The Montreal Protocol bans CFCs and HCFCs aiming to protect the ozone layer while the Kyoto Protocol aims to reduce greenhouse gases and, thus, global warming. F-Gas II, on the other hand, aims to progressively reduce the use of HFCs and high GWP (global warming potential) refrigerants. These laws encourage the use of R744 (CO_2).

CO_2 - POE Lubricants

Carbon dioxide (R744) has been used as a refrigerant since the last century with the introduction of industrial refrigeration systems. R744 has excellent thermodynamic properties and is an environmentally friendly refrigerant (with the lowest GWP and ODP). Its use has grown as it is not only a natural refrigerant but also extremely effective, both in specially designed industrial systems such as supermarket refrigerators and heat pump water heaters. Errecom's CO_2 - POE lubricants are high-performance polyol ester-based synthetic lubricants specially developed for CO_2 applications. CO_2 - POEs are available in 5 different viscosity grades to meet the requirements of a full range of R744 systems. They are characterised by good miscibility, fluidity, and stability. Thanks to their branched molecular structure and the high-performance additive package included in the formulation, they also provide good lubrication with better overall performance than classic POEs over a wide temperature range.

More precisely, Errecom's CO_2 - POE lubricants contain excellent additive packages (anti-oxidants, anti-corrosives, anti-foaming) carefully selected to:
- optimise miscibility with CO_2, thus increasing heat exchange even in the low-temperature zone;
- reduce the formation of foam, usually present at compressor start-up;
- increase its lubricating capacity;
- protect against materials, even under extreme operating conditions.

They are also characterised by low toxicity and high biodegradability.
CO_2 - POEs can be used for both subcritical (e.g. low-temperature cooling stages in supermarket cascade refrigeration systems) and transcritical (e.g. medium-temperature cooling stages in supermarkets) applications.

Physical Quantity Measured (Unit of Measurement)	Analytical Reference Method	CO_2 - POE 32	CO_2 - POE 55	CO_2 - POE 68	CO_2 - POE 85	CO_2 - POE 100
ISO VG	-	32	55	68	85	100
Kinematic Viscosity @ 40°C (cSt)	ASTM-D445	32	55	68,3	84	100
Kinematic Viscosity @ 100°C (cSt)	ASTM-D445	7	8,8	9,5	11,5	16
Viscosity Index	ASTM-D2270	150	142	122	119	112
Pour Point (°C)	ASTM-D97	-51	-49	-42	-39	-39
Flash Point (°C)	ASTM-D93	270	280	270	272	272
Density @ 15°C (g/cm³)	ASTM-D1298	0,983	0,982	0,987	0,991	0,986
Moisture Level (ppm)	ASTM-D6304	50	40	50	40	40
Total Acid (mg KOH/g)	ASTM-D974	<0,04	<0,03	<0,02	<0,03	<0,03

CO_2 - PAG Lubricants

Carbon dioxide (R744) is the natural refrigerant identified as the future ozone-friendly technology. In the last years, the sector has recorded impressive technological development in CO_2-based systems for commercial and industrial applications, especially as far as it concerns CO_2 refrigeration and heat pumps. CO_2 – PAG lubricants are composed of innovative double-end-capped polyalkylene glycols specially designed to operate under high pressure and high-temperature conditions typical of CO_2.

They provide highly efficient lubrication for CO_2 compressors and optimised miscibility with the refrigerant to ensure wear protection even at the highest levels of CO_2 dilution, where alternative lubricants such as PAO or ABZ can reveal hydrodynamic lubrication loss.

Errecom's CO_2 - PAGs are OEM-approved for commercial and industrial refrigeration systems working with CO_2 and are available in different viscosities (between ISO 46-100).

CO_2 – PAGs are characterised by:

- double-end-capped technology with optimised miscibility with CO_2: it maximises the oil return to the compressor to ensure full system efficiency, without loss of hydrodynamic or lubrication properties;
- excellent lubricating properties even under extreme pressure and high-temperature conditions;
- high-performance additives: they ensure excellent thermal, chemical and hydrolytic stability, and reduce downtime and maintenance costs;
- low hygroscopicity: it ensures lower water absorption than alternative R744 technologies (POE, PAO, Alkylbenzenes);
- compatibility with metal and plastic components: it ensures optimised system's stability and durability;
- high viscosity index and low pour point: they guarantee the full efficiency of the system and excellent lubricating properties even under extreme pressure.

Physical Quantity Measured (Unit of Measurement)	Analytical Reference Method	CO_2 - PAG 46	CO_2 - PAG 68	CO_2 - PAG 100
ISO VG	-	46	68	100
Kinematic Viscosity @ 40°C (cSt)	ASTM-D445	49,7	70	107,3
Kinematic Viscosity @ 100°C (cSt)	ASTM-D445	10,7	14	20
Viscosity Index	ASTM-D2270	213	210	216
Pour Point (°C)	ASTM-D97	-49	-46	-43
Flash Point (°C)	ASTM-D93	> 200	> 200	> 200
Density @ 15°C (g/cm³)	ASTM-D1298	0,998	0,998	0,999
Moisture Level (ppm)	ASTM-D6304	300	300	500
Total Acid (mg KOH/g)	ASTM-D974	0,02	0,02	0,1

CO_2 - POE 32

Art.-Nr.	Qty.	€				Packaging
OL6079.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6079.M.P2	500 mL	-	12	972	1080	
OL6079.K.P2	1 L	-	12	756	756	
OL6079.UP.P2	1 Gal	-	02	196	196	
OL6079.I.P2	4 L	-	02	196	196	
OL6079.P.P2	5 L	-	02	140	140	
OL6079.K.01	1 L	-	12	672	672	Metal Tank
OL6079.P.01	5 L	-	02	152	152	
OL6079.UV	5 Gal	-	01	-	-	
OL6079.V	20 L	-	01	24	24	
OL6079.T	25 L	-	01	24	24	
OL6079.B	200 L	-	01	04	04	
OL6079.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - POE 55

