Certificate of Analysis

has been analyzed for compliance with the air/gas quality portion of the specification:

ISO 8573-1:2010 Compressed Air Contaminants - Particles by Laser Particle Counter (L)

as reported on this certificate for the sample described below.

ACCREDITED A2LA CHEMICAL TESTING LABORATORY CERTIFICATION #0322.01

Maria Sandoval, Laboratory Director

Results vs ISO 8573-1:2010 Compressed Air Contaminants - Particles by Laser Particle Counter (L)

Limiting Characteristics			Purity Class (B)	Sample Results (3)	Specification Limit	Pass / Fail	Estimate of Uncertainty % (1)
Particles	Maximum Number of Particles per Cubic Meter (m3) as a Function of Particles Size, d, in micrometers (µm)	0.1 < d ≤ 0.5 µm	2(P)(L)(Q)(E)	1766	≤400,000	PASS	±10
		0.5 < d ≤ 1.0 µm		0	≤6,000		±10
		1.0 < d ≤ 5.0 µm		0	≤100		±10
		d > 5.0 µm		0	None		±10
	By Mass Concentration (CP), mg/m³		(F)	<0.011			±4.3
Water	Pressure Dew Point, °C (4)		2	<-53	≤-40	PASS	±30
Oil	Oil Aerosol, mg/m³			<0.011			±4.6
	Oil Vapor, mg/m³			<0.007			±6.3
	Total Oil, mg/m³		2	<0.018	≤0.1	PASS	±10.9
Other (2)	Other Vapors, mg/m³ (04), comprised of:						
	Mixture Detected (01)			0.567			±6.3

Sampling Point Identification

Collection Point: Air Comp Room After Dryer + Filters
Purification: Molecular Sieve/Desiccant

Sampling Schedule: Other

Next Sample Due Approx: Unspecified

TRACE Analytics LLC — Report 21-40077 R1

Contact

To: Ms. Lynette Caulfield
Air Handling Equipment Inc.
1389 Riverside Dr.
Sidney, OH 45365

Sampled By: Jeremy Garrett
Sampled For:

Sampling Point Identification:
Collection Point: Air Comp Room After Dryer + Filters
Purification: Molecular Sieve/Desiccant

Customer ID: 25109
Purchase Order: TRACE200207
Sample Date: Thu, Dec 16, 2021
LPC Sampled: Thu, Dec 23, 2021
Received: Wed, Dec 29, 2021
Analyzed: Mon, Jan 3, 2022
Reported: Tue, Feb 1, 2022
Customer Comments:

Results Notes

n/a = not applicable n/d = not determined n/p = not provided n/s = not specified
None (or 0) indicates <LOQ, Tr = Trace, >LOD & LOQ (1) At the 95% confidence interval as a percent of the specification limit includes sampling and analytical estimates of uncertainty. Measurement uncertainty is not taken into account when reporting Pass/Fail designations. Pass/Fail is based on test results falling within or outside specified limits. (2) Gases named in ISO 8573-6 Table 2 and/or other measurands required by the specification or customer. (3) Results apply to the sample as received from the customer. (4) Detector tube readings performed by the customer.

Specification Notes

(P) The $0.3 \le d \le 0.5$ µm size range particle results were compared to the ISO 8573-1: 2010 limits for the $0.1 \le d \le 0.5$ µm size range as the Setra LPC can only size down to 0.3 µm.
(L) The particle results were obtained using a Setra Systems, Inc. laser particle counter (LPC) model SPC 83016; serial number 3034, calibration on 6/1/2021, next calibration due 6/1/2022. Laser Particle Counter size channels do not exactly align with ISO 8573 ranges. LPC size channels are matched to closest report ranges.
(Q) No lower limit of quantitation has been determined for the laser particle counter.
(E) The estimate of uncertainty for the laser particle counter data is based on the allowable range for counter efficiency for the 0.5 µm size channel.

Laboratory Notes

(R1) This revision corrects analytical data from that in the original report. The cause for this revision: Pressure dew point results have been replaced with the results of a detector tube test taken on 1/14/2022 at the request of the customer. (F) Particles by mass concentration have been determined by filter analysis.
(04) Other compounds that are not Oil Vapor were detected and may be considered Organic Solvents. The first number in parentheses indicates the goodness of fit of the sample mass spectrum to the NIST library, with 100 being complete agreement.
(01) A complex mixture was identified, which was composed of compounds that are not oil vapor. Poor resolution precluded an exhaustive identification of all mixture components. The following components have been identified. Cyclohexanone, 2-methyl-5-(1-methylethenyl)-, trans(53),Cyclohexane, cyclopropyl- (35), Tetradecane, 1-chloro- (35), Undecanal(38), 3-Methyl-2-(2-oxopropyl)furan (39). The mixture was also identified in the sample blank.

Sampling Collection Conditions

	Temperature	Pressure
Sampling Point	n/p	108 psig
Ambient	65 °F	14.7 psia

Flowmeter Calibration Information

Flowmeter Type	Serial No.	Calibration Date	Calibration Due
Filter Flowmeter			
Tube Flowmeter			

Sampling Collection Information

Parameter	Media No.	Flow Rate (L / min)	Sampling Time	Blank	For Detector Tubes Only: Reading	For Detector Tubes Only: Scale
Aerosol (Particles & Oil Aerosol)	656325	71	31 : 19			
Water Vapor (Pressure Dew Point)(4)	5/a-P (6728531)	4	12 : 41		30 mg/m³	200
	20/a-P (8103061)		:		mg/m³	
Sulfur Dioxide, SO_2 (4)	0.5/a-P (6728491)				ppmv	
Nitrogen Oxides, NO_X (4)	0.5/a-P (CH29401)				ppmv	
Oil Vapor	942570	4	10 : 13	942624		
CO, CO_2, HC						

NOTE: Blank fields indicate that samples were not obtained for the given limiting characteristic and no analytical results are presented.

Analytical Methods

Test Method	Contaminant	Sampling Technique	Analytical Technique	Accredited	Cal. Cert. No.
CAT-A-01	Gases (CO, CO_2, HC)	Gas Collection Bottle	Gas Chromatography - MS / FID	Yes	202203-01
CAT-A-03	Particles by Mass	Membrane Filter (0.2 µm)	Gravimetry	Yes	202203-03
CAT-A-03	Oil Aerosol	Membrane Filter (0.2 µm)	Extraction - Gravimetry	Yes	202203-03
CAT-A-04	Particles by Size	Membrane Filter (0.2 µm)	Optical Microscopy	Yes	202203-04
CAT-A-06	Oil Vapor	Charcoal Tube	Gas Chromatography - Mass Spectrometry	Yes	202203-06
CAT-A-07	Pressure Dewpoint, SO_2, NO_X	Gas Detector Tube	Chemical Length-of-Stain	Yes	202203-07
CAT-A-10	Particles by Size	Laser Particle Counter	Laser Particle Counter	Yes	See Laboratory Notes

‡ Trace Analytics, LLC certifies that the instrument(s) associated with the specified method were calibrated in accordance with applicable internal QA procedures.