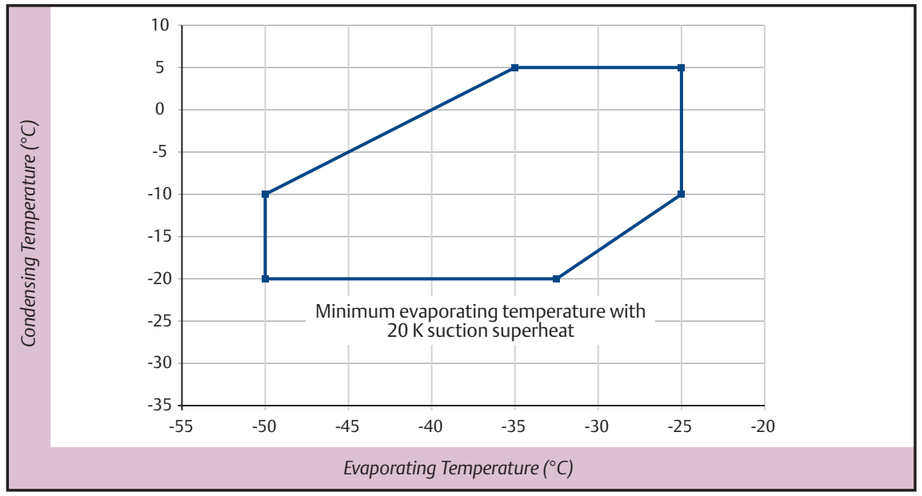
Scroll Compressors for R744 (CO_2) Low Temperature Refrigeration
Safeguarding your product and our environment

Model Overview

Model	Nominal Horsepower	Displacement	Cooling Capacity	COP	Net Weight	Power Supply (Motor Code)
	hp	m^3/h	kW[1]		kg	V/Ph/Hz
ZO 34 K3E	2.0	4.1	7.7	4.38	30	400/3/50 (TFD)
ZO 45 K3E	2.5	5.4	10.7	4.71	31	
ZO 58 K3E	3.5	6.9	13.6	4.78	33	
ZO 104 KCE	6.0	11.7	23.7	4.66	40	

[1] EN 12900: Evaporating -35°C, Condensing -10°C, Suction Superheat 20K, Subcooling 0K

Operating Envelope



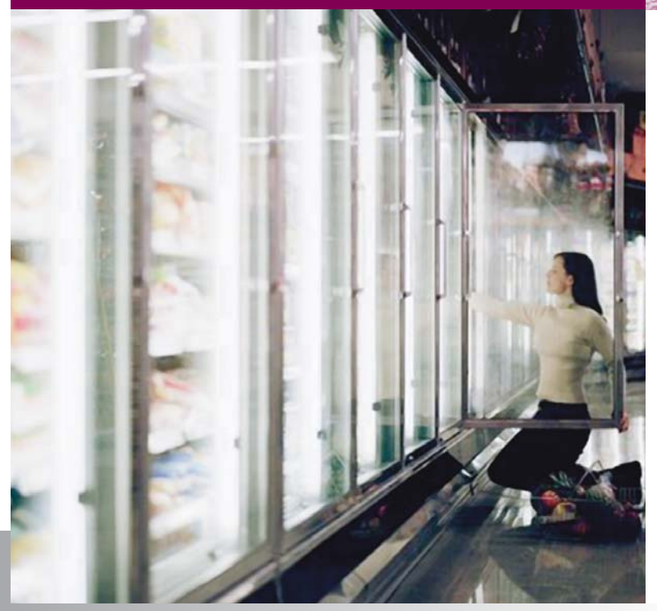
For more details, see www.emersonclimate.eu

Emerson Climate Technologies - European Headquarters - Pascalstrasse 65 - 52076 Aachen, Germany
Phone: +49 (0) 2408 929 0 - Fax: +49 (0) 2408 929 570 - Internet: www.emersonclimate.eu

C1.2.18/1006-0908/IE

EMERSON. CONSIDER IT SOLVED.

Copeland Scroll™ Compressors for R744 (CO_2) Low Temperature Refrigeration



Emerson Climate Technologies is the world's leading compressor manufacturer, delivering comprehensive solutions for numerous refrigeration applications. The ZO compressor range transfers the advantages of Copeland Scroll™ technology to low temperature cascade systems using the refrigerant CO_2.

