

# R-404A/R-507A TO FORANE® 407A RETROFIT GUIDELINES

Retrofit procedure that may be given by some original manufacturer (OEMs) must be followed as priority. The following guidelines are given as an indication only.

## BEFORE THE RETROFIT OF THE SYSTEM:

- Make sure that the system is operating properly, repair if necessary.
- Check for leaks, repair if necessary.
- Check that the elastomeric seals, gaskets and valves are in good shape, replace if necessary.
- Record current operating data with R-404A or R-507A, this will provide a performance baseline.
- Check with compressor manufacturer regarding discharge temperatures.

## RETROFIT GUIDELINES:

1. Fully recover the entire R-404A or R-507A charge from the system using appropriate recovery cylinders. DO NOT VENT TO ATMOSPHERE. Arkema does not recommend mixing Forane® 407A and R-404A or R-507A. Weigh the amount of refrigerant removed.
2. Lubricants used with R-404A or R-507A can usually be used with Forane® 407A. Check oil suitability with the compressor manufacturer.
3. Analyze the lubricant (humidity, acidity, particles): this will give an indication of the system state. If the analysis is wrong, an oil replacement might be necessary.
4. Since Forane® 407A has a lower mass flow than R-404A and R-507A, piping sizing and expansion valve suitability must be checked.
5. Replace the filter drier.
6. Refill the system with Forane® 407A. The refrigerant must be charged in liquid phase. Arkema recommends to initially charge the same amount as R-404A or R-507A and then adjust if necessary. Usual charge is 5 to 7% higher with Forane® 407A than R-404A or R-507A. As Forane® 407A is a zeotropic blend, bubbles may appear at the compressor sight glass but this is not significant of undercharge.
7. Restart the installation. Record the new operating conditions and compare them with the baseline data obtained with R-404A or R-507A. Please note that discharge pressures are lower with Forane® 407A than R-404A or R-507A. Pressure cutouts resetting might be necessary (see equipments manufacturers' recommendations).
8. Adjust expansion valve and charge if necessary.
9. Label the system to indicate that it is now running with Forane® 407A.

# 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