



TEST REPORT

INTERTEK TESTING SERVICES NA, INC.

1717 Arlingate Lane Columbus, OH, 43228

PROJECT NO.: G101495086

ISSUE DATE: January 23, 2014

REPORT NO. 101495086COL-001

RENDERED TO

Client: FrigiTech International
Contact: Mr. Alan Kuehler
Phone: (713) 896-6889

GENERAL: This interim report gives the results of the evaluation of FrigiTech International #9667 blend with R-134a, per SAE J2670 Issue: 2011/02/01 Stability and Compatibility Criteria for Additive and Flushing Materials Intended for Aftermarket Use in R-134a (HFC-134A) and R-1234yf (HFO-1234yf) Vehicle Air-Conditioning Systems. This investigation was authorized by Mr. Alan Kuehler using signed quote Q500485307. The testing began on 1/10/2014 and was completed on 1/21/2014. A sample in good condition was provided by FrigiTech International and was received on December 9th, 2013. The sample was assigned the unique identification number COL1312101554-002 and tested at Intertek's facility at 1717 Arlingate Lane, Columbus, OH 43228, USA.

CONCLUSION: This interim report concludes the partial evaluation of FrigiTech International #9667 blend. Based on this interim evaluation, FrigiTech blend #9667 submitted by FrigiTech International **PASS** sections 7, 9, and 10 of the acceptance Criteria of SAE J2670 Issue: 2011/02/01 Stability and Compatibility Criteria for Additive and Flushing Materials Intended for Aftermarket Use in R-134a (HFC-134A) and R-1234yf (HFO-1234yf) Vehicle Air-Conditioning Systems. A final report containing the findings for SAE J2670 Section 8 will be issued at a later date.

See Table 1 for Calibrated Equipment

See following pages for all test results.

Test Performed by:

Karen Gramke
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Analytical Laboratory

Report Approved by:

John Senediak
Senior Chemist
Columbus Office

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Table 1

Item	Equipment Type	Equipment #	Cal. Due Date
1	Analytical Balance	CE1017	8/20/14
2	10mL Graduated Cylinder	CE2221	VBU
3	100mL Graduated Cylinder	CE2184	VBU
4	Barometer	CE1109	6/3/14
5	Temp/Humidity Meter	E227	3/13/14
6	Falex	CE2222	Reference Only
7	Stop Watch	CE1183	9/10/14
8	Viscometer	CE2136	VBU
9	2L Pressure Vessel	CE1019	Reference Only
10	25X Microscope	CE2216	Reference Only
11	Viscometer (40°)	CE2136	VBU
12	Viscometer (100°)	CE2135	VBU
13	R-134a	MC011490324	N/A
14	Falex Test Pins	MID #87	N/A

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Section 7- Stability Testing:

Clause 7.4.1

"Neat" R-134a Lubricant Mixture		2X Recommended Additive (10%) in R134a Lubricant Mixture
TAN (mgKOH/g)		TAN (mgKOH/g)
Range: 0.70 – 0.71		Range: 0.29 – 0.67

Following the aging process for 14 days and 175°C, Using "Rank Order Analysis", TAN in the sealed tubes containing double the recommended concentration of product showed no increase in TAN compared to control samples using rank order analysis on the R-134a samples and therefore "PASS" the requirement.

Clause 7.4.2

Following the aging process for 14 days and 175°C, metals in the sealed tubes containing double the recommended concentration of product did not show evidence of corrosion or copper plating on the R-134a samples. Using "Rank Order Analysis" R-134a test samples did not show an increase in corrosion or copper plating compared to the control samples and therefore PASS the requirement.

Clause 7.4.3

Following the aging process for 14 days and 175°C, the liquid in the sealed tubes containing double the recommended concentration of dye were slightly cloudy, but showed no evidence of precipitate or insoluble material. Liquid in the control tubes containing neat lubricant were slightly discolored but showed no evidence of precipitate or insoluble material. Using "Rank Order Analysis", R-134a test samples showed no increase in precipitate or insoluble material when compared to control samples and therefore "PASS" the requirement.

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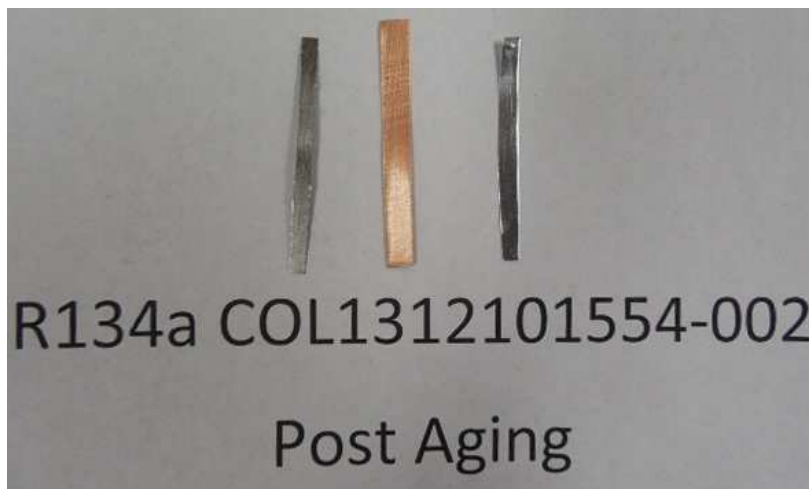
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R-134a cnt vs. test

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Section 8- Non-Metallic Materials Compatibility Testing:

		Post Exposure "Neat" R-134a PAG 46 / Mineral Oil Lubricant Mixture Control Samples		Post Exposure 2X Recommended Additive (10%) in R134a PAG 46 / Mineral Oil Lubricant Mixture		
Material		Swelling (%)	Hardness		Swelling (%)	Hardness
PTFE	Range:	TBD	TBD	Range:	TBD	TBD
Nylon	Range:	TBD	TBD	Range:	TBD	TBD
Polyester	Range:	TBD	TBD	Range:	TBD	TBD
HNBR	Range:	TBD	TBD	Range:	TBD	TBD
Neoprene	Range:	TBD	TBD	Range:	TBD	TBD
NBR	Range:	TBD	TBD	Range:	TBD	TBD
EPDM	Range:	TBD	TBD	Range:	TBD	TBD
Butyl	Range:	TBD	TBD	Range:	TBD	TBD

The average of three measurements will be taken along with the standard deviation of the scale to determine range.

Clause 8.7.1

TBD

Clause 8.7.2

TBD

Clause 8.7.3**

TBD

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Section 9- Wear Testing:

"Neat" R-134a PAG 46 / Mineral Oil Lubricant Mixture	2X Recommended Additive (10%) in R134a PAG 46 / Mineral Oil Lubricant Mixture
Mass (g)	Mass (g)
Range: 0.0020 – 0.0035	Range: 0.0007 – 0.0027

Clause 9.3.1

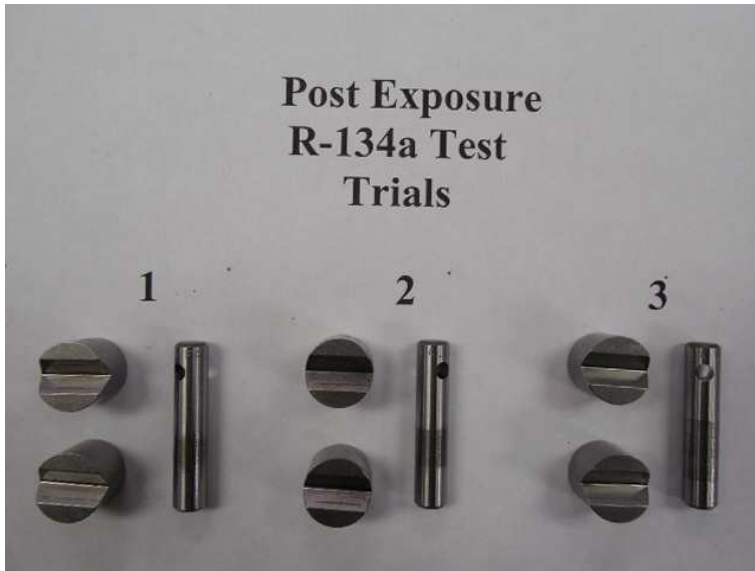
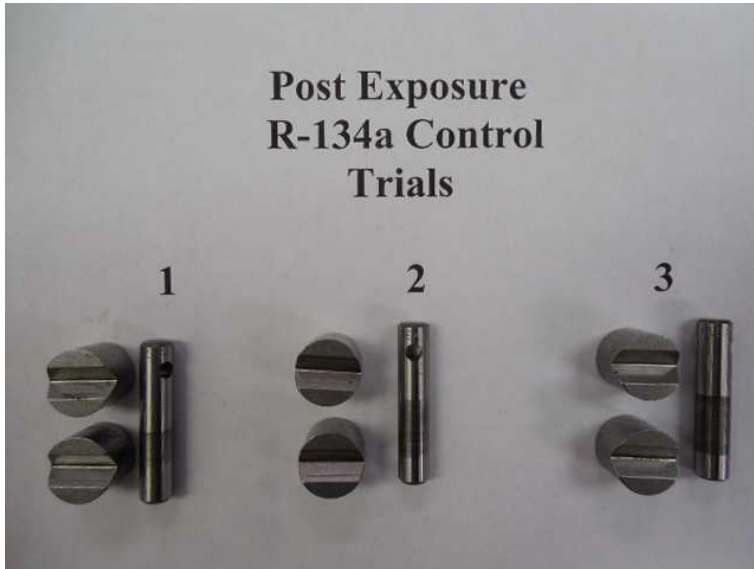
Following the 5 hour Falex performance test, pins protected by the lubricant containing 2X recommended additive concentration did not increase in mass loss when compared to those protected by "Neat" R-134a lubricant mixture control samples using "Rank Order Analysis", and therefore **"PASS"** the requirement.

Clause 9.3.2

Following the 5 hour Falex performance test, blocks protected by the lubricant containing 2X recommended additive concentration did not increase in wear scaring by visual comparison under a 25X magnification when compared to blocks protected by "Neat" R-134a lubricant mixture control samples using "Rank Order Analysis", and therefore **"PASS"** the requirement.

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Section 11- Viscosity Effect Testing:

	“Neat” R-134a PAG 46 / Mineral Oil Lubricant Mixture	2x Recommended Additive (10%) in R-134a PAG / Mineral Oil 46 Lubricant Mixture	Viscosity Increase/Decrease
Temperature (°C)	Viscosity (cSt)	Viscosity (cSt)	Change (%)
40	44.39	43.65	-2
100	7.25	7.414	+2

Clause 11.3

The mixture of lubricant containing the recommended product concentration did not change the viscosity of the lubricant by more than 2% when compared to the viscosity of “Neat” R-134a Compatible lubricant control samples using “Rank Order Analysis”, and therefore **“PASS”** the requirement.