P0782-01

Environmental Efficiency
Consulting Engineers

Further Information Request (IPPC Licence)

For

Dennison Trailers Limited

Document No: 661-07

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QF 1. v2 Document Lead Sheet

Document Title	Further Information Request for IPPC licence application
Project No.	661
Document No.	661-07
Client	Dennison Trailers
Address	Maudlins Cross Industrial Estate, Naas, Co. Kildare

Issue	Status	Date	Author	Signed for and on behalf of	
				Environmental Efficiency	Client
1.01	Approved	09/11/2006	KL		

Where it is a requirement that this report be issued to a regulatory or other authority, then the client should sign the appropriate place in the above table and, unless specifically agreed in writing to the contrary, forward copies to the appropriate authority (e.g. EPA).

EEC Project Manager: Bob Sutcliffe, CEng, MIMechE

EEC Document Author: Kevin Lynchehaun, BSc, MSc

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1 Introduction

As part of an application for an Integrated Pollution Prevention and Control licence (IPPC), Environmental Efficiency Consultants have been requested to complete a Request for Further Information on behalf of Dennison Trailers. Below is a list of information required by the EPA for completion of Dennison Trailers IPPC licence application.

Q1: Site plan

Indicate on a site plan, the proposed monitoring points for surface water and trade effluent discharges. These points shall be labelled SW1, SW2, and SE1 as described in your submission dated 30th June 2006.

See Appendix 1.

Q2: Air Dispersion Model

(i) Clarify that the modelling of emissions is based on the maximum predicted emission of volatile organic carbon and provide details of the maximum concentration and mass loadings of the emissions modelled.

These samples were taken during production. They therefore may not be the max predicted concentration.

(ii) Submit the relevant extract from the USEPA Screening Procedures for Estimating the Air Quality Impact of Stationary Sources referenced as justification for the use of the Screen 3 model to predict the emissions to the atmosphere from the four emission points.

This is taken from section 2.2 of the USEPA Screening Procedures for Estimating the Air Quality Impact of Stationary Sources:

Sources that emit the same pollutant from several stacks with similar parameters that are within about 100m of each other may be analyzed by treating all of the emissions as coming from a single representative stack. For each stack compute the parameter M:

$$M = \frac{h_s V T_s}{Q}$$

where:

M = merged stack parameter which accounts for the relative influence of stack height, plume rise, and emission rate on concentrations

hs = stack height (m)

$V = \pi/4 . ds^2 . vs$ = stack gas volumetric flow rate (m3/s)

d_s = inside stack diameter (m)

v_s = stack gas exit velocity (m/s)

T_s = stack gas exit temperature (K)

Q = pollutant emission rate (g/s)

The stack that has the lowest value of M is used as a "representative" stack. Then the sum of the emissions from all stacks is assumed to be emitted from the representative stack; i.e., the equivalent source is characterized by h_{s1}, V1, T_{s1} and Q, where subscript 1 indicates the representative stack and Q = Q1 + Q2 + . . . + Qn.
The parameters from dissimilar stacks should be merged with caution. For example, if the stacks are located more than about 100m apart, or if stack heights, volumetric flow rates, or stack gas exit temperatures differ by more than about 20 percent, the resulting estimates of concentrations due to the merged stack procedure may be unacceptably high.

(iii) Provide the calculations used to merge the four stacks and to obtain the figures used as input data in the Screen model, (i.e. emission rate, stack diameter, etc.)

The equation below was applied to three of the four stacks using information gathered from the site visit; stack A2-1 was not in use on the day of the visit.

$$M = \frac{h_s V T_s}{Q}$$

where:

M = merged stack parameter which accounts for the relative influence of stack height, plume rise, and emission rate on concentrations

hs = stack height (m)

$V = \pi/4 . ds^2.vs$ = stack gas volumetric flow rate (m3/s)

d_s = inside stack diameter (m)

v_s = stack gas exit velocity (m/s)

T_s = stack gas exit temperature (K)

Q = pollutant emission rate (g/s)

The stack with the lowest M value is used as the representative stack, the emission rate for this stack was multiplied by four and used as the value for the combined stack.

The input data used in the screen 3 model was obtained from a site visit where such measurements such as stack velocity, stack height, inside stack diameter, ambient air temperature and stack temperature, while other data such as building dimensions were taken from scale plans of the site. Emission rates were calculated by Environmental Efficiency's laboratory management system which has been internally validated.

