

Institut für Energie- und
Umwelttechnik e.V. (IUTA)
Air Quality & Filtration
Bliersheimer Straße 58 - 60
47229 Duisburg
Germany



- IUTA-CERTIFICATE -
Validation of compressed air filters
according to ISO 12500-2:2007
(Filters for compressed air – Test methods – Oil vapours)

Customer: Airfilter Engineering (M) Sdn. Bhd. No. 20, Jalan Anggerik Mokara 31/47,
Kota Kemuning, 40460 Shah Alam, Selangor, Malaysia

Tested products: Single measurement of 3 filter cartridges model "Grade C"

IUTA test report: UN2-140814-55969.00-008-AFE

| Test parameters | | | | |
|---|---|-------------|-------------|---------|
| Test results | Cartridge 1 | Cartridge 2 | Cartridge 3 | Average |
| Inlet pressure | 7 bar (e) [8 bar (a)] | | | |
| Air flow for testing | 50 m³/h (ANR) | | | |
| Test agent (n-hexane) concentration in air | 100 mg/kg air (33.6 ppm) | | | |
| Conditioning of the filter cartridges | by flow till weight constance (dew point – 40 °C) | | | |
| Pressure drop [mbar] | 24-25 | 24 | 24 | 24.2 |
| Time until breakthrough of 80 mg/kg air (80%) [min] | 15.5 | 16 | 15.9 | 15.8 |
| Mass of test agent adsorbed [mg] (until breakthrough of 80 mg/kg air) | 1043 | 1103 | 1069 | 1071.7 |

The cartridges were mounted in filter housing model: BB141033.

Duisburg, 14th November 2014

Managing Director

Signature
Department Head

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- IUTA-CERTIFICATE - **Validation of compressed air filters according to ISO 12500-3:2009^{1) 2)}**

(Filters for compressed air – Test methods – Particulates)

- 1) According to the state of the art in particle measurement technology via online optical aerosol spectrometry particle sizes < 0.14 µm cannot be detected under pressure.
- 2) Particle size range: (0.19 – 2.74) µm

Customer: Airfilter Engineering (M) Sdn. Bhd. No. 20, Jalan Anggerik Mokara 31/47, Kota Kemuning, 40460 Shah Alam, Selangor, Malaysia

Tested product: Grade H

IUTA test report: LrF 34/14

Tested cartridge: Single measurement of three cartridges model Grade H

| | | | |
|-------------------------------|--|---------------|----------------|
| Test parameter | | | |
| Inlet pressure | 7 bar (e) [8 bar (a)] | | |
| Air flow | 50 Nm ³ /h = 100 % nominal flow rate from inside to outside | | |
| Flow direction | | | |
| Test aerosol | DEHS | | |
| Particle size range | (0.19 – 2.74) µm | | |
| Aerosol spectrometer | PCS 1200 (Palas GmbH) | | |
| Test results | | | |
| Particle diameter [µm] | lower | 0.19 | 0.24 |
| * | upper | 0.24 | 0.36 |
| Average efficiency [%] | | 99.999 | 99.9998 |
| | | | 99.9999 |

Remark: The product was tested under the designation "Grade H"

* Averages were calculated from the data shown in the test report (mean values of 3 tests in filter housing model "BB141033").

Duisburg, 20th August 2014

Managing Director

i.R. W. Maly

Department Head

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Customer: Airfilter Engineering (M) Sdn. Bhd. No. 20, Jalan Anggerik Mokara 31/47,
Kota Kemuning, 40460 Shah Alam, Selangor, Malaysia

Tested product: **Grade U**

IUTA test report: LrF 34/14

Tested cartridge: Single measurement of three cartridges model Grade U

| | | | | | |
|-------------------------------|---|---------------|----------------|----------------|-----------------|
| Test parameter | | | | | |
| Inlet pressure | 7 bar (e) [8 bar (a)] | | | | |
| Air flow | 50 Nm ³ /h = 100 % nominal flow rate | | | | |
| Flow direction | from inside to outside | | | | |
| Test aerosol | DEHS | | | | |
| Particle size range | (0.19 – 2.74) µm | | | | |
| Aerosol spectrometer | PCS 1200 (Palas GmbH) | | | | |
| Test results | | | | | |
| Particle diameter [µm] | lower upper | 0.19 0.24 | 0.24 0.36 | 0.36 0.52 | 0.52 0.81 |
| Average efficiency [%] | | 99.998 | 99.9989 | 99.9998 | 99.99998 |

Remark: The product was tested under the designation "Grade U"

* Averages were calculated from the data shown in the test report (mean values of 3 tests in filter housing model "BB141033").