ZO Range of Copeland Scroll™ Compressors

Benefits for CO_2 Applications

Copeland Scroll™ for R744 (CO_2) Refrigeration

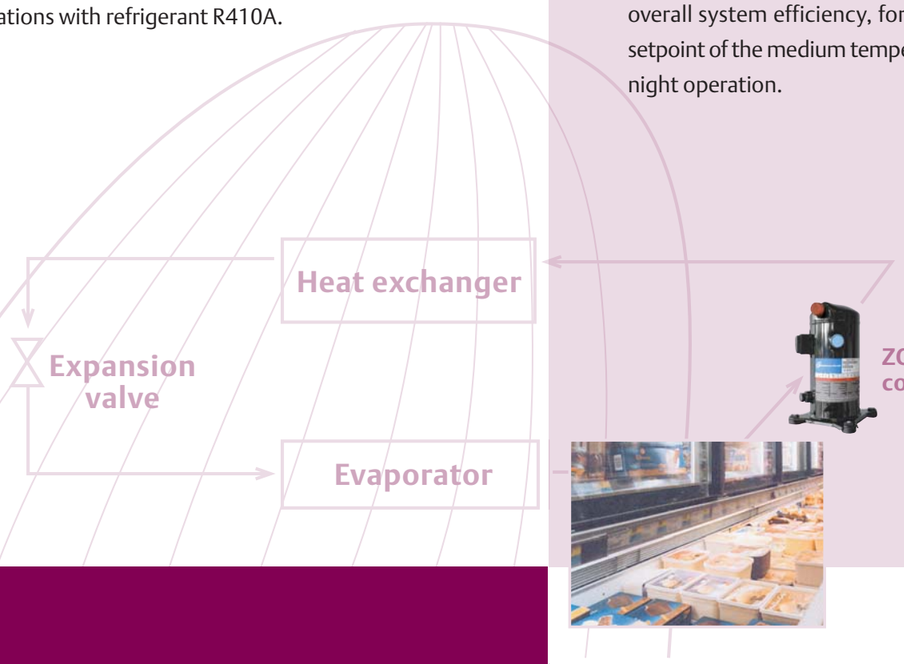
Increasing environmental concerns about the potential direct emissions from HFC-based refrigeration systems into the atmosphere have led to the revival of the refrigerant R744 (CO_2) in parts of the European refrigeration market. Regionally, this trend is reinforced by legislation and taxation schemes which favour the usage of CO_2.

In comparison with HFC refrigerants, the specific properties of CO_2 require changes in the design of the refrigeration system. The ZO range of Copeland Scroll™ compressors has been particularly designed to exploit the characteristics of CO_2 refrigeration systems. Efficiency, reliability and liquid handling advantages of the Copeland Scroll™ technology equally apply.

Low Temperature Cascade Systems

The comparably high pressure level and thermodynamic properties of the refrigerant CO_2 have driven system designers towards cascade systems, where CO_2 is used as a direct expanding medium in the low temperature stage. Different options exist for the medium temperature stage as well.

This way, compressors in the low temperature stage are still exposed to pressure levels higher than in standard HFC-based systems. However, they are limited to pressure levels similar to those already known from air-conditioning applications with refrigerant R410A.



Safeguarding Your Product and Our Environment

Environmental concerns must address potential direct refrigerant emissions as well as those arising from the energy consumption of the refrigeration system. The use of the refrigerant CO_2 almost completely eliminates the former potential environmental hazard. However, refrigerant leakage is still undesirable as it jeopardizes system reliability. With its hermetic design, Copeland Scroll™ technology eliminates any compressor-related risk, contributing to reliable system operation and thus safeguarding your refrigerated product.

Additionally, the ZO range of scroll compressors transfers the high efficiency inherent in the Copeland Scroll™ design to CO_2 refrigeration systems. The extended operating envelope of the ZO compressors can further boost overall system efficiency, for example when lifting the setpoint of the medium temperature side during low load night operation.

Optimized Design for CO_2 Applications

The challenges for CO_2 compressors compared to HFC compressors lie in the high pressure levels, the higher mass flow for a given displacement, and in securing proper lubrication.

In terms of mechanical strength, ZO scroll compressors benefit from several years of experience with R410A air-conditioning compressors, which are operating at similar pressure levels as CO_2 compressors. For piston compressors, particular attention has to be paid to redesigning the suction and discharge valves for the higher mass flow. Copeland Scroll™ compressors eliminate this problem up-front by not utilizing suction and discharge valves to control the compression process.

Lubrication is always of particular concern during the design stage of new compressors and has to be proven during reliability and field testing. The effort has resulted in the development of a dedicated polyol ester oil (POE). Moreover, ZO compressors feature internal design details which ensure higher bearing durability and lubrication to all critical parts at any time during run-time and system start-up. This includes the use of Teflon bearings.