Nu-Calgon Product Bulletin

A COMPLETE FAMILY OF NAPHTHENIC MINERAL OILS FOR REFRIGERATION AND AIR CONDITIONING COMPRESSORS.

- **Recommended by OEM's for use with CFC's and HCFC's**
- **Approved by OEM's including Copeland, Carlyle, etc.**
- **C-3s is approved replacement for 3GS**

Refrigeration Oil

C-3s, C-4s, C-5s



Description

Nu-Calgon naphthenic mineral oil is available in three grades: C-3s (150 SUS), C-4s (300 SUS) and C-5s (500 SUS). All viscosities are manufactured by Calumet Lubricant Co. and are approved by Copeland, Trane and other compressor manufacturers, approvals varying by viscosity.

They are specifically designed for today's high performance air conditioning and refrigeration compressors. These modern compressors run at higher speeds and generate higher temperatures, and they need better lubrication.

Use of C-3s, C-4s, and C-5s mineral oil will insure continued efficient system operation, providing the important properties required from a good refrigeration oil. Nu-Calgon mineral oils combine excellent solubility and stability with good floc and pour points to provide excellent low temperature performance.

Packaging:	C-3s	C-4s	C-5s
1 gallon bottlle	**4303-07**	**4304-07**	**4305-07**
5 gallon pail	**4303-05**	**4304-05**	
55 gallon drum	**4303-01**	**4304-01**	**4305-01**

Lubrication

The basic purpose of refrigeration oil is to lubricate the moving parts in an air conditioning or refrigeration compressor. The refrigeration oil must function without maintenance or service at higher than usual temperatures for the life of the unit. It must also be miscible with the refrigerant while retaining its lubricant properties.

Nu-Calgon mineral oils are designed to provide years of trouble-free service in refrigeration and air conditioning units. There is no finer mineral refrigeration lubricant on the market today.

Low Temperature Performance

Small amounts of refrigeration oil are carried with the refrigerant through the entire system and are subject to very low temperatures. Poor low temperature solubility or miscibility can cause the oil to separate from the refrigerant and form wax-like deposits which can clog a system. And this is more critical in R-22 and R-502 systems because they have limited miscibility with mineral oil. Therefore, it is important that the mineral oil have good low temperature miscibility.

The "Floc Point Test" is used to determine low temperature performance. The floc point is determined by cooling a mixture of 10% oil and 90% refrigerant in a sealed tube. The mixture is observed at 5° increments for cloudiness due to flocculant formation.

Typical results of this test are:

	Nu-Calgon Mineral Oil		
	C-3s	C-4s	C-5s
Floc Point (degrees F)	-70	-55	-35
Pour Point (degrees F)	-50	-35	-20

Mineral oils from Nu-Calgon combine excellent solubility and miscibility, providing for low floc and cloud points. The above figures represent the lowest temperatures that the respective oils can be taken without the formation of wax (floc).

Stability

Refrigeration oil must have both thermal and chemical stability. Thermal stability simply means resistance to high temperature. Chemical stability refers to the oil's ability to remain chemically stable in the presence of other components in the system at very high temperatures and pressures.

A test for refrigeration oil stability is the "fourteen day sealed tube test." Oil, R-12 and Swedish steel are heated to 327°F in a pressure chamber. After 14 days, the percent of R-22 that has developed from the breakdown of R-12 is measured. The smaller the quantity formed, the better the stability of the oil. Both C-3 and C-4 perform exceedingly well, forming only 0.23% and 0.42%, respectively, after 14 days.

Additional Important Points

Contamination problems are extremely critical in refining and handling refrigeration oils. Great care is used to insure that Nu-Calgon oils are free of moisture and noncondensables such as air. The same degree of care must be used by the service professional to make certain that oil remains clean and dry.

Here are some rules for handling refrigeration oil:

1. Use clean tools – pumps, funnels, tubing, etc. – while working with the oil.
2. Recap the bottle immediately after use. Refrigeration oil in an open bottle will absorb moisture.
3. Keep refrigeration oil in its original container. If you must pour oil into another container, be sure that container is clean and dry.
4. Properly dispose of any oil that you think dirt or moisture has contaminated. Don't risk using it. It is much less expensive to replace a bottle of refrigeration oil than to repair or replace a compressor.

Typical Data

GRADE		**C-3s**	**C-4s**	**C-5s**
Property	**Method***			
Viscosity, SUS/100F	D2161	156	328	525
Viscosity, SUS/210F	D2161	41	48	55.7
Viscosity Index	D2270	18	36	37
Viscosity, cs/100F	D445	33.0	65.8	113.4
Viscosity, cs/210F	D445	4.56	6.67	8.9
Flashpoint °F	D92	370	395	360
Fire Point °F	D92	395	430	390
Pour, F	D97	-50	-35	-20
Floc Point, °F	J-58**	-70	-55	-35
Color	D1500	L1.0	L1.0	2.5
Gravity, API	D287	25.0	25.6	21.5
Pounds per Gallon	D1250	7.53	7.56	7.70
Specific Gravity	D1250	0.904	0.910	0.925
Total Acid No., mgKOH/g	D974	nil	nil	nil
Water, PPM	D1533	<17	<25	<25
Dielectric Strength, KV	D877	>35	>35	>30
Sulfur, %	D129	0.05	0.05	0.05
Conradson Carbon, %	D189	Trace	Trace	0.01
Aniline Point, °F	D611	180	196	182
Refractive Index	D1747	1.4965	1.4992	1.5070
Sealed Tube, % R-22 3 Day	Elsey	0.05	0.10	—
14 Day		0.23	0.42	—

*ASTM unless otherwise specified **Sun Method

Read and understand the product's label and Safety Data Sheet ("SDS") for precautionary and first aid information. The SDS is available on the Nu-Calgon website at www.nucalgon.com or is returnable by U.S. Mail upon request.

Nu-Calgon
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