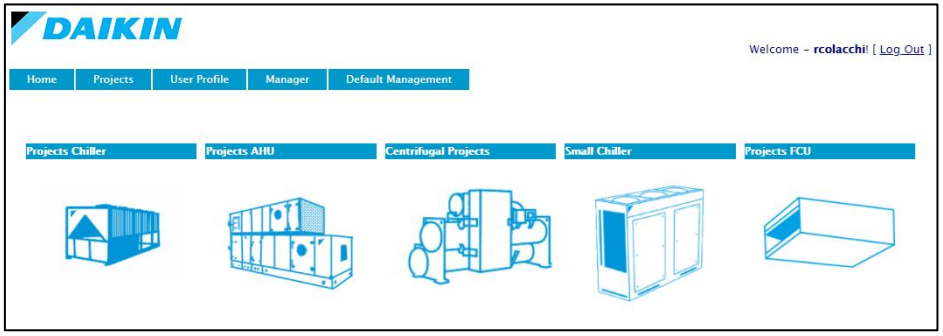

DAIKIN

OILED CENTRIFUGAL CHILLERS
DWDC C SERIES
WEBINAR

Roberto Colacchi
Product Manager
Marketing Department
02/08/2022

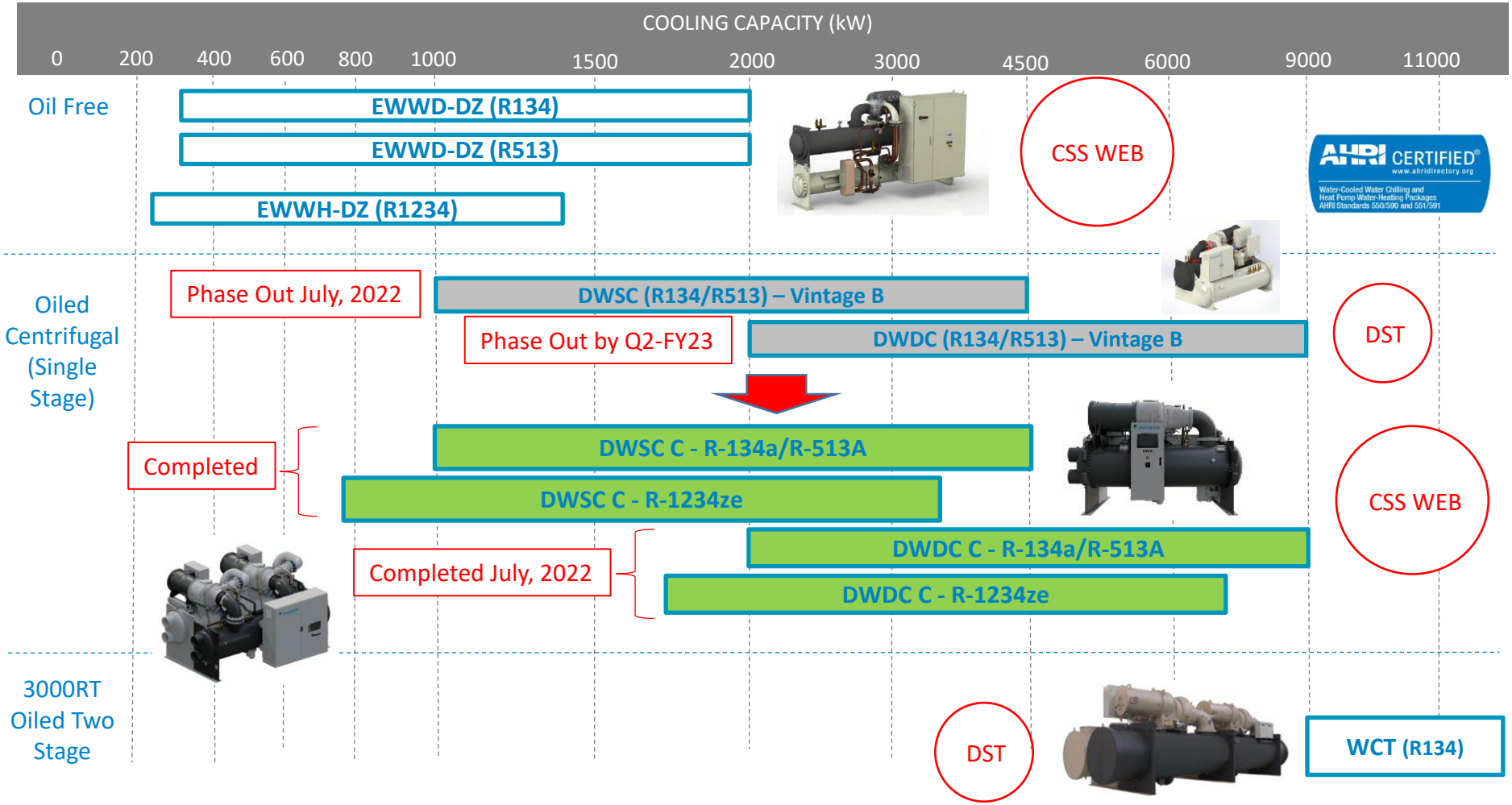
Tuesday 02nd August 2022, Hour: 10.00 - 11.00



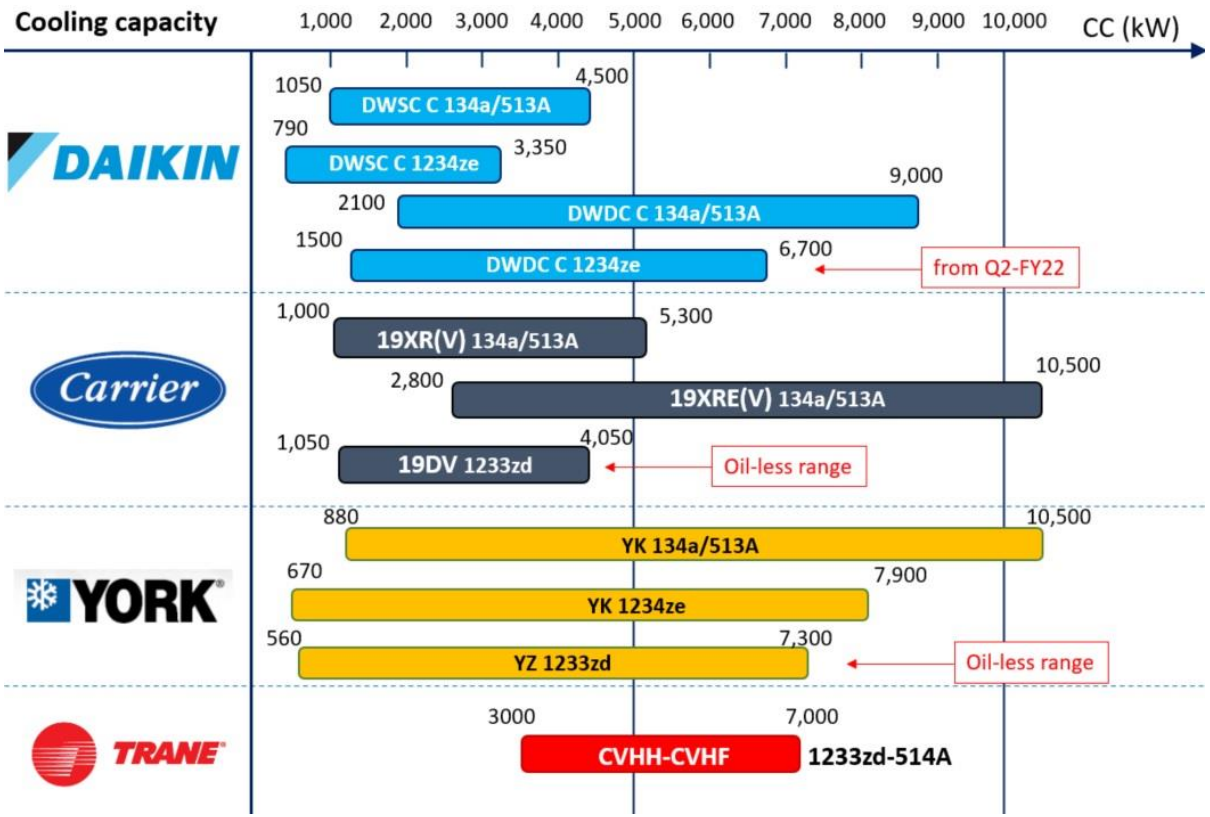
PRODUCT RANGE OVERVIEW

CENTRIFUGAL CHILLER RANGE - PRODUCT RANGE OVERVIEW

- Updated product portfolio



CENTRIFUGAL CHILLER RANGE - PRODUCT RANGE OVERVIEW



Trane

- Very aggressive cost on R1233zd chilers;
- Proposing lower capacity Centrifugal , which are out of range of R1233zd, with R514a refrigerant;
- Specifying R134a Water-cooled Screw chiller up to 1000 TR capacity to escape R514a refrigerant toxicity issue;
- Increased proposals with Trane China origin.

Carrier

Low GWP alternative: R513A only on oiled compressors (AHRI certified);
R1233zd refrigerant on 19DV oil-less chiller with ceramic bearing (niche products only)

York

- Low GWP alternative: R513A & recent R1234ze on oiled compressors YK range (AHRI certified);
- Specifying and aggressive pricing on YZ low GWP R1233zd magnetic bearing chiller;
- Capacity range extension of York YZ up to 7300 kW Dual compressors;

- Trane: official phase out of CVGF (R134a) being replaced with INV screw → Sales strategy
- Trane: still the only manufacturer offering LP refrigerant (R1233zd) on oiled compressors
- Trane still offers R514 refrigerant (B1 toxic) in EU & non-EU countries
- York: Proposing and specifying 11kV VFD chillers on new projects and as retrofit option for energy optimization in existing plants;
- Asian manufacturer increasing projects coverage: LG, Midea,…(mainly TR, ME)
- Clivet (Midea) launched R-1234ze on **oiled** compressor with CC range 230-450RT - China manuf. - No AHRI certified

- **Launch schedule of DWDC C Series**

Rapid News 2 → **week19**

Release brochure → **week20**

Press Release → **week23**

Product presentation → **week24**

Databook release → **week25**

MyDaikin product page → **week25**

Video animation → **week27**

List Price and CSS WEB Step3-Rating (R-134a, R-513A & R-1234ze) → **week31**

Webinar → Today, 02/08/2022 (**week31**)

Order Entry for the new DWDC C Series → **week31**

- **GA drawings (basic configuration - standard option)**

DWSC100M-113M-126M → **Q2-FY22 (July)**

DWSC079L-087L-087M → **Q3-FY22 (December)**

Non standard options available on request.

