

DATASHEET

Compressed Air Quality Analysis according
 ISO 8573-3:1999 (humidity)
 ISO 8573-4:2001 (particles)
 ISO 8573-5:2001 (residual oil)

QUALITÄTSANALYSEN



ÖLDAMPFMESSUNG

zur Qualitätsbestimmung der Druckluft und Kohlenwasserstoffbestimmung gemäß **DIN ISO 8573-5** Methode durch Probenahme und anschließende Auswertung durch akkreditiertes Labor



MASSENSPEKTROSKOPISCHE BESTIMMUNG

(MS-Screening) der Teilkomponenten inklusive Öldampfmessung nach **ISO 8573-5:2001** durch Probenahme und anschließende Auswertung durch akkreditiertes Labor



KONDENSATANALYSE

zur Qualitätsbestimmung des Druckluftkondensats nach **DIN EN ISO** durch massenspektroskopische Bestimmung der Teilkomponenten (MS-Screening) oder gaschromatographische Untersuchung mittels Probenahme und anschließende Auswertung durch akkreditiertes Labor



ELEKTRONENMIKROSKOPISCHE ANALYSE

zur Qualitätsbestimmung der Druckluft durch **DIN ISO 8573-8** Partikelanalyse und Anzahlbestimmung mittels Elektronenrastermikroskop durch Probenahme und anschließende Auswertung durch akkreditiertes Labor



KEIMZAHLBESTIMMUNG

(Bestimmung der Gesamtzahl an Mikroorganismen) zur Qualitätsbestimmung der Druckluft durch Probenahme und anschließende Auswertung durch akkreditiertes Labor – Analyse gemäß **DIN ISO 8573-7**



DRÜCKTAUPUNKTBESTIMMUNG

zur Qualitätsbestimmung der Druckluft mittels **DIN ISO 8573-3**-kalibriertem Drucktaupunkttransmitter



DRÜCKLUFTQUALITÄTSMESSUNG

gemäß **ISO 8573-1** und **EN 12021** durch Probenahme und anschließende Auswertung durch akkreditiertes Labor



ÖLANALYSE

durch ein **DIN EN ISO 9001** und **DIN EN ISO 14001** zertifiziertes und nach **DIN EN ISO/IEC 17025:2005** akkreditiertes Labor



PARTIKELANZAHLBESTIMMUNG

DIN ISO 8573-4 Partikelanzahlbestimmung zur Qualitätsbestimmung der Druckluft mittels Partikelzähler



KÜHLWASSERANALYSE

durch Probenahme und anschließende Auswertung durch akkreditiertes Labor



LEGIONELLENANALYSE

in Kühl- oder Trinkwasser durch akkreditiertes Labor



SAUERSTOFFANALYSE

zur Qualitätsbestimmung des Sauerstoffs auf Sauerstoffe



STICKSTOFFANALYSE

zur Qualitätsbestimmung des Stickstoffs auf Stickstoffe



Compressed air quality analysis according ISO 8573

All measurements can be carried out directly by you as a specialised company. We will provide you with the necessary measuring equipment and detailed operating instructions.

The measurement results are analysed by our affiliated certified chemical laboratory and sent to you in a summarised report in accordance with standard specifications.

These results can be used by you or your customers at any time as the basis for a corresponding quality audit.

Residual oil measurement in compressed air

Suspicion of residual oil? The measurement of residual oil in compressed air is an important basic requirement for ensuring compressed air quality in accordance with ISO 8573-5:2001.

The sampling kit for rent from Pro Air GmbH enables compressed air users to carry out residual oil sampling themselves. The individual sampling steps are explained in detail. All the components required for precise and safe measurement are included in the rental set: the specially developed, pressure-stable tube holder, a test tube, all connections and hoses, a measuring device for determining the ambient parameters and even gloves and safety goggles.

After connection to the mains supply, the test tube is flowed through with predefined parameters and any residual oil in the carrier gas accumulates in the sorbents of the test tube. Pro Air GmbH sends the sample to our affiliated, accredited laboratory with the enclosed return envelope. A newly developed GC-FID measuring method analogue to the H-53 method ensures the detection of hydrocarbons in the range from C6 to C40.

