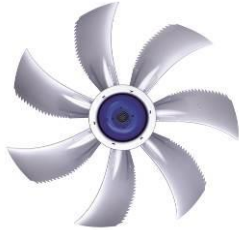
All fans have a protection grid, internal heat protection with automatic resetting, class F insulation.

The condensing control, foresees the adoption of EC fans type, with electronic speed regulation (inverter).

The exceptional efficiency and regularity of these fans, allow the chiller to work in a very wide field of temperatures and with reduced energy consumption.

Furthermore this option makes it quieter when the outer temperature is low or when it operates with a reduced load.

Rotation speed is regulated in function of the condensing pressure by means of a pressure transducer.



Evaporator

With stainless steel brazed plates, compact in size and really efficient.

The electronic control's anti-freeze function keeps the evaporator's outlet water temperature under control to stop it freezing up. A differential pressure switch protects the evaporator against lack of water.

For models from CWB-R 270 to CWB-R 570, the evaporator has double refrigerant circuit and single water circuit.

This configuration is very efficient with partial loads, compared to independent evaporator solutions.



Electronic expansion valve

All CWB-R units are fitted with electronic expansion valves.

These valves grant the best performance of the unit, a big flexibility towards different working conditions and a safe control of the gas superheating which is important for compressor protection and for unit reliability.



Refrigerant circuit

Made with top quality materials by specialised personnel following rigorous brazing procedures, conforming with directive 97/23; it includes:

- Scroll compressor designed for R410A;
- AISI 316 stainless steel brazed plates;
- Micro-channel aluminium condensers;
- Dehydrator filter;
- Sight glass flow indicating presence of humidity;
- Electronic expansion valve;
- Solenoid valve on liquid refrigerant piping;
- Manual reset high pressure switch and automatic reset low pressure switch;
- High and low pressure gauges;
- Control and maintenance pressure plugs.

Safety and control devices

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 anomalous pressures on the refrigerant circuit's high pressure side; manual reset;
- 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.

Control panel

Control panel complying with EN 60204 CE, with door lock disconnecter (blocks access to the 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 there is an ON/OFF switch on the panel door.



Microprocessor controller

The electronic control micro-processor controls and optimizes all CWB-R chiller components and functions. In particular:

- Regulates evaporator water outlet temperature;
- Turns pump (optional) on and off;
- Manages fans;
- Compressors' on and off cycles based on water temperature required;
- Compressor emergency cutting function if operating with water or air temperature too high outside limits set;
- Measurement and display of evaporator inlet and outlet water temperature and ambient temperature;
- Measurement and display of condensing and evaporating pressures;
- Alarm message management:
 - High refrigerant pressure switch;
 - Low refrigerant pressure switch;
 - Differential water pressure switch;
 - Wrong phase sequence;
 - Compressor circuit breaker;
 - Pump circuit breaker;
 - Temperature probe failure;
 - Pressure probe failure;
 - High water temperature;
 - Anti-freeze.



Microprocessor controller



Remote control panel

User interface is easy and intuitive. It is possible to enable the “remote” function with a clear, visible alarm indicator. The easy-to-follow set up menu allows for easy access to set main operating parameters. The integrated double display with its clear icons provides a complete real time display of the chiller's operation and alarm status.

Controls and testing

Each CWB-R is tested with full load.

The following tests are also carried out:

- Correct components assembly;
- Pressing of refrigerating circuit and search for any leaks using helium leak – searcher;
- Pressing of hydraulic circuit;
- Electric tests in compliance with standard EN60204;
- Control that protections and safety devices work correctly;
- Control that the electronic controller works correctly;
- Thermal performance and electric quantities measurement.

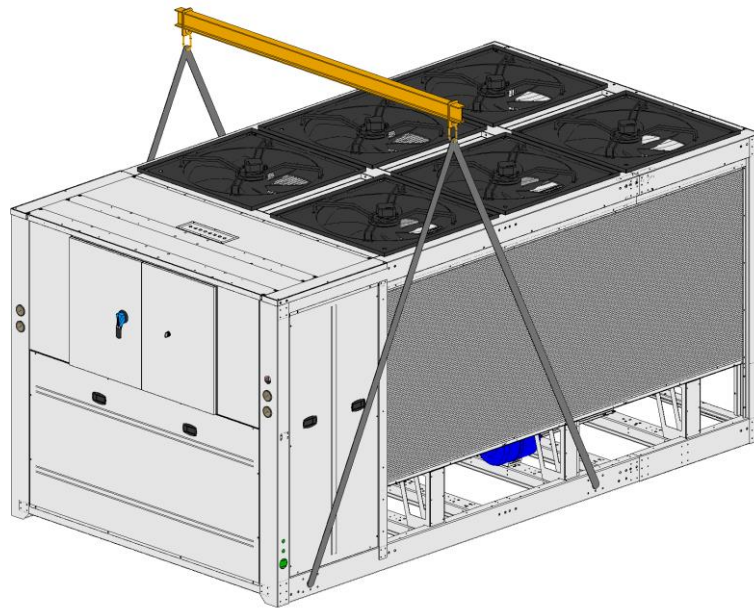
Packing

The entire range CWB-R comes standard with two wooden beams secured with metal brackets, cling film, corner protections, and cartons to protect the condensers and the electrical panel.

Additionally can be provided the wood base, need for container shipments. In this case, the wooden beams are removed.

Handling

The bottom has holes so that tubes can be inserted for lifting with belts.



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Optional Components

	Initial
Single P2 Pump	P2
Single P3 Pump	P3
Single P5 Pump	P5
Double P2 Pump	D2
Double P3 Pump	D3
Double P5 Pump	D5
Non-ferrous water piping for single pump units	WP [1]
Non-ferrous water piping for double pump units	WD [2]
Pressurized water tank	TP [3]
Non-ferrous pressurized water circuit for single pump housing (Stainless steel water tank)	TPI [3]
Water Level Switch	LS
Evaporator anti freeze heater	RA1
Evaporator and pump anti freeze heater	RA2
Evaporator, pump and tank anti freeze heater	RA3
Electrical Switchboard anti-condensation resistor	RS
Water Double Set point	WE
E-coating condensers treatment	OEC
Condensing Control: Low ambient temperature kit (up to -20°C ambient temp.)	CL
Automatic Water Filling Kit	WF
Condenser air filters	FP
Flanged Water Connections (EN 1092-1)	WC1
Threaded Water Connections (GAS)	WC2
Stainless steel Threaded Water Connections (GAS)	WC2I
Rubber anti-vibration mountings for no tank units	FA1
Rubber anti-vibration mountings for units with tank	FA2
Remote Panel	ER
Packing with barrier bag	PBB
Wooden Basement	PWB
Wooden Crate	PWC
Container loading	PCL
Heating Resistors	RH [4]
Free cooling	FC [4]

- [1] WP option provides piping and connections in AISI304 stainless steel.
Combine WP with an option P2, P3, P5 but it's not available with TP, TPI, TA.
- [2] WD option provides piping and connections in AISI304 stainless steel.
Combine WD with an option D2, D3, D5 but it's not available with TP, TP2, TPI, TPI2, TA.
- [3] To combine with an option P2, P3, P5, D2, D3, D5.
- [4] Contact our company.

Technical data CWB-R (S.I.)

Model	CWB-R	140	160	190	220
Cooling capacity (1)	[kW]	135,66	160,07	181,89	211,56
Compressors power input (1)	[kW]	27,21	38,80	34,73	47,00
Total power input (1) (2)	[kW]	31,11	42,70	40,58	52,85
Total absorbed current (1) (2)	[A]	45,51	60,71	58,60	74,37
EER (pump excluded) (1)	---	4,36	3,75	4,48	4,00
Water flow (1)	[l/h]	23.334	27.533	31.285	36.388
Pressure drop (1)	[kPa]	51	68	46	60
Maximum power input (total) (2) (3)	[kW]	44,0	56,3	62,1	78,2
Maximum absorbed current (total) (2) (3)	[A]	62,5	78,6	87,3	108,7
Starting current (2) (3)	[A]	210,6	254,6	335,6	346,3
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	2	2	3	3
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Braze plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	2	2	2	2
N° of refrigerant circuits	[#]	1	1	1	1
Air flow	[m ³ /h]	44000	44000	66000	66000
Sound pressure level (4)	[dbA]	59,5	60,0	59,0	59,0
Water connections diameter	[inch]	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Width	[mm]	1104	1104	1104	1104
Depth	[mm]	3004	3004	4002	4002
Height	[mm]	1977	1977	1977	1977
Weight	[kg]	1170	1180	1290	1300
Tank capacity - Option	[dm ³]	470	470	470	470
Expansion vessel capacity - Option	[dm ³]	18	18	18	18
P2 Pump power input - Option	[kW]	3,56	3,56	3,56	3,56
P2 Pump absorbed current - Option	[A]	5,20	5,20	5,20	5,20
P3 Pump power input - Option	[kW]	6,22	6,22	6,22	6,22
P3 Pump absorbed current - Option	[A]	9,30	9,30	9,30	9,30
P5 Pump power input - Option	[kW]	8,36	8,36	8,36	8,36
P5 Pump absorbed current - Option	[A]	12,20	12,20	12,20	12,20

- (1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C
 (2) Data referred to unit without pump
 (3) Data related to most heavy condition allowed by safety devices fitted on the unit
 (4) Referred at 10 m and at an height of 1,5 m in free field

Modello - Model	CWB-R	270	300	320	380
Cooling capacity (1)	[kW]	265,21	291,72	306,00	366,78
Compressors power input (1)	[kW]	49,98	61,19	66,88	69,70
Total power input (1) (2)	[kW]	57,78	68,99	74,68	81,40
Total absorbed current (1) (2)	[A]	84,02	98,69	107,25	117,76
EER (pump excluded) (1)	---	4,59	4,23	4,10	4,51
Water flow (1)	[l/h]	45.617	50.175	52.631	63.086
Pressure drop (1)	[kPa]	51	61	66	46
Maximum power input (total) (2) (3)	[kW]	81,9	94,3	100,3	116,6
Maximum absorbed current (total) (2) (3)	[A]	115,8	131,9	141,2	163,9
Starting current (2) (3)	[A]	266,1	314,2	321,2	339,8
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	4	4	4	6
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Brazen plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	4	4	4	4
N° of refrigerant circuits	[#]	2	2	2	2
Air flow	[m ³ /h]	88000	88000	88000	132000
Sound pressure level (4)	[dbA]	61,0	61,5	61,5	61,5
Water connections diameter	[inch]	3"	3"	3"	3"
Width	[mm]	2204	2204	2204	2204
Depth	[mm]	3004	3004	3004	4004
Height	[mm]	1977	1977	1977	1977
Weight	[kg]	1810	1830	1850	2250
Tank capacity - Option	[dm ³]	600	600	600	600
Expansion vessel capacity - Option	[dm ³]	18	18	18	18
P2 Pump power input - Option	[kW]	6,22	6,22	6,22	6,22
P2 Pump absorbed current - Option	[A]	9,30	9,30	9,30	9,30
P3 Pump power input - Option	[kW]	8,36	8,36	8,36	8,36
P3 Pump absorbed current - Option	[A]	12,20	12,20	12,20	12,20
P5 Pump power input - Option	[kW]	16,71	16,71	16,71	16,71
P5 Pump absorbed current - Option	[A]	23,30	23,30	23,30	23,30

(1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C

(2) Data referred to unit without pump

(3) Data related to most heavy condition allowed by safety devices fitted on the unit

(4) Referred at 10 m and at an height of 1,5 m in free field

Modello - Model	CWB-R	420	450	510	570
Cooling capacity (1)	[kW]	401,61	433,11	500,50	563,71
Compressors power input (1)	[kW]	81,46	95,05	96,30	117,36
Total power input (1) (2)	[kW]	93,16	106,75	111,90	132,96
Total absorbed current (1) (2)	[A]	132,76	150,10	165,30	190,80
EER (pump excluded) (1)	---	4,31	4,06	4,47	4,24
Water flow (1)	[l/h]	69.077	74.496	86.086	96.958
Pressure drop (1)	[kPa]	55	63	61	77
Maximum power input (total) (2) (3)	[kW]	136,4	156,3	167,2	193,3
Maximum absorbed current (total) (2) (3)	[A]	190,6	217,3	238,9	272,6
Starting current (2) (3)	[A]	434,9	454,9	483,8	478,1
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	6	6	8	8
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Braze plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	4	4	4	4
N° of refrigerant circuits	[#]	2	2	2	2
Air flow	[m ³ /h]	132000	132000	176000	176000
Sound pressure level (4)	[dbA]	61,0	60,5	61,5	61,5
Water connections diameter	[inch]	3"	3"	3"	3"
Width	[mm]	2204	2204	2204	2204
Depth	[mm]	4004	4004	5004	5004
Height	[mm]	1977	1977	1977	1977
Weight	[kg]	2270	2290	2650	2650
Tank capacity - Option	[dm ³]	600	600	600	600
Expansion vessel capacity - Option	[dm ³]	18	18	18	18
P2 Pump power input - Option	[kW]	6,22	6,22	8,36	8,36
P2 Pump absorbed current - Option	[A]	9,30	9,30	12,20	12,20
P3 Pump power input - Option	[kW]	8,36	8,36	12,15	12,15
P3 Pump absorbed current - Option	[A]	12,20	12,20	18,60	18,60
P5 Pump power input - Option	[kW]	16,71	16,71	16,71	16,71
P5 Pump absorbed current - Option	[A]	23,30	23,30	23,30	23,30

(1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C

(2) Data referred to unit without pump

(3) Data related to most heavy condition allowed by safety devices fitted on the unit

(4) Referred at 10 m and at an height of 1,5 m in free field

Technical data CWB-R (US Units)

Modello - Model	CWB-R	140	160	190	220
Cooling capacity (1)	[Tons]	38,57	45,51	51,72	60,15
Compressors power input (1)	[kW]	27,21	38,80	34,73	47,00
Total power input (1) (2)	[kW]	31,11	42,70	40,58	52,85
Total absorbed current (1) (2)	[A]	45,51	60,71	58,60	74,37
EER (pump excluded) (1)	---	4,36	3,75	4,48	4,00
Water flow (1)	[gal/min]	102,74	121,22	137,74	160,21
Pressure drop (1)	[psig]	7	10	7	9
Maximum power input (total) (2) (3)	[kW]	44,0	56,3	62,1	78,2
Maximum absorbed current (total) (2) (3)	[A]	62,5	78,6	87,3	108,7
Starting current (2) (3)	[A]	210,6	254,6	335,6	346,3
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	2	2	3	3
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Braze plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	2	2	2	2
N° of refrigerant circuits	[#]	1	1	1	1
Air flow	[cfm]	25897	25897	38846	38846
Sound pressure level (4)	[dbA]	59,5	60,0	59,0	59,0
Water connections diameter	[inch]	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Width	[inch]	43,5	43,5	43,5	43,5
Depth	[inch]	118,3	118,3	157,6	157,6
Height	[inch]	77,8	77,8	77,8	77,8
Weight	[lb]	2579	2601	2844	2866
Tank capacity - Option	[gal]	124,2	124,2	124,2	124,2
Expansion vessel capacity - Option	[gal]	4,8	4,8	4,8	4,8
P2 Pump power input - Option	[kW]	3,56	3,56	3,56	3,56
P2 Pump absorbed current - Option	[A]	5,20	5,20	5,20	5,20
P3 Pump power input - Option	[kW]	6,22	6,22	6,22	6,22
P3 Pump absorbed current - Option	[A]	9,30	9,30	9,30	9,30
P5 Pump power input - Option	[kW]	8,36	8,36	8,36	8,36
P5 Pump absorbed current - Option	[A]	12,20	12,20	12,20	12,20

(1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C

(2) Data referred to unit without pump

(3) Data related to most heavy condition allowed by safety devices fitted on the unit