(iv) Alternatively, re-assess the emissions to atmosphere by means of a detailed air dispersion model. Submit air dispersion model input and out files, (.dat format files), meteorological data files and terrain files, if used, for each of the modelled years. Provide input, output, met data and terrain files in electronic format.

N/A

Provide an assessment of the predicted 1 hour ground level concentration, 2.5 mg/m^3, by comparison against the derived environmental air quality standard, based on the Occupational Exposure Limit (OEL), (as per the National Authority for Occupational Safety and Health 2002 code of practice for the Safety, Health and Welfare at Work (Chemical Agent) regulations, 2001) for Metyl Isoamyl Ketone.

The Occupational Exposure Limit (TWA) for Methyl Isoamyl Ketone (CAS: 110-12-3) is 95 mg/m^3, $1/40^{th}$ of this is used for the purpose of air dispersion models, this gives a value of 2.375 mg/m^3. The maximum ground level concentration reported in the air dispersion report (661-04) is 2.5 mg/m^3, this concentration is in breach of the air quality standard.

Q3: Mitigation Measures for Emissions to Atmosphere

Describe the mitigation including timeframes which you propose to implement to ensure that emissions to atmosphere from your installation will comply with emission limit values specified in Council Directive 1999/13/EC on the limitation of emissions of VOCs due to the use of organic solvents in certain activities and installation and which shall be complied with by 21st October 2007.

Dennison Trailers are involved in discussions with various manufacturers in regards to air abatement technology. No decision has been made at present on the particular model. One of the proposals issued by LENSI is attached in Appendix 2. However they are aware of the deadline for the installation by 21st October 2007.

Q4: Technical Specifications of Dust Abatement

Provide technical specifications of the dust abatement equipment currently employed on the welding lines and shot blasting system. This shall include details of the level of filtration that is provided by the filters in both shot blasting unit and the welding lines and the resulting emissions to atmosphere. Provide details of current operation, control and monitoring of the abatement systems employed. Identify the emission point to atmosphere from the shot blasting unit on a suitably scaled site drawing.

See Appendix 3.

Q5: Complete Tables E.1 (ii) and E.1 (iii)

Complete Tables E.1 (ii) and E.1 (iii) of the application for the emission to atmosphere from the shot blasting abatement unit. Provide details and/or proposals for monitoring of emissions to atmosphere. Assess the impact of the emissions from the shot blast abatement unit. Provide a site drawing showing the location of the shot blast abatement emission point and monitoring location (See Appendix 1 of Site Drawing)

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. N^{o}:	***D1***
Source of Emission:	Particulate emission from Shot Blasting Unit
Location :	Beside Paint Shop
Grid Ref. (12 digit, 6E,6N):	290915E, 221084N
Vent Details (x 2) Diameter: Height above Ground(m):	See Figure 1 & 2 0.3m (This is not a stack; it is an opening (0.3m (W) x 0.7m (L). See Figure 1 & 2.) 3m
Date of commencement:	1993

Characteristics of Emission :

(i)Volume to be emitted:			
Average/day	37,013.76M^3/d	Maximum/day	49,351.6m^3/d
Maximum rate/hour	6,169 m^3/h	Min efflux velocity	8.16m.sec^{-1}

(ii) Other factors			
Temperature	20.7°C(max)	15°C(min)	17.8°C(avg)
For Combustion Sources: N/A Volume terms expressed as: ☐ wet. ☐ dry. _____%O_2			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day 235 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	***D2***
Source of Emission:	Particulate emission from Shot Blasting Unit
Location :	Beside Paint Shop
Grid Ref. (12 digit, 6E,6N):	290915E, 221084N
Vent Details (x 2) Diameter: Height above Ground(m):	See Figure 1 & 2 0.3m (This is not a stack; it is an opening (0.3m (W) x 0.7m (L). See Figure 1 & 2.) 3m
Date of commencement:	1993

Characteristics of Emission :

(i)Volume to be emitted:			
Average/day	37,013.76M^3/d	Maximum/day	49,351.6m^3/d
Maximum rate/hour	6,169 m^3/h	Min efflux velocity	8.16$m.sec^{-1}$
(ii) Other factors			
Temperature	20.7°C(max)	15°C(min)	17.8°C(avg)
For Combustion Sources: N/A Volume terms expressed as: ☐ wet. ☐ dry. _____ $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day 235 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. N^{o}:	***D3***
Source of Emission:	Particulate emission from Shot Blasting Unit
Location :	Beside Paint Shop
Grid Ref. (12 digit, 6E,6N):	290915E, 221084N
Vent Details (x 2) Diameter: Height above Ground(m):	See Figure 1 & 2 0.3m (This is not a stack; it is an opening (0.3m (W) x 0.7m (L). See Figure 1 & 2.) 3m
Date of commencement:	1993