- **Lead time**

Lead time Ex Works is 20 weeks from Order Entry versus 18 weeks current Shipping Cycle for DWSC C.

Target lead time is same as DWSC C. (Basic configuration - standard options with copper tubes)

Please contact factory for evaluate possible lead time improvement on project basis.

MAIN FEATURES

AT A GLANCE

- Nominal capacity range with R-134a/R-513A: 2100 9000kW (600 2500RT)
- Nominal capacity range with R-1234ze: 1500 6700 kW (450 1900 RT)

- Daikin Single Stage centrifugal compressor (traditional US design – Impeller sizes: 079L – 087L - 087M - 100M - 113M - 126M);

- Enhanced selection flexibility with Heat Exchangers designed by DAE, for offering a real taylor-made job-based chiller. 1” or ¾” tubes diameter availability for heat exchanger selection;

- New control Software based on Siemens platform with the Microtech 4 controller introduction;

- Refrigerant availability. The range offers a choice of three different refrigerants - R134a, R513A and R1234ze - and all machines require less refrigerant than its predecessor series.

- Positive Pressure Design. Positive pressure systems offer numerous advantages over negative pressure design. In a negative pressure system, leaks allow air, moisture, and other contaminants to seep into the system, which will gradually decrease performance, as well as cause corrosion which must be removed. The Daikin positive pressure design eliminates this worry, providing sustainable performance and trouble-free ownership for the life of the unit under normal operation

AT A GLANCE

- Single electrical connection point thanks to the new design of the Unit Mounted Electrical Panel;

- Multiple Starter versions:
  - -1) Variable Frequency Drive designed and manufactured by Daikin;
  - -2) Low Harmonics VFD designed and manufactured by Daikin;
  - -3) Soft Starter Unit Mounted for Fixed Speed application;

- Electrical Panel layout, including both the power section as well as control section with both the compressor and unit controls and transformer for auxiliary circuits. Specifically designed by Daikin means internal design and manufacturing to create the optimal balance between cost and performance;

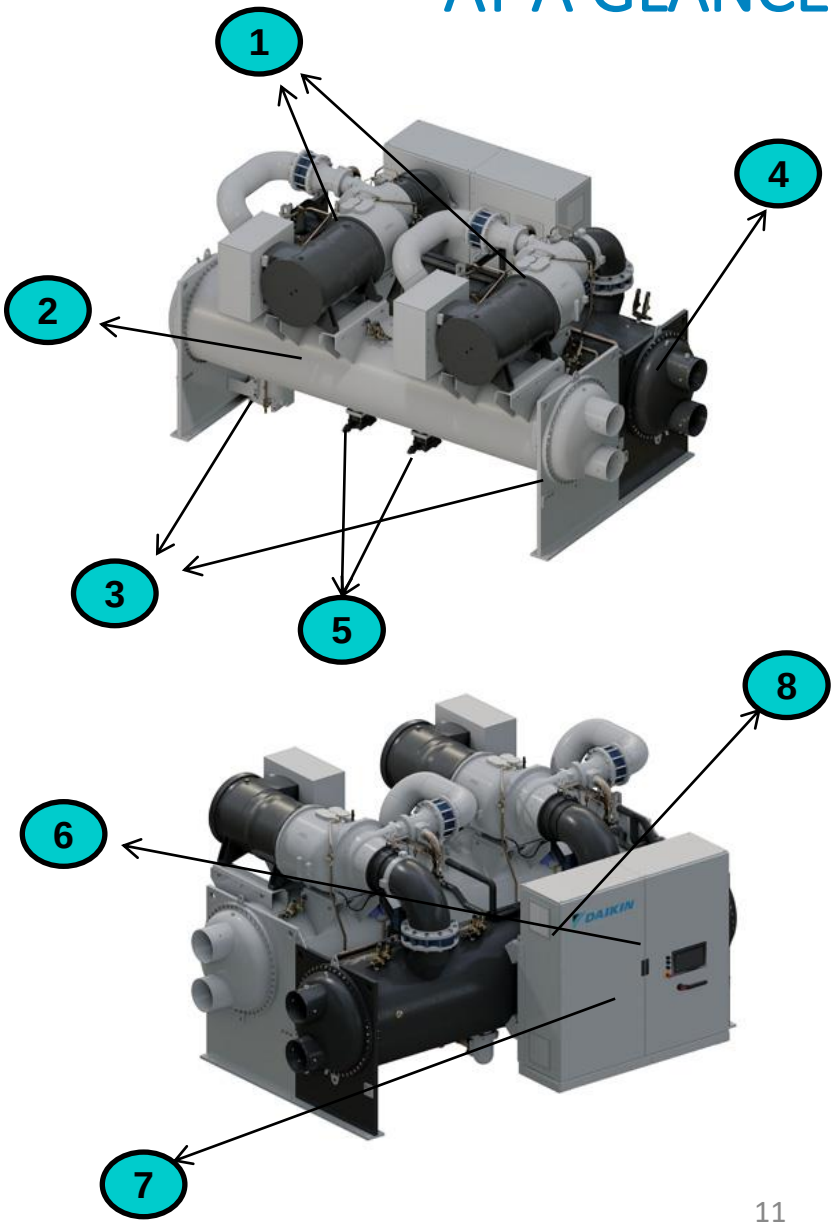
- New CSS WEB Centrifugal chillers selection software design by DAE;

- 50Hz and 60Hz power supply models AHRI certified;

- Extensive list of options and accessories (see next paragraph).

AT A GLANCE

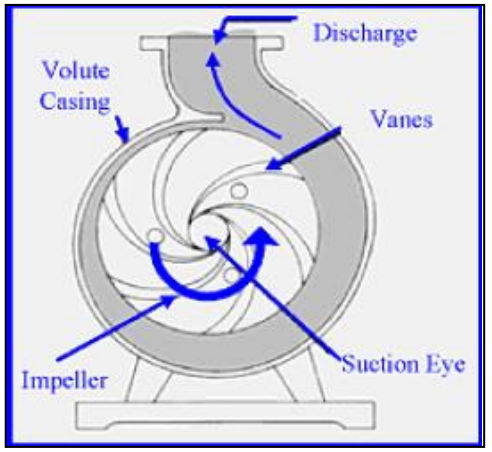
1. **Daikin Single Stage** centrifugal compressor
2. **Two Pass** flooded condenser
3. **Oil sump** unit mounted
4. **Two Pass** flooded evaporator
5. **Electronic** expansion valve
6. **Microtech 4** control panel
7. **Unit Mounted** Electrical Panel
8. **Touch Screen OITS**

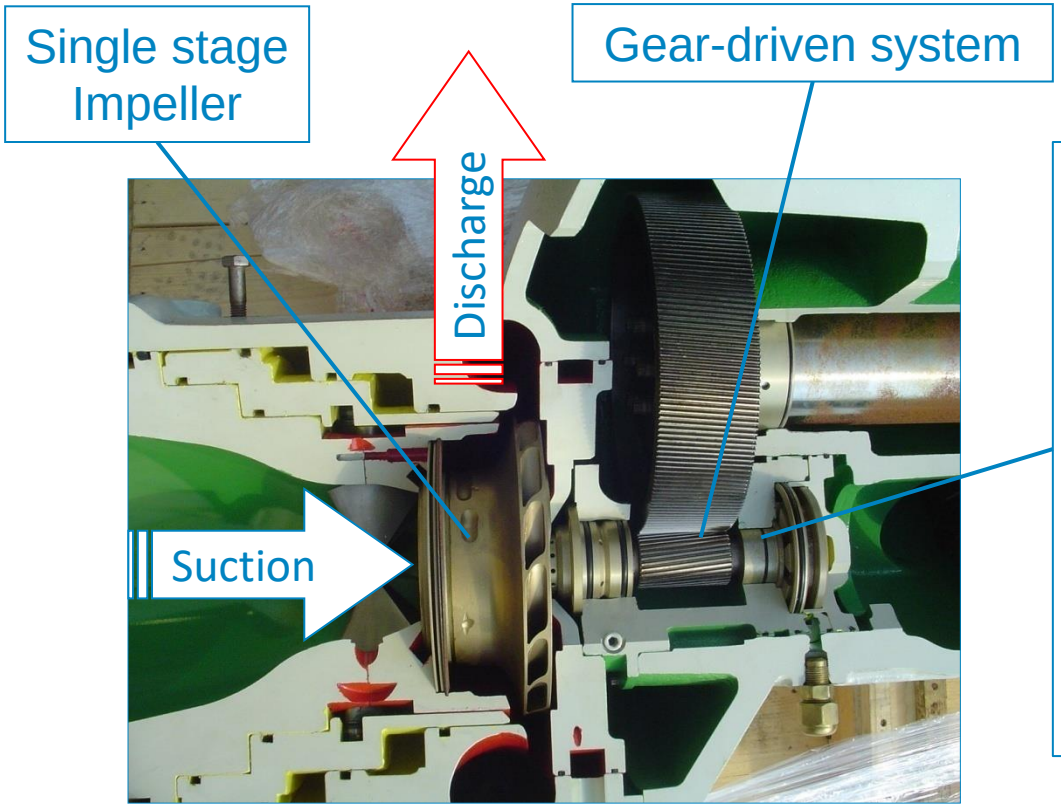


CENTRIFUGAL COMPRESSOR DESIGN

Main components

Daikin centrifugal compressors incorporate **compact** impellers rotating at high speed RPM by using **high technology gear systems.**