Duisburg, 20th August 2014

Managing Director

1.17. W. Hertel

Department Head

VALIDATION CERTIFICATE

ILK Dresden 

Institut für Luft- und Kältetechnik gGmbH
Bereich Luftreinhaltung

Measurements according to
ISO 8573-2 "Compressed Air for General Use – Part 2"
of the filter element

Compressed Air Filter Grade S

manufactured by
Airfilter Engineering (AFE)

resulted in an outlet residual oil concentration of

less than 0.001 mg/m³.*

The determination of the oil aerosol separation efficiency of the compressed air filter was executed at the test institute. Test procedures and results have been documented and archived.



Dresden, 29.03.2005

Dipl.-Ing. Ralf Heidenreich
(Department Manager)



Dipl.-Ing. (FH) Tim Neuhaus
(Project Manager)

* **TEST PARAMETERS:** Air stream loaded with > 20mg/m³ Aerosol of Mineral Compressor Oil, Viscosity Grade 46; air flow 50m³/h (ANR); test pressure 7 bar abs. (also meets ISO/DIS 12500-1). Declared result is the average from 3 consecutive tests on the same element. Employed measurement and test techniques, in addition to test conditions, generated reproducible results.

Certified to ISO 9001

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- IUTA-CERTIFICATE -

Validation of compressed air filters according to ISO 12500-1:2007

(Filters for compressed air – Test methods – Oil aerosols)

Customer: Airfilter Engineering (M) Sdn. Bhd. No. 20, Jalan Anggerik Mokara 31/47,
Kota Kemuning, 40460 Shah Alam, Selangor, Malaysia

Tested product: Grade H

IUTA test report: UN2-150518-55969.00-032

Tested cartridge: Threefold measurement of three cartridges model Grade H

| | | | | |
|--|--|-------------|-------------|---------------------|
| Test parameters Inlet pressure Air flow Test inlet oil concentration Compressor oil viscosity | 8 bar (a) 50 m³/h (ANR) = 100 % nominal flow rate 9.6 mg/m³ ISO VG 46 | | | |
| Test results | Cartridge 1 | Cartridge 2 | Cartridge 3 | Average |
| Dry pressure drop* (mbar) | 31 | 30 | 31 | 30.67 |
| Saturated pressure drop* (mbar) | 110 | 102 | 92 | 101.33 |
| Mean outlet oil concentration [mg/m³ (ANR)]** | 0.009±0.008 | 0.01±0.001 | 0.01±0.001 | 0.0097±0.004 |

Remark: The product was tested under the designation "Grade H"

*Pressure drop measured upstream and downstream of the filter-housing model "BB141033"

**Mean outlet oil concentration of each of three cartridges is determined by averaging the results of a threefold measurement from the data shown in the report of each cartridge (nine measurements in total) and finally the total average is shown.

Duisburg, 17th August 2015

Managing Director

A handwritten signature in blue ink, appearing to read "Hans-Joachim Lippert".

Department Head

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Customer: Airfilter Engineering (M) Sdn. Bhd. No. 20, Jalan Anggerik Mokara 31/47,
Kota Kemuning, 40460 Shah Alam, Selangor, Malaysia

Tested product: Grade U

IUTA test report: LrF 34/14

Tested cartridge: Threefold measurement of three cartridges model Grade U

| | | | | |
|--|---|---------------|---------------|----------------|
| Test parameters | | | | |
| Inlet pressure | 7 bar (e) [8 bar (a)] | | | |
| Air flow | 50 Nm ³ /h = 100 % nominal flow rate | | | |
| Test inlet oil concentration | 10 ± 2 mg/m ³ | | | |
| Compressor oil viscosity | ISO VG 46 | | | |
| Test results | Cartridge 1 | Cartridge 2 | Cartridge 3 | Average |
| Dry pressure drop* (mbar) | 68 | 69 | 69 | 68.6 |
| Saturated pressure drop* (mbar) | 203-205 | 202-203 | 200-202 | 202.5 |
| Mean outlet oil concentration [mg/m ³ (ANR)]** | 0.026 ± 0.005 | 0.033 ± 0.029 | 0.027 ± 0.014 | 0.028 ± 0.019 |

Remark: The product was tested under the designation "Grade U"

* Pressure drop measured upstream and downstream the filter-housing model "BB141033"

** Mean outlet oil concentration of each of three cartridges is determined by averaging the results of a threefold measurement from the data shown in the test report on each cartridge (nine measurements in total) and finally the total average is shown.

Duisburg, 27th January 2015

Managing Director

Department Head