Characteristics of Emission :

(i)Volume to be emitted:			
Average/day	37,013.76M^3/d	Maximum/day	49,351.6m^3/d
Maximum rate/hour	6,169 m^3/h	Min efflux velocity	8.16m.sec^{-1}
(ii) Other factors			
Temperature	20.7°C(max)	15°C(min)	17.8°C(avg)
For Combustion Sources: N/A Volume terms expressed as: ☐ wet. ☐ dry. _____%O_2			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day 235 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	***D4***
Source of Emission:	Particulate emission from Shot Blasting Unit
Location :	Beside Paint Shop
Grid Ref. (12 digit, 6E,6N):	290915E, 221084N
Vent Details (x 2) Diameter: Height above Ground(m):	See Figure 1 & 2 0.3m (This is not a stack; it is an opening (0.3m (W) x 0.7m (L). See Figure 1 & 2.) 3m
Date of commencement:	1993

Characteristics of Emission :

(i)Volume to be emitted:			
Average/day	37,013.76M^3/d	Maximum/day	49,351.6m^3/d
Maximum rate/hour	6,169 m^3/h	Min efflux velocity	8.16m.sec^{-1}
(ii) Other factors			
Temperature	20.7°C(max)	15°C(min)	17.8°C(avg)
For Combustion Sources: N/A Volume terms expressed as : ☐ wet. ☐ dry. _____%O_2			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included*):

Periods of Emission (avg)	_____min/hr _____hr/day 235 day/yr

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: ***D1***

Parameter	Prior to treatment[1]				Brief description of treatment	As discharged[1]					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
N/A											

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: ***D2***

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
N/A											

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: *D3*

Parameter	Prior to treatment[1]				Brief description of treatment	As discharged[1]					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
N/A											

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: ***D4***

Parameter	Prior to treatment[1]				Brief description of treatment	As discharged[1]					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
N/A											

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise

Figure 1: Dust Abatement Equipment for Shot Blasting Line

Figure 2: Vent details of Dust Abatement Equipment for Shot Blasting Line: D1 and D2

Figure 3: Dust Abatement Equipment for Welding Line

Q6: Classification of Interceptor

Please clarify the classification of the interceptor (i.e. Class I or Class II, full or by-pass)

Class II By – pass interceptor is a low risk interceptor which suits this site as any spills or overflows is going to be rain water.

Q7: New Contact Details

Please update Section B.2. of the application with the new contact details (i.e. name, position, and email address)

B.2. Location of Activity

Name: Dennison Trailers

Full Address: Maudlins Cross

Naas

Co. Kildare

Telephone N: 045 866 468 *Fax Nº:* 045 876 244

Contact Name(s): Shay O'Connor

Position(s): General Manager

e-mail : shayoconnor@dennison.com

National Grid Reference (12 digit-6E,6N) E290888, N221137

Location maps, with grid references should be enclosed in **Attachment Nº B.2.**

Q8: Clarify BOD readings for discharges in Table E3 (iii)