All hydrodynamic bearings

Shaft rides on film of oil (No metal to metal contact after start up)

INFINITE bearing life

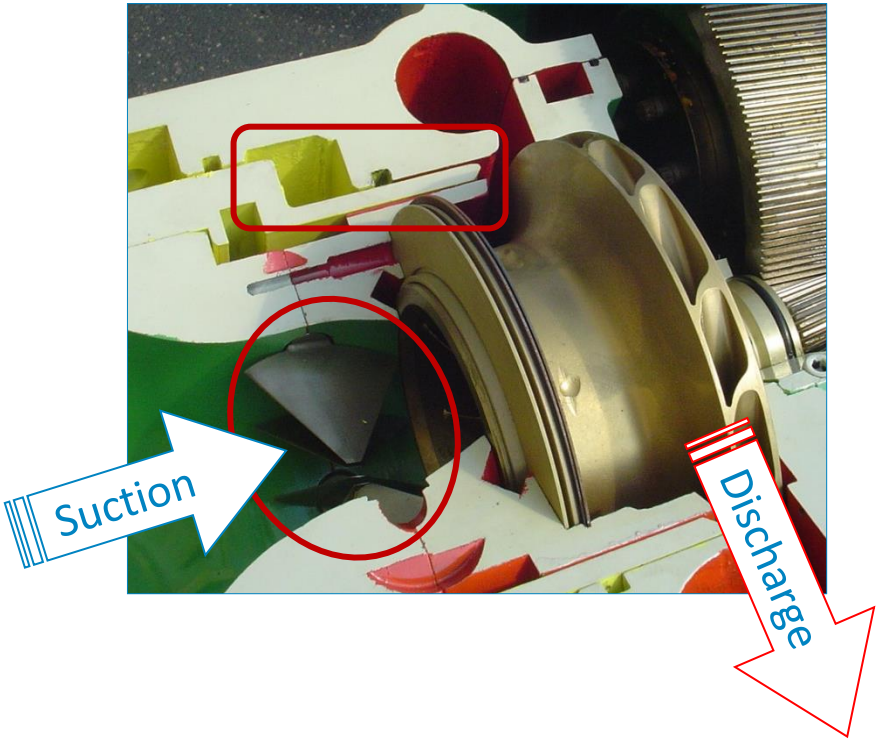
Corrosion Resistant

CENTRIFUGAL COMPRESSOR DESIGN

Capacity control system

- The gas flow reduction is practically carried out by partially closing the movable vanes on the compressor suction (the vanes are moved by oil pressure).

- Moveable discharge unloader piston travels inward allowing to keep sufficient gas speed even in strongly unloaded conditions and extending unit working range down to 10% without hot gas by-pass. Improves stability at extremely light loads and reduces surge potential.



When configuring a chiller we can choose among:

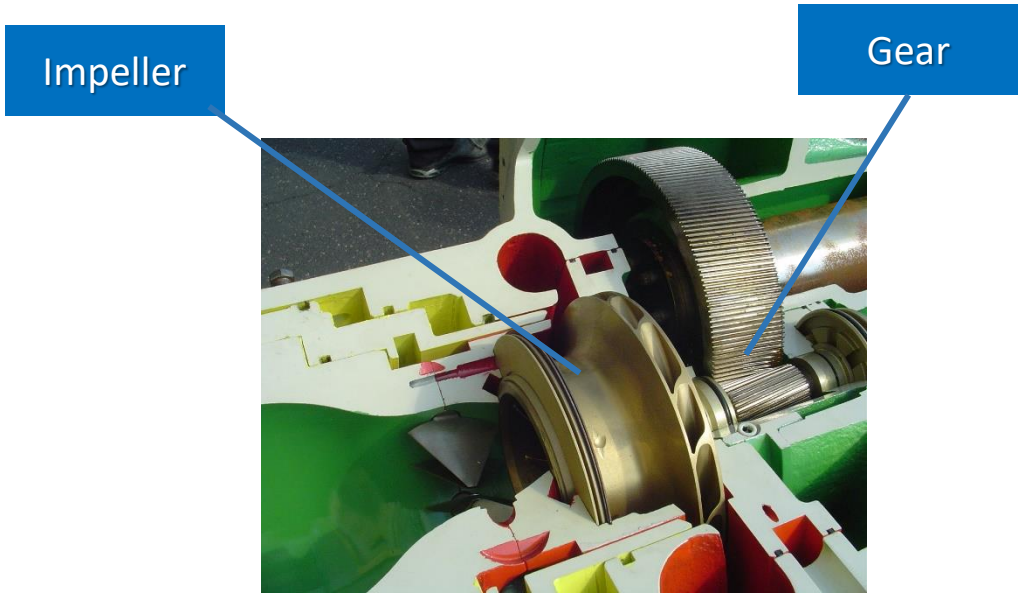
- 5 impellers (079L, 087L, 087M, 100M, 113M, 126M)

Impeller Diameter	Impeller Width
	79L
	87M
	100M
	113M
	126M

Table 1 Impellers

Compressor size is referred to the impeller size as below: DWDC079L, DWDC087M, DWDC100M, DWDC113M, DWDC126M

Daikin centrifugal compressors are **compact** (D= from 10 to 12.6 inches) and use **high technology gear systems** (same as aircraft) to achieve high RPM velocity, in the range of **12,000 ÷ 32,000 RPM.**



CENTRIFUGAL COMPRESSOR DESIGN

Capacity control system - Efficiency advantage with the <u>Inverter</u>

- The chiller controller monitors the operating conditions and at part loads uses a combination of the mechanical system (IGV) and the Inverter (VFD).
- Typically the compressor speed is lowered down to 60-70% of the design speed

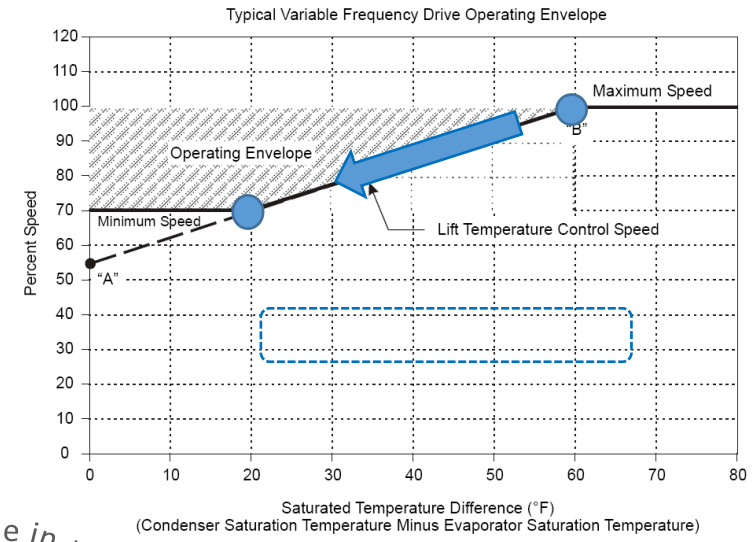
Mechanical & Electrical advantage

VFD also works as a "soft starter"

- Reduced starting current: Inrush amps = RLA
- Reduced torque = Less stress and longer motor life
- Higher Power factor (> 0.95) = Reduced nominal current

=

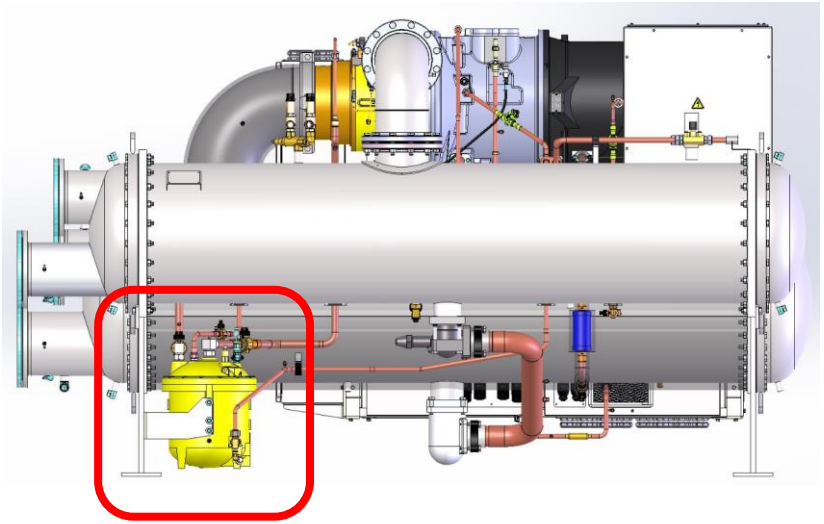
Improved Performance and reliability !!



CHILLER DESIGN

Compressor lubrication system

A separately driven electric oil pump assembly supplies lubrication at controlled temperature and pressure to all bearing surfaces and is the source of hydraulic pressure for the capacity control system.



Compressor motor cooling

Motor cooling by liquid refrigerant.

Liquid refrigerant provides more mass to cool the motor compared with gas cooled motors.

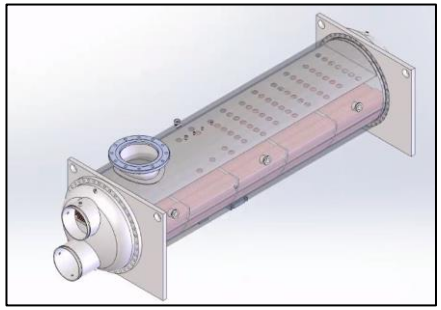
No risk of refrigerant's contamination in case a motor burns.

CHILLER DESIGN

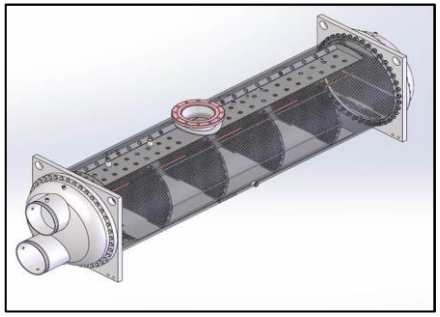
Heat exchangers

Heat Exchangers are designed to optimize performance and reduce refrigerant amount in the chiller.