(4) Referred at 10 m and at an height of 1,5 m in free field

Modello - Model	CWB-R	270	300	320	380
Cooling capacity (1)	[Tons]	75,41	82,94	87,01	104,29
Compressors power input (1)	[kW]	49,98	61,19	66,88	69,70
Total power input (1) (2)	[kW]	57,78	68,99	74,68	81,40
Total absorbed current (1) (2)	[A]	84,02	98,69	107,25	117,76
EER (pump excluded) (1)	---	4,59	4,23	4,10	4,51
Water flow (1)	[gal/min]	200,85	220,91	231,73	277,76
Pressure drop (1)	[psig]	7	9	10	7
Maximum power input (total) (2) (3)	[kW]	81,9	94,3	100,3	116,6
Maximum absorbed current (total) (2) (3)	[A]	115,8	131,9	141,2	163,9
Starting current (2) (3)	[A]	266,1	314,2	321,2	339,8
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	4	4	4	6
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Braze plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	4	4	4	4
N° of refrigerant circuits	[#]	2	2	2	2
Air flow	[cfm]	51795	51795	51795	77692
Sound pressure level (4)	[dbA]	61,0	61,5	61,5	61,5
Water connections diameter	[inch]	3"	3"	3"	3"
Width	[inch]	86,8	86,8	86,8	86,8
Depth	[inch]	118,3	118,3	118,3	157,6
Height	[inch]	77,8	77,8	77,8	77,8
Weight	[lb]	3990	4034	4079	4960
Tank capacity - Option	[gal]	158,5	158,5	158,5	158,5
Expansion vessel capacity - Option	[gal]	4,8	4,8	4,8	4,8
P2 Pump power input - Option	[kW]	6,22	6,22	6,22	6,22
P2 Pump absorbed current - Option	[A]	9,30	9,30	9,30	9,30
P3 Pump power input - Option	[kW]	8,36	8,36	8,36	8,36
P3 Pump absorbed current - Option	[A]	12,20	12,20	12,20	12,20
P5 Pump power input - Option	[kW]	16,71	16,71	16,71	16,71
P5 Pump absorbed current - Option	[A]	23,30	23,30	23,30	23,30

(1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C

(2) Data referred to unit without pump

(3) Data related to most heavy condition allowed by safety devices fitted on the unit

(4) Referred at 10 m and at an height of 1,5 m in free field

Modello - Model	CWB-R	420	450	510	570
Cooling capacity (1)	[Tons]	114,19	123,15	142,31	160,28
Compressors power input (1)	[kW]	81,46	95,05	96,30	117,36
Total power input (1) (2)	[kW]	93,16	106,75	111,90	132,96
Total absorbed current (1) (2)	[A]	132,76	150,10	165,30	190,80
EER (pump excluded) (1)	---	4,31	4,06	4,47	4,24
Water flow (1)	[gal/min]	304,13	327,99	379,03	426,89
Pressure drop (1)	[psig]	8	9	9	11
Maximum power input (total) (2) (3)	[kW]	136,4	156,3	167,2	193,3
Maximum absorbed current (total) (2) (3)	[A]	190,6	217,3	238,9	272,6
Starting current (2) (3)	[A]	434,9	454,9	483,8	478,1
Fan power	[kW]	1,95	1,95	1,95	1,95
Fan current	[A]	3,30	3,30	3,30	3,30
Number of fans	[#]	6	6	8	8
Power supply	[V/Ph/Hz]	460/3/60			
IP protection degree	---	IP54			
Refrigerant	---	R410A			
Compressor type	---	Scroll			
Evaporator type	---	Braze plates			
Condenser type	---	Microchannel			
N° of compressors	[#]	4	4	4	4
N° of refrigerant circuits	[#]	2	2	2	2
Air flow	[cfm]	77692	77692	103590	103590
Sound pressure level (4)	[dbA]	61,0	60,5	61,5	61,5
Water connections diameter	[inch]	3"	3"	3"	3"
Width	[inch]	86,8	86,8	86,8	86,8
Depth	[inch]	157,6	157,6	197,0	197,0
Height	[inch]	77,8	77,8	77,8	77,8
Weight	[lb]	5004	5049	5842	5842
Tank capacity - Option	[gal]	158,5	158,5	158,5	158,5
Expansion vessel capacity - Option	[gal]	4,8	4,8	4,8	4,8
P2 Pump power input - Option	[kW]	6,22	6,22	8,36	8,36
P2 Pump absorbed current - Option	[A]	9,30	9,30	12,20	12,20
P3 Pump power input - Option	[kW]	8,36	8,36	12,15	12,15
P3 Pump absorbed current - Option	[A]	12,20	12,20	18,60	18,60
P5 Pump power input - Option	[kW]	16,71	16,71	16,71	16,71
P5 Pump absorbed current - Option	[A]	23,30	23,30	23,30	23,30

(1) Data referred to following conditions: water temperature in/out: 20/15°C - ambient air temperature: 25°C

(2) Data referred to unit without pump

(3) Data related to most heavy condition allowed by safety devices fitted on the unit

(4) Referred at 10 m and at an height of 1,5 m in free field

Performance data CWB-R

CWB-R 140

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	17,58	17,58	17,58	17,58	17,58	17,48	16,47	15,38	14,23	13,01
	kW	61,8	61,8	61,8	61,8	61,8	61,5	57,9	54,1	50,1	45,8
23 [°F] / -5 [°C] Glycol 30%	Tons	21,54	21,54	21,54	21,54	21,54	21,03	19,87	18,64	17,33	15,96
	kW	75,7	75,7	75,7	75,7	75,7	73,9	69,9	65,5	61,0	56,1
32 [°F] / 0 [°C] Glycol 20%	Tons	26,12	26,12	26,12	26,12	26,12	25,04	23,69	22,28	20,79	19,22
	kW	91,9	91,9	91,9	91,9	91,9	88,1	83,3	78,4	73,1	67,6
41 [°F] / 5 [°C] Glycol 15%	Tons	31,06	31,06	31,06	31,06	30,67	29,20	27,66	26,05	24,35	22,59
	kW	109,2	109,2	109,2	109,2	107,9	102,7	97,3	91,6	85,7	79,4
44,6 [°F] / 7 [°C] Glycol 0%	Tons	33,62	33,62	33,62	33,62	32,92	31,36	29,72	27,99	26,19	24,31
	kW	118,3	118,3	118,3	118,3	115,8	110,3	104,5	98,5	92,1	85,5
50 [°F] / 10 [°C] Glycol 0%	Tons	36,91	36,91	36,91	36,91	35,69	34,00	32,22	30,37	28,43	26,42
	kW	129,8	129,8	129,8	129,8	125,5	119,6	113,3	106,8	100,0	92,9
59 [°F] / 15 [°C] Glycol 0%	Tons	42,82	42,82	42,82	42,34	40,50	38,57	36,56	34,48	32,32	
	kW	150,6	150,6	150,6	148,9	142,4	135,7	128,6	121,3	113,7	
68 [°F] / 20 [°C] Glycol 0%	Tons	46,94	46,94	46,94	45,63	43,49	41,27	38,99	36,64	34,22	
	kW	165,1	165,1	165,1	160,5	152,9	145,2	137,1	128,8	120,4	
77 [°F] / 25 [°C] Glycol 0%	Tons	46,94	46,94	46,94	45,63	43,49	41,27	38,99	36,64	34,22	
	kW	165,1	165,1	165,1	160,5	152,9	145,2	137,1	128,8	120,4	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	24,9	24,9	24,9	24,9	24,9	25,1	27,4	30,0	32,8	36,0
23 [°F] / -5 [°C]	25,2	25,2	25,2	25,2	25,2	26,2	28,5	31,1	34,0	37,2
32 [°F] / 0 [°C]	25,4	25,4	25,4	25,4	25,4	27,2	29,6	32,2	35,2	38,4
41 [°F] / 5 [°C]	25,7	25,7	25,7	25,7	26,3	28,4	30,8	33,5	36,4	39,7
44,6 [°F] / 7 [°C]	25,8	25,8	25,8	25,8	26,7	28,9	31,3	34,0	37,0	40,2
50 [°F] / 10 [°C]	26,0	26,0	26,0	26,0	27,5	29,7	32,1	34,8	37,8	41,1
59 [°F] / 15 [°C]	26,4	26,4	26,4	26,9	28,9	31,1	33,6	36,3	39,3	
68 [°F] / 20 [°C]	26,8	26,8	26,8	27,9	29,8	32,0	34,4	37,2	40,1	
77 [°F] / 25 [°C]	26,8	26,8	26,8	27,9	29,8	32,0	34,4	37,2	40,1	

CWB-R 160

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	21,98	21,98	21,98	21,98	21,98	21,22	20,09	18,92	17,68	16,36
	kW	77,3	77,3	77,3	77,3	77,3	74,6	70,7	66,5	62,2	57,6
23 [°F] / -5 [°C] Glycol 30%	Tons	26,82	26,82	26,82	26,82	26,68	25,36	24,00	22,58	21,09	19,50
	kW	94,3	94,3	94,3	94,3	93,8	89,2	84,4	79,4	74,2	68,6
32 [°F] / 0 [°C] Glycol 20%	Tons	32,47	32,47	32,47	32,47	31,58	30,01	28,40	26,71	24,93	23,04
	kW	114,2	114,2	114,2	114,2	111,1	105,6	99,9	93,9	87,7	81,0
41 [°F] / 5 [°C] Glycol 15%	Tons	38,59	38,59	38,59	38,40	36,63	34,82	32,94	30,97	28,90	26,71
	kW	135,7	135,7	135,7	135,1	128,8	122,5	115,8	108,9	101,6	93,9
44,6 [°F] / 7 [°C] Glycol 0%	Tons	41,77	41,77	41,77	41,14	39,25	37,31	35,29	33,18	30,97	28,63
	kW	146,9	146,9	146,9	144,7	138,1	131,2	124,1	116,7	108,9	100,7
50 [°F] / 10 [°C] Glycol 0%	Tons	45,85	45,85	45,85	44,46	42,43	40,32	38,14	35,86	33,46	30,93
	kW	161,2	161,2	161,2	156,4	149,2	141,8	134,1	126,1	117,7	108,8
59 [°F] / 15 [°C] Glycol 0%	Tons	53,18	53,18	52,41	50,18	47,89	45,51	43,04	40,46	37,76	
	kW	187,0	187,0	184,3	176,5	168,4	160,1	151,4	142,3	132,8	
68 [°F] / 20 [°C] Glycol 0%	Tons	59,80	59,80	57,30	54,64	51,92	49,13	46,26	43,29	40,22	
	kW	210,3	210,3	201,5	192,2	182,6	172,8	162,7	152,3	141,5	
77 [°F] / 25 [°C] Glycol 0%	Tons	59,80	59,80	57,30	54,64	51,92	49,13	46,26	43,29	40,22	
	kW	210,3	210,3	201,5	192,2	182,6	172,8	162,7	152,3	141,5	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	31,8	31,8	31,8	31,8	31,8	33,7	36,8	40,3	44,2	48,4
23 [°F] / -5 [°C]	32,0	32,0	32,0	32,0	32,3	35,1	38,4	42,0	46,0	50,4
32 [°F] / 0 [°C]	32,1	32,1	32,1	32,1	33,7	36,6	39,9	43,6	47,7	52,2
41 [°F] / 5 [°C]	32,4	32,4	32,4	32,6	35,3	38,2	41,6	45,3	49,5	54,1
44,6 [°F] / 7 [°C]	32,6	32,6	32,6	33,4	36,0	39,0	42,4	46,1	50,2	54,8
50 [°F] / 10 [°C]	32,9	32,9	32,9	34,6	37,2	40,2	43,6	47,4	51,6	56,2
59 [°F] / 15 [°C]	34,0	34,0	34,7	37,0	39,7	42,7	46,1	49,9	54,1	
68 [°F] / 20 [°C]	35,3	35,3	37,1	39,3	41,8	44,7	48,0	51,7	55,8	
77 [°F] / 25 [°C]	35,3	35,3	37,1	39,3	41,8	44,7	48,0	51,7	55,8	

(1) Referred to unit without pump

CWB-R 190

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	23,45	23,45	23,45	23,45	23,45	23,45	22,29	20,88	19,37	17,75
	kW	82,5	82,5	82,5	82,5	82,5	82,5	78,4	73,4	68,1	62,4
23 [°F] / -5 [°C] Glycol 30%	Tons	28,71	28,71	28,71	28,71	28,71	28,42	26,88	25,24	23,48	21,59
	kW	101,0	101,0	101,0	101,0	101,0	100,0	94,5	88,8	82,6	75,9
32 [°F] / 0 [°C] Glycol 20%	Tons	34,72	34,72	34,72	34,72	34,72	33,80	32,00	30,07	28,02	25,82
	kW	122,1	122,1	122,1	122,1	122,1	118,9	112,5	105,8	98,5	90,8
41 [°F] / 5 [°C] Glycol 15%	Tons	41,12	41,12	41,12	41,12	41,12	39,35	37,26	35,04	32,68	30,17
	kW	144,6	144,6	144,6	144,6	144,6	138,4	131,1	123,3	114,9	106,1
44,6 [°F] / 7 [°C] Glycol 0%	Tons	44,43	44,43	44,43	44,43	44,33	42,22	39,99	37,61	35,09	32,41
	kW	156,2	156,2	156,2	156,2	155,9	148,5	140,6	132,3	123,4	114,0
50 [°F] / 10 [°C] Glycol 0%	Tons	48,62	48,62	48,62	48,62	47,98	45,70	43,28	40,72	38,00	35,13
	kW	171,0	171,0	171,0	171,0	168,7	160,7	152,2	143,2	133,7	123,5
59 [°F] / 15 [°C] Glycol 0%	Tons	56,09	56,09	56,09	56,09	54,30	51,71	48,98	46,10	43,05	
	kW	197,3	197,3	197,3	197,3	191,0	181,9	172,3	162,1	151,4	
68 [°F] / 20 [°C] Glycol 0%	Tons	61,47	61,47	61,47	61,37	58,51	55,52	52,40	49,13	45,71	
	kW	216,2	216,2	216,2	215,8	205,8	195,3	184,3	172,8	160,8	
77 [°F] / 25 [°C] Glycol 0%	Tons	61,47	61,47	61,47	61,37	58,51	55,52	52,40	49,13	45,71	
	kW	216,2	216,2	216,2	215,8	205,8	195,3	184,3	172,8	160,8	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	34,4	34,4	34,4	34,4	34,4	34,4	34,4	37,3	41,0	45,3	50,1
23 [°F] / -5 [°C]	34,5	34,5	34,5	34,5	34,5	34,5	35,1	38,5	42,2	46,5	51,4
32 [°F] / 0 [°C]	34,7	34,7	34,7	34,7	34,7	34,7	36,3	39,7	43,5	47,9	52,7
41 [°F] / 5 [°C]	34,8	34,8	34,8	34,8	34,8	34,8	37,6	41,0	44,9	49,3	54,2
44,6 [°F] / 7 [°C]	34,9	34,9	34,9	34,9	34,9	35,1	38,1	41,6	45,5	49,9	54,8
50 [°F] / 10 [°C]	35,1	35,1	35,1	35,1	35,1	35,9	39,0	42,5	46,4	50,8	55,8
59 [°F] / 15 [°C]	35,3	35,3	35,3	35,3	35,3	37,4	40,6	44,1	48,1	52,6	
68 [°F] / 20 [°C]	35,6	35,6	35,6	35,7	35,7	38,5	41,6	45,2	49,1	53,6	
77 [°F] / 25 [°C]	35,6	35,6	35,6	35,7	35,7	38,5	41,6	45,2	49,1	53,6	

CWB-R 220

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	28,45	28,45	28,45	28,45	28,45	27,98	26,37	24,65	22,79	20,75
	kW	100,1	100,1	100,1	100,1	100,1	98,4	92,8	86,7	80,1	73,0
23 [°F] / -5 [°C] Glycol 30%	Tons	34,84	34,84	34,84	34,84	34,84	33,60	31,69	29,64	27,41	24,98
	kW	122,5	122,5	122,5	122,5	122,5	118,2	111,5	104,2	96,4	87,9
32 [°F] / 0 [°C] Glycol 20%	Tons	42,12	42,12	42,12	42,12	41,94	39,82	37,56	35,13	32,50	29,64
	kW	148,1	148,1	148,1	148,1	147,5	140,1	132,1	123,5	114,3	104,2
41 [°F] / 5 [°C] Glycol 15%	Tons	49,88	49,88	49,88	49,88	48,63	46,18	43,55	40,72	37,68	34,39
	kW	175,4	175,4	175,4	175,4	171,0	162,4	153,1	143,2	132,5	120,9
44,6 [°F] / 7 [°C] Glycol 0%	Tons	53,88	53,88	53,88	53,88	52,09	49,45	46,64	43,61	40,36	36,85
	kW	189,5	189,5	189,5	189,5	183,2	173,9	164,0	153,4	141,9	129,6
50 [°F] / 10 [°C] Glycol 0%	Tons	58,95	58,95	58,95	58,94	56,25	53,40	50,34	47,07	43,56	39,79
	kW	207,3	207,3	207,3	207,3	197,8	187,8	177,0	165,5	153,2	139,9
59 [°F] / 15 [°C] Glycol 0%	Tons	67,97	67,97	67,97	66,44	63,39	60,15	56,69	53,00	49,06	
	kW	239,1	239,1	239,1	233,7	223,0	211,5	199,4	186,4	172,5	
68 [°F] / 20 [°C] Glycol 0%	Tons	76,00	76,00	76,00	72,56	68,92	65,09	61,06	56,81	52,33	
	kW	267,3	267,3	267,3	255,2	242,4	228,9	214,7	199,8	184,0	
77 [°F] / 25 [°C] Glycol 0%	Tons	76,00	76,00	76,00	72,56	68,92	65,09	61,06	56,81	52,33	
	kW	267,3	267,3	267,3	255,2	242,4	228,9	214,7	199,8	184,0	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	41,9	41,9	41,9	41,9	41,9	41,9	43,2	47,8	53,1	59,2	66,2
23 [°F] / -5 [°C]	41,9	41,9	41,9	41,9	41,9	41,9	44,8	49,5	54,9	61,0	68,0
32 [°F] / 0 [°C]	41,9	41,9	41,9	41,9	41,9	42,3	46,5	51,3	56,7	62,9	70,0
41 [°F] / 5 [°C]	42,0	42,0	42,0	42,0	42,0	44,1	48,4	53,3	58,8	65,1	72,2
44,6 [°F] / 7 [°C]	42,0	42,0	42,0	42,0	42,0	44,9	49,2	54,1	59,7	66,0	73,1
50 [°F] / 10 [°C]	42,1	42,1	42,1	42,1	42,1	46,1	50,5	55,5	61,1	67,5	74,6
59 [°F] / 15 [°C]	42,3	42,3	42,3	44,2	44,2	48,3	52,8	58,0	63,7	70,1	
68 [°F] / 20 [°C]	42,5	42,5	42,5	46,1	46,1	50,2	54,7	59,8	65,5	71,8	
77 [°F] / 25 [°C]	42,5	42,5	42,5	46,1	46,1	50,2	54,7	59,8	65,5	71,8	

