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Oil Analysis of GM Genuine Parts compressor oil  
(Universal oil VG46)

Apollo America Corporation

DETROIT OFFICE  
2000 TOWN CTR • SUITE 1450 • SOUTHFIELD, MICHIGAN 48075-1253 • PHONE: (248)355-0666 • FAX: (248)355-9337  
E-MAIL: [dtrsales@apolloamerica.com](mailto:dtrsales@apolloamerica.com)



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### 1. Purpose

The evaluation has been done to check the performance of the mixture between GM parts oil and Refrigerant Activator agent which provided by Arctic Distributors.

Miscibility, Compatibility and Lubricity test had been conducted with mixture of lubricant and Refrigerant Activator agent (for HFC).

### 2. Result

(1) Table. 1 shows the miscibility data of new oil and 10% mixture of Refrigerant Activator agent (for HFC). The miscibility with R134a of mixture oil shows no significant difference from that of pure oil, indicate that Refrigerant Activator (HFC) does not effect to the miscibility of compressor oil.

(2) Table. 2 show the chemical stability test result of pure compressor oil and mixture oil under the condition of R134a atmosphere. After 14 days aging at 175 degree C, mixture oil show clear appearance, but light yellow color, and no sedimentation found. Also there are no significant changes on every metal surface appearance. The TAV (Total Acid Number) after SGT of mixture was slightly higher than new oil, but we believe it will be acceptable range for practical use.

Other tests such as compatibility with organic materials used in individual automotive A/C were not conducted in this evaluation, and have to be done by A/C manufacturer for practical use.

(3) Table. 3 show the lubricity data of pure compressor oil and mixture in R134a atmosphere.

The lubricity of mixture oil shows slightly lower Falex (Fe/Fe) value than that of pure oil. We believe that it will be acceptable range for practical use, but it should be necessary that the further evaluation with actual compressor parts or driving test for individual compressor design have to be done by compressor manufacture for practical use.

### 2. Sample

- (1) Refrigerant : R134a
- (2) Lubricant : R134a Air compressor oil (GM Universal Air conditioning oil VG46)
- (3) Additive agent: Arctic Blast Refrigerant Activator ( for HFC)

### 3. Result

(1) Table.1 Miscibility

Sample	A/C oil VG46	10% Refrigerant Activator
Two Phase ,Sep. Temp		
(Upper) 3% oil in R134a, °C	76	79
7% oil in R134a, °C	71	72
(Lower)All concentration, °C	less than -40	less than -40

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### (2) Chemical Stability

Method: Sealed Glass Tube

Condition: Temperature 175°C X 14 days, R134A/Sample=1g/4cc

Catalyses: Fe, Cu, Al, 300ppm water

Table 2: Sealed Tube Test result

Sample	A/C oil VG46, N=3	10% Refrigerant Activator, N=3
Sample appearance	Clear Slightly light yellow	Clear Light yellow
Metal Catalyses	Fe: good, Cu: good, Al: good	Fe: good, Cu: good, Al: good
TAV (Total Acid No.)	AVE. 0.07 mgKOH/g	AVE. 0.11 mgKOH/g

### (3) Lubricity

Method: Falex (Fe/Fe), Seizure load test

Test driving: 200lb X 1 min X 290 rpm, R.T.

Table 3: Lubricity

Sample	A/C oil VG46, N=3	10% Refrigerant Activator, N=3
Seizure load	980	970



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