

Solkane[®] 22 M / Solkane[®] 22 L

R 22 Drop-In Products



Solvay
Fluor



Product Description

As of 01.01.2010 the use of virgin R 22 as refrigerant is banned in the European Union due to EU legislation 2037/2000.

Solvay Fluor now offers a family of carefully selected Solkane® refrigerants that provide for easy and cost-efficient ways to comply with this regulation until the end of your systems lifetime.

The product family contains one specific “ODP 0” HFC solution for each application field.

Solkane® 22 M is the product of choice for airconditioning systems operating at evaporation temperatures above 0 °C.

Solkane® 22 L is designed for medium and low temperature applications as they are found in supermarket or commercial refrigeration systems.

Applications

Solkane® 22 M

Solkane® 22 M is a “Drop-in” solution for easy replacement of R 22 in existing a/c systems. The product is applicable for residential and commercial direct expansion units and is extensively tested. The product is compatible with practically all commonly used lubricants such as mineral oils, alkylbenzene oils and polyolester oils.

Solkane® 22 L

Solkane® 22 L is a “Drop-in” solution for easy replacement of R 22 in existing refrigeration systems. The product can be used in both medium and low temperature applications. Tests have shown that Solkane® 22 L outperforms other available alternatives and R 22 with respect to capacity especially at high condensation temperatures or heavy duty operating conditions. It also delivers very favourable efficiencies. Suitable evaporation temperatures range from – 30 °C to above zero. Solkane® 22 L is a very versatile product and it is compatible with practically all commonly used lubricants such as mineral oils, alkylbenzene oils and polyolester oils. Typical applications are supermarket display cases, small cold stores, ice machines, etc.

Physical Properties

	Unit	Solkane® 22 M	Solkane® 22 L
Chemical Formula		CHF ₂ CF ₃ /CH ₂ FCF ₃ /C ₄ H ₁₀	CHF ₂ CF ₃ /CH ₂ FCF ₃ /C ₄ H ₁₀
Molecular Weight	[kg/kmol]	106.8	113.1
Boiling Point at 1.01325 bar	[°C]	–39.1	–44.9
Critical Temperature	[°C]	87.1	75.2
Critical Pressure	[bar]	40.4	38.3
Critical Density	[kg/m ³]	520.6	542.9
Critical Volume	[m ³ /kg]	1.92 E-03	1.84 E-03
Density Liquid ¹⁾	[kg/m ³]	1151.8	1154.3
Density Vapor ¹⁾	[kg/m ³]	47.6	67.7
Heat of Vaporisation ¹⁾	[kJ/kg]	149.0	125.3
Specific Heat Capacity Liquid ¹⁾	[kJ/(kg*K)]	1.457	1.449
Specific Heat Capacity Vapor ¹⁾	[kJ/(kg*K)]	1.062	1.174

¹⁾ saturated, t = 25 °C

Packaging

Loan steel container
(approx. 800 kg)



ISO-tank container
(approx. 16,900 kg)



Returnable steel cylinders: upon request

General Advice on System Conversion from R 22 to Solkane® 22 M/L

Solkane® 22 M/L are designed for an easy replacement of R 22. They combine compatibility to most R 22 systems with good capacity and efficiency characteristics.

Nevertheless some changes on the system itself could be necessary. Following system modifications are recommended when using Solkane® 22 M/L:

- Replacement the filter dryer (introduce an HFC model e.g. for R 404A)
- Replace the gaskets which were in contact with R 22 e.g. o-rings, solenoid valves etc.
- Adjust the expansion device
- Check if system components are able to accommodate the slightly higher system pressure of Solkane® 22 L (see wet vapour table)
- Labeling of the converted system acc. EU842/2006

Oil Management

Solkane® 22 M/L is compatible with most of the standard oils used in the existing R 22 systems. The correct choice of oil is always a matter of further influencing factors e.g. compressor type, system design, compatibility vs. non metallic components and oil return capability. R 22 systems with a difficult oil return behaviour e.g. flooded evaporators or widely branched systems should be converted to a suitable polyolester oil during the conversion to Solkane® 22 M/L.

Compatibility to Elastomers and Plastics

R 22 has different solvent characteristics than Solkane® 22 M/L which might be critical to the non metal components. Furthermore the tightness of the system is often related to the age of the gaskets and sealings. The simple decompression of the R 22 containing gasket materials can already lead to a destruction of the gasket itself. Therefore a replacement of elastomer gaskets e.g. in solenoid valves, o-rings etc. is recommended. An exchange of all critical gaskets and sealings is mandatory.

Compatibility elastomers vs. Solkane® 22 M/L

	Neoprene	HNBR	NBR	EPDM
Polyolester oil	+	o	+	+
Mineral oil	+	–	+	–

Compatibility plastics vs. Solkane® 22 M/L

	Polyester	Nylon	Epoxy
Polyolester oil	o	+	+
Mineral oil	o	+	+

Compatibility criteria: + good / o moderate / – poor

Performance Characteristics of R 22 vs. Solkane® 22 L

Theoretical capacity comparisons (To: –30°C) suggest that Solkane® 22 L delivers ca. 20% lower refrigeration capacity than R 22. Practical measurements however show that actual delivered capacity is equal to that of R 22 – sometimes even superior. For condensation temperatures of 45 °C and higher practical measurements show slightly higher capacities and efficiencies of Solkane® 22 L vs. R 22. Solkane® 22 L also outperforms other R 22 drop-in products with respect to capacity and efficiency. Contact our technical specialists for detailed comparisons.

Performance Characteristics of R 22 vs. Solkane® 22 M

While the trend observed with Solkane® 22 L is also true for Solkane® 22 M (the actual performance is better than thermodynamic cycle calculations), the effective capacity and efficiency for Solkane® 22 M will be lower than that for R 22. Typical deltas range between 15 and 20%. It can be observed though that the majority of installed units have excess capacity in this order of magnitude. A clear advantage is that Solkane® 22 M will reduce the compressor discharge temperature vs. R 22. Contact our technical specialists for detailed comparisons.

