

**Institute for energy-
and environmental technology e.V.**

IUTA · Bliersheimer Str. 60 · D-47229 Duisburg

Tel. 02065/418-0

Department: Measurement office



IUTA Report
M 060507

about validation of filters for compressed air

Client: Tiger Filtration Ltd.
Unit 18
Stanfield Business Centre
Addison Street
Hendon
Sunderland
SR2 8BL

Table of contents

1 Introduction 3
 2 Description of filter for compressed air / parameter..... 3
 3 Performance of investigation..... 3
 3.1 Procedure 3
 3.1.1 Investigation „oil aerosol content“ 3
 3.2 Design of the test equipment 4
 3.3 Quantitative determination of oil aerosol content..... 4
 3.3.1 Extraction 4
 3.3.2 Gas-chromatographic analysis..... 5
 4 Results..... 6
 4.1 Determination „oil aerosol content“..... 6
 4.1.1 Tiger 42002229..... 6

Annex

1 Introduction

The validation of the filter for compressed air was effected for the parameter oil aerosols according to following ISO-standard:

- ISO/WD 8573-2: Compressed air – Part 2: Test methods for oil aerosol content
- ISO/CD 12500-1: Filters for compressed air – Methods of test – Part 1: Oil aerosols

2 Description of filter for compressed air / parameter

Type of filter	Fabr.-Nr.	Parameter
Tiger 42002229	No data	Oil aerosol content

Tab. 1

3 Performance of investigation

3.1 Procedure

3.1.1 Investigation „oil aerosol content“

The inlet oil aerosol concentration was controlled by weighing the filter element and the condensate separator before and after investigation.

- The determination of oil aerosol content was made by isokinetic sampling.
- The conditioning of the filter element was executed until a state of equilibrium was reached (pressure drop y 1 %/hr).

During the investigation following parameter were adjusted:

Oil aerosol generator heated: Yes (25 °C)
 Inlet temperature: Appr. 21 °C
 Inlet pressure: 7 bar (e)
 Inlet oil concentration: Appr. 10 mg/Nm³

3.2 Design of the test equipment

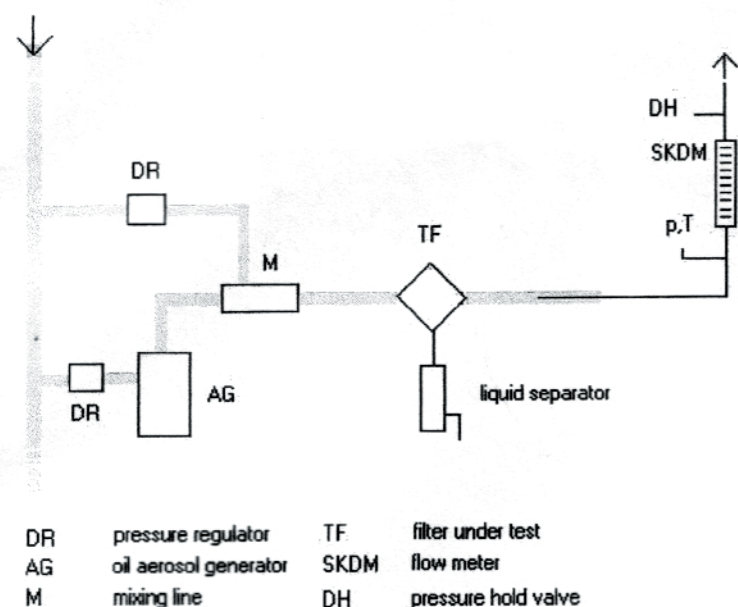


Abb. 1: Sketch of the test equipment

3.3 Quantitative determination of oil aerosol content

For quantitative determination of oil aerosol content the used micro fibre-glass membrane was back-washed with n-hexane and merged with the rinse-solution of the probe. The solution was narrowed and analysed with GC-FID.

3.3.1 Extraction

N-hexane was used for cleaning, extraction and solvent.

Before determination the membrane were prepared with n-hexane.

After test the membrane were put into a petri dish and extracted 3 times with new n-hexane in an ultra sonic bath. The probe was rinsed with n-hexane and merged with the "membrane-solution".

The n-hexane-solution was narrowed in a rotary evaporator followed by reducing the solution with pure nitrogen to 1 ml. The sample was analysed with GC/FID.

3.3.2 Gas-chromatographic analysis

Gaschromatography – Flame-ionisation-detector

Instrument:	GC-FID
Type:	Thermoquest Finnigan Trace GC 2000 Series
Carrier:	H ₂ , const. Flow 1,0 ml/min
Column:	OPTIMA-1-TG-0,1 µm; 25 m; 0,32 mm
Injector:	heatable; 350 °C – 400 °C with 15 K/min
Injection volume:	1 µl
Temperature program:	50 °C isotherm 3 min 20 °C/min to 350 °C
Injector temperature:	350 °C – 400 °C with 15 K/min

4 Results

4.1 Determination „oil aerosol content“

The saturation curve is given in the annex.

4.1.1 Tiger 42002229

Test protocol		
Product notation:	42002229	
Manufacturer:	Tiger Filtration Ltd.	
Type of filter:	42002229	
Model number:	No data	
Oil type used:	Shell Corena D 46	
Test parameter and result		
Parameter	Einheit	V=35 Nm ³ /h
Inlet temperature:	[°C]	20,5
Inlet pressure:	[bar ü]	7
Ambient pressure:	[mbar]	1016
Ambient temperature:	[°C]	21
Inlet oil aerosol concentration:	[mg/Nm ³]	13
Test duration:	[h]	3
Pressure drop:	[mbar]	222
Outlet oil concentration:	[mg/Nm ³]	0,007

Tab. 2

Responsible for examination: *16.05.06*
Date
D. Jarzyna
Dipl.-Phys.-Ing. D. Jarzyna

Head of department: *16.05.06*
Date
M. Beyer
Dipl.-Ing. M. Beyer

Scientific-techn. leader: *16.05.06*
Date
S. Haep
Dr.-Ing. S. Haep