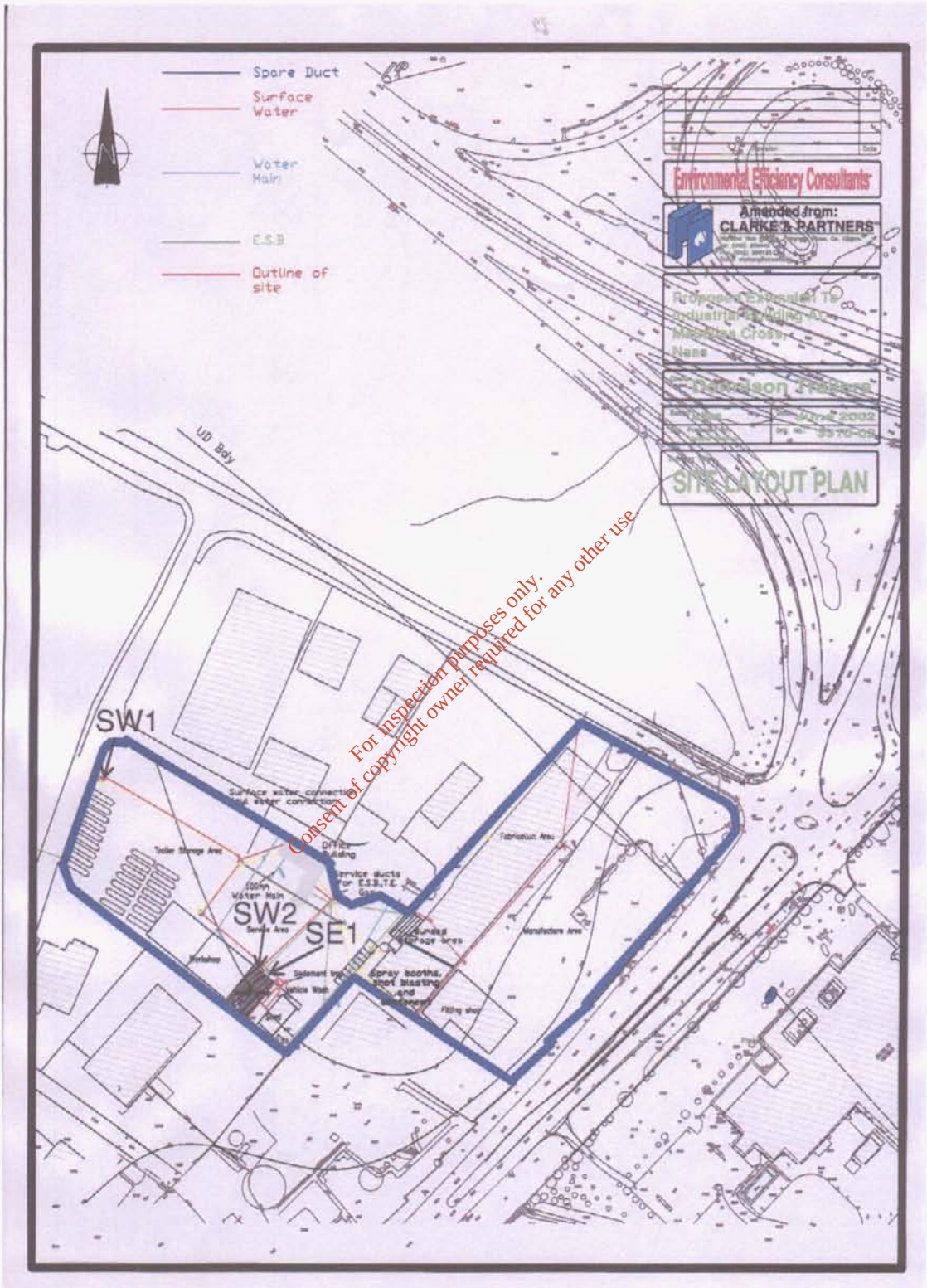
TABLE E.3 (I) EMISSIONS TO SEWER

Emission point reference number: SE1

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/72days/yr	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
BOD	117	117	0.084	6.048					
COD	249	249	0.18	12.96					
Suspended solids	105	105	0.000072	0.005					
FOG	10.00	10.00	0.0756	5.44					
Detergent (MBAS)	0.1	0.1	0.0072	0.52					

There was an error in the Table above in the IPPC Licence Application. These correct figures in the Table above are for the parameters from one grab sample. (Example BOD daily: 117mg/l (BOD) x 0.72m^3 (flow) x 1000 = 84,240mg → 0.084kg x 72 (days) → 6.048 kg/72days/yr).

Appendix 1: Site Plan with proposed monitoring points for SW1, SW2, SE1; and location of the shot blast abatement emission point and monitoring location



Appendix 2: VOC Abatement

LESNI A/S
Air Purification Engineering
PO Box 7404, Sutton Coldfield
West Midlands, B73 6TS
Tel.: 0121 355 3162 Fax: 0121 628 7847
Email: smaamari@compuserve.com

Environmental Efficiency
Consulting Engineers
Parnell House
19 Quinsboro Road,
Bray, Co. Wicklow
Ireland

11th September 2006
case: 05154

Attn: Mr. Kevin Lynchehaun

Your ref.: Dennison-Email enquiry of 5/9

our ref.: SHM/05154/D

QUOTATION

Dear Kevin,

Subject: Activated Carbon adsorption - Dennison

We thank you for your recent email and enquiry; and are pleased to submit our proposal for the supply of one large carbon adsorption plant for removing organic carbon solvents from the exhaust stream.