Functionality of the test tubes

The hydrocarbon content in compressed air is relatively low. It is therefore necessary to first enrich the oil present in the compressed air so that it can then be determined using an analyser (gas chromatograph). This enrichment takes place by allowing a larger volume of air to flow through a test tube with activated carbon.

The test tubes contain a so-called "sorbent" through which the test gas flows at a specific, measured volume. As the gas flows through, the sorbent absorbs the hydrocarbons contained in the gas flow and stores them in the pores. The volume flow and the length of the test gas sample can therefore be used to determine the volume of the carrier gas and thus the amount of substance stored in the sorbent. The hydrocarbons therefore accumulate in the sorbent over time.

Once a sufficient quantity of the hydrocarbons is present, the sampling is completed. The tube is opened in the laboratory and extracted with a solvent. The hydrocarbons are now in the solvent, which is analysed quantitatively using gas chromatography.

Compressed air quality analysis according ISO 8573

Residual oil measurement by sampling

The residual oil measurement to determine the quality of the compressed air analysis for hydrocarbon determination is carried out in accordance with the DIN ISO 9377-2 (H53) method.

Background information:

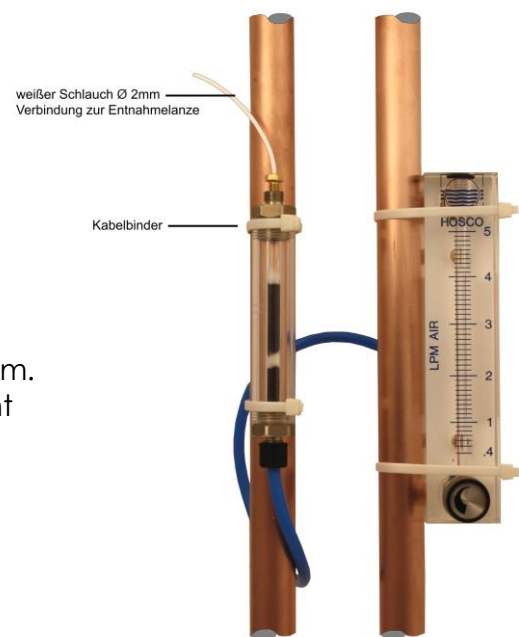
In 2001, this method replaced the previous standard (DIN 38409 H 18) for the determination of mineral oil hydrocarbons using mineral oil hydrocarbons using IR spectroscopy. Since 2001, DIN ISO 9377-2 (formerly DIN 38409 H 53), which is now the only valid standard, has been used.

The laboratory measurement conforms to standard 8573-5:2001.

IR spectroscopy is replaced by a process by means of gas chromatography. Hydrocarbons of known chain length are added, which act as markers (e.g. C10 and C40). Finally, the entire area between the marker peaks is integrated.

The quality analysis is carried out using a sample unit provided by us with sample tubes and a precise operating manual. This manual explains how to connect the sample unit to the compressed air system. After sending in the sample tube and the subsequent analysis has been conducted a complete test report will be provided.

ATTENTION: If the sampling system is used for several measuring points, it must be ensured that there is no contamination from one measuring point to another. We recommend using one measuring system per measuring point.



Standards

The following standards are relevant for determination of hydrocarbons:

ISO 8573-1:2001	compressed air - contaminants and purity classes
ISO 8573-2:2001	test methods for aerosol oil content
ISO 8573-5:2001	determination of oil vapour and organic solvent content

The original text of the listed standards can be procured e.g. from Beuth publishing house in Berlin.

Compressed air quality analysis according ISO 8573

How does the measurement work in practice?

The customer receives a complete sampling system.

The compressed air is extracted (in accordance with the instructions) e.g. via a clean compressed air coupling or an oil-free ball valve.

