

ISCEON 49 (R 413 A)

Drop-In Replacement for R12, ODP Zero
Compatible with traditional lubricants



ISCEON[®] 49

A zero ODP drop-in replacement for R12, usable with existing oils

Although the production of CFCs has been halted on a global basis following International Legislation, there is still an economic need in the service sector to continue using existing R12 equipment until the end of its working life. ISCEON[®] 49* is a unique replacement for R12 since its properties include zero ozone depletion, low global warming and compatibility of existing oils. The latter property is of particular advantage with hermetic systems or where problems arise from the inconvenience and cost of multiple oil flushes necessary when changing over to other new refrigerants.

No engineering changes

Only minor adjustments may be necessary during change-over. The most common adjustment is to increase the superheat setting of the thermal expansion valve to allow for the temperature glide, and to achieve optimum performance. Where capillary devices are used, no modification is necessary to use ISCEON[®] 49. Any drier suitable for R134a can be used.

Easy handling and servicing

ISCEON[®] 49 is a zeotropic three component blend which we recommend be transferred from the liquid phase during charging. The procedure is simple and closely parallels that for

conventional refrigerants as indicated in figure 1. The only occasion when vapour filling can be used is when the total cylinder contents are charged into the system. ISCEON[®] 49 is formulated for DX systems and is not recommended for use with flooded evaporators or centrifugal units where equipment modifications would be required.

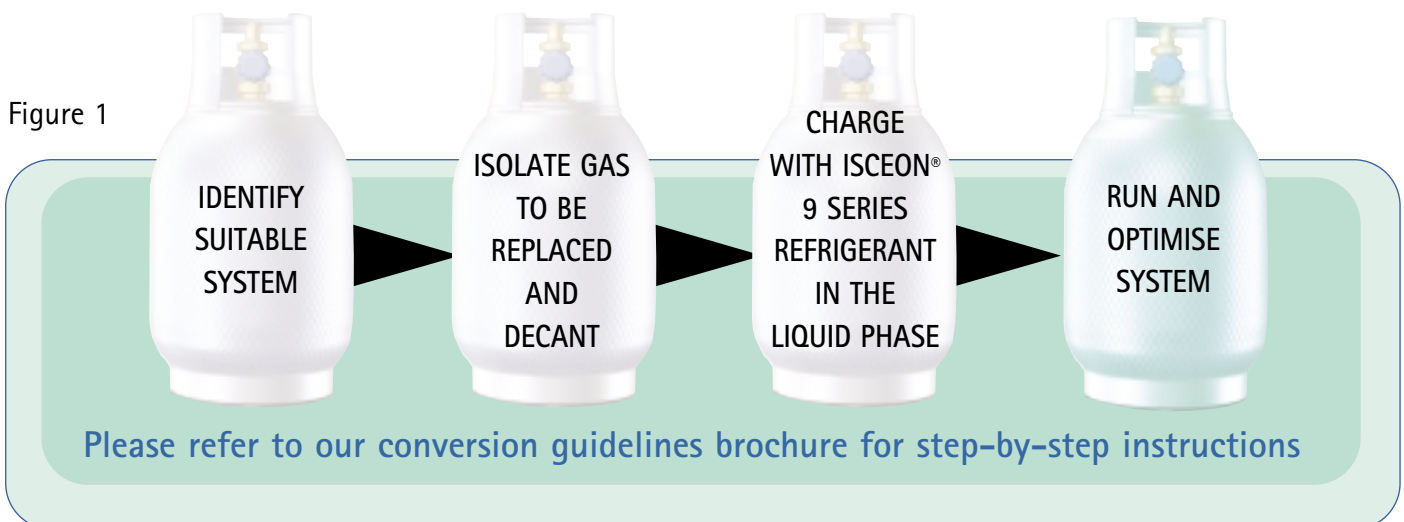
The total refrigerant charge is 10% less by weight than R12. Millions of conversions have been carried out successfully since the product was launched in 1993. No problems have been encountered with the zeotropic nature of ISCEON[®] 49. This is consistent with general experience accruing from use of this type of mixture, which shows that composition change in the event of leakage does not present a significant difficulty. In any operational leak scenario the system may be topped up with ISCEON[®] 49 without significant affect on performance.

Safety

ISCEON[®] 49 has been independently tested and found to be non-flammable as formulated. Flammability testing by ASHRAE has resulted in an A1/A2 classification. The formulation comprises well established materials and has a toxicity profile similar to R134a. Health and Safety data are readily available upon request.