Art.-Nr.	Qty.	€				Packaging
OL6062.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6062.M.P2	500 mL	-	12	972	1080	
OL6062.K.P2	1 L	-	12	756	756	
OL6062.UP.P2	1 Gal	-	02	196	196	
OL6062.I.P2	4 L	-	02	196	196	
OL6062.P.P2	5 L	-	02	140	140	
OL6062.K.01	1 L	-	12	672	672	Metal Tank
OL6062.P.01	5 L	-	02	152	152	
OL6062.UV	5 Gal	-	01	-	-	
OL6062.V	20 L	-	01	24	24	
OL6062.T	25 L	-	01	24	24	
OL6062.B	200 L	-	01	04	04	
OL6062.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - POE 68

Art.-Nr.	Qty.	€				Packaging
OL6083.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6083.M.P2	500 mL	-	12	972	1080	
OL6083.K.P2	1 L	-	12	756	756	
OL6083.UP.P2	1 Gal	-	02	196	196	
OL6083.I.P2	4 L	-	02	196	196	
OL6083.P.P2	5 L	-	02	140	140	
OL6083.K.01	1 L	-	12	672	672	Metal Tank
OL6083.P.01	5 L	-	02	152	152	
OL6083.UV	5 Gal	-	01	-	-	
OL6083.V	20 L	-	01	24	24	
OL6083.T	25 L	-	01	24	24	
OL6083.B	200 L	-	01	04	04	
OL6083.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - POE 85

Art.-Nr.	Qty.	€				Packaging
OL6063.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6063.M.P2	500 mL	-	12	972	1080	
OL6063.K.P2	1 L	-	12	756	756	
OL6063.UP.P2	1 Gal	-	02	196	196	
OL6063.I.P2	4 L	-	02	196	196	
OL6063.P.P2	5 L	-	02	140	140	
OL6063.K.01	1 L	-	12	672	672	Metal Tank
OL6063.P.01	5 L	-	02	152	152	
OL6063.UV	5 Gal	-	01	-	-	
OL6063.V	20 L	-	01	24	24	
OL6063.T	25 L	-	01	24	24	
OL6063.B	200 L	-	01	04	04	
OL6063.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - PAG 46

Art.-Nr.	Qty.	€				Packaging
OL6036.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6036.M.P2	500 mL	-	12	972	1080	
OL6036.K.P2	1 L	-	12	756	756	
OL6036.UP.P2	1 Gal	-	02	196	196	
OL6036.I.P2	4 L	-	02	196	196	
OL6036.P.P2	5 L	-	02	140	140	
OL6036.K.01	1 L	-	12	672	672	Metal Tank
OL6036.P.01	5 L	-	02	152	152	
OL6036.UV	5 Gal	-	01	-	-	
OL6036.V	20 L	-	01	24	24	
OL6036.T	25 L	-	01	24	24	
OL6036.B	200 L	-	01	04	04	
OL6036.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - POE 100

Art.-Nr.	Qty.	€				Packaging
OL6084.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6084.M.P2	500 mL	-	12	972	1080	
OL6084.K.P2	1 L	-	12	756	756	
OL6084.UP.P2	1 Gal	-	02	196	196	
OL6084.I.P2	4 L	-	02	196	196	
OL6084.P.P2	5 L	-	02	140	140	
OL6084.K.01	1 L	-	12	672	672	Metal Tank
OL6084.P.01	5 L	-	02	152	152	
OL6084.UV	5 Gal	-	01	-	-	
OL6084.V	20 L	-	01	24	24	
OL6084.T	25 L	-	01	24	24	
OL6084.B	200 L	-	01	04	04	
OL6084.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - PAG 68

Art.-Nr.	Qty.	€				Packaging
OL6037.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6037.M.P2	500 mL	-	12	972	1080	
OL6037.K.P2	1 L	-	12	756	756	
OL6037.UP.P2	1 Gal	-	02	196	196	
OL6037.I.P2	4 L	-	02	196	196	
OL6037.P.P2	5 L	-	02	140	140	
OL6037.K.01	1 L	-	12	672	672	Metal Tank
OL6037.P.01	5 L	-	02	152	152	
OL6037.UV	5 Gal	-	01	-	-	
OL6037.V	20 L	-	01	24	24	
OL6037.T	25 L	-	01	24	24	
OL6037.B	200 L	-	01	04	04	
OL6037.IBC	1000 L	-	01	-	-	IBC Cube

CO_2 - PAG 100

Art.-Nr.	Qty.	€				Packaging
OL6078.Q.P2	250 mL	-	24	2592	2592	Plastic Tank
OL6078.M.P2	500 mL	-	12	972	1080	
OL6078.K.P2	1 L	-	12	756	756	
OL6078.UP.P2	1 Gal	-	02	196	196	
OL6078.I.P2	4 L	-	02	196	196	
OL6078.P.P2	5 L	-	02	140	140	
OL6078.K.01	1 L	-	12	672	672	Metal Tank
OL6078.P.01	5 L	-	02	152	152	
OL6078.UV	5 Gal	-	01	-	-	
OL6078.V	20 L	-	01	24	24	
OL6078.T	25 L	-	01	24	24	
OL6078.B	200 L	-	01	04	04	
OL6078.IBC	1000 L	-	01	-	-	IBC Cube