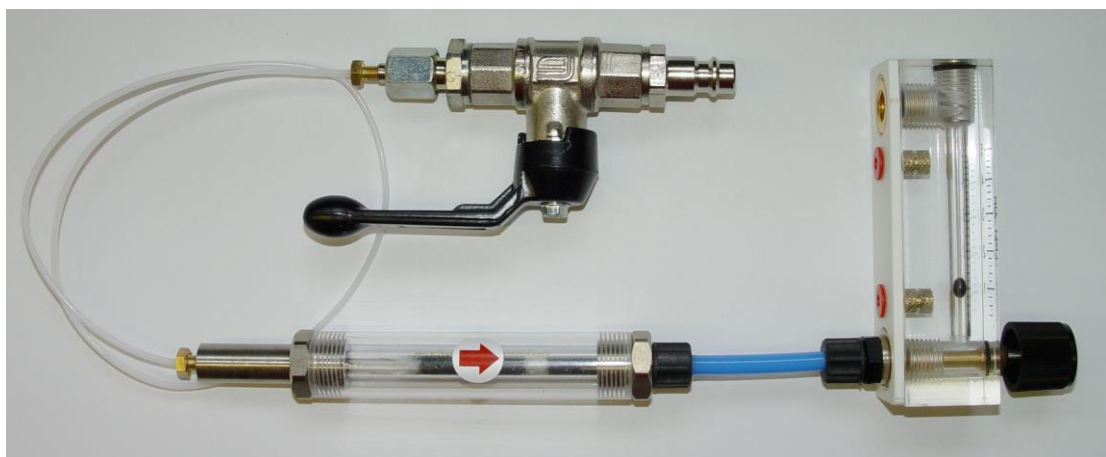
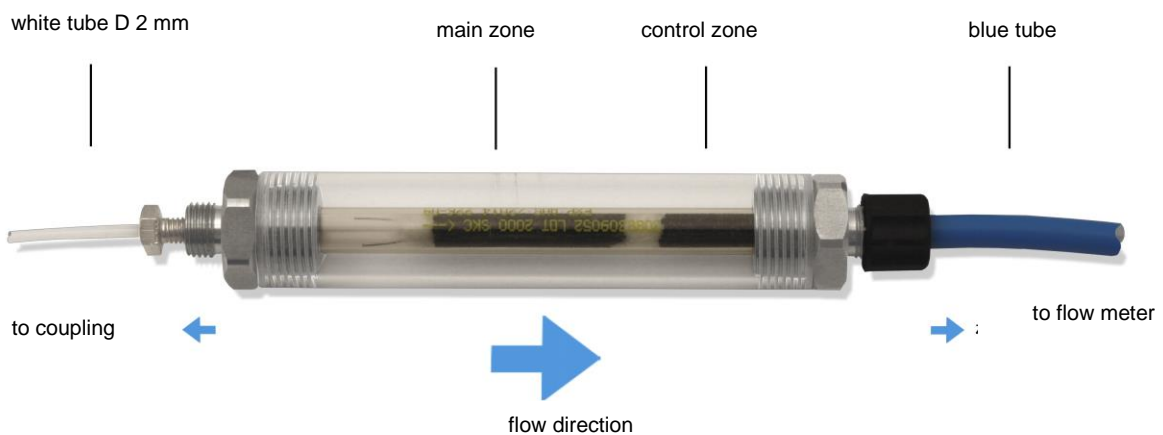
When analysing the intake air, by means of a diaphragm pump directly from the atmosphere.

For aerosol measurement via an isokinetic sampling line.

The air to be measured is "sampled" in the integrated sample tube.

According to DIN, the sampling time depends on the compressed air quality (preparation) and ranges from a few hours to 7 days, depending on the class. (exact instructions can be found in the enclosed manual).

The sample tube is then sent to our laboratory and analysed.



Compressed air quality analysis according ISO 8573

What does the analysis look like?