(1) Referred to unit without pump

CWB-R 270

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	34,76	34,76	34,76	34,76	34,77	34,68	32,85	30,91	28,86	26,69
	kW	122,3	122,3	122,3	122,3	122,3	122,0	115,5	108,7	101,5	93,9
23 [°F] / -5 [°C] Glycol 30%	Tons	41,91	41,91	41,91	41,91	41,91	41,15	39,04	36,82	34,47	31,99
	kW	147,4	147,4	147,4	147,4	147,4	144,7	137,3	129,5	121,2	112,5
32 [°F] / 0 [°C] Glycol 20%	Tons	50,46	50,46	50,46	50,46	50,46	48,73	46,27	43,68	40,97	38,11
	kW	177,5	177,5	177,5	177,5	177,5	171,4	162,7	153,6	144,1	134,1
41 [°F] / 5 [°C] Glycol 15%	Tons	59,88	59,88	59,88	59,88	59,50	56,79	53,95	50,98	47,88	44,62
	kW	210,6	210,6	210,6	210,6	209,3	199,7	189,7	179,3	168,4	156,9
44,6 [°F] / 7 [°C] Glycol 0%	Tons	64,81	64,81	64,81	64,81	63,92	61,01	57,97	54,79	51,47	47,99
	kW	228,0	228,0	228,0	228,0	224,8	214,6	203,9	192,7	181,0	168,8
50 [°F] / 10 [°C] Glycol 0%	Tons	71,20	71,20	71,20	71,20	69,38	66,22	62,93	59,50	55,92	52,18
	kW	250,4	250,4	250,4	250,4	244,0	232,9	221,3	209,3	196,7	183,5
59 [°F] / 15 [°C] Glycol 0%	Tons	82,83	82,83	82,83	82,46	79,00	75,40	71,67	67,80	63,76	
	kW	291,3	291,3	291,3	290,0	277,8	265,2	252,1	238,4	224,3	
68 [°F] / 20 [°C] Glycol 0%	Tons	86,70	86,70	86,70	85,60	81,61	77,52	73,32	69,00	64,56	
	kW	304,9	304,9	304,9	301,0	287,0	272,6	257,9	242,7	227,0	
77 [°F] / 25 [°C] Glycol 0%	Tons	86,70	86,70	86,70	85,60	81,61	77,52	73,32	69,00	64,56	
	kW	304,9	304,9	304,9	301,0	287,0	272,6	257,9	242,7	227,0	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	46,9	46,9	46,9	46,9	46,9	47,1	51,3	56,0	61,2	67,0
23 [°F] / -5 [°C]	47,3	47,3	47,3	47,3	47,3	48,7	53,0	57,8	63,1	69,0
32 [°F] / 0 [°C]	47,7	47,7	47,7	47,7	47,7	50,6	54,9	59,7	65,1	71,1
41 [°F] / 5 [°C]	48,3	48,3	48,3	48,3	48,8	52,6	57,0	61,9	67,3	73,3
44,6 [°F] / 7 [°C]	48,5	48,5	48,5	48,5	49,6	53,5	57,9	62,8	68,3	74,3
50 [°F] / 10 [°C]	49,0	49,0	49,0	49,0	51,1	55,0	59,4	64,3	69,8	75,9
59 [°F] / 15 [°C]	50,0	50,0	50,0	50,3	53,8	57,8	62,2	67,2	72,7	
68 [°F] / 20 [°C]	50,4	50,4	50,4	51,2	54,6	58,5	62,8	67,7	73,1	
77 [°F] / 25 [°C]	50,4	50,4	50,4	51,2	54,6	58,5	62,8	67,7	73,1	

CWB-R 300

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	39,36	39,36	39,36	39,36	39,36	38,69	36,71	34,66	32,51	30,22
	kW	138,4	138,4	138,4	138,4	138,4	136,1	129,1	121,9	114,3	106,3
23 [°F] / -5 [°C] Glycol 30%	Tons	47,35	47,35	47,35	47,35	47,35	45,76	43,44	41,02	38,48	35,78
	kW	166,5	166,5	166,5	166,5	166,5	160,9	152,8	144,3	135,3	125,8
32 [°F] / 0 [°C] Glycol 20%	Tons	56,95	56,95	56,95	56,95	56,68	54,03	51,29	48,44	45,44	42,27
	kW	200,3	200,3	200,3	200,3	199,3	190,0	180,4	170,4	159,8	148,7
41 [°F] / 5 [°C] Glycol 15%	Tons	67,55	67,55	67,55	67,55	65,86	62,79	59,62	56,31	52,84	49,18
	kW	237,6	237,6	237,6	237,6	231,6	220,8	209,7	198,0	185,8	173,0
44,6 [°F] / 7 [°C] Glycol 0%	Tons	73,10	73,10	73,10	73,10	70,67	67,39	63,99	60,44	56,72	52,79
	kW	257,1	257,1	257,1	257,1	248,6	237,0	225,1	212,6	199,5	185,7
50 [°F] / 10 [°C] Glycol 0%	Tons	80,30	80,30	80,30	80,03	76,59	73,03	69,35	65,51	61,49	57,25
	kW	282,4	282,4	282,4	281,5	269,4	256,9	243,9	230,4	216,3	201,4
59 [°F] / 15 [°C] Glycol 0%	Tons	93,38	93,38	93,38	90,85	86,96	82,94	78,77	74,42	69,87	
	kW	328,4	328,4	328,4	319,5	305,8	291,7	277,0	261,7	245,7	
68 [°F] / 20 [°C] Glycol 0%	Tons	99,55	99,55	99,55	95,31	90,74	86,08	81,29	76,37	71,28	
	kW	350,1	350,1	350,1	335,2	319,1	302,7	285,9	268,6	250,7	
77 [°F] / 25 [°C] Glycol 0%	Tons	99,55	99,55	99,55	95,31	90,74	86,08	81,29	76,37	71,28	
	kW	350,1	350,1	350,1	335,2	319,1	302,7	285,9	268,6	250,7	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	53,8	53,8	53,8	53,8	53,8	55,3	60,4	66,0	72,2	79,1
23 [°F] / -5 [°C]	54,0	54,0	54,0	54,0	54,0	57,3	62,4	68,1	74,5	81,6
32 [°F] / 0 [°C]	54,3	54,3	54,3	54,3	54,8	59,4	64,6	70,4	76,9	84,1
41 [°F] / 5 [°C]	54,9	54,9	54,9	54,9	57,3	61,9	67,2	73,0	79,6	86,9
44,6 [°F] / 7 [°C]	55,3	55,3	55,3	55,3	58,5	63,1	68,3	74,2	80,8	88,1
50 [°F] / 10 [°C]	56,0	56,0	56,0	56,3	60,4	65,1	70,3	76,2	82,8	90,2
59 [°F] / 15 [°C]	57,8	57,8	57,8	60,2	64,3	69,0	74,3	80,2	86,9	
68 [°F] / 20 [°C]	58,9	58,9	58,9	62,0	65,9	70,4	75,4	81,2	87,6	
77 [°F] / 25 [°C]	58,9	58,9	58,9	62,0	65,9	70,4	75,4	81,2	87,6	

(1) Referred to unit without pump

CWB-R 320

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	41,88	41,88	41,88	41,88	41,88	40,84	38,66	36,36	33,93	31,34
	kW	147,3	147,3	147,3	147,3	147,3	143,7	136,0	127,9	119,3	110,2
23 [°F] / -5 [°C] Glycol 30%	Tons	50,44	50,44	50,44	50,44	50,44	48,31	45,78	43,12	40,31	37,32
	kW	177,4	177,4	177,4	177,4	177,4	169,9	161,0	151,7	141,8	131,3
32 [°F] / 0 [°C] Glycol 20%	Tons	60,65	60,65	60,65	60,65	59,81	56,99	54,04	50,94	47,67	44,21
	kW	213,3	213,3	213,3	213,3	210,3	200,4	190,0	179,1	167,7	155,5
41 [°F] / 5 [°C] Glycol 15%	Tons	71,88	71,88	71,88	71,88	69,39	66,14	62,73	59,16	55,41	51,45
	kW	252,8	252,8	252,8	252,8	244,1	232,6	220,6	208,1	194,9	181,0
44,6 [°F] / 7 [°C] Glycol 0%	Tons	77,76	77,76	77,76	77,76	74,41	70,93	67,28	63,47	59,45	55,23
	kW	273,5	273,5	273,5	273,5	261,7	249,4	236,6	223,2	209,1	194,2
50 [°F] / 10 [°C] Glycol 0%	Tons	85,36	85,36	85,36	84,17	80,55	76,78	72,84	68,72	64,39	59,86
	kW	300,2	300,2	300,2	296,0	283,3	270,0	256,2	241,7	226,5	210,5
59 [°F] / 15 [°C] Glycol 0%	Tons	99,15	99,15	99,15	95,38	91,27	87,00	82,54	77,89	73,03	
	kW	348,7	348,7	348,7	335,4	321,0	306,0	290,3	273,9	256,8	
68 [°F] / 20 [°C] Glycol 0%	Tons	106,74	106,74	105,36	100,60	95,72	90,71	85,55	80,25	74,77	
	kW	375,4	375,4	370,6	353,8	336,6	319,0	300,9	282,2	263,0	
77 [°F] / 25 [°C] Glycol 0%	Tons	106,74	106,74	105,36	100,60	95,72	90,71	85,55	80,25	74,77	
	kW	375,4	375,4	370,6	353,8	336,6	319,0	300,9	282,2	263,0	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	56,8	56,8	56,8	56,8	56,8	59,3	64,8	70,8	77,6	85,1
23 [°F] / -5 [°C]	57,2	57,2	57,2	57,2	57,2	61,6	67,2	73,4	80,3	88,0
32 [°F] / 0 [°C]	57,6	57,6	57,6	57,6	59,0	64,1	69,8	76,1	83,2	91,0
41 [°F] / 5 [°C]	58,2	58,2	58,2	58,2	61,9	67,0	72,8	79,2	86,3	94,2
44,6 [°F] / 7 [°C]	58,6	58,6	58,6	58,6	63,1	68,3	74,1	80,5	87,7	95,6
50 [°F] / 10 [°C]	59,3	59,3	59,3	60,7	65,3	70,5	76,3	82,8	90,0	97,9
59 [°F] / 15 [°C]	60,9	60,9	60,9	64,8	69,4	74,7	80,6	87,1	94,4	
68 [°F] / 20 [°C]	62,0	62,0	63,1	66,9	71,3	76,4	82,0	88,4	95,4	
77 [°F] / 25 [°C]	62,0	62,0	63,1	66,9	71,3	76,4	82,0	88,4	95,4	

CWB-R 380

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	47,80	47,80	47,80	47,80	47,80	47,80	45,60	43,10	40,51	37,80
	kW	168,1	168,1	168,1	168,1	168,1	168,1	160,4	151,6	142,5	132,9
23 [°F] / -5 [°C] Glycol 30%	Tons	57,64	57,64	57,64	57,64	57,64	57,10	54,22	51,27	48,20	44,97
	kW	202,7	202,7	202,7	202,7	202,7	200,8	190,7	180,3	169,5	158,1
32 [°F] / 0 [°C] Glycol 20%	Tons	69,34	69,34	69,34	69,34	69,34	67,62	64,24	60,75	57,13	53,31
	kW	243,9	243,9	243,9	243,9	243,9	237,8	225,9	213,7	200,9	187,5
41 [°F] / 5 [°C] Glycol 15%	Tons	82,13	82,13	82,13	82,13	82,13	78,75	74,84	70,81	66,60	62,18
	kW	288,8	288,8	288,8	288,8	288,8	277,0	263,2	249,0	234,2	218,7
44,6 [°F] / 7 [°C] Glycol 0%	Tons	88,81	88,81	88,81	88,81	88,63	84,56	80,39	76,06	71,55	66,82
	kW	312,3	312,3	312,3	312,3	311,7	297,4	282,7	267,5	251,6	235,0
50 [°F] / 10 [°C] Glycol 0%	Tons	97,40	97,40	97,40	97,40	96,10	91,72	87,21	82,54	77,66	72,56
	kW	342,5	342,5	342,5	342,5	338,0	322,6	306,7	290,3	273,1	255,2
59 [°F] / 15 [°C] Glycol 0%	Tons	112,91	112,91	112,91	112,91	109,21	104,28	99,19	93,92	88,42	
	kW	397,1	397,1	397,1	397,1	384,1	366,8	348,9	330,3	311,0	
68 [°F] / 20 [°C] Glycol 0%	Tons	119,60	119,60	119,60	119,60	114,19	108,53	102,75	96,81	90,68	
	kW	420,6	420,6	420,6	420,6	401,6	381,7	361,4	340,5	318,9	
77 [°F] / 25 [°C] Glycol 0%	Tons	119,60	119,60	119,60	119,60	114,19	108,53	102,75	96,81	90,68	
	kW	420,6	420,6	420,6	420,6	401,6	381,7	361,4	340,5	318,9	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	67,7	67,7	67,7	67,7	67,7	67,7	72,9	79,3	86,5	94,4
23 [°F] / -5 [°C]	67,9	67,9	67,9	67,9	67,9	69,0	74,8	81,4	88,7	96,8
32 [°F] / 0 [°C]	68,2	68,2	68,2	68,2	68,2	71,0	76,9	83,5	90,9	99,2
41 [°F] / 5 [°C]	69,0	69,0	69,0	69,0	69,0	73,6	79,5	86,1	93,5	101,8
44,6 [°F] / 7 [°C]	69,5	69,5	69,5	69,5	69,7	74,8	80,7	87,3	94,7	103,0
50 [°F] / 10 [°C]	70,5	70,5	70,5	70,5	71,9	77,0	82,8	89,4	96,8	105,1
59 [°F] / 15 [°C]	73,1	73,1	73,1	73,1	76,4	81,4	87,1	93,7	101,1	
68 [°F] / 20 [°C]	74,4	74,4	74,4	74,4	78,4	83,1	88,6	94,9	102,1	
77 [°F] / 25 [°C]	74,4	74,4	74,4	74,4	78,4	83,1	88,6	94,9	102,1	

