



CO₂, an old story and brand new CARLY components.

CO₂ has been used as a refrigerant for more than 120 years, and is now a crucial part of many different applications from commercial and industrial refrigeration to air conditioning, certain kinds of heat pump and - most recently - mobile applications.

At such a low cost, with such a limited effect on the environment (GWP = 1) and no effect on the ozone layer (ODP = 0), zero toxicity and complete non-flammability, this is often the go-to technical solution for professionals.

What's more, the F-Gas regulation (N°517/2017) brought in on the 01/01/2015 encourages the use of "natural" refrigerants such as CO₂.

This relatively recent change of direction for the profession is a real challenge, and the CARLY RCS Company is up to it. Working in close collaboration with the market leaders, CARLY RCS is constantly developing new ranges of refrigeration line components which are adapted to be used with CO₂. They also produce a huge number of custom components, meeting the increasing needs of users for component solutions adapted to their specific expectations rather than off-the-shelf systems.

The main feature of these new "CO₂" components is their capacity to work under higher operating pressures than those used with traditional refrigerants: 46, 64, 90, 140 bars, or even higher...

Whether the CO₂ system is running in a sub-critical or trans-critical cycle, CARLY RCS can provide component solutions for a vast range of refrigeration components: single-block dehydrator filters, replaceable-cartridge filter driers, impurity filters, silent backflows and oil filters. Suction accumulators and liquid tanks can be custom-designed and created.

CARLY's flexibility, their factory located in the heart of Europe and their particularly agile industrial organization, make the company your preferred partner for all of your CO₂ developments.

Act for CO₂, Think CARLY !



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CARLY commitment to planet friendly components A full range of CO₂ solutions



Anti-acid filter driers DCY-P6 / DCY-P14

Filtering and drying of CO₂ and acid neutralization for liquid lines, in installations running with high working pressures (64bar - 140bar)



Replaceable core filter drier shells BCY-HP / BCY-P6 / BCY-P14

Filtering and drying of CO₂ and acid neutralization for liquid lines, running with high working pressures (46bar - 140bar). Replaceable core filter drier shells allow the replacement of the filter drier's active parts only



Dirt filters (permanent use) FILRY-P9 / FCY-P6

Permanent CO₂ filtering, regulation and expansion element protection in installations running at 90bar



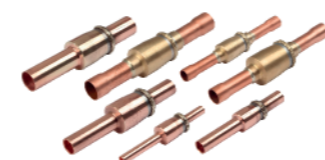
Discharge line mufflers SCY-P6 / SCY-P14

Reduction of noise caused by gas pulses in the discharge lines of installations running at 64bar - 140bar



Oil filters HCYF-P6 / HCYF-P14

Oil filtering on the oil return line to the compressor sumps of installations running at 64bar - 140bar



Check valves CRCY-P9

The check valves ensure a one-way direction of CO₂ flow (90bar)

For CO₂ range presentation, please see our special brochure or visit our website www.carly-sa.com



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THE NEW GENERATION OF 140 bar OIL SEPARATORS

TURBOIL®-R-P14 DD - INTEGRITY

Double Deck, double actions for double results : efficiency and integrity



10 reasons to select a SUPERIOR high performance oil separator TURBOIL®-R-P14 DD - INTEGRITY

1- Efficiency

Up to 98,5% efficiency with a special focus on fine oil particles separation.

2- Integrity

Superior level of oil separation whatever the flow: thanks to the special sequential double treatment.

3- Unique design

The TURBOIL-R-P14 DD innovation consists into a unique oil separation treatment though a « double sequential action » articulated around two individual chambers (Double Deck) connected by a « regulation tunnel ». The coalescent chamber is dynamic.

4- 140 bar / 2030 Psi - 160°C / 320°F

New, specially design to meet high pressure (140 bar / 2030 Psi) and temperature (160°C / 320°F)

5- Double range: “mini market” and “supermarket / industrial”

Mini market (1 reference) to offer the best value for money oil separator dedicated to small units (up to 10kW)

Supermarket / industrial (5 references) to cover a large range of refrigeration capacities (up to 285kW)

6- No maintenance

No need to open TURBOIL-R-P14 DD for maintenance operation.

7- Vertical / Horizontal

To help designer of transcritical CO₂ units, TURBOIL-R-P14 DD can be mounted vertically and horizontally (TURBOIL-R-P14 103 S/, optionally TURBOIL-R-P14 205 S/).

8- Anti “back wash” design

Thanks to its unique design, TURBOIL-R-P14 DD is the only 140 bar oil separator whose inlet is located at the upper end of the pressure vessel. Thus all potential solid particles will be stopped by gravity inside the oil separator. It is not possible for them to come back to the compressor though the discharge after stopping installations.

9- Muffler effect

Flow pulsations (gas pulses) are strongly decreased thanks to the helicoidal brushes mounted in the separation chamber.