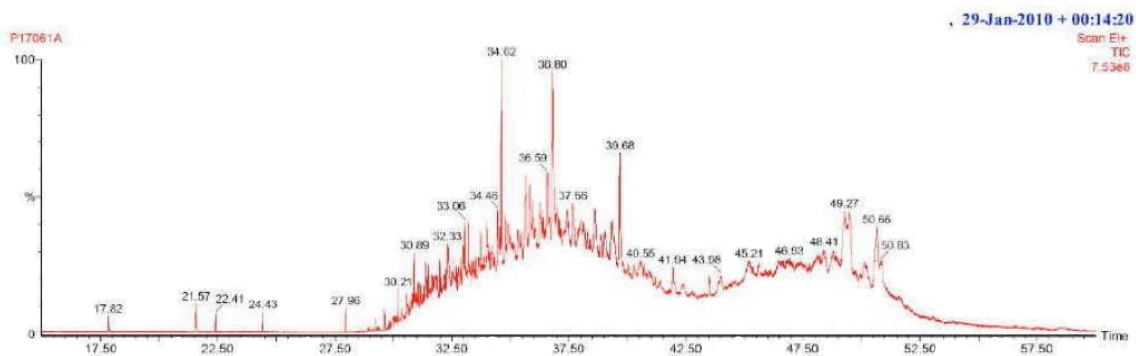
The customer receives a complete evaluation using a gas chromatograph.

The evaluation certifies and documents the exact traceability of the test results and the test equipment used.

Furthermore, the customer receives the chromatogram created for his air and a precise evaluation of the number of hydrocarbons determined as well as a clear classification of his compressed air in accordance with DIN ISO 8573.

Analysis

Chromatogramm GC-MS

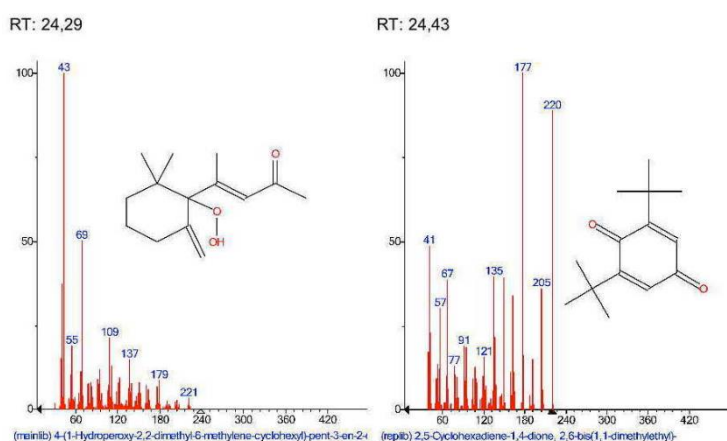


Total hydrocarbons	50 µg/ml
Hydrocarbons in air	1,27 mg/m ³

Compressed air quality analysis according ISO 8573

Extended analysis using mass spectroscopy (optional)

Mass spectrometry, especially in combination with gas chromatography, is the most flexible and powerful analytical technique available to us today for analysing organic substances - with the exception of macromolecules. It is characterised by the highest sensitivity combined with high specificity and makes it possible to identify and quantify even the lowest concentrations of substances in biological material.



Particle measurement in compressed air

Using the complete set "Particle measurement incl. data logger", you as a specialised company can easily carry out a particle count on site yourself.

The particle measurement should be carried out for at least 1 day.

The current values are saved directly on site using the enclosed data logger.

Measuring procedure

The optical particle counters described here use the scattered light effect to determine the particle size distribution and concentration of aerosol particles. The particles are illuminated with laser light. The intensity of the scattered light emitted by the particle at different angles is measured and used as a parameter to determine the particle diameter. As soon as an aerosol particle passes through the measuring cell, its scattered light reaches a photo element (photodiode) via a converging lens system. The electronic pulse generated here is amplified and categorised into a preselected size range in the microprocessor system.

The pulses counted in a preselected period of time are related to the volume of air passed through (28.3 l/min., or 2.83 l/min.).

Compressed air quality analysis according ISO 8573

When analysing the counted particles, two terms are used that require more precise explanation:

- cumulative (cumul.) = the number of particles that is greater than the particle diameter specified in the respective channel.
- distributive (distr.) = the number of particles that is larger than the particle diameter specified in the respective channel, but smaller than the (larger) particle diameter specified in the next channel.

By default, the particleguardPRO outputs the measured values distributively.

