



**Application Engineering Bulletin
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REFRIGERATION OILS

As a result of the changes taking place in our industry due to the CFC issue, Copeland has evaluated numerous compressor lubricants to ensure compatibility with new HFC refrigerants and HCFC interim blends offered by several chemical producers. In addition to compatibility with these new refrigerants, it is also desirable that any new lubricant be compatible with the traditional refrigerants such as

R-12, R-22 or R-502. However, this has not been achieved in all cases.

The following table summarizes which oils/lubricants are approved for use in Copeland compressors with the various refrigerants:

COPELAND APPROVED LUBRICANTS

| Lubricant Type | | Traditional Refrigerants | | Interims R-401A, R-401B, R-402A, R-408A, R-409A (MP-39, MP-66, HP-80, FX-10, FX-56) | HFC's R-134a, R-404A, R-507 R-407C, R-410A |
|---|--|--------------------------|-------------|---|--|
| | | R-12 | R-22, R-502 | | |
| P O E S | Copeland Ultra 22CC | NOT ACCEPTABLE | A | A | P |
| | Copeland 3MA | | A | A | P (1,3) |
| | Mobil EAL ARCTIC 22CC | | A | A | P |
| | ICI (Virginia KMP) Emkarate RL 32CF | | A | A | P |
| | Thermal Zone 22CC | | A | A | P |
| M I N E R A L O I L S | Witco Suniso 3GS | P | P | PM | NOT ACCEPTABLE |
| | Texaco Capella WF32 | P | P | PM | |
| | Calumet RO15 | P | P | PM | |
| | Witco (2,3) LP-200 | P | P | | |
| | Penreco (2,3) Sontex 200-LT Shritene | P | P | | |
| A B | Copeland Ultra 200 | A | A | PM | NOT ACCEPTABLE |
| | Shreve Zerol 200 TD | A | A | PM | |
| | Soltex AB200A | A | A | PM | |
| | Thermal Zone 200 | A | A | PM | |
| A B M I X | Shell 22-12 | A | A | P | NOT ACCEPTABLE |
| | Witco R-195-0 | A | A | P | |

Legend:

P = Preferred Lubricant Choice
 A= Acceptable Alternative
 M= Mixture of Mineral Oil and Alkyl Benzene (AB) with minimum 50% AB

(1) ZP Scroll A/C applications
 (2) BR, QR and Scroll A/C applications
 (3) Not available in field

Napthenic Mineral Oils

The BR, QR, and Scroll compressors used in HCFC R-22 applications use Witco LP-200 or Sontex 200-LT, both "white oils". Since these oils are not available through normal refrigeration wholesalers, for field "top-off" the use of any approved mineral oil (MO) or alkyl benzene (AB) is permissible.

Suniso 3GS, Capella WF32 and Calumet RO15 (pale yellow oils) are available through refrigeration wholesalers. These oils are compatible if mixed and can be used on both high and low temperature systems.

Polyol Ester Lubricants

Copeland has tested and approved the following polyol ester lubricants for use in our compressors:

Copeland Ultra 22CC

Mobil EAL Arctic 22CC

ICI Emkarate RL 32CF

Thermal Zone 22CC

These lubricants have been specifically formulated to meet our stringent demands and have been found to be equivalent in performance. These POE's **must** be used if HFC refrigerants are used in the system. They are also acceptable for use with any of the traditional refrigerants or interim blends and are compatible with mineral oils. They can therefore be mixed with mineral oils when used in systems with CFC or HCFC refrigerants. These lubricants are compatible with one another and can be mixed.

The ZP scroll compressors used in HFC R-410A applications use a POE oil not available through wholesalers. Any of the POE oils listed above may be used to replace up to 50% of the original oil if necessary.

One caution the users of POE's must be aware of is the hygroscopic nature of these lubricants. Care must be taken to avoid moisture absorption during handling.

Alkyl Benzene's

Copeland Ultra 200, Zerol 200TD, Soltex AB 200A and Thermal Zone 200 are alkyl benzene (AB) lubricants. Copeland recommends these lubricants for use as mixtures with mineral oil (MO) when using the Interim Blends such as R-401A, R-401B, R-402A, R-408A, and R-409A (MP-39, MP-66, HP80, FX-10 and FX-56). A minimum of 50% AB is required with these mixtures to assure proper oil return to the compressor.

Shell 22-12 and Witco R-195-0 are mixtures of AB/MO. If these lubricants are used in a retrofit situation, virtually all of the existing MO must be drained prior to re-filling with these products to assure a minimum 50% AB content.

Additional Literature

Additional information regarding HFC's and retrofits can be obtained from the following Copeland literature:

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|--------------------|---|
| AE Bulletin 4-1295 | HFC 134a Refrigerant Guidelines |
| Form 93-11 | Copeland Accepted Refrigerants/Lubricants |
| Form 93-02 | R-12 to R-401A Refrigerant Changeover Guidelines |
| Form 93-03 | R-12 to R-401B Refrigerant Changeover Guidelines |
| Form 93-04 | R-12 to R-134a Refrigerant Changeover Guidelines |
| Form 93-05 | R-502 to R-402A or R-408A Refrigerant Changeover Guidelines |
| Form 94-15 | R-502 to R-404A or R-507 Refrigerant Changeover Guidelines |
| Form 95-14 | R-22 to R-407C Refrigerant Changeover Guidelines |