

National Refrigerants, Inc.

Analytical Laboratory

661 Kenyon Avenue
Bridgeton, NJ 08302
Telephone (856) 455-2776
Fax (856) 455-4733

Problems Found Action Required

Normal Results No Action Needed

SL: 03

Refrigerant Analysis Report

Customer:	Johnson Controls	P.O. No.:	NRIHP
Address:	812 First St Blvd. Wilmington, DE 19804	Refrigerant Type:	R-134a
Contact:	Kevin Fraze	Job Location:	DuPont Experimental Station
Telephone:	302-353-0315	System S/N:	MRP 626 904
Fax:	kevin.m.fraze@jci.com	Sample ID#:	Chiller 7
		Lab. Reference:	181228-07
		Date Rec.:	12/28/18

Analysis

Sample Results

In-Service Limits

Identification	By Gas Chromatography	R-134a	
Moisture	parts per million by weight	132	120 <u>Max.</u>
High Boiling Residue	per cent by volume	0.3	2 <u>Max.</u>
Acidity	parts per million (as HCl)	<0.20	1 <u>Max.</u>
Non-Condensable Gas	per cent by volume	-	1.5 <u>Max.</u>
Chloride	pass/fail	Pass	pass
Purity	% by weight (Gas Chromatography)	99.97	99.5 <u>Min.</u>
Particulates	pass/fail	Pass	pass
Other	Total Hrs Run: 93,761		

(1) 20 ppm for R-11, 113, 123.

Comments: Moisture above the normal range (120 ppm maximum). The high boiling residue (0.30%) is a hazy light amber oil. All other above test results are normal. The only significant organic impurity present individually is R-143a: 0.01%. Recommend you change the filter driers. Resample at next scheduled maintenance interval.

Laboratory Supervisor: Dan Wright, Manager

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DN: cn=Dan Wright, Manager, o=National Refrigerants Inc., ou=Analytical Lab, email=dan.wright@refrigerants.com, c=US
Date: 2019.01.03 07:45:42 -0500

Date: 1/2/2019

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Address:	812 First St Blvd. Wilmington, DE 19804	Refrigerant Type:	R-134a
Contact:	Kevin Fraze	Job Location:	DuPont Experimental Station
Telephone:	302-353-0315	System S/N:	GACM 117 864
Fax:	kevin.m.fraze@jci.com	Sample ID#:	Chiller 8
		Lab. Reference:	181228-08
		Date Rec.:	12/28/18

Analysis

Sample Results

In-Service Limits

Identification	By Gas Chromatography	R-134a	
Moisture	parts per million by weight	35	120 <u>Max.</u>
High Boiling Residue	per cent by volume	0.21	2 <u>Max.</u>
Acidity	parts per million (as HCl)	<0.20	1 <u>Max.</u>
Non-Condensable Gas	per cent by volume	-	1.5 <u>Max.</u>
Chloride	pass/fail	Pass	<u>pass</u>
Purity	% by weight (Gas Chromatography)	99.95	99.5 <u>Min.</u>
Particulates	pass/fail	Pass	<u>pass</u>
Other	Total Hrs Run: 52,182, Starts: 2,279		

(1) 20 ppm for R-11, 113, 123.

Comments: The high boiling residue (0.21%) is a hazy light yellow oil. All other above test results show good quality in-service R-134a and indicate normal system performance. Trace organic impurities present are R-22: 0.03% and R-143a: 0.01%. Resample at next scheduled maintenance interval.