3 channels are measured:

Channel 1: 0,1 μ m - 0,5 μ m

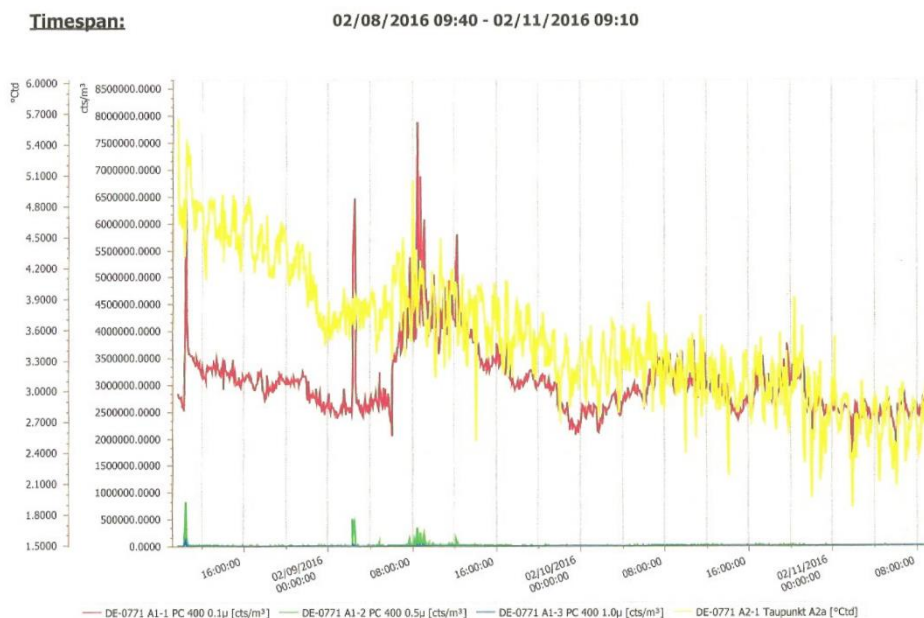
Channel 2: 0,5 μ m - 1,0 μ m

Channel 3: 1,0 μ m - 5,0 μ m

Standard reference: ISO 8573 - 4: 2001

What does the analysis look like?

The customer receives a complete evaluation of the overall course of the individual particle sizes as a diagram.





Compressed air quality analysis according ISO 8573

A table summarising the following values is also provided:

- Average value
- Minimal value
- Time stamp of minimal value
- Maximal value
- Time stamp of maximal value

Statistic Report

Timespan:

02/08/2016 09:40 - 02/11/2016 09:10

DE-0771

DE-0771 (DataLogger)

Devicetyp: 1

Serialnumber: 31150771

ID	Value name	Unit	Average	Min	Time of min	Max	Time of max
1	A1-1 PC 400 0.1µ	cts/m³	3029587	682633	02/11/2016 06:07:59	10829500	02/08/2016 10:28:29
2	A1-2 PC 400 0.5µ	cts/m³	13336.81	1695.11	02/11/2016 06:07:59	2320320	02/08/2016 10:28:29
3	A1-3 PC 400 1.0µ	cts/m³	620.4769	0	02/08/2016 09:46:29	338350	02/08/2016 10:28:29
4	A2-1 Taupunkt A2a	°Ctd	3.5112	1.4615	02/11/2016 01:52:29	6.1026	02/09/2016 08:01:29

Humidity measurement in compressed air

With the complete set "ISO-calibrated dew point transmitter with connected data logger", you as a specialised company can easily carry out a pressure dew point measurement on site yourself.

The current values can be easily read and saved on site using the easy-to-read display.

Measuring procedure

The TPM 80 portable pressure dew point meter provided by us can be used to measure the pressure dew point very easily via a standard compressed air coupling.

The device with ISO calibration, which is mandatory for the certification of pharmaceutical and food companies, measures the compressed air using the enclosed measuring chamber via a standard compressed air coupling.

The measured data is recorded and stored on the supplied data logger and can be easily read out.

The measurement is carried out in accordance with ISO 8573-3:1999.

