

Oil Coolers No Longer Required



Special points of interest:

06T compressors keep their cool **without** oil coolers in most applications!

Carlyle Compressor is announcing that after extensive testing, it is eliminating the requirement for oil cooling in most applications with our 06T screw compressors. In 1997, Carlyle announced that oil coolers were not required for medium temperature R-404A & R-507 applications. We are now allowing the operation of our 06T screw compressors without oil coolers in Low Temperature R-404A/507 and Medium, High, and Low Temperature R-22 applications.

This decision is based on extensive bearing life testing and evaluation and positive experience with other high-speed compressor models that Carlyle has produced over the past several years. Please reference the chart below to determine whether or not your application will require an oil cooler.

Allowable Application Range Without Oil Coolers

<u>Application:</u>	<u>saturated Suction:</u>	<u>Saturated Condensing:</u>	<u>Recommended Oils:</u>
R-404A/507 Low Temp.	-40 F to 0 F	70 F to 120 F	POE 100
R-404A/507 Medium Temp.	0 F to 50 F	70 F to 130 F	POE 100
R-134a Medium & High Temp.	-10 F to 50 F	70 F to 150 F	POE 100
R-22 Low Temp.	-25 F to 0 F	70 F to 120 F	POE 170*
R-22 Low Temp.	-30 F to -26 F	70 F to 110 F	POE 170*
R-22 Medium & High Temp.	0 F to 50 F	70 F to 130 F	POE 170*

* If oil cooler used, oil can revert to the POE 100 recommended in our current Application Manual dated 10/97.

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When an oil cooler is not required, it also eliminates the need for any oil mixing components to keep the oil within a designated temperature range when the oil is being returned from an air cooled oil cooler during low ambient periods.

This change in oil cooler requirements does not change our lubricant recommendations for R-404A/507. We will continue to recommend the same POE-100 lubricants shown in our latest Application Manual. For R-22 applications we are changing our lubricant recommendation to POE-170. We recommend the use of CPI Solest 170 lubricant for all R-22 low, medium and high temperature applications where an oil cooler is not used. When an oil cooler is used with R-22, the recommendation of POE100 shown in our latest Application Manual still applies.

The elimination of the oil cooler does impact the system's condenser selection. Since the oil cooler did remove heat from the compressor, this additional heat

will be transferred to the compressor's heat of rejection or condenser load. Our current Windows@ based compressor selection software (versions 1.3 & 1.4) computes the oil cooler load for 05T/06T selections. When the oil cooler is eliminated we require adding this load to the Total Condenser HR. An updated version is now being completed that will incorporate this change.

The elimination of the oil coolers results in little or no performance change on higher displacement models. The slower rotor speeds on the smaller CFM models though results in a discernable capacity loss that may require consideration. The following capacity factors should be used against the performance data supplied in the current versions of our Compressor Selection Programs, Windows@ Version 1.3 & 1.4. An updated version that reflects the new adjusted performance data should be completed in August 1998.

Capacity Adjustment & Without Oil Cooler

Compressor Model	HP	R-22 Capacity Adjustments		R-404A/507 Capacity Adjust.		R-134a Capacity Adjust.	
		Low Temp.	Med/High Temp.	Low Temp.	Medium Temp.	Medium Temp.	High Temp.
Low Temp.							
06TRC033	15	0.95	N/A	0.93	N/A	0.97	1.00
06TRD039	20	0.96	N/A	0.94	N/A	0.97	1.00
06TRD044	20	0.97	N/A	0.95	N/A	0.98	1.00
06TRE048	25	0.97	N/A	0.96	N/A	0.98	1.00
06TRE054	25	0.98	N/A	0.97	N/A	0.99	1.00
06TRF065	30	0.99	N/A	0.98	N/A	0.99	1.00
06TRG078	35	0.98	N/A	0.99	N/A	1.00	1.00
06TRH088	40	0.96	N/A	1.00	N/A	1.00	1.00
MedTemp/High Temp							
06TAD033	20	N/A	0.97	N/A	0.97	0.97	1.00
06TAE039	25	N/A	0.97	N/A	0.97	0.97	1.00
06TAF044	30	N/A	0.98	N/A	0.98	0.98	1.00
06TAF048	30	N/A	0.98	N/A	0.98	0.98	1.00
06TAG054	35	N/A	0.99	N/A	0.99	0.99	1.00
06TAG065	35	N/A	0.99	N/A	0.99	0.99	1.00
06TAH078	40	N/A	1.00	N/A	1.00	1.00	1.00
06TAK088	50	N/A	1.00	N/A	1.00	1.00	1.00