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Refrigerant Analysis Report

Customer:	Johnson Controls	P.O. No.:	NRIHP
Address:	812 First St Blvd. Wilmington, DE 19804	Refrigerant Type:	R-134a
Contact:	Kevin Fraze	Job Location:	DuPont Experimental Station
Telephone:	302-353-0315	System S/N:	GACM 127 698
Fax:	kevin.m.fraze@jci.com	Sample ID#:	Chiller 9
		Lab. Reference:	181228-09
		Date Rec.:	12/28/18

Analysis

Sample Results

In-Service Limits

Identification	By Gas Chromatography	R-134a	
Moisture	parts per million by weight	5	120 Max.
High Boiling Residue	per cent by volume	<0.01	2 Max.
Acidity	parts per million (as HCl)	<0.20	1 Max.
Non-Condensable Gas	per cent by volume	-	1.5 Max.
Chloride	pass/fail	Pass	pass
Purity	% by weight (Gas Chromatography)	99.98	99.5 Min.
Particulates	pass/fail	Pass	pass
Other	Total Hrs Run: 48,950, Starts: 2,127		

(1) 20 ppm for R-11, 113, 123.

Comments: All of the above test results show good quality in-service R-134a and indicate normal system performance. The only significant organic impurity present individually is R-143a: 0.01%. Resample at next scheduled maintenance interval.

Laboratory Supervisor: Dan Wright, Manager

Date: 1/2/2019

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Refrigerant Analysis Report

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Address:	812 First St Blvd. Wilmington, DE 19804	Refrigerant Type:	R-134a
Contact:	Kevin Fraze	Job Location:	DuPont Experimental Station
Telephone:	302-353-0315	System S/N:	GACM 127 699
Fax:	kevin.m.fraze@jci.com	Sample ID#:	Chiller 10
		Lab. Reference:	181228-10
		Date Rec.:	12/28/18

Analysis

Sample Results

In-Service Limits

Identification	By Gas Chromatography	R-134a	
Moisture	parts per million by weight	7	120 Max.
High Boiling Residue	per cent by volume	0.12	2 Max.
Acidity	parts per million (as HCl)	<0.20	1 Max.
Non-Condensable Gas	per cent by volume	-	1.5 Max.
Chloride	pass/fail	Pass	pass
Purity	% by weight (Gas Chromatography)	99.80	99.5 Min.
Particulates	pass/fail	Pass	pass
Other	Total Hrs Run: 42,866, Starts: 1,436		

(1) 20 ppm for R-11, 113, 123.

Comments: The high boiling residue (0.12%) is a clear light yellow oil. All other above test results show good quality in-service R-134a and indicate normal system performance. Trace organic impurities present are R-22: 0.18%, R-143a: 0.01% and R-152a: 0.01%. Resample at next scheduled maintenance interval.

Laboratory Supervisor: Dan Wright, Manager

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Date: 2019.01.03 07:46:09 -05'00'

Date: 1/2/2019

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Refrigerant Analysis Report

Customer:	Johnson Controls	P.O. No.:	NRIHP
Address:	812 First St Blvd. Wilmington, DE 19804	Refrigerant Type:	R-134a
Contact:	Kevin Fraze	Job Location:	DuPont Experimental Station
Telephone:	302-353-0315	System S/N:	657634
Fax:	kevin.m.fraze@jci.com	Sample ID#:	York Recovery Tank
		Lab. Reference:	181228-11
		Date Rec.:	12/28/18

Analysis

Sample Results

In-Service Limits

Identification	By Gas Chromatography	R-134a	
Moisture	parts per million by weight	5	120 <u>Max.</u>
High Boiling Residue	per cent by volume	0.3	2 <u>Max.</u>
Acidity	parts per million (as HCl)	<0.20	1 <u>Max.</u>
Non-Condensable Gas	per cent by volume	-	1.5 <u>Max.</u>
Chloride	pass/fail	Pass	<u>pass</u>
Purity	% by weight (Gas Chromatography)	99.82	99.5 <u>Min.</u>
Particulates	pass/fail	Fail	<u>pass</u>
Other			

(1) 20 ppm for R-11, 113, 123.

Comments: The sample contains a small amount of medium sized black particles. The high boiling residue (0.30%) is a clear pale amber oil. All other above test results are normal. Trace organic impurities present are R-22: 0.16%, R-143a: 0.01% and R-152a: 0.01%. Recommend you check an oil sample for signs of compressor wear. Resample at next scheduled maintenance interval.

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