




# FORANE<sup>®</sup> 407A

- **Reduced GWP refrigerant designed for the replacement of R-404A and R-507A in medium and low temperature refrigeration applications (retrofit and new installations).**

## MAIN PROPERTIES

<b>Composition</b>	R-134a (40%) 	R-125 (40%) 	R-32 (20%) 
<b>Type</b>	HFC Zeotropic blend		
<b>ASHRAE safety classification</b>	A1 - non-toxic and non-flammable		
<b>GWP*</b>	2107		
<b>Recommended lubricant</b>	POE		

\* GWP value for 100-year time horizons according to IPCC 2007 Fourth Assessment Report

## MAIN APPLICATIONS

Forane<sup>®</sup> 407A is a low-GWP refrigerant designed for the **replacement of R-404A and R-507A (retrofit and new equipments)** in medium and low temperature refrigeration. Common applications include supermarket refrigeration (food display, storage cases...), refrigerated transports (trucks, containers...), food processing...

## PERFORMANCES

- Reduced carbon footprint: GWP nearly 50% lower than R-404A and R-507.
- High energy savings: improved energy efficiency for low and medium evaporation temperatures particularly for high ambient temperatures.
- Similar cooling capacity to R-404A and R-507.
- Lower discharge temperature compared to competitive products, allowing a wider range of applications without liquid injection.

## RETROFIT

Forane<sup>®</sup> 407A can be a retrofit solution for R-404A or R-507 installations:

- No change required in the type of oil.
- In many cases the original expansion device may be used with Forane<sup>®</sup> 407A (adjustments required). For some systems, a change of the expansion device may be needed.
- For low temperatures applications, liquid injection may be recommended to maintain the discharge temperature at an acceptable level: check compressor manufacturer specifications.

System design, operating conditions and ambient temperatures can impact retrofit results. Always consult the OEM for recommendations before performing any system retrofit.

## LUBRICATION

Forane<sup>®</sup> 407A requires polyolester (POE) lubricant to ensure reliable oil return and circulation throughout the system. In many cases the original system oil can be reused.

## CHARGING

Due to the zeotropic nature of Forane<sup>®</sup> 407A, it should be charged as a liquid to prevent fractionation. For installations where vapor is normally fed into the low side of a running system, a flash valve should be installed in the charging line to prevent liquid from entering the compressor.

## DELIVERIES

Forane<sup>®</sup> 407A can be delivered in various packaging:

- **bulk:** ISO container (18 Tons) or ton-tank (850 kg).
- **other packaging available under requests.**

# FORANE®407A

## THERMODYNAMIC PROPERTIES

This information is based on values calculated using the NIST REFPROP Database (NIST Standard Reference Database 23, Version 9.0, Lemmon, E. W., Huber, M. L., and McLinden, M. O., Thermophysical Properties Division, 2010).

**Critical temperature: 82°C**

Saturation points (bubble and dew points at same composition).

Temperature (°C)	Liquid Phase Pressure (bar)	Vapor Phase Pressure (bar)	Liquid Phase Density (kg/m <sup>3</sup> )	Vapor Phase Density (kg/m <sup>3</sup> )	Liquid Phase Enthalpy (kJ/kg)	Vapor Phase Enthalpy (kJ/kg)	Liquid Phase Entropy (kJ/(kg.K))	Vapor Phase Entropy (kJ/(kg.K))
-40	1,3	0,9	1387	5	146	375	0,79	1,78
-35	1,6	1,2	1371	6	153	378	0,82	1,77
-30	2,0	1,5	1355	7	159	380	0,84	1,77
-25	2,4	1,9	1338	9	166	383	0,87	1,76
-20	3,0	2,3	1321	11	173	386	0,90	1,75
-15	3,6	2,9	1304	13	179	389	0,92	1,74
-10	4,3	3,5	1286	16	186	391	0,95	1,74
-5	5,1	4,2	1268	19	193	394	0,97	1,73
0	6,0	5,0	1249	22	200	396	1,00	1,73
5	7,0	5,9	1230	27	207	398	1,03	1,72
10	8,2	6,9	1210	31	214	401	1,05	1,72
15	9,5	8,1	1189	37	221	403	1,08	1,71
20	10,9	9,5	1168	43	229	405	1,10	1,71
25	12,5	10,9	1145	50	236	407	1,12	1,70
30	14,3	12,6	1122	58	244	408	1,15	1,70
35	16,2	14,4	1097	67	252	409	1,17	1,69
40	18,4	16,5	1071	78	260	411	1,20	1,69
45	20,7	18,7	1043	90	268	411	1,23	1,68
50	23,2	21,2	1013	104	276	412	1,25	1,67
55	26,0	23,9	980	121	285	412	1,28	1,67
60	29,0	26,9	943	142	294	411	1,30	1,66
65	32,3	30,2	901	167	304	410	1,33	1,65

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See MSDS for Health & Safety Considerations