Oil Coolers No Longer Rewired

The oil cooler does offer some help in keeping the discharge and motor temperatures within their respective limits. To make up for this lost cooling, some additional refrigerant injection is required. For screw compressors this injection is by the motor cooling valve or at the rotor injection port. Because this refrigerant injection for motor and discharge cooling flows into the screw rotor chamber after the suction gas is trapped, this cooling does not, in most cases, significantly affect the compressor's capacity, if at all. Under some conditions the motor cooling valve can accommodate this extra cooling re-

quirement. For compressors using the current CEM module, we recommend using a **Sporlan Y-1037 desuperheating valve** or its equivalent. It should be selected for a 190°F start cool setting and fully open at a 200°F discharge bulb temperature. The bulb should be located on the discharge line within 6" of the compressor discharge service valve. A properly sized solenoid valve should be located upstream to insure positive shut-off when the compressor is off. Applications where the extra cooling valve is required and valve size information is shown in the chart below:

Desuperheating Valve Sizing Without Oil Cooler

Compressor Model	HP	R-22 Added Desuperheating		R-404A/507 Added Desuperheating		R-134a Added Desuperheating	
		Low Temp.	Med/High Temp.	Low Temp.	Medium Temp.	Medium Temp.	High Temp.
Low Temp.							
SCT Range		70 to 120 F		90 to 120 F		70 to 150 F	70 to 150 F
06TRC033	15	FV-2	N/A	FV-1*	N/A	None	None
06TRD039	20	FV-3	N/A	FV-1-1/2*	N/A	None	None
06TRD044	20	FV-3	N/A	FV-1-1/2*	N/A	None	None
06TRE048	25	FV-3	N/A	FV-2*	N/A	None	None
06TRE054	25	FV-3	N/A	FV-2*	N/A	None	None
06TRF065	30	FV-5	N/A	FV-3*	N/A	None	None
06TRG078	35	FV-5	N/A	FV-3*	N/A	None	None
06TRH088	40	FV-5	N/A	FV-3*	N/A	None	None
Med Temp/High Temp							
SCT Range			70 to 130 F		70 to 130 F		
06TAD033	20	N/A	FV-2**	N/A	None	None	None
06TAE039	25	N/A	FV-3**	N/A	None	None	None
06TAF044	30	N/A	FV-3**	N/A	None	None	None
06TAF048	30	N/A	FV-3**	N/A	None	None	None
06TAG054	35	N/A	FV-3**	N/A	None	None	None
06TAG065	35	N/A	FV-5**	N/A	None	None	None
06TAH078	40	N/A	FV-5**	N/A	None	None	None
06TAK088	50	N/A	FV-5**	N/A	None	None	None

Note: Valve P/N's shown above are for Sporlan Valve Y-1037 series desuperheating valves. A valve with a 190°F temperature setting is required. Alternate desuperheating valve sizing or manufacturers must be approved by Carlyle Application Engineering.

* = Operation with Evap condensers below -25 F SST may not require any additional desuperheating.
Contact Carlyle Application Engineering for limits.

** = Operation with Evap condensers above +10 F SST may not require any additional desuperheating.

Carlyle Compressor is continuing laboratory and field testing to simplify the application of our screw compressors to our customers products.