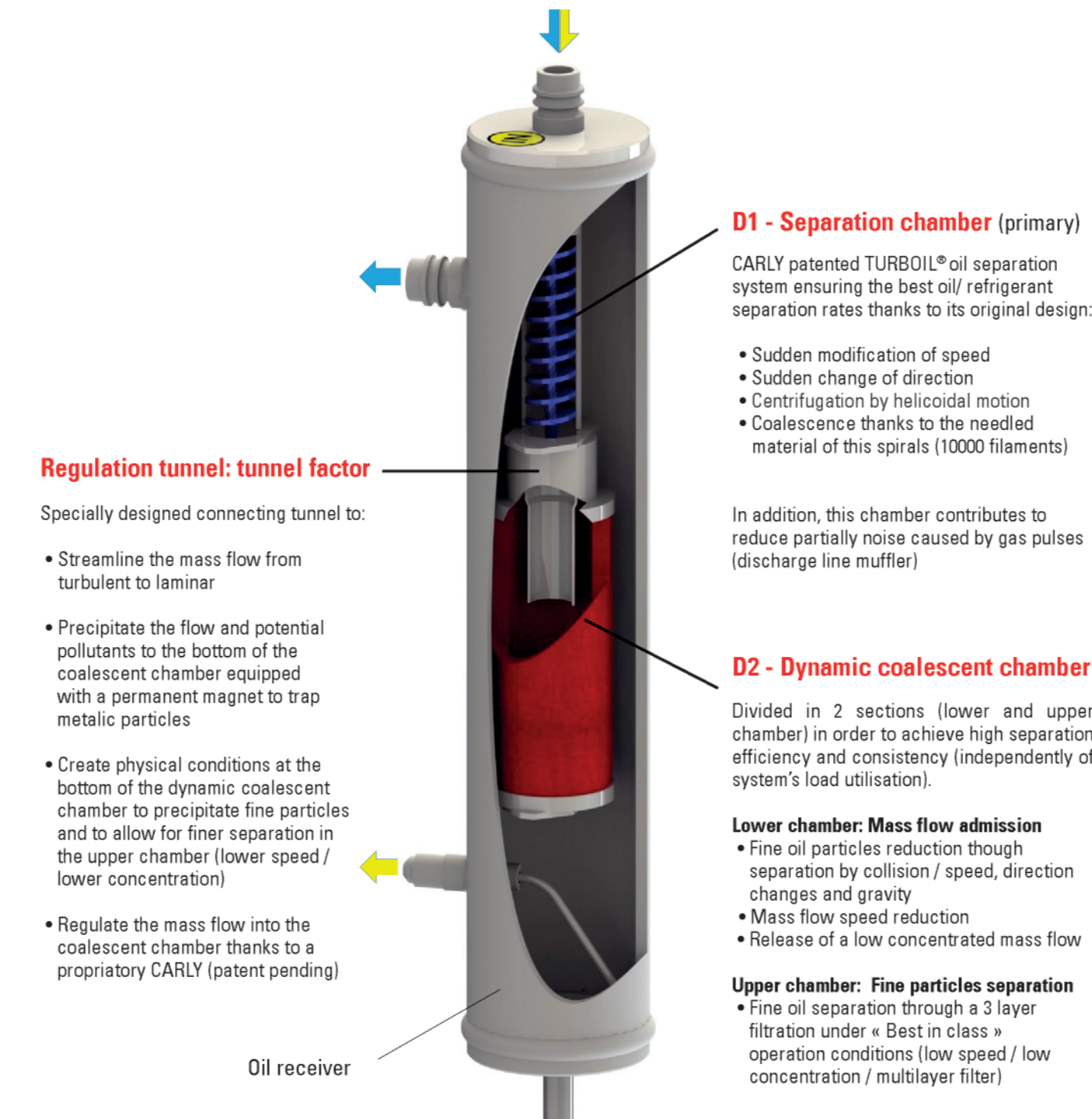
10- Engineered and produced in FRANCE by CARLY



TURBOIL®-R-P14 DD - INTEGRITY « special fine particles »

Double Deck, double actions for double results: efficiency and integrity

The **TURBOIL®-R-P14 DD** innovation consists into a unique oil separation treatment though a « double sequential action » articulated around two individual chambers (Double Deck) connected by a « dynamic tunnel ».



D1 - Separation chamber (primary)

CARLY patented TURBOIL® oil separation system ensuring the best oil/ refrigerant separation rates thanks to its original design:

- Sudden modification of speed
- Sudden change of direction
- Centrifugation by helicoidal motion
- Coalescence thanks to the needed material of this spirals (10000 filaments)

In addition, this chamber contributes to reduce partially noise caused by gas pulses (discharge line muffler)

D2 - Dynamic coalescent chamber

Divided in 2 sections (lower and upper chamber) in order to achieve high separation efficiency and consistency (independently of system's load utilisation).

