

# 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

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

Date: 1/2/2019

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### Refrigerant Analysis Report

<b>Customer:</b> Johnson Controls	<b>P.O. No.:</b> NRIHP
<b>Address:</b> 812 First St Blvd. Wilmington, DE 19804	<b>Refrigerant Type:</b> R-134a <b>Job Location:</b> DuPont Experimental Station <b>System S/N:</b> GACM 117 864
<b>Contact:</b> Kevin Frazee	<b>Sample ID#:</b> Chiller 8
<b>Telephone:</b> 302-353-0315	<b>Lab. Reference:</b> 181228-08
<b>Fax:</b> kevin.m.fraze@jci.com	<b>Date Rec.:</b> 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	pass
Purity	% by weight (Gas Chromatography)	99.95	99.5 <u>Min.</u>
Particulates	pass/fail	Pass	pass

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.

Laboratory Supervisor: \_\_\_\_\_

Date: 1/2/2019

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### Refrigerant Analysis Report

<b>Customer:</b> Johnson Controls	<b>P.O. No.:</b> NRIHP
<b>Address:</b> 812 First St Blvd. Wilmington, DE 19804	<b>Refrigerant Type:</b> R-134a <b>Job Location:</b> DuPont Experimental Station <b>System S/N:</b> GACM 127 698
<b>Contact:</b> Kevin Frazee	<b>Sample ID#:</b> Chiller 9
<b>Telephone:</b> 302-353-0315	<b>Lab. Reference:</b> 181228-09
<b>Fax:</b> kevin.m.fraze@jci.com	<b>Date Rec.:</b> 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	<0.01	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)	99.98	99.5 <u>Min.</u>
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: \_\_\_\_\_

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### Refrigerant Analysis Report

<b>Customer:</b> Johnson Controls	<b>P.O. No.:</b> NRIHP
<b>Address:</b> 812 First St Blvd. Wilmington, DE 19804	<b>Refrigerant Type:</b> R-134a <b>Job Location:</b> DuPont Experimental Station
<b>Contact:</b> Kevin Frazee	<b>System S/N:</b> GACM 127 699
<b>Telephone:</b> 302-353-0315	<b>Sample ID#:</b> Chiller 10
<b>Fax:</b> kevin.m.fraze@jci.com	<b>Lab. Reference:</b> 181228-10
	<b>Date Rec.:</b> 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.

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Date: 1/2/2019

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### Refrigerant Analysis Report

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

### Analysis

### Sample Results

### In-Service Limits

		<u>Sample Results</u>	<u>In-Service Limits</u>
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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