In the event of a gross leak into an enclosed area, such as a compressor room, ISCEON[®] 49 acts as other HFC refrigerants, which have a tendency to collect in low lying areas. Therefore precautions need to be taken to avoid inhalation before entry.

Conversion principles for the ISCEON[®] 9 SERIES



Performance

Comparative trials have shown that both the capacity and efficiency of ISCEON® 49 are similar to R12 under most conditions of use. These parameters are compared in figures 3 and 4.

Applications

ISCEON® 49 has been operating since 1993 in various applications such as refrigerated mobile containers, car air-conditioning, chilled cold stores, display cabinets and domestic refrigerators. All reports are satisfactory, and confirm a similar performance to R12.

Figure 2

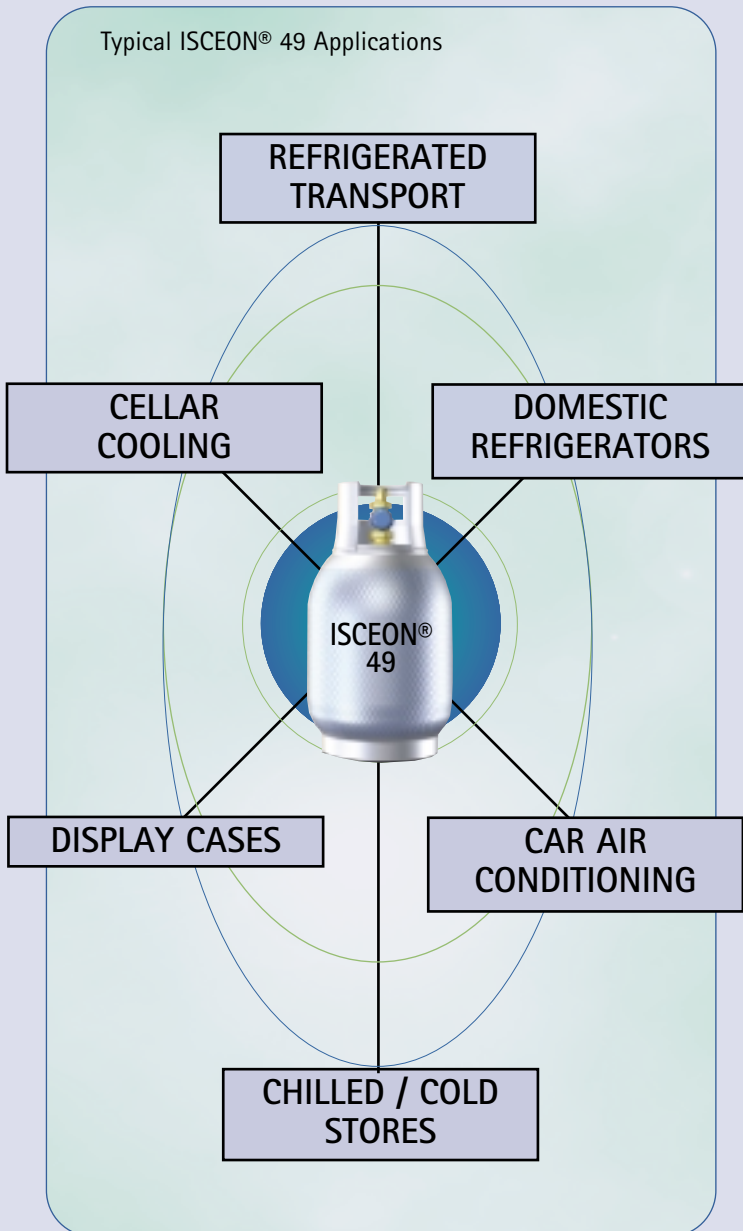


Figure 3

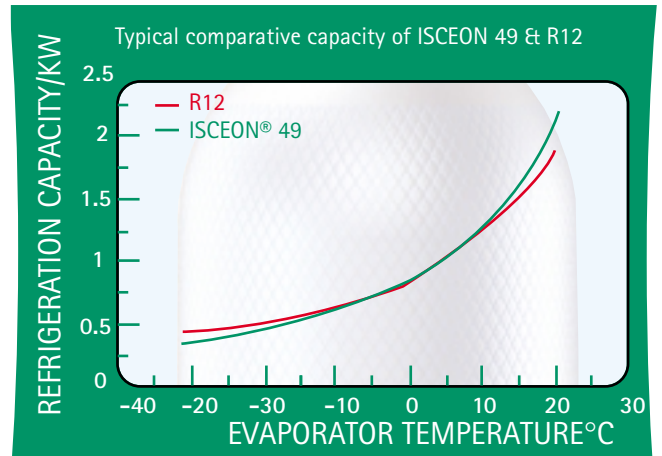
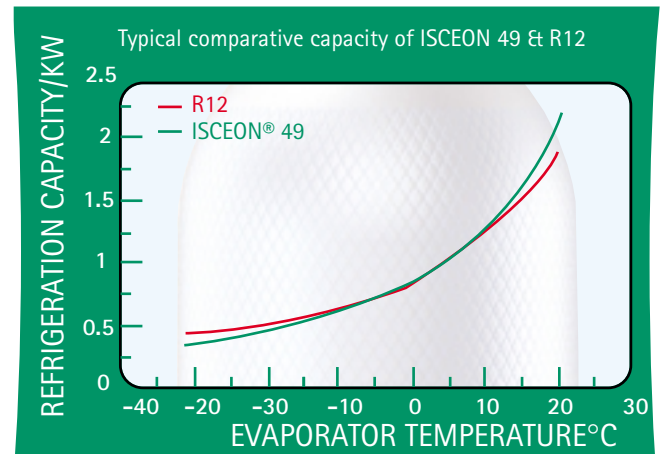


Figure 4



ISCEON® 9 SERIES
Effective, pure, simple

ISCEON® 49

ASHRAE No. R413A

PHYSICAL PROPERTIES

Table of properties comparing ISCEON® 49 with R12 and 134a

PHYSICAL PROPERTY	ISCEON® 49	R12	ISCEON® 134a	PHYSICAL PROPERTY	ISCEON® 49	R12	ISCEON® 134a		
COMPOSITION	Zeotropic blend of R134a, R218 & R600a	CCl ₂ F ₂	C ₂ H ₂ F ₄	SPECIFIC HEAT, VAPOUR AT CONSTANT PRESSURE AT 25°C	J.mol ⁻¹ .K	98.8	74.98	104.6	