This reduction is possible thanks to high efficiency tubes.



Evaporator



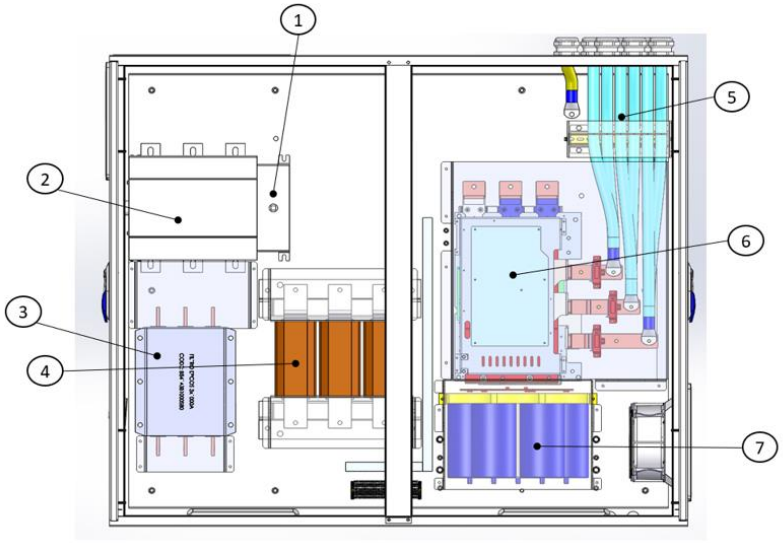
Condenser

Electronic Expansion Valve

Fast, accurate response to load and water temperature changes.

Expansion valve control logic optimized for R-1234ze for a perfect chilled water leaving temperature control.

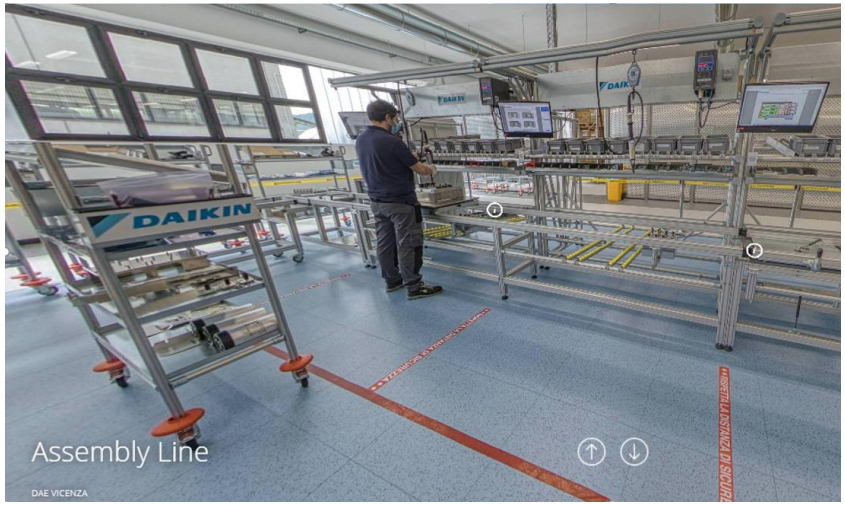
MAIN COMPONENTS

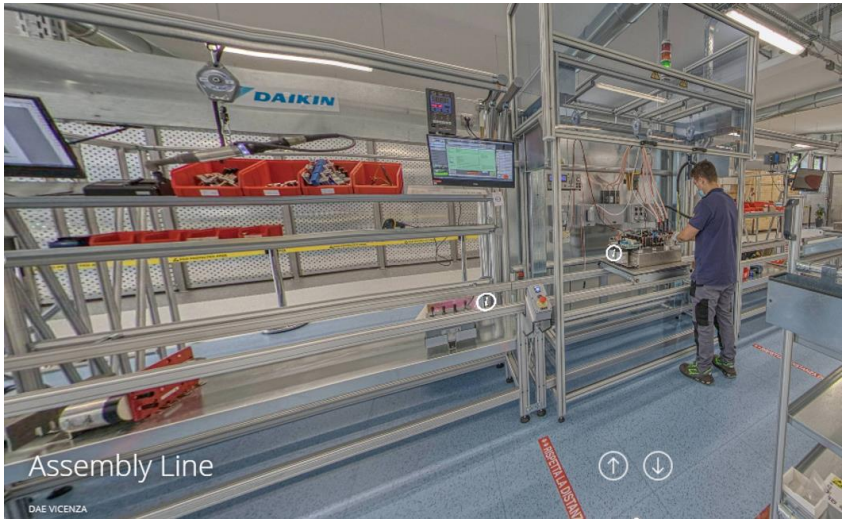


1) Main switch
2) Fuses
3) Filters
4) Line reactors
5) Supply cables
6) VFD
7) Capacitors

Total Integration Philosophy

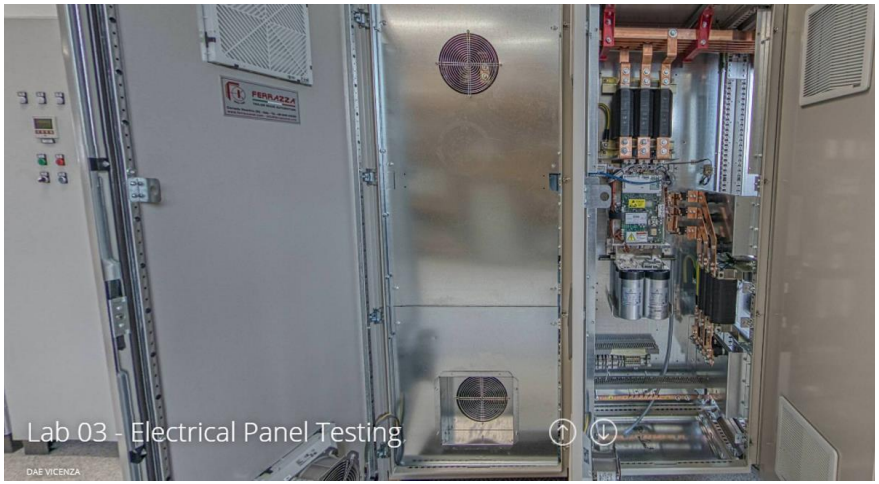
- The inverter is located in a panel that includes also the auxiliary components as transformer, line fuses,…
- No need for extra components outside the panel;
- **Inverter Refrigerant cooled** and drive back channel cooling and temperature controlled fans in the panel for heat removal;
- EMI and harmonic filters are included in the panel as well;
- Hardware and components are designed for allowing the longest lifetime in heavy duty conditions.

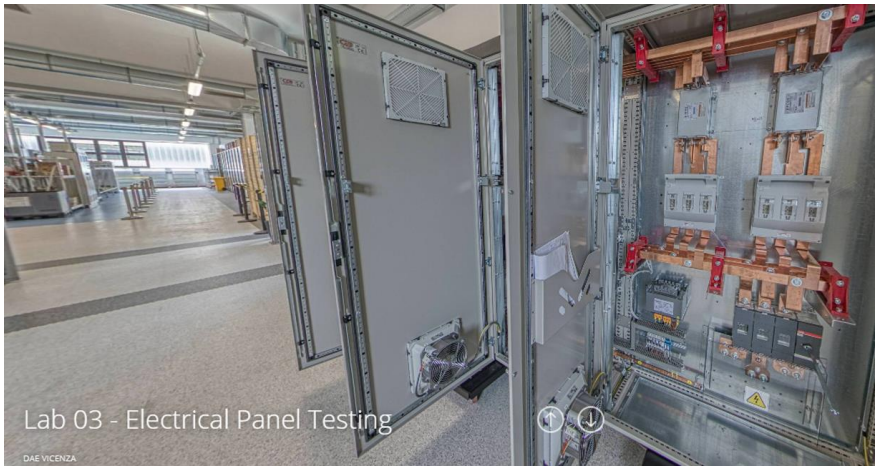




Assembly Line

- Inverter assembly line specifically designed to protect the devices from electrical risk;
- Electrostatic Protected Area for operator protection against galvanic currents;
- Automation and Monitoring system for accurate Inverter assembly;





Electrical Panel Testing

- Automated optical inspection and In Circuit test are two activities carried out during the Panel Testing;
- The Electrical Panel Testing is concluded with the Functoinal Test caried out with Daikin automation system following dedicated instrumentation and procedures specifically designed by Daikin.