(1) Referred to unit without pump

CWB-R 420

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	53,51	53,51	53,51	53,51	53,51	53,13	50,30	47,32	44,15	40,73
	kW	188,2	188,2	188,2	188,2	188,2	186,9	176,9	166,4	155,3	143,3
23 [°F] / -5 [°C] Glycol 30%	Tons	64,56	64,56	64,56	64,56	64,56	63,08	59,76	56,25	52,50	48,48
	kW	227,1	227,1	227,1	227,1	227,1	221,8	210,2	197,8	184,7	170,5
32 [°F] / 0 [°C] Glycol 20%	Tons	77,66	77,66	77,66	77,66	77,66	74,57	70,67	66,54	62,13	57,39
	kW	273,1	273,1	273,1	273,1	273,1	262,3	248,6	234,0	218,5	201,9
41 [°F] / 5 [°C] Glycol 15%	Tons	91,93	91,93	91,93	91,93	90,95	86,66	82,14	77,35	72,25	66,78
	kW	323,3	323,3	323,3	323,3	319,9	304,8	288,9	272,0	254,1	234,9
44,6 [°F] / 7 [°C] Glycol 0%	Tons	99,39	99,39	99,39	99,39	97,57	92,97	88,13	83,00	77,53	71,69
	kW	349,6	349,6	349,6	349,6	343,1	327,0	309,9	291,9	272,7	252,1
50 [°F] / 10 [°C] Glycol 0%	Tons	108,96	108,96	108,96	108,96	105,66	100,69	95,45	89,89	83,99	77,70
	kW	383,2	383,2	383,2	383,2	371,6	354,1	335,7	316,2	295,4	273,3
59 [°F] / 15 [°C] Glycol 0%	Tons	126,22	126,22	126,22	125,18	119,82	114,18	108,24	101,96	95,30	
	kW	443,9	443,9	443,9	440,3	421,4	401,6	380,7	358,6	335,2	
68 [°F] / 20 [°C] Glycol 0%	Tons	135,80	135,80	135,80	132,81	126,45	119,84	112,96	105,79	98,28	
	kW	477,6	477,6	477,6	467,1	444,7	421,5	397,3	372,1	345,6	
77 [°F] / 25 [°C] Glycol 0%	Tons	135,80	135,80	135,80	132,81	126,45	119,84	112,96	105,79	98,28	
	kW	477,6	477,6	477,6	467,1	444,7	421,5	397,3	372,1	345,6	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	75,8	75,8	75,8	75,8	75,8	76,7	84,1	92,6	102,1	112,9
23 [°F] / -5 [°C]	75,9	75,9	75,9	75,9	75,9	79,1	86,7	95,2	104,9	115,9
32 [°F] / 0 [°C]	76,1	76,1	76,1	76,1	76,1	81,7	89,4	98,1	107,9	119,0
41 [°F] / 5 [°C]	76,5	76,5	76,5	76,5	78,0	84,9	92,6	101,5	111,4	122,6
44,6 [°F] / 7 [°C]	76,7	76,7	76,7	76,7	79,3	86,3	94,1	102,9	112,9	124,1
50 [°F] / 10 [°C]	77,3	77,3	77,3	77,3	81,6	88,6	96,5	105,4	115,4	126,7
59 [°F] / 15 [°C]	78,7	78,7	78,7	79,8	86,1	93,2	101,2	110,2	120,3	
68 [°F] / 20 [°C]	79,7	79,7	79,7	82,3	88,4	95,3	103,0	111,8	121,7	
77 [°F] / 25 [°C]	79,7	79,7	79,7	82,3	88,4	95,3	103,0	111,8	121,7	

CWB-R 450

Cooling Capacity

Ambient temperature

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	59,06	59,06	59,06	59,06	59,06	57,91	54,67	51,18	47,39	43,24
	kW	207,7	207,7	207,7	207,7	207,7	203,7	192,3	180,0	166,7	152,1
23 [°F] / -5 [°C] Glycol 30%	Tons	71,28	71,28	71,28	71,28	71,28	68,67	64,87	60,77	56,32	51,44
	kW	250,7	250,7	250,7	250,7	250,7	241,5	228,2	213,7	198,1	180,9
32 [°F] / 0 [°C] Glycol 20%	Tons	85,73	85,73	85,73	85,73	85,20	81,04	76,57	71,74	66,51	60,81
	kW	301,5	301,5	301,5	301,5	299,6	285,0	269,3	252,3	233,9	213,9
41 [°F] / 5 [°C] Glycol 15%	Tons	101,45	101,45	101,45	101,45	98,80	93,97	88,78	83,18	77,13	70,57
	kW	356,8	356,8	356,8	356,8	347,5	330,5	312,2	292,5	271,3	248,2
44,6 [°F] / 7 [°C] Glycol 0%	Tons	109,65	109,65	109,65	109,65	105,90	100,71	95,14	89,14	82,66	75,66
	kW	385,6	385,6	385,6	385,6	372,4	354,2	334,6	313,5	290,7	266,1
50 [°F] / 10 [°C] Glycol 0%	Tons	120,16	120,16	120,16	119,79	114,53	108,90	102,86	96,37	89,37	81,84
	kW	422,6	422,6	422,6	421,3	402,8	383,0	361,8	338,9	314,3	287,8
59 [°F] / 15 [°C] Glycol 0%	Tons	139,09	139,09	139,09	135,56	129,55	123,14	116,28	108,92	101,05	
	kW	489,2	489,2	489,2	476,8	455,6	433,1	408,9	383,1	355,4	
68 [°F] / 20 [°C] Glycol 0%	Tons	152,01	152,01	152,01	145,12	137,83	130,17	122,10	113,60	104,64	
	kW	534,6	534,6	534,6	510,4	484,7	457,8	429,4	399,5	368,0	
77 [°F] / 25 [°C] Glycol 0%	Tons	152,01	152,01	152,01	145,12	137,83	130,17	122,10	113,60	104,64	
	kW	534,6	534,6	534,6	510,4	484,7	457,8	429,4	399,5	368,0	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	83,9	83,9	83,9	83,9	83,9	87,0	96,2	106,8	119,0	133,0
23 [°F] / -5 [°C]	83,9	83,9	83,9	83,9	83,9	90,0	99,5	110,2	122,6	136,6
32 [°F] / 0 [°C]	83,9	83,9	83,9	83,9	85,0	93,4	103,1	114,0	126,5	140,7
41 [°F] / 5 [°C]	84,0	84,0	84,0	84,0	88,6	97,3	107,2	118,3	131,0	145,2
44,6 [°F] / 7 [°C]	84,1	84,1	84,1	84,1	90,2	99,0	108,9	120,2	132,9	147,2
50 [°F] / 10 [°C]	84,2	84,2	84,2	84,8	92,7	101,7	111,8	123,2	136,0	150,4
59 [°F] / 15 [°C]	84,6	84,6	84,6	89,3	97,5	106,7	117,1	128,7	141,8	
68 [°F] / 20 [°C]	84,9	84,9	84,9	92,2	100,3	109,4	119,6	130,9	143,6	
77 [°F] / 25 [°C]	84,9	84,9	84,9	92,2	100,3	109,4	119,6	130,9	143,6	

(1) Referred to unit without pump

CWB-R 510**Cooling Capacity****Ambient temperature**

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	64,40	64,40	64,40	64,40	64,40	64,40	60,97	57,16	53,21	49,10
	kW	226,5	226,5	226,5	226,5	226,5	226,5	214,4	201,0	187,1	172,7
23 [°F] / -5 [°C] Glycol 30%	Tons	78,02	78,02	78,02	78,02	78,02	77,04	72,79	68,33	63,66	58,77
	kW	274,4	274,4	274,4	274,4	274,4	270,9	256,0	240,3	223,9	206,7
32 [°F] / 0 [°C] Glycol 20%	Tons	94,26	94,26	94,26	94,26	94,26	91,50	86,54	81,31	75,80	70,01
	kW	331,5	331,5	331,5	331,5	331,5	321,8	304,4	286,0	266,6	246,2
41 [°F] / 5 [°C] Glycol 15%	Tons	112,11	112,11	112,11	112,11	112,11	106,88	101,14	95,09	88,70	81,97
	kW	394,3	394,3	394,3	394,3	394,3	375,9	355,7	334,4	311,9	288,3
44,6 [°F] / 7 [°C] Glycol 0%	Tons	121,43	121,43	121,43	121,43	120,72	114,91	108,76	102,26	95,41	88,20
	kW	427,1	427,1	427,1	427,1	424,6	404,1	382,5	359,7	335,6	310,2
50 [°F] / 10 [°C] Glycol 0%	Tons	133,49	133,49	133,49	133,49	131,14	124,84	118,18	111,15	103,74	95,94
	kW	469,5	469,5	469,5	469,5	461,2	439,1	415,6	390,9	364,9	337,4
59 [°F] / 15 [°C] Glycol 0%	Tons	155,37	155,37	155,37	155,37	149,45	142,30	134,74	126,77	118,39	
	kW	546,4	546,4	546,4	546,4	525,6	500,5	473,9	445,9	416,4	
68 [°F] / 20 [°C] Glycol 0%	Tons	168,47	168,47	168,47	167,25	159,48	151,32	142,78	133,85	124,53	
	kW	592,5	592,5	592,5	588,2	560,9	532,2	502,1	470,7	438,0	
77 [°F] / 25 [°C] Glycol 0%	Tons	168,47	168,47	168,47	167,25	159,48	151,32	142,78	133,85	124,53	
	kW	592,5	592,5	592,5	588,2	560,9	532,2	502,1	470,7	438,0	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	94,0	94,0	94,0	94,0	94,0	94,0	94,0	102,1	111,9	122,8	135,2
23 [°F] / -5 [°C]	94,1	94,1	94,1	94,1	94,1	94,1	96,1	104,9	114,9	126,1	138,8
32 [°F] / 0 [°C]	94,2	94,2	94,2	94,2	94,2	94,2	99,0	108,0	118,1	129,6	142,4
41 [°F] / 5 [°C]	94,6	94,6	94,6	94,6	94,6	94,6	102,5	111,6	121,9	133,4	146,4
44,6 [°F] / 7 [°C]	94,9	94,9	94,9	94,9	94,9	95,9	104,0	113,2	123,5	135,1	148,2
50 [°F] / 10 [°C]	95,6	95,6	95,6	95,6	95,6	98,5	106,7	115,9	126,3	138,0	151,1
59 [°F] / 15 [°C]	97,3	97,3	97,3	97,3	97,3	103,7	111,9	121,2	131,7	143,5	
68 [°F] / 20 [°C]	98,6	98,6	98,6	99,6	99,6	106,8	114,9	124,0	134,4	146,0	
77 [°F] / 25 [°C]	98,6	98,6	98,6	99,6	99,6	106,8	114,9	124,0	134,4	146,0	

CWB-R 570**Cooling Capacity****Ambient temperature**

Outlet water temperature		14 [°F] -10 [°C]	32 [°F] 0 [°C]	50 [°F] 10 [°C]	59 [°F] 15 [°C]	68 [°F] 20 [°C]	77 [°F] 25 [°C]	86 [°F] 30 [°C]	95 [°F] 35 [°C]	104 [°F] 40 [°C]	113 [°F] 45 [°C]
14 [°F] / -10 [°C] Glycol 30%	Tons	75,09	75,09	75,09	75,09	75,09	74,03	69,74	65,32	60,69	55,79
	kW	264,1	264,1	264,1	264,1	264,1	260,4	245,3	229,7	213,5	196,2
23 [°F] / -5 [°C] Glycol 30%	Tons	90,86	90,86	90,86	90,86	90,86	87,96	83,01	77,85	72,41	66,62
	kW	319,6	319,6	319,6	319,6	319,6	309,4	292,0	273,8	254,7	234,3
32 [°F] / 0 [°C] Glycol 20%	Tons	109,68	109,68	109,68	109,68	109,68	104,16	98,39	92,32	85,90	79,06
	kW	385,8	385,8	385,8	385,8	385,8	366,3	346,0	324,7	302,1	278,1
41 [°F] / 5 [°C] Glycol 15%	Tons	130,37	130,37	130,37	130,37	127,65	121,27	114,59	107,55	100,09	92,15
	kW	458,5	458,5	458,5	458,5	448,9	426,5	403,0	378,3	352,0	324,1
44,6 [°F] / 7 [°C] Glycol 0%	Tons	141,18	141,18	141,18	141,18	137,01	130,19	123,03	115,48	107,48	98,96
	kW	496,5	496,5	496,5	496,5	481,9	457,9	432,7	406,1	378,0	348,1
50 [°F] / 10 [°C] Glycol 0%	Tons	155,15	155,15	155,15	155,15	148,54	141,14	133,38	125,20	116,53	107,31
	kW	545,7	545,7	545,7	545,7	522,4	496,4	469,1	440,3	409,8	377,4
59 [°F] / 15 [°C] Glycol 0%	Tons	180,47	180,47	180,47	176,68	168,66	160,27	151,45	142,15	132,32	
	kW	634,7	634,7	634,7	621,4	593,2	563,7	532,7	500,0	465,4	
68 [°F] / 20 [°C] Glycol 0%	Tons	198,70	198,70	198,70	190,65	181,27	171,53	161,40	150,83	139,76	
	kW	698,8	698,8	698,8	670,5	637,5	603,3	567,6	530,5	491,5	
77 [°F] / 25 [°C] Glycol 0%	Tons	198,70	198,70	198,70	190,65	181,27	171,53	161,40	150,83	139,76	
	kW	698,8	698,8	698,8	670,5	637,5	603,3	567,6	530,5	491,5	

Power input [kW] ⁽¹⁾

14 [°F] / -10 [°C]	106,0	106,0	106,0	106,0	106,0	106,0	108,5	119,2	131,2	144,9	160,4
23 [°F] / -5 [°C]	106,3	106,3	106,3	106,3	106,3	106,3	112,2	123,1	135,4	149,4	165,2
32 [°F] / 0 [°C]	106,6	106,6	106,6	106,6	106,6	106,6	116,4	127,5	140,1	154,4	170,4
41 [°F] / 5 [°C]	107,0	107,0	107,0	107,0	107,0	111,1	121,2	132,5	145,4	159,9	176,2
44,6 [°F] / 7 [°C]	107,3	107,3	107,3	107,3	107,3	113,1	123,3	134,7	147,7	162,3	178,7
50 [°F] / 10 [°C]	107,8	107,8	107,8	107,8	107,8	116,3	126,6	138,3	151,4	166,1	182,7
59 [°F] / 15 [°C]	108,9	108,9	108,9	113,1	113,1	122,4	133,0	144,9	158,3	173,3	
68 [°F] / 20 [°C]	109,9	109,9	109,9	117,2	117,2	126,5	136,9	148,7	162,0	176,8	
77 [°F] / 25 [°C]	109,9	109,9	109,9	117,2	117,2	126,5	136,9	148,7	162,0	176,8	

(1) Referred to unit without pump

Correction factors

Definitions and symbols:

Pf	Cooling capacity [kW]
Q _W	Liquid flow [l/h]
T _a	Air temperature [°C]
T _{W IN}	Inlet liquid temperature [°C]
T _{W OUT}	Outlet liquid temperature [°C]
ΔT _W	Liquid temperature difference (T _{W IN} - T _{W OUT}) [°C]
K _{Pf(GLY)}	Correction factor for cooling capacity due to ethylene glycol presence
K _{Pf(ΔT_W)}	Correction factor for cooling capacity due to liquid temperature difference (ΔT _W) other from 5°C
K _{Q_W(GLY)}	Correction factor for liquid flow due to ethylene glycol presence

Cooling capacity correction:

From tables of chapter “Performances” is possible to get chiller cooling capacity Pf related to outlet water temperature T_{W OUT} and to ambient air temperature T_a.

Where necessary (with outlet water temperatures lower than 5°C) tables indicate proper glycol percentage and they report the already correct value of cooling capacity accordingly to glycol presence.

Cooling capacity can further vary in consequence of ethylene glycol presence (if not already considered) and in consequence of various water temperature differences ΔT_W of treated fluid from the unit.