Lower chamber: Mass flow admission

- Fine oil particles reduction through separation by collision / speed, direction changes and gravity
- Mass flow speed reduction
- Release of a low concentrated mass flow

Upper chamber: Fine particles separation

- Fine oil separation through a 3 layer filtration under « Best in class » operation conditions (low speed / low concentration / multilayer filter)

Regulation tunnel: tunnel factor

Specially designed connecting tunnel to:

- Streamline the mass flow from turbulent to laminar
- Precipitate the flow and potential pollutants to the bottom of the coalescent chamber equipped with a permanent magnet to trap metallic particles
- Create physical conditions at the bottom of the dynamic coalescent chamber to precipitate fine particles and to allow for finer separation in the upper chamber (lower speed / lower concentration)
- Regulate the mass flow into the coalescent chamber thanks to a propriatory CARLY (patent pending)

Technical specifications

- Maximum allowable working pressure: 140bar - 2030 Psi
- Working range temperature: -40°C - +160°C / -40°F - +320°F
- Certifications and markings: PED 2014/68/UE
- 5 different models, from 10 to 289 kW perform in a wide operating range
- Horizontal and vertical version for models TURBOIL-R-P14 103 S/, TURBOIL-R-P14 205 S/

The “ Double Deck ” innovation:

Double Deck, double actions for double results: efficiency and integrity

The Double Deck conception and design, flow and process parameters have been uniquely engineered to **maximize efficiency of each of the 4 major oil separation techniques: speed changes, direction changes, centrifugation and coalescence** in order to achieve a high level of separation (high efficiency) under a wide range of operating conditions (integrity / reliability).

D1 - Separation chamber (primary): Over 95% of the oil contained into the mass flow is systematically separated through the first deck. The mass flow is then precipitated through a « regulation tunnel » to the dynamic coalescent chamber D2.

Regulation tunnel: tunnel factor: This feature has been specially designed to trigger optimal separation conditions into the coalescent chamber D2.

The tunnel length, diameter and position between the 2 chambers have been carefully designed to streamline the mass flow and to generate specific conditions in the lower coalescent chamber D2/Low. This « tunnel factor » offers the double benefits to streamline the mass flow from turbulente to laminar and to foster a partial fine oil particle precipitation into the lower coalescent chamber D2/low (precipitation / coalescence).

D2 - Dynamic coalescent chamber: Divided in 2 sections in order to achieve high separation efficiency and consistency under a wide range of system's load (integrity). The ultimate separation of the finest oil particles can be separated under the « Best in class » conditions in the upper chamber D2/up (low speed filtration through a multilayer filter, low oil concentration mass flow, dryer filter).

The upper chamber D2/up, acting in a way similar to a « white / clean chamber » provides the best environment and conditions to achieve the ultimate separation of the very fine oil particles.

Double deck, double actions for double results : efficiency and integrity.

Selection table

TURBOIL-R-P14 DD INTEGRITY “ MINI MARKET ”

CARLY references	Connections To solder ODF inlet/outlet inch - mm	Connection types ⁽³⁾	Connections To screw SAE oil return inch	Refrigerating capacity			Dimensions				CE category ⁽²⁾
				kW ⁽¹⁾			mm	mm	L	L	
				-10°C	-20°C	-30°C	Ø	Height	Volume	Volume oil reserve	
TURBOIL-R-P14 103 S/	3/8 - 10	4	1/4	13	10	8	60	360	0,7	0,1/0,2	Art4\$3

TURBOIL-R-P14 DD INTEGRITY “SUPERMARKET / INDUSTRIAL”

CARLY references	Connections To solder ODF inlet/outlet inch - mm	Connection types ⁽³⁾	Connections To screw SAE oil return inch	Refrigerating capacity			Dimensions				CE category ⁽²⁾
				kW ⁽¹⁾			mm	mm	L	L	
				-10°C	-20°C	-30°C	Ø	Height	Volume	Volume oil reserve	
TURBOIL-R-P14 205 S/	5/8 - 16	5	1/4	43	34	25	89	610	2,5	1,5	II
TURBOIL-R-P14 207 S/	7/8 - 22	5	1/4	74	58	43	114	680	4,3	2,0	II
TURBOIL-R-P14 309 S	1 1/8 - 29	6	3/8	115	91	67	141	780	7,6	3,0	III
TURBOIL-R-P14 411 S/	1 3/8 - 35	5	3/8	156	123	92	168	800	10,0	4,0	III
TURBOIL-R-P14 813 S	1 5/8 - 41	6	3/8	289	228	170	219	880	19,5	8,0	III

⁽¹⁾ The indicated refrigerating capacities take into account 90 bar - 1305 Psi high pressure at +35°C - +95°F out gas cooler, and 8K useful superheat.

⁽²⁾ Classification by volume, according to PED 2014/68/EU.

⁽³⁾ Chapter «Connection features and drawings» (refer to chapter 114 to CARLY technical catalogue CO.)