When configuring a chiller we can choose among:

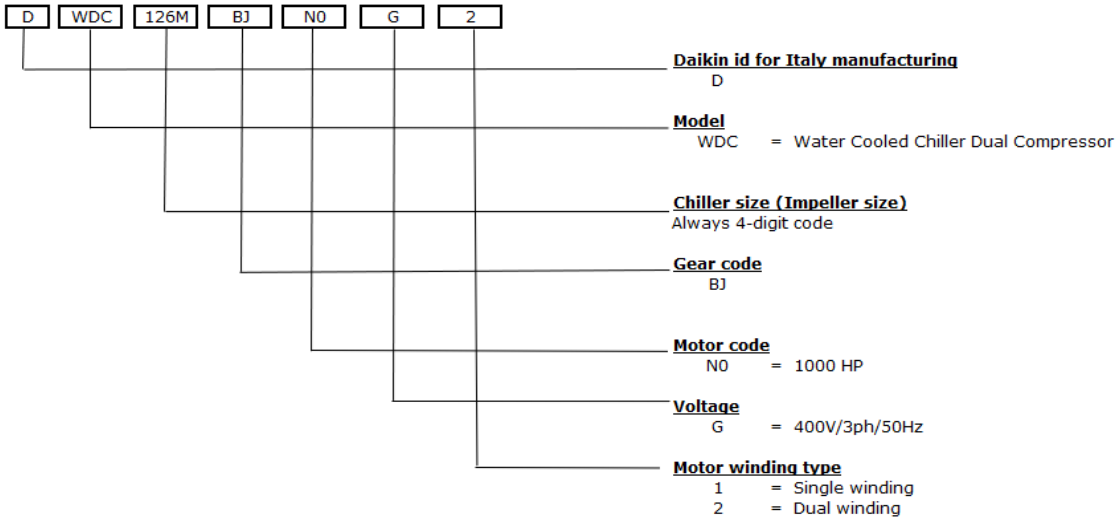
- 6 impellers (079L, 087L, 087M, 100M, 113M, 126M)
- 10 gear boxes (or more, according to the impeller size)
- 8 voltage/frequency code (motor rated power is selected according to the chiller conditions)
- 3 shell diameter for the Evaporator (32”, 38”, 44”)
- 6 shell diameter for the Condenser (28”, 30”, 32”, 38”, 40”, 42”)
- 1 shell length for both evaporator and condenser (14ft)
- Up to 6 tube counts for both evaporator and condenser
- 2 Tubes diameter for each shell (1” and ¾”; tube diameter can be different for evaporator and condenser)

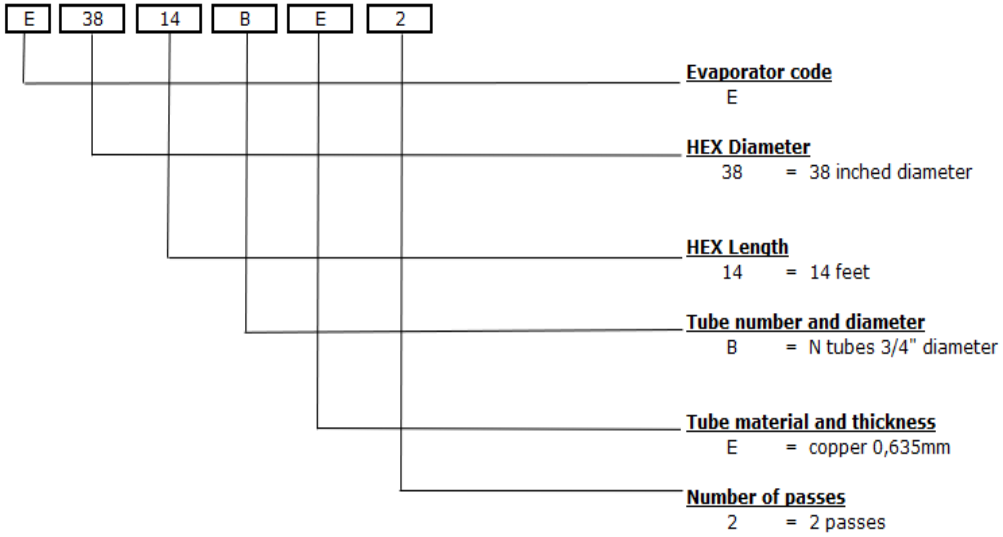
As a result, we can select among around 30 compressors configurations (impeller&gear), each one can be associated with 240 shell stacks configuration.

In addition, we can select tubes thickness among 3 choices (0,635mm [or 0.025”], 0,711mm [or 0.028”] and 0,889mm [or 0.035”]), according to tube material

NOMENCLATURE

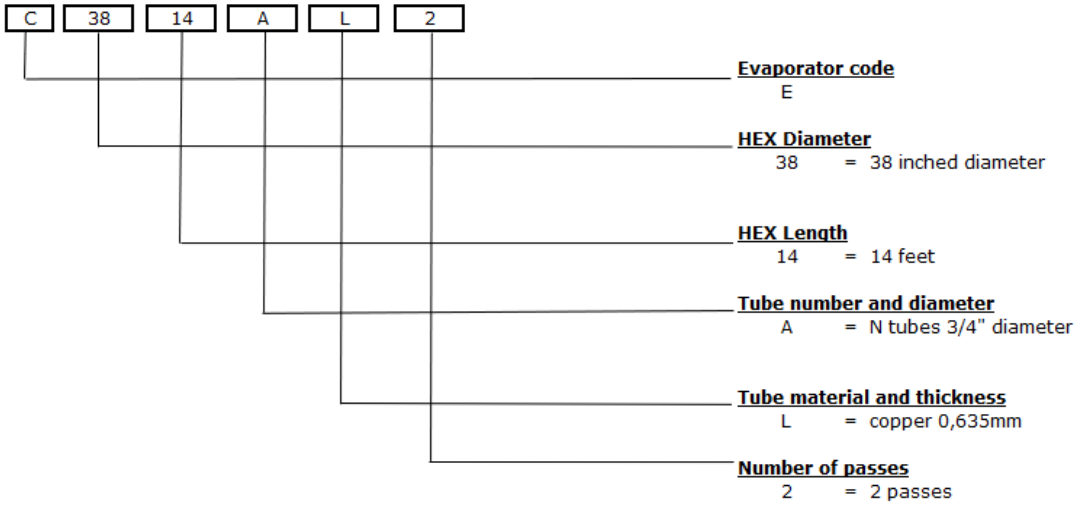
The DWSC DWDC C Series will be included in the CSS WEB Centrifugal Chiller Selection Software and the following nomenclature will be adopted.

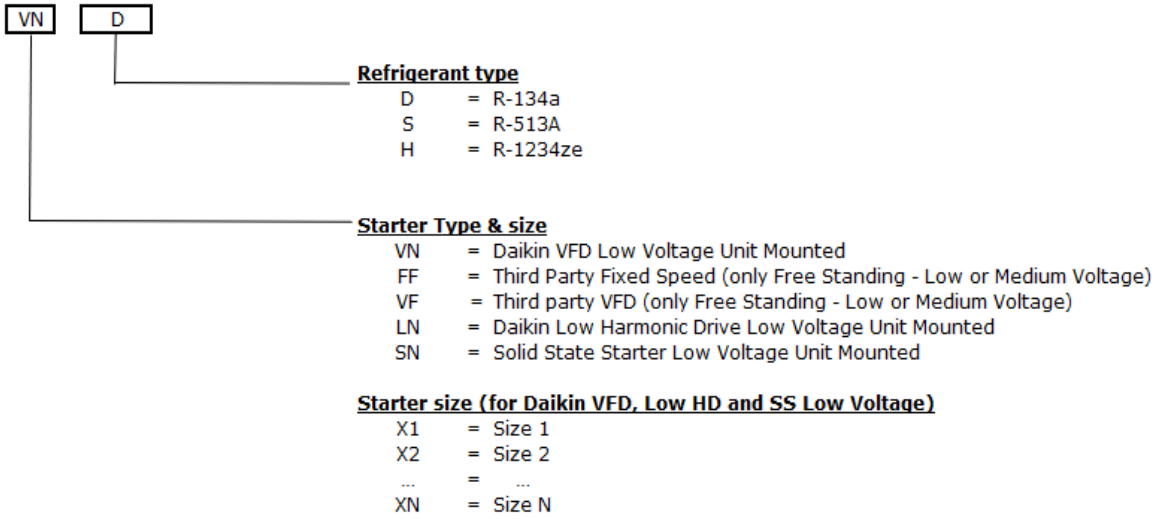




NOMENCLATURE

The DWSC DWDC C Series will be included in the CSS WEB Centrifugal Chiller Selection Software and the following nomenclature will be adopted.





PRODUCT CHARACTERISTICS

THE REDUNDANCY FEATURE

Daikin DWDC C Dual centrifugal compressor chillers have **two of everything** connected to the evaporator and condenser – two compressors, two lubrication systems, two control systems, and two starters.

If any component on a compressor system fails, the component can be removed or repaired without shutting down the other compressor; providing an automatic back-up with **at least 60 percent of the chiller design capacity** available on DWDC units.

LOWER INRUSH CURRENT

With DWDC C dual compressor chillers, there are two smaller motors (as compared to a single compressor chiller with one larger motor) which produce the same cooling capacity. The microprocessor control logic is built in such a way that when the second compressor is to be started, the first compressor is unloaded further and the second compressor startup is initiated. This **starting method reduces the total inrush current of the dual compressor chillers**. Additionally, if an emergency power back-up generator is utilized, this method can reduce the size of the generator.

LOWER RUN HOURS

For chillers operating at 60% and below load for DWDC's, Daikin has programed the unit controls to allow only one compressor to run, which results in **lower run hours**. Lower run hours inherently reduce wear and tear of the compressor and increase its overall life as compared to a single compressor chiller.

SINGLE CIRCUIT DWDC CHILLERS

These chillers have a single-refrigerant circuit for the evaporator and condenser with two compressors running in parallel and are available in one, two or three-pass configurations. Their salient feature is that at single-compressor, part load operation, **the running compressor can utilize the entire chiller's heat transfer surface**, providing outstanding part load performance.

STATE-OF-THE-ART ENGINEERING

The unique design of Daikin's Inverter uses fewer internal components to create the optimal balance between cost and performance. Engineering and factory-mounting the Inverter provides significant economies of scale, ensuring low in-rush currents to the chillers, reducing the risks of overheating and wiring deterioration over time for a more dependable motor life.

The Inverter is available also in a 'Low Harmonic -LH' version (option) in accordance with IEEE-519 2014 requirements (THDi<5%).

The unique and latest design of the Daikin Inverter Low Harmonic Filter allows to adjust the Harmonic Current according to the specific application to achieve <3% THDi. This feature is available on request option for both the DWDC C and DWSC C Series.