Calculation of new value has to be made using following formula:

$$Pf_{CORR} = Pf \times K_{Pf(GLY)} \times K_{Pf(\Delta T_W)}$$

Where

Ethylene glycol percentage [%]	0	10	15	20	25	30
K _{Pf(GLY)}	1	0,990	0,985	0,980	0,975	0,970

Liquid temp. difference ΔT _W [°C]	3	4	5	6	7	8	9	10
Liquid temp. difference ΔT _W [°F]	5.4	7.2	9	10.8	12.6	14.4	16.2	18
K _{Pf(ΔT_W)}	0,981	0,991	1	1,007	1,013	1,018	1,022	1,025

At this point water flow has to be calculated again consequently to Pf_{CORR}, to ethylene glycol percentage and to water temperature difference using the formula:

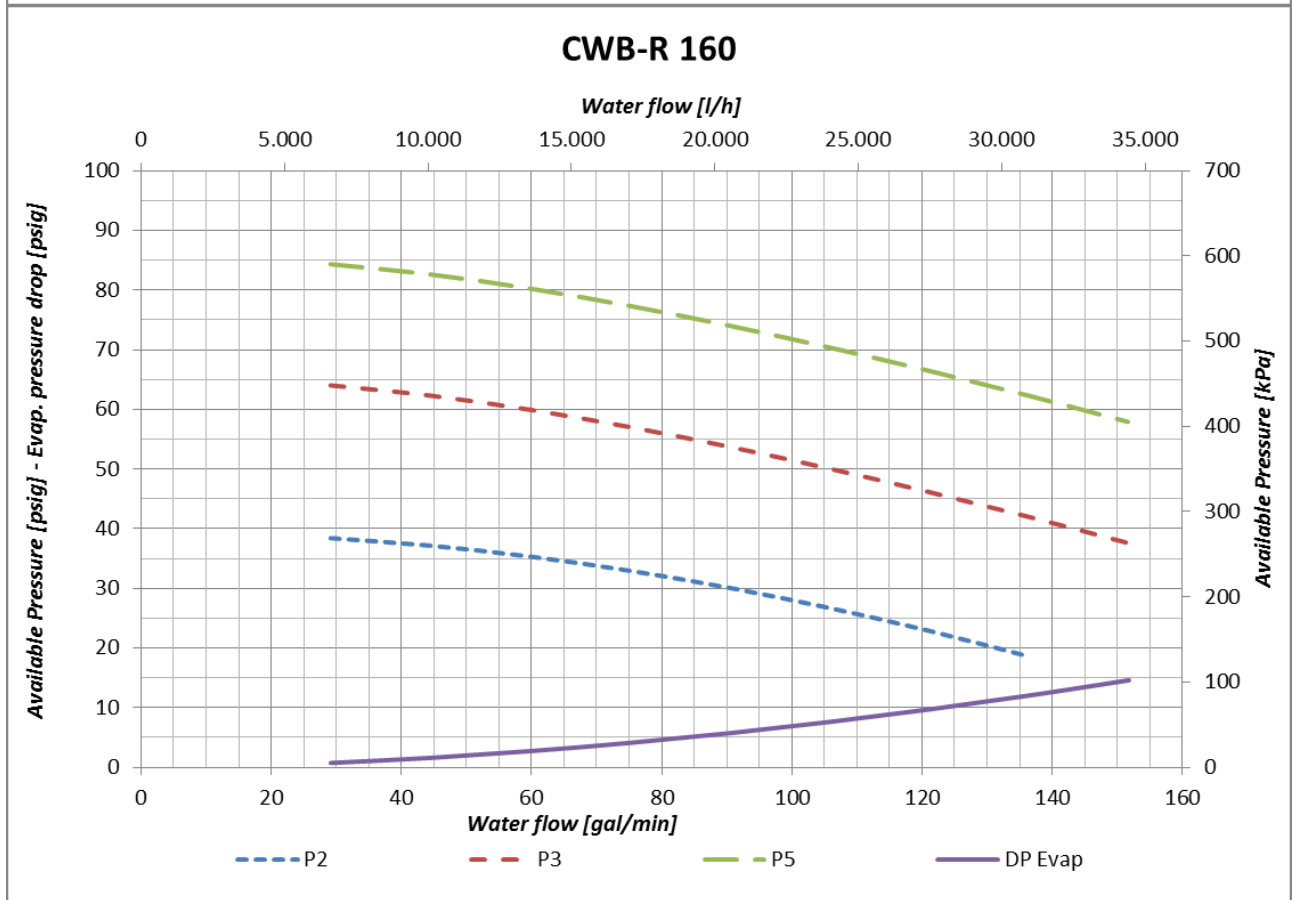
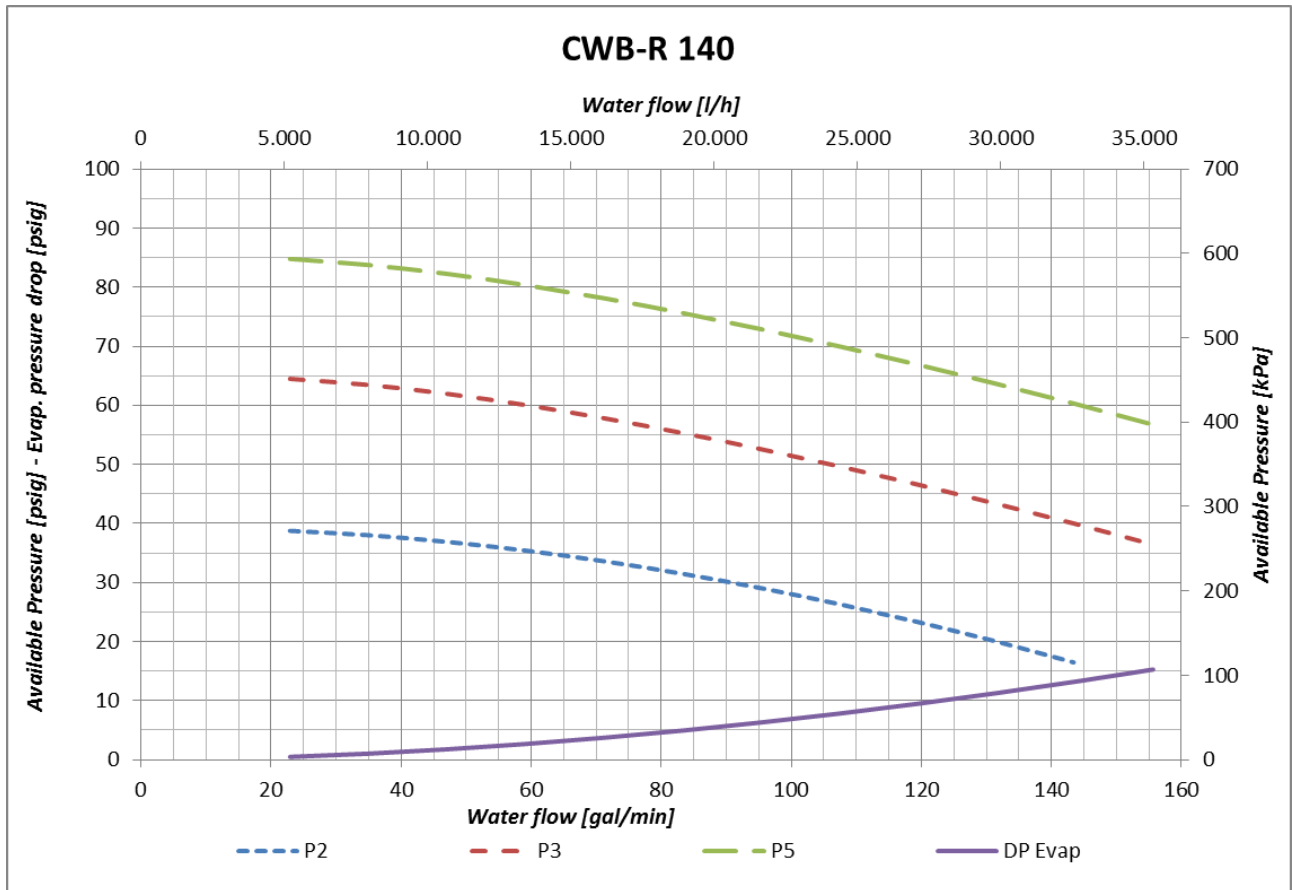
$$Q_w = (Pf_{CORR} \times 860 \times K_{Q_w(GLY)}) \div \Delta T_w$$

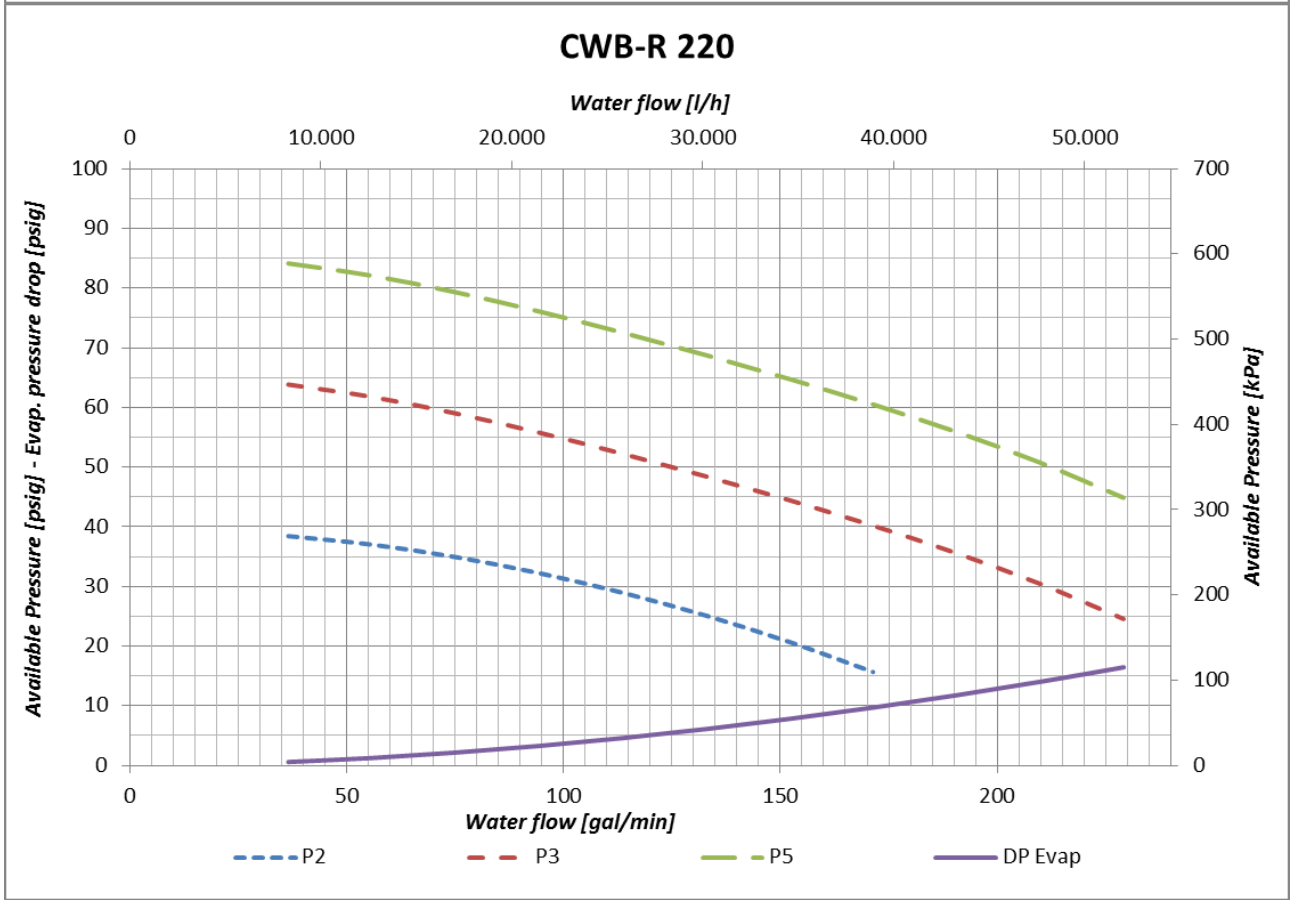
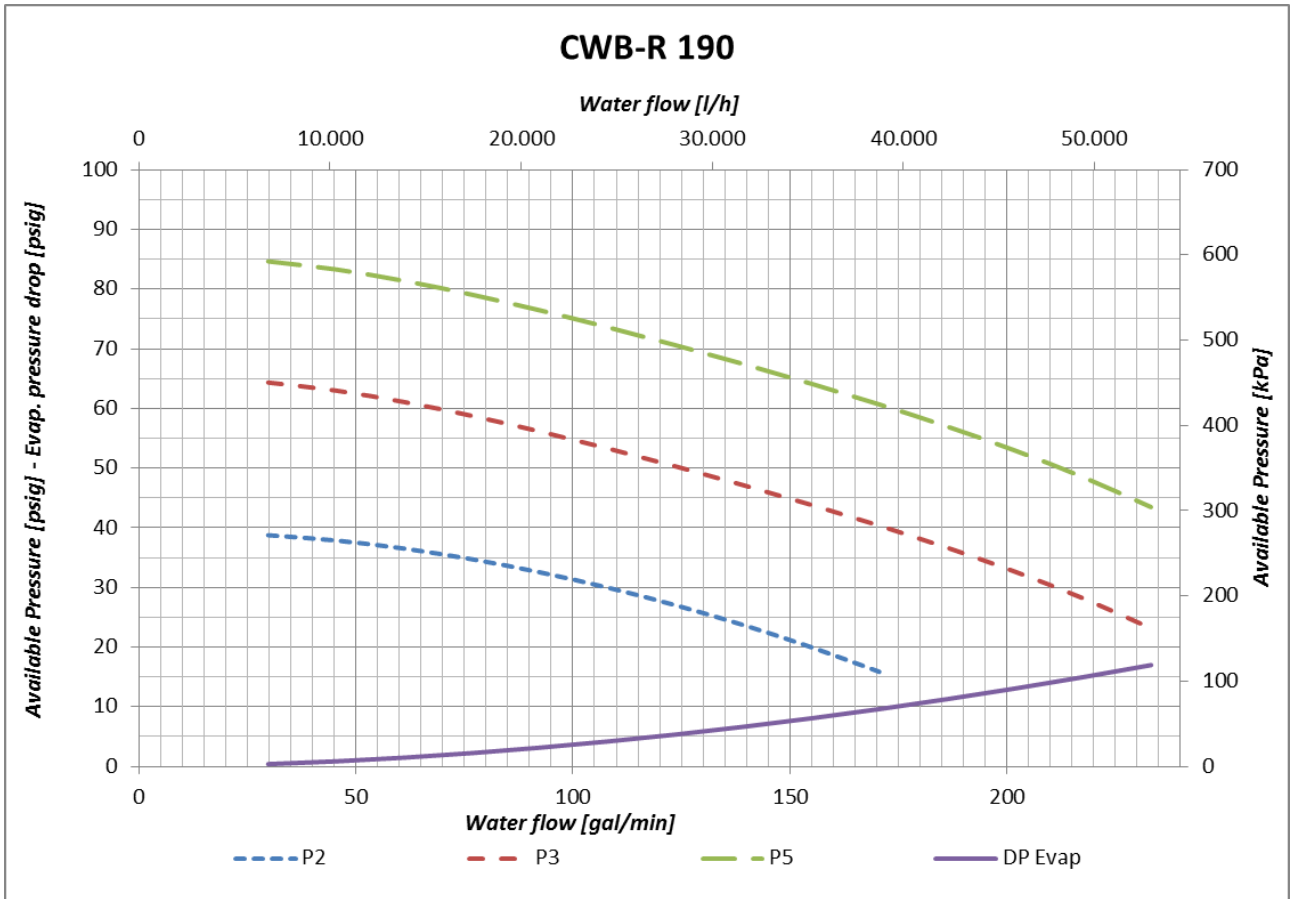
Where