MOLECULAR WEIGHT	103.96	120.93	102.04	RATIO OF SPECIFIC HEATS AT 1ATMS. AT 25°C	(Cp/Cv)	1.112	1.137	1.119	
BUBBLE POINT AT 1ATMS.	°C	-35.0	-29.79	HEAT OF VAPORISATION AT B.P.T.	KJ.Kg ⁻¹	211.6	165.1	216.4	
DEW POINT AT 1ATMS.	°C	-28.1	Not applicable	THERMAL CONDUCTIVITY LIQUID AT 25°C	W/m°C	0.052	0.041	0.048	
VAPOUR PRESSURE AT 25°C	psia	113.8	94.5	95.42	VISCOSITY VAPOUR AT 1 ATMS. AT 25°C	cP	0.012	0.013	0.012
	Bara	7.85	6.57	6.63	VISCOSITY, LIQUID AT 25°C	cP	0.23	0.26	0.20
CRITICAL TEMPERATURE	°C	101.3	112	101.2	SURFACE TENSION AT 25°C	dyn.cm ⁻¹	10.9	11	8
	K	374.5	385	374.2	SOLUBILITY OF WATER IN REFRIGERANT AT 25°C	wt.%	0.12	0.009	0.12
CRITICAL PRESSURE	psia	596.1	596.7	589.3	OZONE DEPLETION POTENTIAL (RELATIVE TO CFC11=1.0)		0	1.0	0
	Bara	41.1	41.15	40.64	HGWP (RELATIVE TO CFC11=1.0)		0.44	2.13	0.33
DENSITY OF LIQUID AT 25°C	Kg.m ⁻³	1188	1311	1206	FLAMMABLE		NO	NO	NO
DENSITY, SATURATED VAPOUR AT B.P.T.	Kg.m ⁻³	3.9	6.3	5.2					
SPECIFIC HEAT, LIQUID AT 25°C	J.mol ⁻¹ .K	158.0	121.4	145.8					

COMMERCIAL

Quality

The ISCEON® business of Rhodia Ltd gained ISO9002 accreditation in 1992. Rhodia Product Specification reference QCS50 applies.

Available in:

Bulk Iso tanks, nominal 1000 kg. returnable drums, 61 kg. returnable cylinders, 12.5 kg. returnable cylinders, 1kg. can, 12.5 kg. non-returnable cylinders.

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