REFRIGERANTS

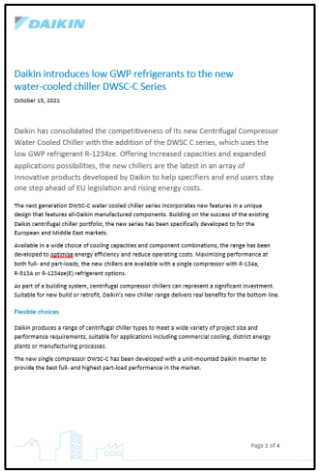
Environmental impact reduction

- The use of R-1234ze(E) offers an environmentally friendly solution, combining a low Global Warming Potential (GWP).
- R-1234ze(E) is an HFO refrigerant (Hydro Fluoro Olefins) with an Ozone Depletion Potential (ODP) is equal to zero (0).
- The introduction of the new R-1234ze(E) range provides a long-term solution that supports the HFC phase down schedule of the F-gas Regulation.
- Alongside R-1234ze(E), Daikin can offer products with conventional refrigerant R-134a or R-513A (which have lower environmental impact than R-134a), according to customer needs.
- All above-mentioned refrigerants can be used for lifetime chiller operation, thereby eliminating the uncertainty of refrigerant availability going forward.
- DWSC-C DWDC-C Series chillers are designed and tested with the aim of minimizing the risk of refrigerant leakage into the atmosphere. Since they operate slightly above atmospheric pressure, outside air containing non-condensable moisture cannot enter the chiller, eliminating the need for a purge unit to evacuate water vapor and refrigerant into the atmosphere.

Refrigerant type	ODP	GWP*1	Safety Group *2		Nominal composition (mass fraction %)*2	Saturated temperature (°C) *3	Saturated pressure (MPa)25°C *3
			Toxicity	Flammability			
R-134a	0	1430	A	1	R-134a (100)	-26.1	0.67
R-513A	0	573	A	1	R-1234yf/134a (56.0/44.0)	-29.6	0.71
R-1234ze(E)	0	1	A	2L	R-1234ze(E) (100)	-19.0	0.50

*1 Based on IPCC 4th AR. The GWP values of other refrigerants which are not listed in the IPCC 4th AR are obtained from IPCC 5th AR.
*2 Based on ISO 817:2014/AMD 1:2017 and ASHRAE 34-2019

*3 Properties are generated by using NIST REFPROP ver. 10.


DAIKIN

Daikin introduces low GWP refrigerants to the new water-cooled chiller DWSC-C Series

October 15, 2021

Daikin has consolidated the competitiveness of its new Centrifugal Compressor Water Cooled Chiller with the addition of the DWSC C series, which uses the low GWP refrigerant R-1234ze. Offering increased capacities and expanded applications possibilities, the new chillers are the latest in an array of innovative products developed by Daikin to help specifiers and end users stay one step ahead of EU legislation and rising energy costs.

The next generation DWSC-C water cooled chiller series incorporates new features in a unique design that features all-Daikin manufactured components. Building on the success of the existing Daikin centrifugal chiller portfolio, the new series has been specifically developed to for the European and Middle East markets.

Available in a wide choice of cooling capacities and component combinations, the range has been developed to optimize energy efficiency and reduce operating costs. Maximizing performance at both full- and part-loads, the new chillers are available with a single compressor with R-134a, R-513A or R-1234ze(E) refrigerant options.

As part of a building system, centrifugal compressor chillers can represent a significant investment. Suitable for new build or retrofit, Daikin's new chiller range delivers real benefits for the bottom line.

Flexible choices

Daikin produces a range of centrifugal chiller types to meet a wide variety of project size and performance requirements, suitable for applications including commercial cooling, district energy plants or manufacturing processes.

The new single compressor DWSC-C has been developed with a unit-mounted Daikin inverter to provide the best full- and highest part-load performance in the market.

Page 1 of 4

[See Press Release]

ELECTRICAL PANELS

ELECTRICAL LAYOUT

DWDC C Series has 4 main choice for Electrical Panels, in order to satisfy every requirement:

1. Variable Frequency Drive designed and manufactured by Daikin;
2. Low Harmonics VFD designed and manufactured by Daikin;
3. Soft Starter Unit Mounted for Fixed Speed application designed by Daikin;
4. Control Panel designed by Daikin for third party Starter.

Free Standing VFD Electrical Panels are not designed/manufactured by Daikin

Note: Dedicated training session will be executed on starter type for the centrifugal chillers and how to rate in selection software

ELECTRICAL LAYOUT

Daikin VFD, Low Voltage Unit Mounted - Starter Type: VN

	DWDC C											
Size	VC	VD	VE	VG	VH	VI	VL	VM	VO	VP	VQ	VR
Frame	450.2D	500.2D	540.2D	660.2D	680.2D	800.2D	900.4	1000.4	1080.4	1320.4	1360.4	1600.4
Output Amps [A]	365 365	400 400	450 450	545 545	600 600	700 700	730 730	800 800	900 900	1090 1090	1200 1200	1400 1400
Width [mm]	2000						2000 + 2000 (2 separate electrical panels)					
Depth [mm]	600						600					
Height [mm]	1800						1800					
Weight [kg]	900						900 + 900 (2 separate electrical panels)					
Colour	Ivory White (Munsell code 5Y7.5/1 ± RAL7044)						Ivory White (Munsell code 5Y7.5/1 ± RAL7044)					
Material	Galvanized and painted steel sheet						Galvanized and painted steel sheet					
Degree of protection	IP54 (enclosure) - IPXXB (inside panel)						IP54 (enclosure) - IPXXB (inside panel)					
Operating Temperature [°C]	-10°C...+45°C						-10°C...+45°C					
Voltage [V]	380-415V +/-10%						380-415V +/-10%					
Frequency [Hz]	50/60 +/-5%						50/60 +/-5%					
Line cable entry	BOTTOM (TOP with OP207 - dimensions change)						BOTTOM only - OP207 not available					

Layout, including both the power section as well as control section with both the compressor and unit controls and transformer for auxiliary circuits.

ELECTRICAL LAYOUT

Daikin Low Harmonic VFD, Low Voltage Unit Mounted - Starter Type: LN

	DWDC C					
Size	LC	LD	LE	LG	LH	LI
Frame	450.2D	500.2D	540.2D	660.2D	680.2D	800.2D
Output Amps [A]	365 365	400 400	450 450	545 545	600 600	700 700
Width [mm]	3000					
Depth [mm]	600					
Height [mm]	1800					
Weight [kg]	1400		1520		1600	
Colour	Ivory White (Munsell code 5Y7.5/1 ± RAL7044)					
Material	Galvanized and painted steel sheet					
Degree of protection	IP54 (enclosure) - IPXXB (inside panel)					
Operating Temperature [°C]	-10°C...+45°C					
Voltage [V]	380-415V +/-10%					
Frequency [Hz]	50/60 +/-5%					
Line cable entry	BOTTOM - OP207 not available					

Layout, including both the power section as well as control section with both the compressor and unit controls and transformer for auxiliary circuits.

ELECTRICAL LAYOUT

Daikin Soft Starter, Low Voltage Unit Mounted - Starter Type: SN

	DWDC C											
Size	SD	SE	SF	SG	SH	SI	SL	SM	SO	SP	SQ	SR
Frame	248	340	420	500	600	740	940	1140	1440	1680	2100	2500
Output Amps [A]	186 186	242 242	275 275	355 355	433 433	518 518	687 687	845 845	1027 1027	1201 1201	1515 1515	1788 1788
Width [mm]	1500 + 1500				2000 + 2000 (2 separate electrical panels)			2000 + 2000 (2 separate electrical panels)				
Depth [mm]	500				500			500				
Height [mm]	1800				1800			1800				
Weight [kg]	600 + 600				800 + 800 (2 separate electrical panels)			800 + 800 (2 separate electrical panels)				
Colour	Ivory White (Munsell code 5Y7.5/1, ± RAL7044)											
Material	Galvanized and painted steel sheet											
Degree of protection	IP54 (enclosure) - IPXXB (inside panel)											
Operating Temperature [°C	-10°C...+42°C											
Voltage [V]	380-415V +/-10%											
Frequency [Hz]	50/60 +/-5%											
Line cable entry	BOTTOM only - OP207 not available											

Layout, including both the power section as well as control section with both the compressor and unit controls and transformer for auxiliary circuits.

ELECTRICAL LAYOUT

Daikin electrical Panel - Only Control, Low Voltage Unit Mounted,

available for Third Party Starter below listed:
FF = Fixed Speed (only Free Standing - Low or Medium Voltage)
VF = VFD (only Free Standing - Low or Medium Voltage)

	DWDC C
Width [mm]	850
Depth [mm]	431
Height [mm]	1575
Weight [kg]	210
Colour	Ivory White (Munsell code 5Y7.5/1, ± RAL7044)
Material	Galvanized and painted steel sheet
Degree of protection	IP54 (enclosure) - IPXXB (inside panel)
Operating Temperature [°C]	-10°C...+42°C
Voltage [V]	380-415V +/-10%
Frequency [Hz]	50/60 +/-5%

Layout, including both the power section as well as control section with both the compressor and unit controls and transformer for auxiliary circuits.