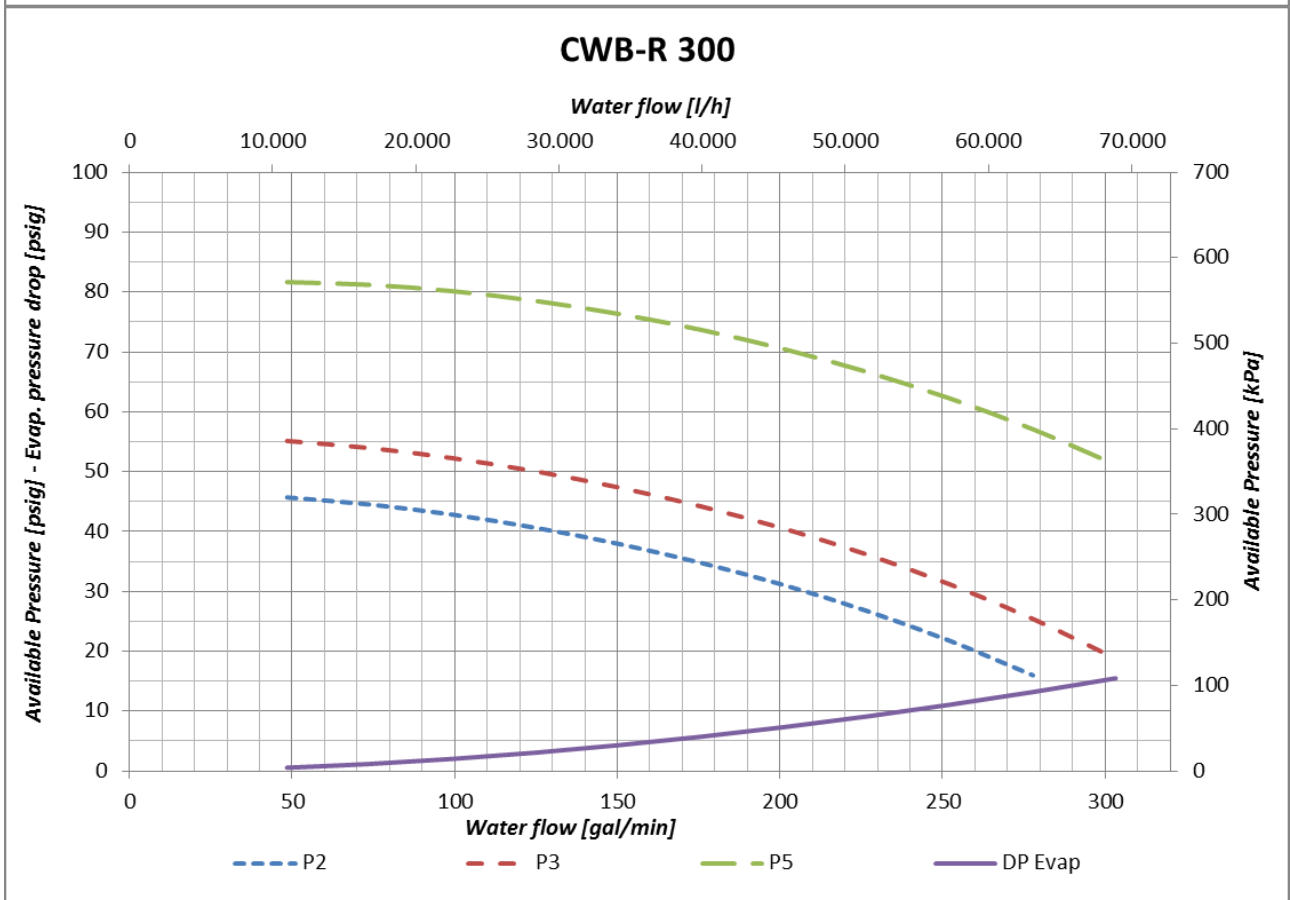
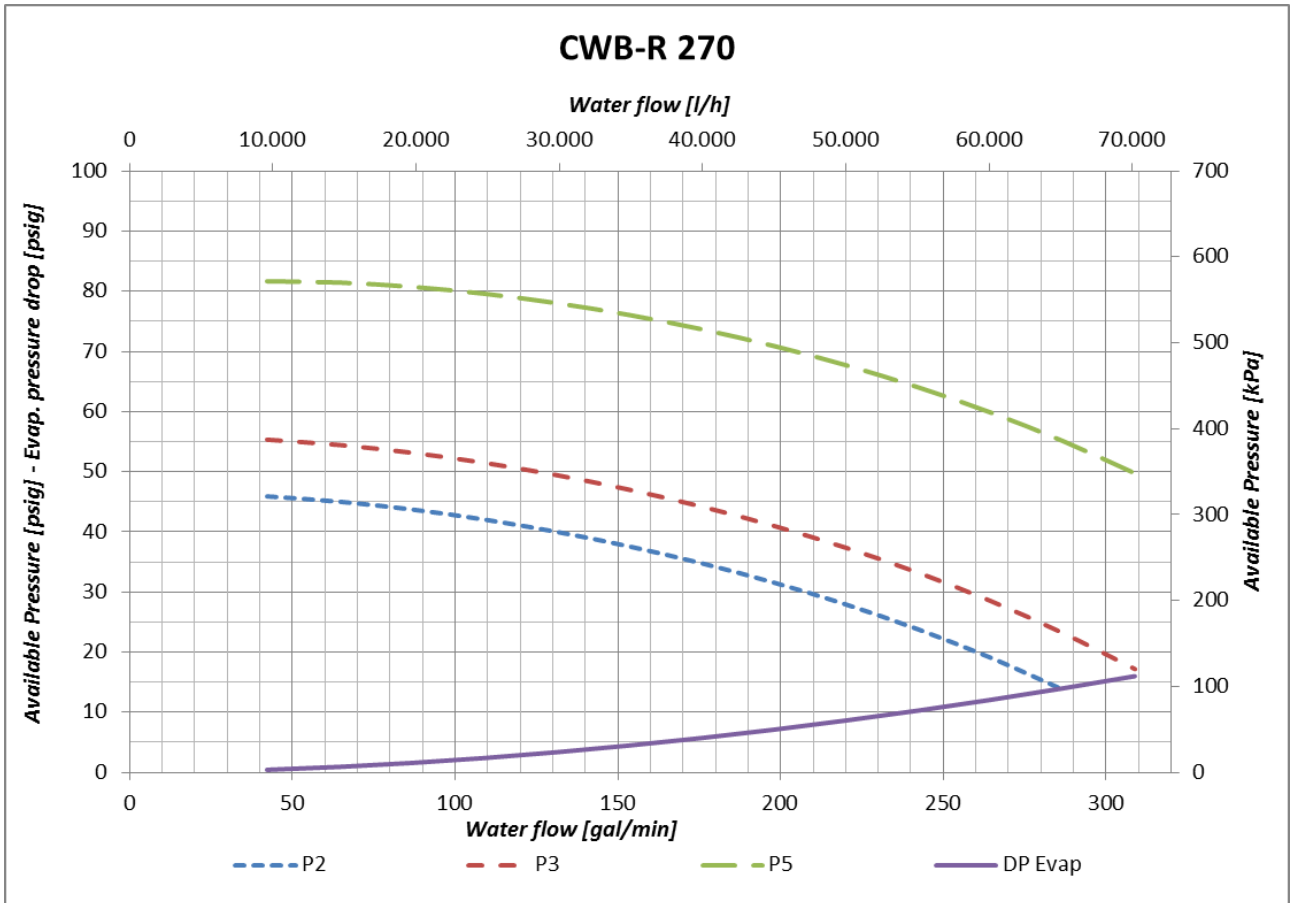
Ethylene glycol percentage [%]	0	10	15	20	25	30
K _{Q_w(GLY)}	1	1,023	1,038	1,054	1,072	1,092

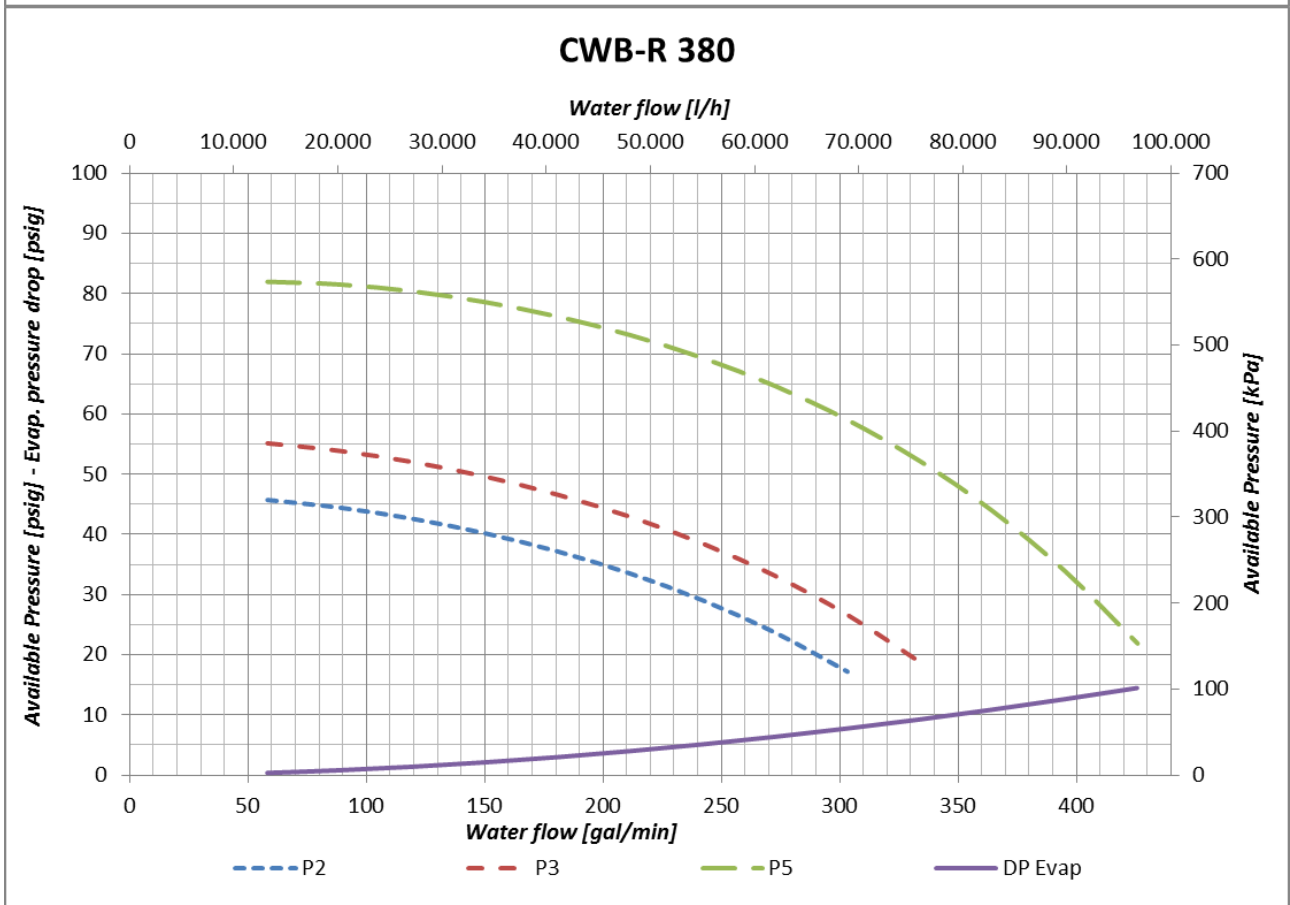
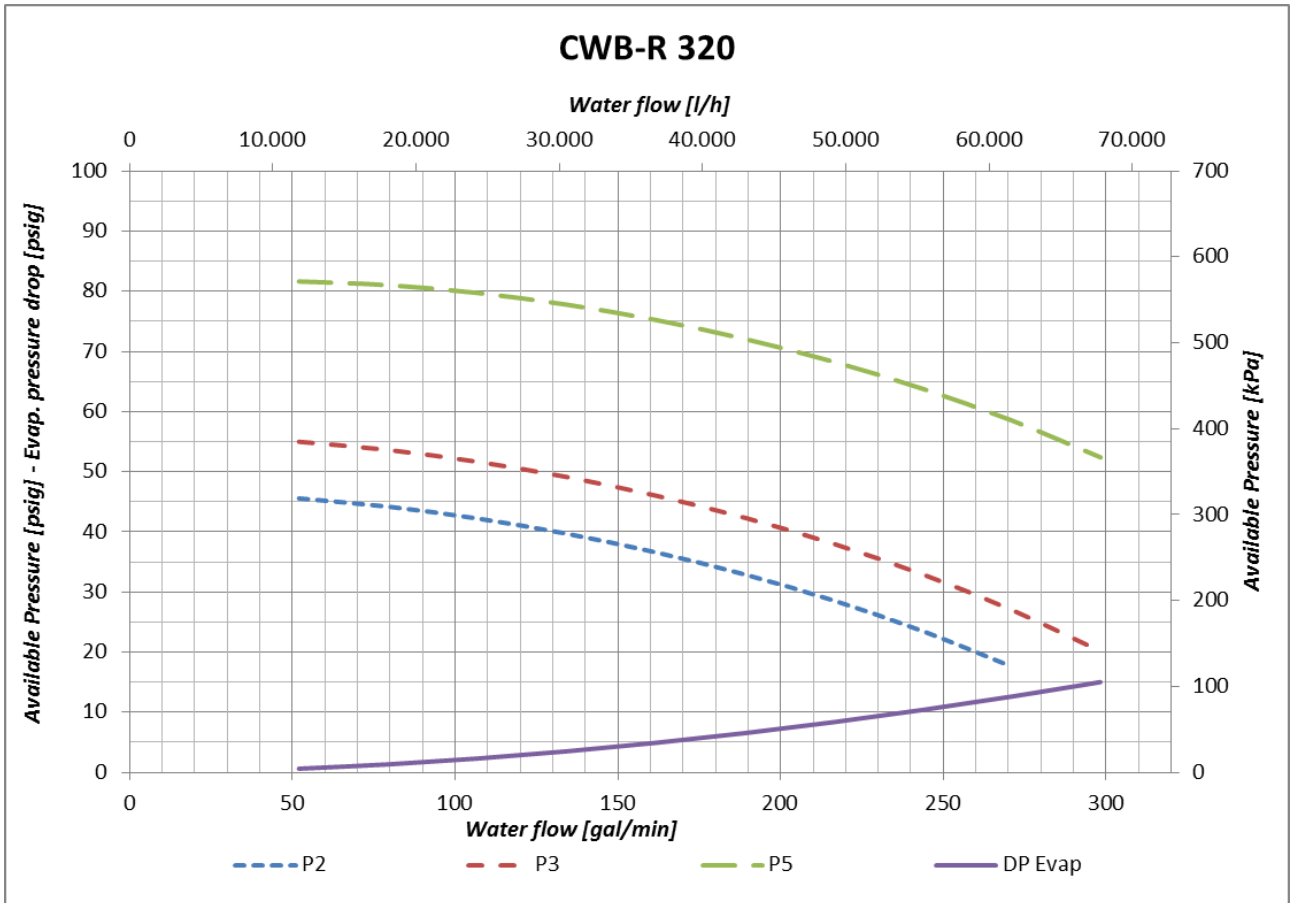
With reference to the new water flow value, is possible to obtain available water pressure using diagrams on paragraph “Water available pressure”.