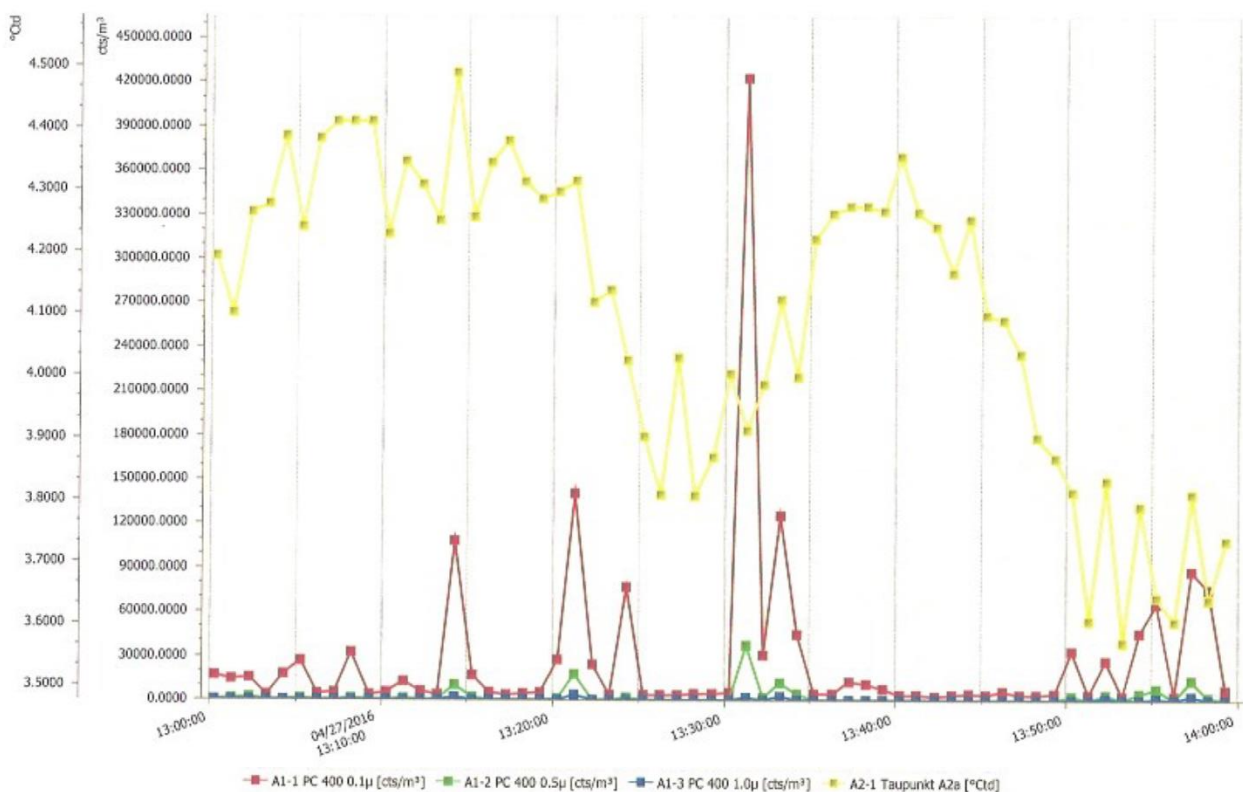
Compressed air quality analysis according ISO 8573

What does the analysis look like?

The customer receives a complete evaluation of the overall course of the individual particle sizes as a diagram.

Chart

04/27/2016 13:00 - 04/27/2016 14:00



A table summarising the following values is also provided:

- Average value
- Minimal value
- Time stamp of minimal value
- Maximal value
- Time stamp of maximal value

DE-0771 (DataLogger)

Devicetyp: 1

Serialnumber: 31150771

ID	Value name	Unit	Average	Min	Time of min	Max	Time of max
1	A1-1 PC 400 0.1µ	cts/m ³	144927.2	2154.2	04/27/2016 13:56:18	9409530	04/27/2016 11:57:18
2	A1-2 PC 400 0.5µ	cts/m ³	14921.92	0	04/27/2016 12:44:18	1410580	04/27/2016 11:57:18
3	A1-3 PC 400 1.0µ	cts/m ³	1670.052	0	04/27/2016 11:34:18	140482	04/27/2016 11:57:18
4	A2-1 Taupunkt A2a	°Ctd	5.2587	3.2905	04/27/2016 12:48:18	11.96	04/27/2016 11:34:18