ELECTRICAL DESIGN

Options

- **Energymeter** ➔ Touch screen display shows many parameters, including motor current and voltage;
- **Ground Fault Protection** ➔ This device detect current from the output phase to earth either in the cable between the starter and the motor or in the motor itself;
- **Reversed line cable entry** ➔ Allow reversed cable entry;
- **IT-net configuration**

V1 D

Refrigerant type

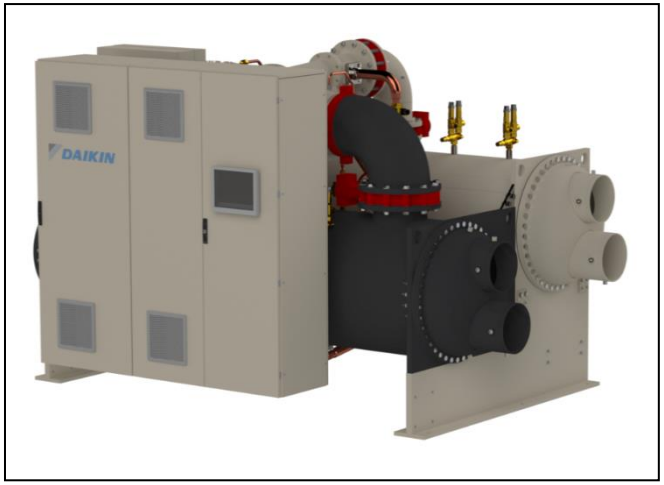
D	=	R-134a
H	=	R-1234ze
S	=	R-513A
B	=	R-515B

Starter Type & size

VN	=	VFD Low Voltage Unit Mounted
LN	=	Low Harmonic Drive Low Voltage Unit Mounted
SN	=	SS Low Voltage Unit Mounted
FF	=	Third Party Fixed Speed (only Free Standing - Low or Medium Voltage)
VF	=	Third party VFD (only Free Standing - Low or Medium Voltage)

Starter size (for Daikin VFD, Low HD and SS Low Voltage)

X1	=	Size 1
X2	=	Size 2
...	=	...
XN	=	Size N



CHILLER OPTIONS

ON REQUEST OPTIONS

OPTIONS, ACCESSORIES AND WITNESS TEST

Mechanical		Type
167	Marine Version	TBD
07a	Heat Pump (including Pursuit mode)	UM
175	Hot Gas By Pass	UM
121	Refrigerant leak detection	UM
61	Discharge Line Shut-off Valve	UM
62	Suction Line Shut-off Valve	UM
76-b	Low noise (Discharge Line only)	UM
76-d	Low noise (Condenser & Discharge Line)	UM
63	High Pressure side manometer	UM
64	Low Pressure side manometer	UM
194	ASME certification for evaporator and condenser	UM

Heat Exchangers		Type
201	Evaporator Inlet Right	UM
202	Condenser Inlet Right	UM
104	Evaporator Flanges	UM
196	Evaporator Counter-flanges	UM
26	Condenser Flanges	UM
197	Condenser Counter-flanges	UM
198	40mm Evaporator insulation	UM
33	20 mm Condenser insulation	UM
27	Evaporator Water Side design pressure 16bar	UM
47	Condenser Water Side design pressure 16bar	UM
22	EVAPORATOR MARINE WATERBOX (2 PASSES)	UM
22a	Evaporator MWB 1 pass (on both ends)	UM
23	Evaporator MWB 3 passes (on both ends)	UM
38	CONDENSER MARINE WATERBOX (2 PASSES)	UM
38a	Cond MWB 1 pass (on both ends)	UM
39	Cond MWB 3 passes (on both ends)	UM

Electrical		Type
110	Rapid restart	UM
58	Evaporator Flow Switch	UM
56	Evaporator Water differential pressure switch	UM
55	Condenser Water differential pressure switch	UM
59	Condenser Flow Switch	UM

Software		Type
155	DAIKIN ON SITE MODEM (WITH ANTENNA)	UM
184	iCM Standard	UM
180	Modbus RTU MSTP	UM
181	BACNet MSTP	UM
182	BACNet IP	UM

Other		Type
195	Knockdown (On-site disassembly)	-
147	Knockdown Electrical Panel	-

Starter		Type
16	Energy Meter	UM
102	Ground Fault Protection	UM
207	REVERSED LINE CABLE ENTRY (FROM THE TOP)	UM
208	IT-NET CONFIGURATION	UM

Accessories		Type
EKCMBACIP	BACnet/IP communication module	UM
EKDIPM10	INTELLIGENT PUMP MANAGER FOR ICM 10PUMPS	SL
EKDIPM05	INTELLIGENT PUMP MANAGER FOR ICM 5 PUMPS	SL
EKQDP2M016	DIFFERENTIAL PRESSURE SENSOR 4-20 MA 0-160 KPA	SL
EKQDP2M020	DIFFERENTIAL PRESSURE SENSOR 4-20 MA 0-250 KPA	SL
EKQDP2M040	DIFFERENTIAL PRESSURE SENSOR 4-20 MA 0-400 KPA	SL
EKQDP2M060	DIFFERENTIAL PRESSURE SENSOR 4-20 MA 0-600 KPA	SL
EKDOSMWO	DAIKIN ON SITE MODEM WITHOUT M2M CARD	UM

Witness Test		Type
WITFLCEN	Full load Test	-
WITPLPTCEN	Part Load test	-
WITACCEN	Acoustic test Full load	-

ON REQUEST OPTIONS

OPTIONS, ACCESSORIES AND WITNESS TEST

Mechanical		Type
167	Marine Version	TBD
07a	Heat Pump (including Pursuit mode)	UM
175	Hot Gas By Pass	UM
121	Refrigerant leak detection	UM
61	Discharge Line Shut-off Valve	UM
62	Suction Line Shut-off Valve	UM
76-b	Low noise (Discharge Line only)	UM
76-d	Low noise (Condenser & Discharge Line)	UM
63	High Pressure side manometer	UM
64	Low Pressure side manometer	UM
194	ASME certification for evaporator and condenser	UM

Heat Exchangers		Type
201	Evaporator Inlet Right	UM
202	Condenser Inlet Right	UM
104	Evaporator Flanges	UM
196	Evaporator Counter-flanges	UM
26	Condenser Flanges	UM
197	Condenser Counter-flanges	UM
198	40mm Evaporator insulation	UM
33	20 mm Condenser insulation	UM
27	Evaporator Water Side design pressure 16bar	UM
47	Condenser Water Side design pressure 16bar	UM
22	EVAPORATOR MARINE WATERBOX (2 PASSES)	UM
22a	Evaporator MWB 1 pass (on both ends)	UM
23	Evaporator MWB 3 passes (on both ends)	UM
38	CONDENSER MARINE WATERBOX (2 PASSES)	UM
38a	Cond MWB 1 pass (on both ends)	UM
39	Cond MWB 3 passes (on both ends)	UM

Electrical		Type
110	Rapid restart	UM
58	Evaporator Flow Switch	UM
56	Evaporator Water differential pressure switch	UM
55	Condenser Water differential pressure switch	UM
59	Condenser Flow Switch	UM

Software		Type
155	DAIKIN ON SITE MODEM (WITH ANTENNA)	UM
184	iCM Standard	UM
180	Modbus RTU MSTP	UM
181	BACNet MSTP	UM
182	BACNet IP	UM

Heat Exchangers		Type
209	EVAPORATOR HINGES ON BOTH ENDS	UM
210	CONDENSER HINGES ON BOTH ENDS	UM
211	EVAPORATOR SACRIFICIAL ANODES	UM
212	CONDENDER SACRIFICIAL ANODES	UM
213	EVAPORATOR CERAMIC COATING (WATER SIDE)	UM
214	CONDENSER CERAMIC COATING (WATER SIDE)	UM
215	EVAPORATOR EPOXY COATING (WATER SIDE)	UM
216	CONDENSER EPOXY COATING (WATER SIDE)	UM

Note: Dedicated training session will be executed on product flexibility and full list of "on request“ chiller’s options

Water Heads

Compact (DOME) Water Box (included in STANDARD PRICE)

MWB are an option available on all evaporator and condenser sizes. They provide tube access for inspection, cleaning, and removal without dismantling water piping.

Hinges (Op209 e Op210)

Marine Water Box (Op22 e Op38)

Hinges are available for enhance the service utility.

Water nozzles

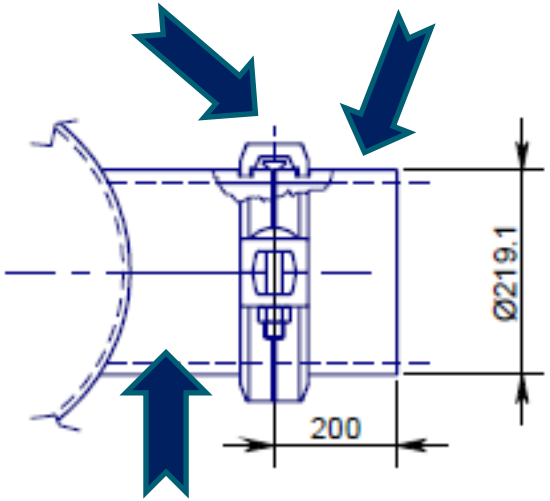
Victaulic (Grooved) connections (included in STANDARD PRICE)

Mechanical pipe connection system where two grooved end pipes are joined through a ring fitted around the joint, resulting in a quick, easy, water and air-tight connection..

«Counter-VIC»

- furnished as a standard by the factory
- shipped in a separate box
- to be welded on site with plant piping)

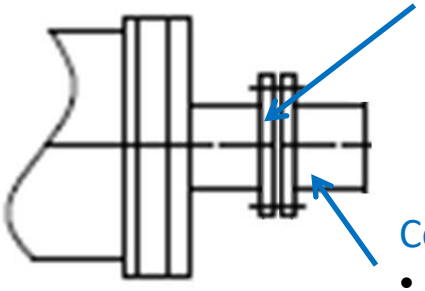
Victaulic coupling, through VICTAULIC RING



Water piping (on the chiller)

Water nozzles

Flanged joints are made by bolting together (through fasteners with nuts) two flanges with a gasket between them.



Main flange on the chiller water nozzle (Op26 e Op104)

Counter-flange:

- Optional (Op196 e Op197)
- shipped in a separate box

Coatings on water heads (water side)

Options available for dirty water applications:

- Epoxy coating of the water boxes (Op215 e Op216)
- Ceramic coating of the water boxes (Op213 & Op214)

Contact factory for technical specifications

→ Brushable, high performance ceramic filled epoxy for sealing, protecting and repairing surfaces subject to erosion, corrosion and wear

Note: Contact factory for quotation on Marine Water Box and 1-pass or 3-pass Heat Exchanger Configuration

Low noise options

Low noise (discharge line only): Op76-b

Discharge line sound package is offered. An additional 1.5 dB(A) reduction normally occurs.

Incompatibility with 76-d Low noise (Condenser & Discharge Line).

Low noise (condenser & discharge line only): Op76-d

For extremely sensitive projects, an optional unit mounted sound package is offered consisting of sound insulation installed on the unit's discharge line and condenser. An additional 8dB(A) reduction normally occurs.

Incompatibility with 76-b Low noise (Discharge only).