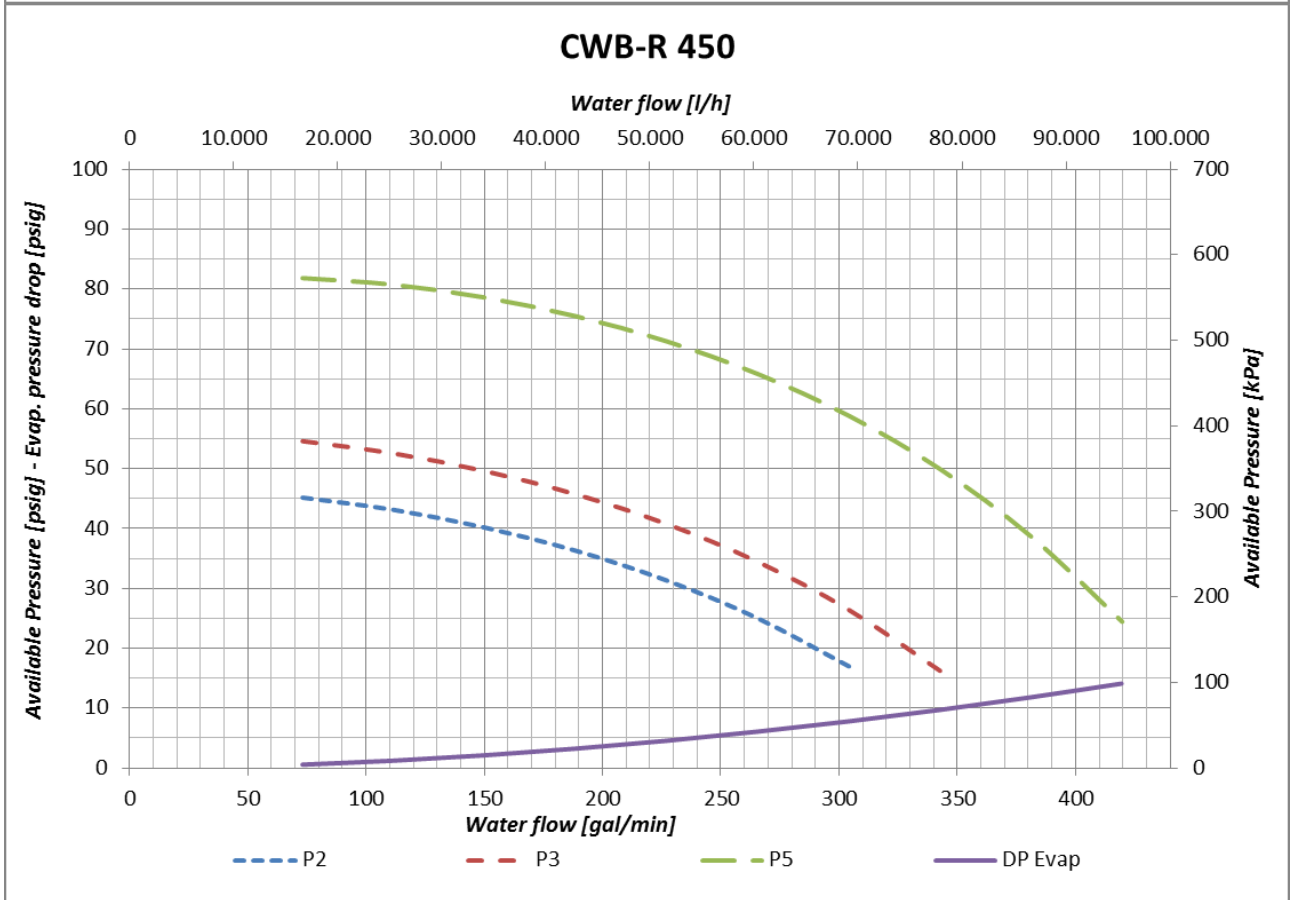
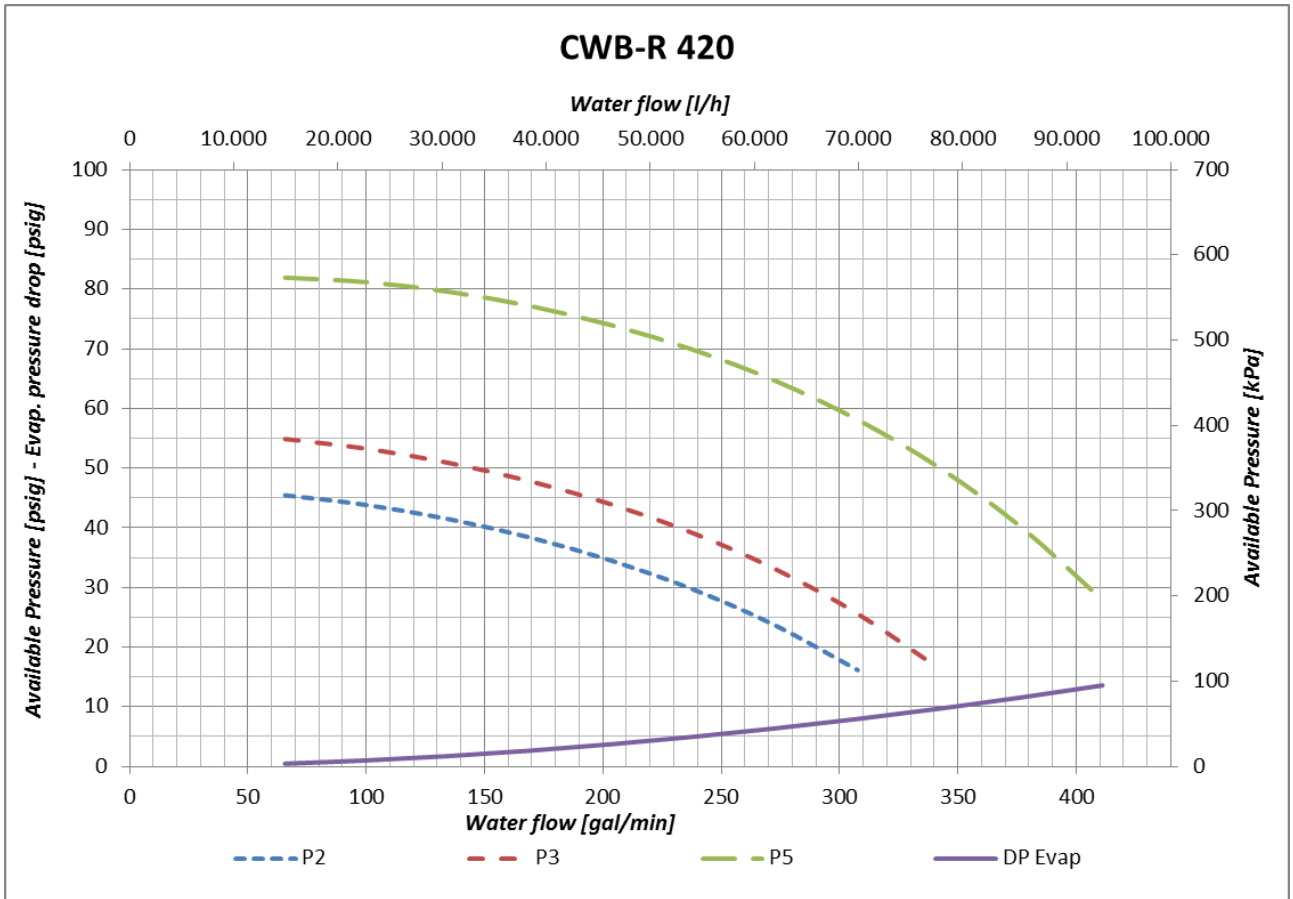
Water available pressure and evaporator pressure drop



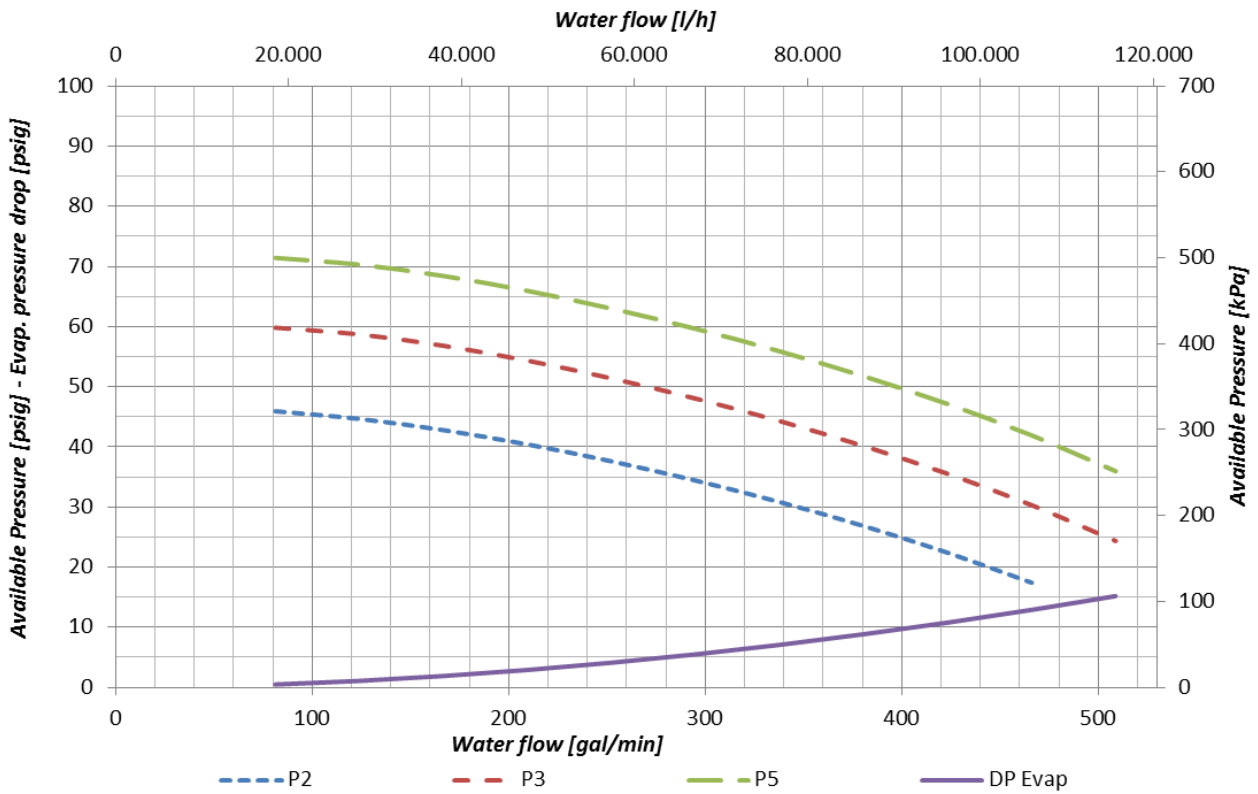




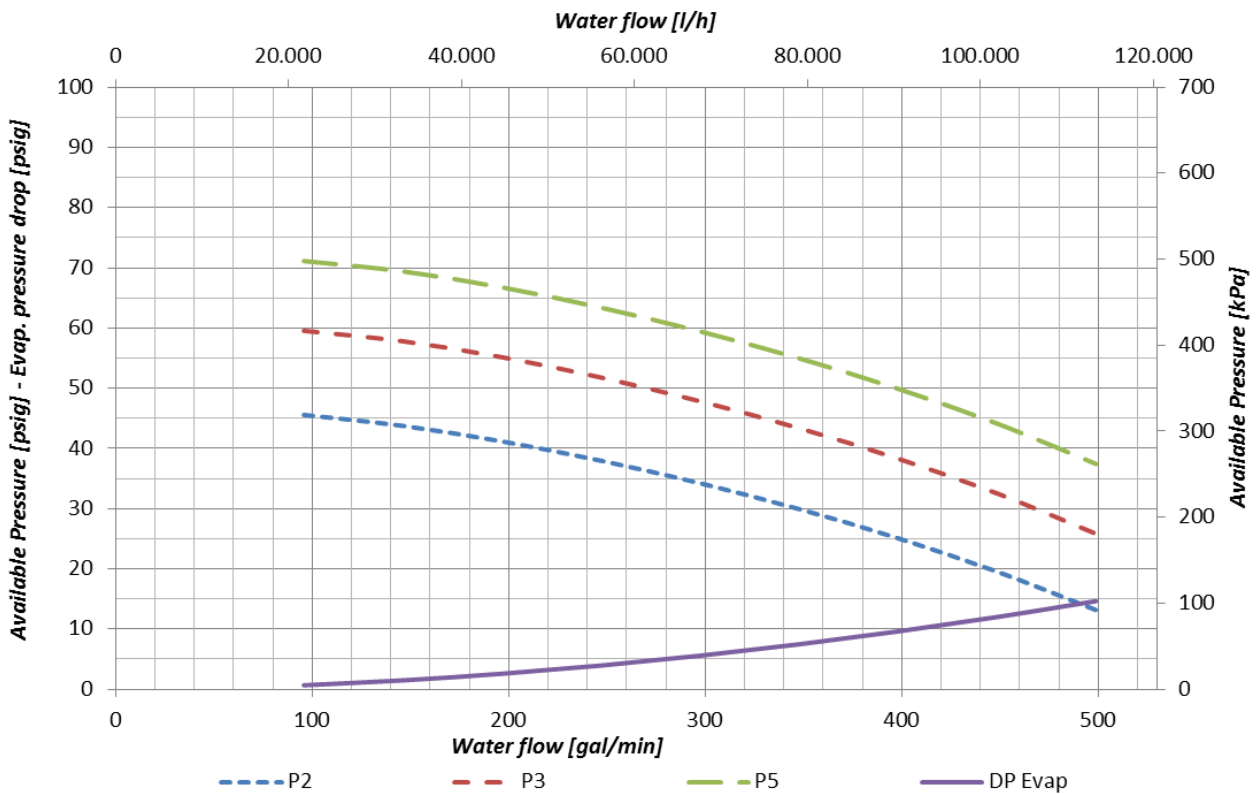




CWB-R 510

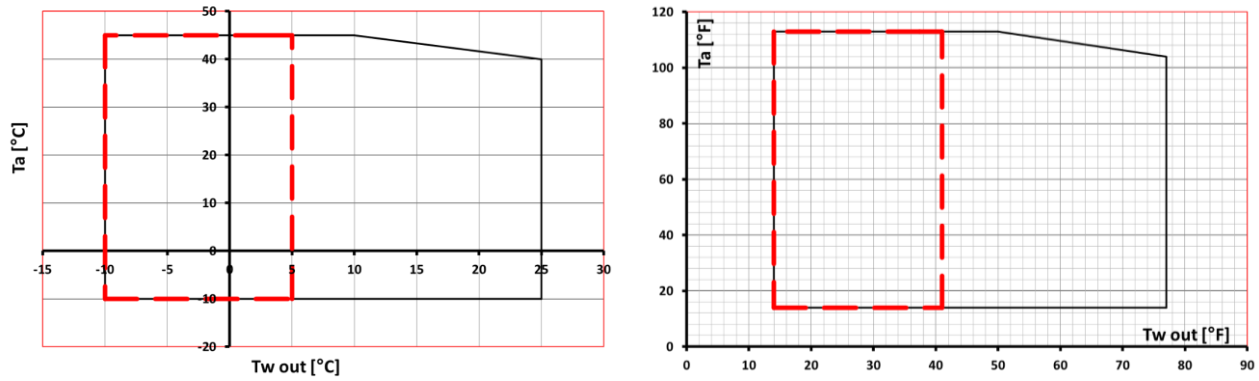


CWB-R 570



Working limits

CWB-R series units feature operating limits in relation to the choice of the condensing control option. Furthermore, for fluid temperature close or below 0°C, the tables indicate the needed glycol percentage. All models thanks, to the optional condensation control, can reach very low external air temperature; they can be also prepared to produce water at low temperature: in this case, it is necessary to contact our company. The graph shows the continuous operating limits of CWB-R units in relation to the temperature of the water exiting the machine (Tw out) and the temperature of the outside air (Ta).



Legend:

Ta: External air temperature [°C]//[°F]
 Tw out: Outlet water temperature [°C]//[°F]
 — — — Glycol mixture needed – contact our company

Liquid temperature difference between inlet and outlet of the chiller should be included in the range from 3 to 8 K.

Maximum inlet water temperature in cooling mode: 30°C//86°F.

In case of different needs, please contact our company.

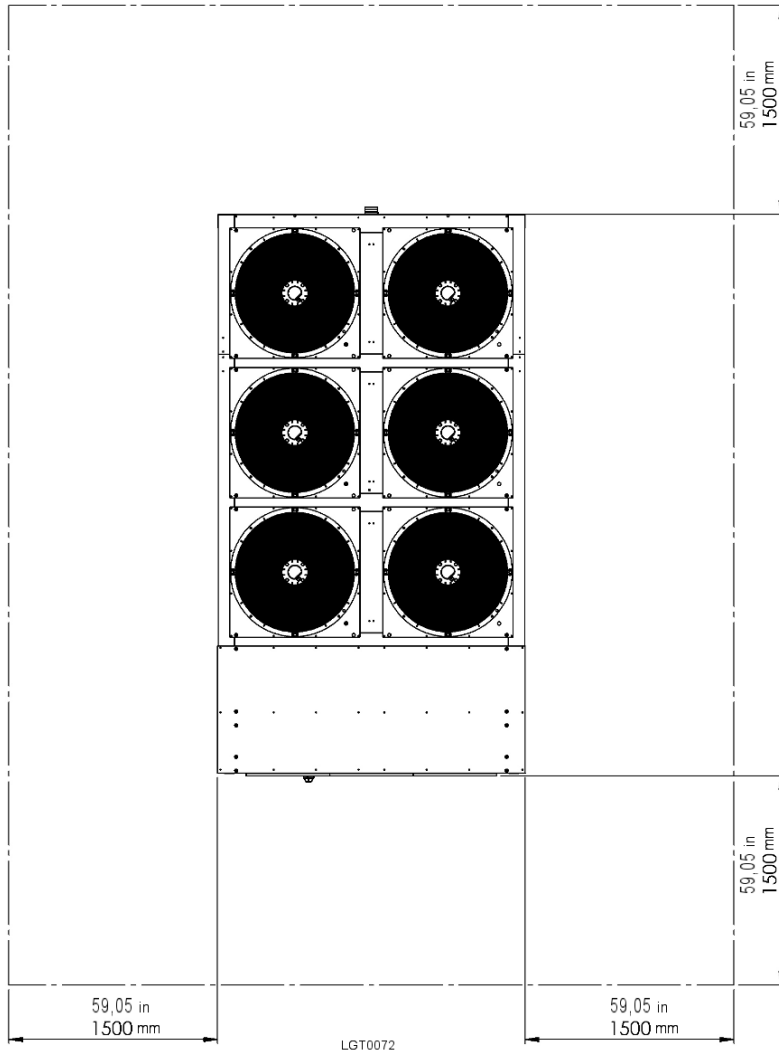
Installation clearance

To ensure proper functioning of the unit and access for maintenance, you must respect the minimum installation space shown in the figure in this paragraph.

The exit of air from the fans must not be obstructed.