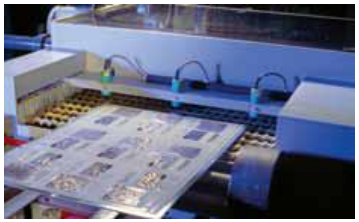
Rapid restart (Op110)

Ideal solution for those critical applications that cannot afford the loose of cooling.
In case of power failure unit will re-start as fast as 30 seconds from power restoration (UPS in included in electrical panel). Unit will reach full load within 280 seconds.

A short-term power loss can happen during power interruptions or utility switching operations, and could turn into a critical loss of cooling in facilities such as data centres, health care buildings or manufacturing processes.


Health Care Facilities


Data Centers


Manufacturing Processes

These *cannot afford to lose cooling*

The 'Rapid restart' allows the unit to start as fast as 30 seconds after power is restored.

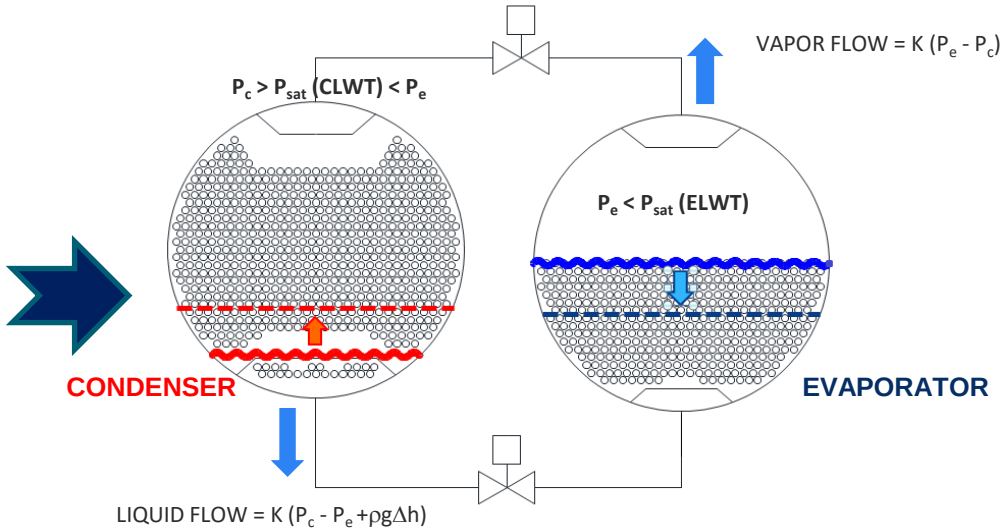
Free Cooling option available from October 2022

Free Cooling option with Standard Chiller layout

Thanks to the new layout with condenser at higher level than evaporator

Dedicated vapor line and liquid line are introduced

Free Cooling Operation



Cooling effect is obtained thanks to refrigerant migration (as vapor) from evaporator to condenser and liquid flowing back from condenser to evaporator thanks to gravity. Liquid levels are self-regulated to keep liquid mass flow equal to vapor mass flow.

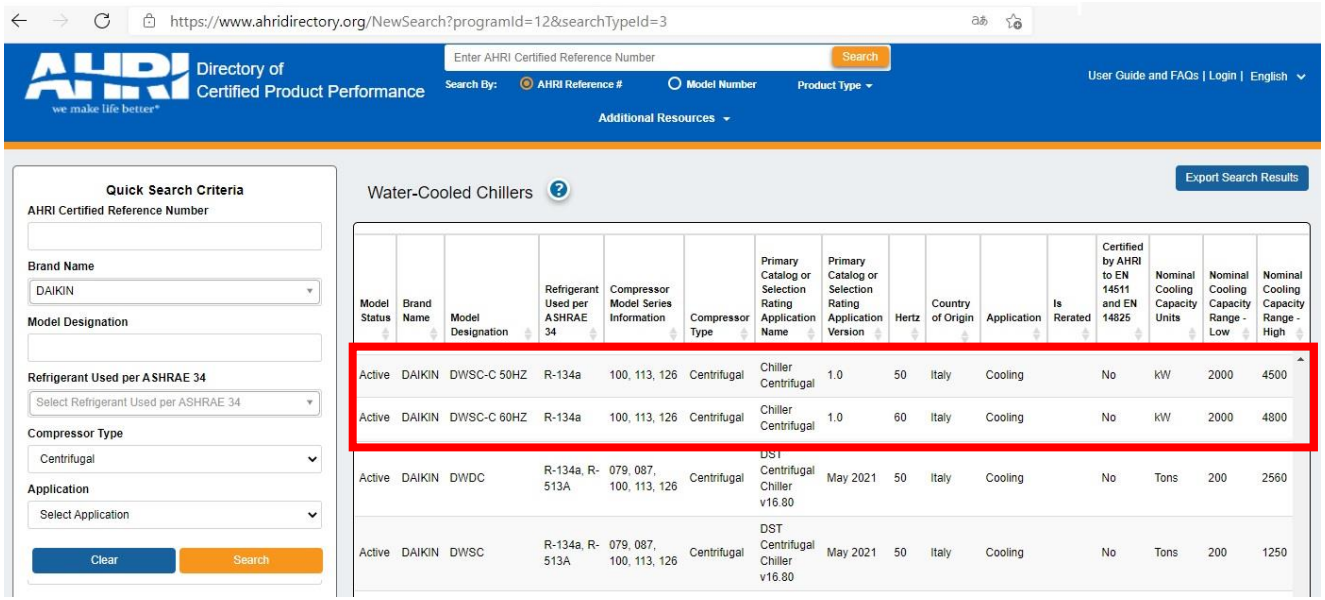
SELECTION IN DAE CENTRIFUGAL SOFTWARE

- Centrifugals are **configurable chillers**

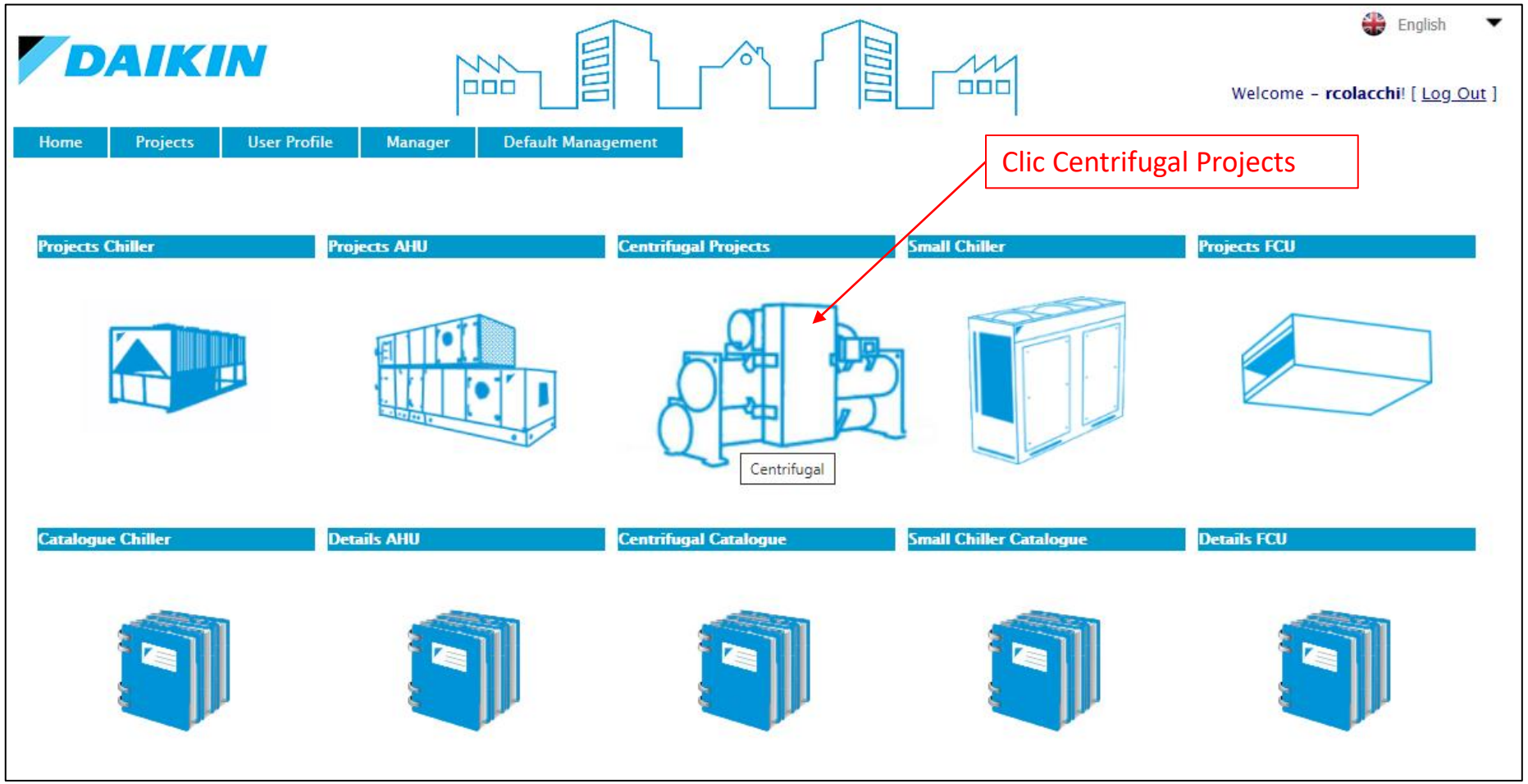
- Daikin Applied Europe designed a dedicated **Selection software (Centrifugal CSS) in a brand new platform** that allows to play with the components and options combinations in order to suit the unit to project requirements;

- Sales of centrifugal chillers are possible only with a proper knowledge of the product and its selection flexibility: it's important to know how to play with the selection flexibility in order to achieve what is really crucial to get the job (best efficiency, low pressure drops,…)

- **Centrifugal CSS** software is **certified by AHRI**, meaning that the selections within the AHRI scope are certified



LOG IN & OPEN A NEW PROJECT



THANK YOU