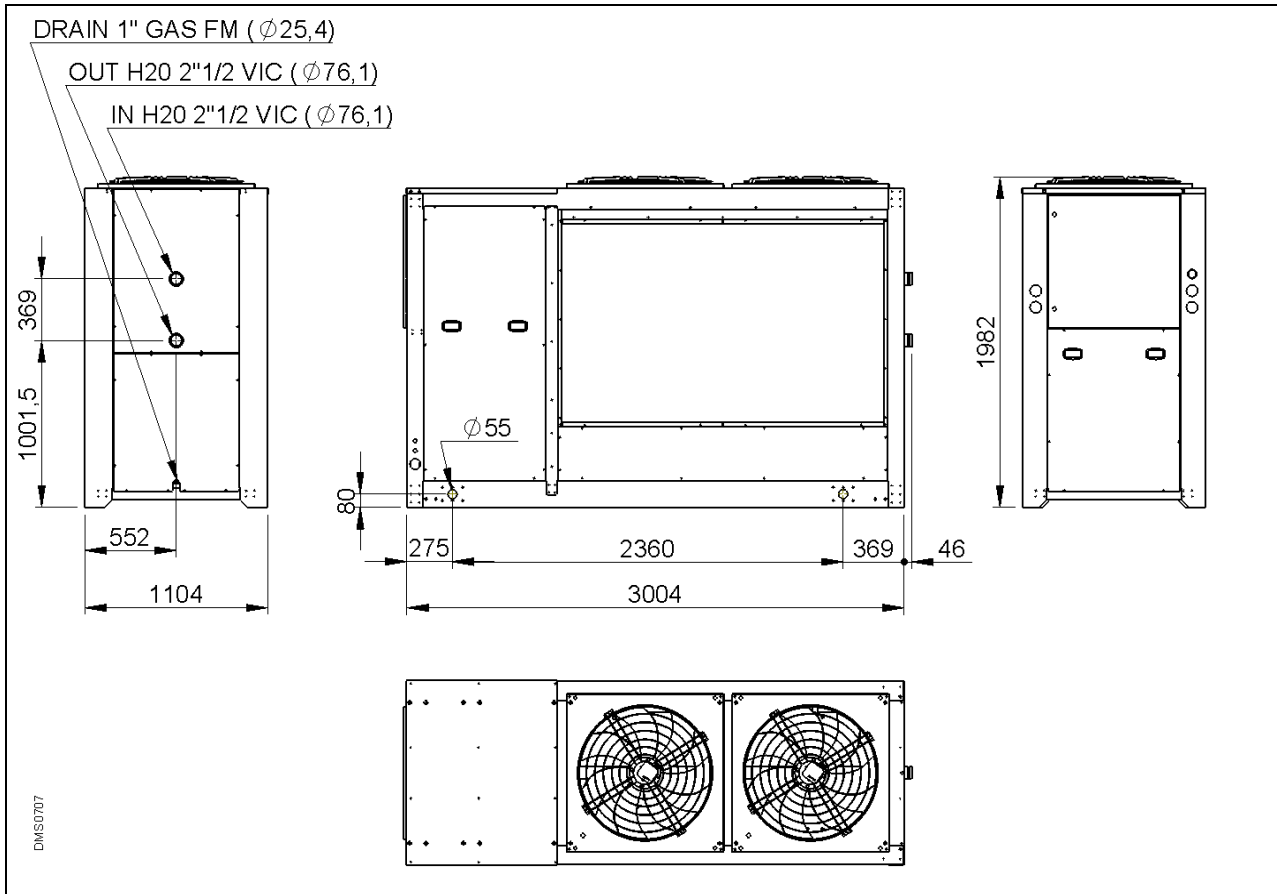
In any case, avoid all situations in which hot air can circulate between the output of the fans and the intake of the machine.

Contact our office to verify feasibility in all cases where one of the preceding conditions cannot be met.

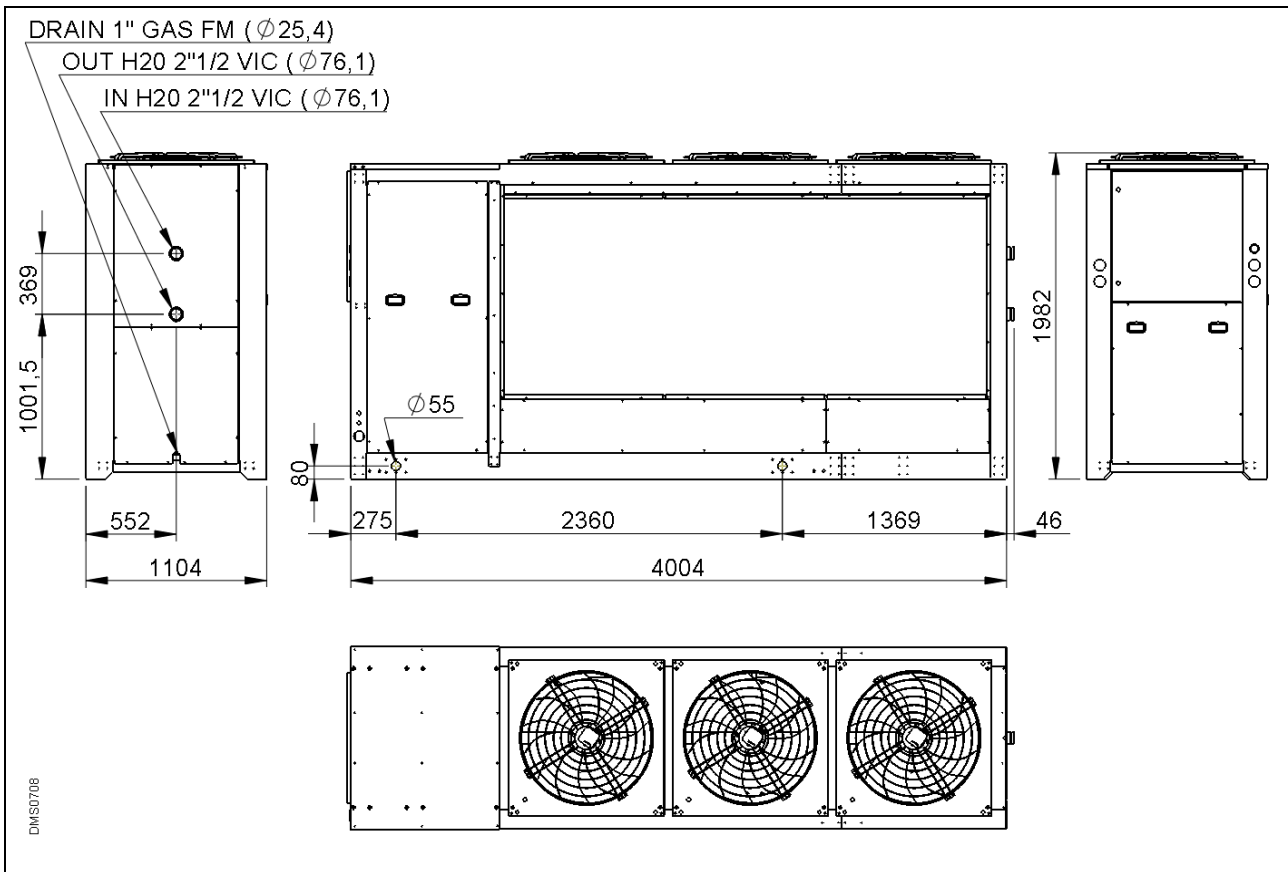


Dimensional drawings¹

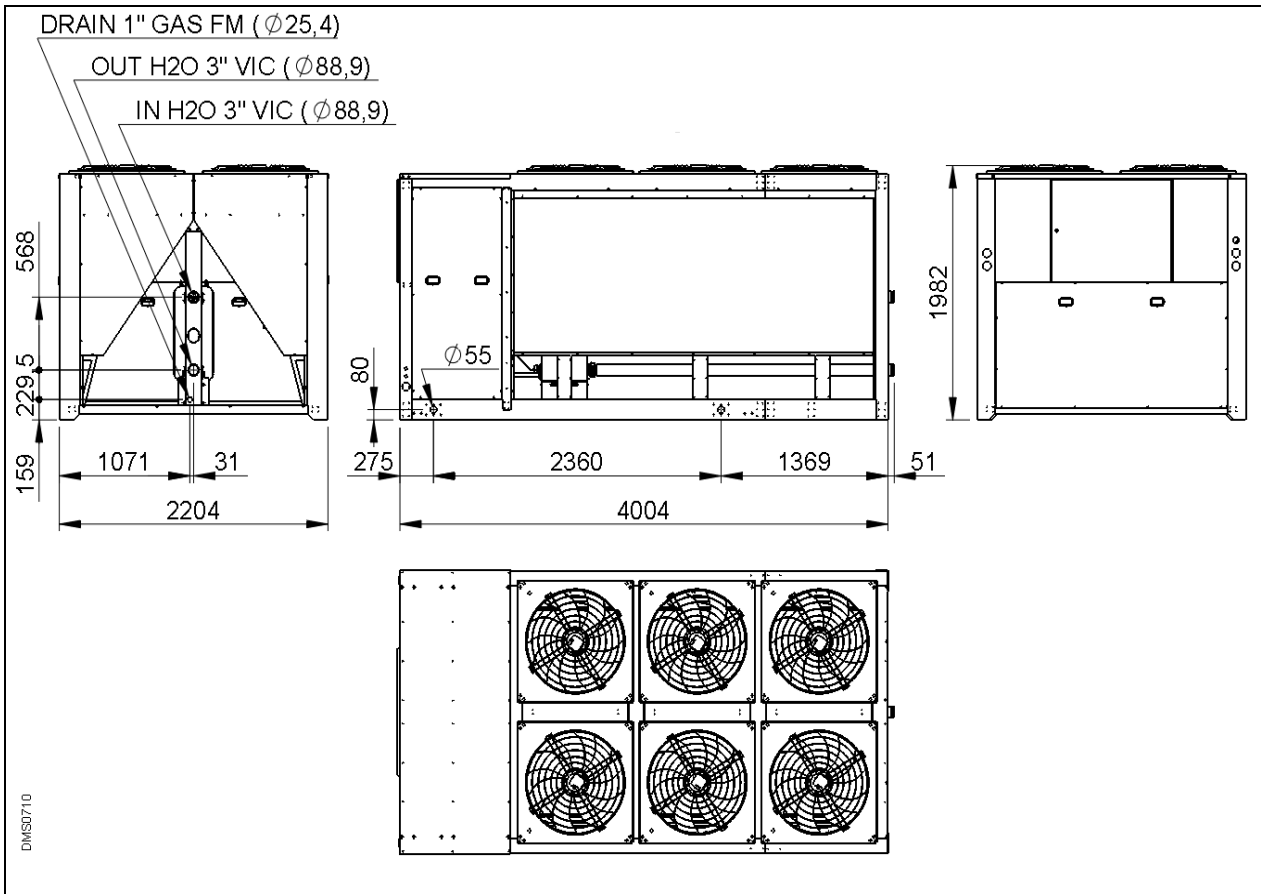
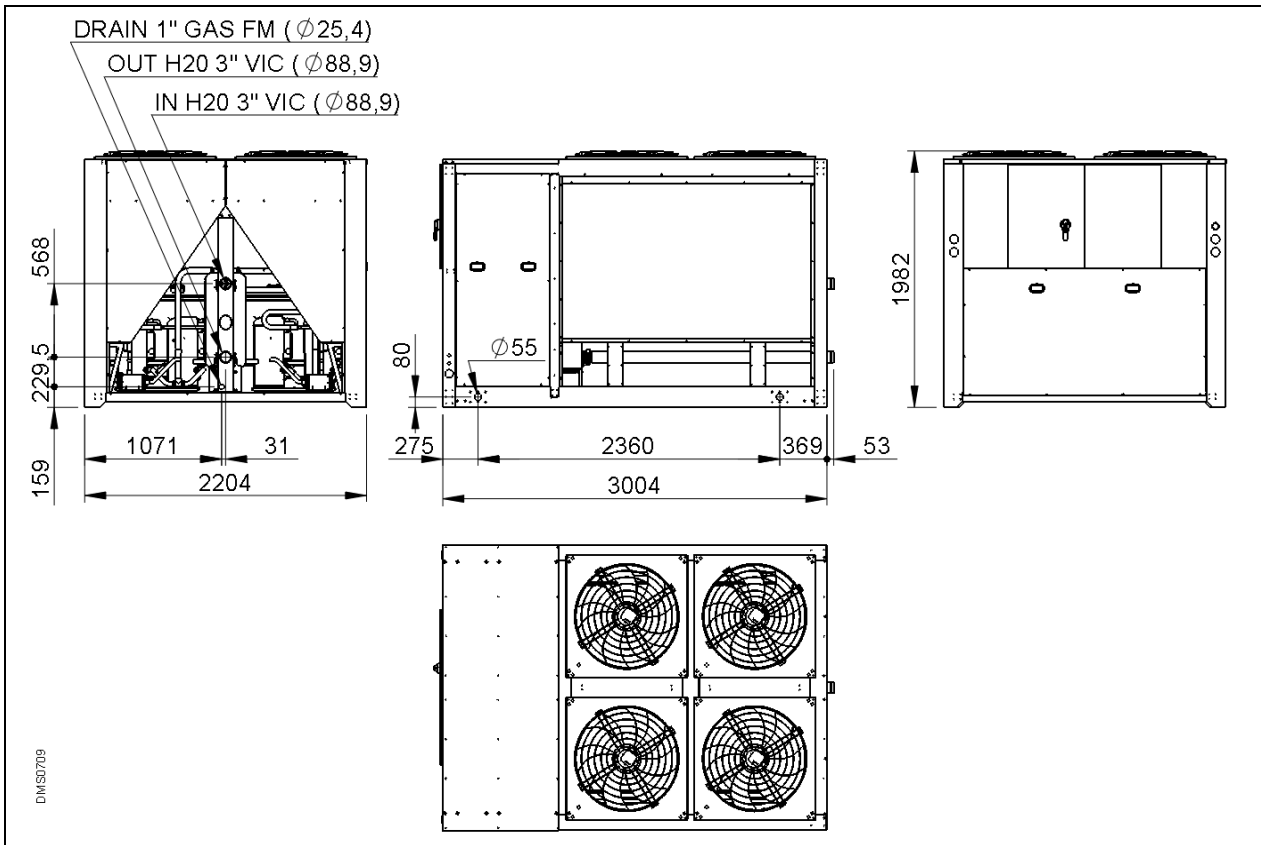
CWB-R 140 – CWB-R 160

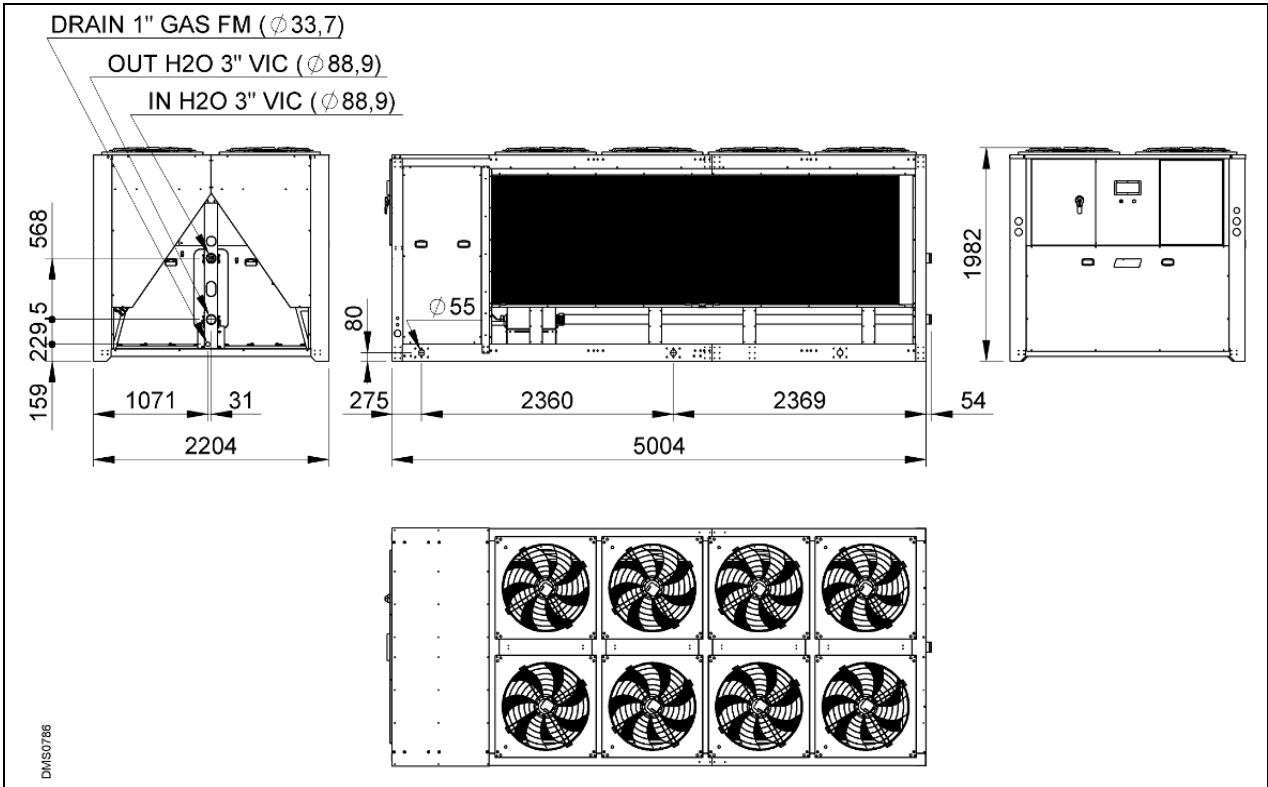


CWB-R 190 – CWB-R 220



¹ Dimension in millimeter





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