For this application we recommend our horizontal cylindrical type adsorber in stainless steel; complete with associated extract fan and interconnecting duct, with activated carbon and internal baffles and supporting trays; as per the data and specification mentioned below.

The adsorber will be prepared with inlet and outlet transition pieces to connect and match with incoming exhaust duct.

One radial heavy-duty extract fan; complete with duty motor is included to provide extraction through the purification plant.

Data:

Airflow (two separate streams):	18,902 and 17,757 Nm^3/hr
Total air flow:	**36,659 Nm^3/hr**
Temperature:	15 °C
Pollutant:	Solvents as listed in your email of 11/9
Average mass loading:	2-3 tons/year (6000 hours/year)
Inlet Concentration:	40.6 mg/m^3 and 131.2 mg/m^3
Purification:	*less than 50* mgC/m^3

Head Office: LESNI A/S
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Billund, Denmark
☎ + 45 75 33 25 00
Fax: + 45 75 35 30 06
Email.post@lesni-as.dk
Den Danske Bank
DK-7190 Billund
Kt.nr. 4657131504
Vat no. 10605830
A/S reg. no 159659
PBS-nr: 01220691

LESNI A/S
Air Purification Engineering

Running cost/plant:

Carbon replacement:	approx. Euro (€) 45,000.00/change*
Electric Power:	35 Kw

*Above price includes:

- Delivery of 10 Tons of selected virgin carbon.
- Labour and disposal/regeneration and activation of the waste carbon.
- Includes cranes and scaffolding where necessary, during this exercise.
- We recommend changing the carbon once a year, this exercise could be Scheduled during normal shut down and our team should complete this work in Less than one week.

Dimension:

L x W x H:	Adsorber (10 m x 3.0 m x 3.8 m) & fan (1.5m x 1.5m x 1.5m)
Weight:	20 tons

Specification:

1. One carbon filter type APF- H, size 2800, in Stainless steel 304 complete with:
   - Support and baffles for the carbon
   - Inlet and outlet nozzles flanged for process air
   - Manway and access nozzles.
   - Skid supporting structure.
   - Stack in the form of 1m duct extension on the point of exhaust.
2. 10 tons of extruded carbon impregnated highly active carbon.
3. Extract fan in SS complete with 45 kW motor and V-belt drive.

   The radial fan is complete with dynamically balanced impeller, to (G 6.3) and with steel frame and base plate for taking the fan and the motor assembly.

   The casing is fitted with drain flanged nozzle, cleansing hole, and appropriate connections for the inlet and outlet nozzles complete with square to circular outlet transformation piece flanged.

   Type of construction: R type, with V-belt Drive

   Material:

Casing:	mild steel
Impeller:	mild steel
Transition piece:	304
Shaft seal:	GACO Seal
Nuts/bolts:	316

With One IP 55 motor (3 X 400V, 50 Hz) coupled to the same shaft, with special motor plate assembly with pivoting point for ease of belt changing and tensioning.

Accessories:

- Soft flexible collar for the suction and pressure side, including flanges.
- Set of anti vibration mounts.
- Cleansing hole at fan casing.
- Rain cover for belt housing.
- Provide bleed and drain nipples as necessary for motors and bearing for regular maintenance.

4. Necessary interconnecting duct in SS 304 between fan and adsorber.

5. Assembly as one skid unit on site.

6. Delivery to site.

7. Commissioning and start up by LESNI service engineer.

8. Detail project engineering and submission of complete documentation for the control and maintenance of the plant.

   - Description
   - Operation
   - Maintenance
   - Components
   - Drawings

Budget Price: Euro (€) 135,000.00

Exclusions:

Foundation and civil works
Electrical erection.
Connection of inlet duct.
Cranes and Lifting to position.

References:

Glancre, Co Mayo
Organic lens, Co Clare.
Prestige Industrial, UK
Danyard A/S, Denmark
Pfizer, Sweden
Yamanouchi, Ireland
AstraZeneca, Avonmouth

LESNI A/S
Air Purification Engineering

Time of delivery:
Approx.: 14 weeks from final order.
Time of delivery with reservations against conditions we do not control.

Payment Conditions Proposed:

30 %	with order.
60 %	on delivery to site
10%	after commissioning and hand over.

Guarantee- and delivery Conditions:

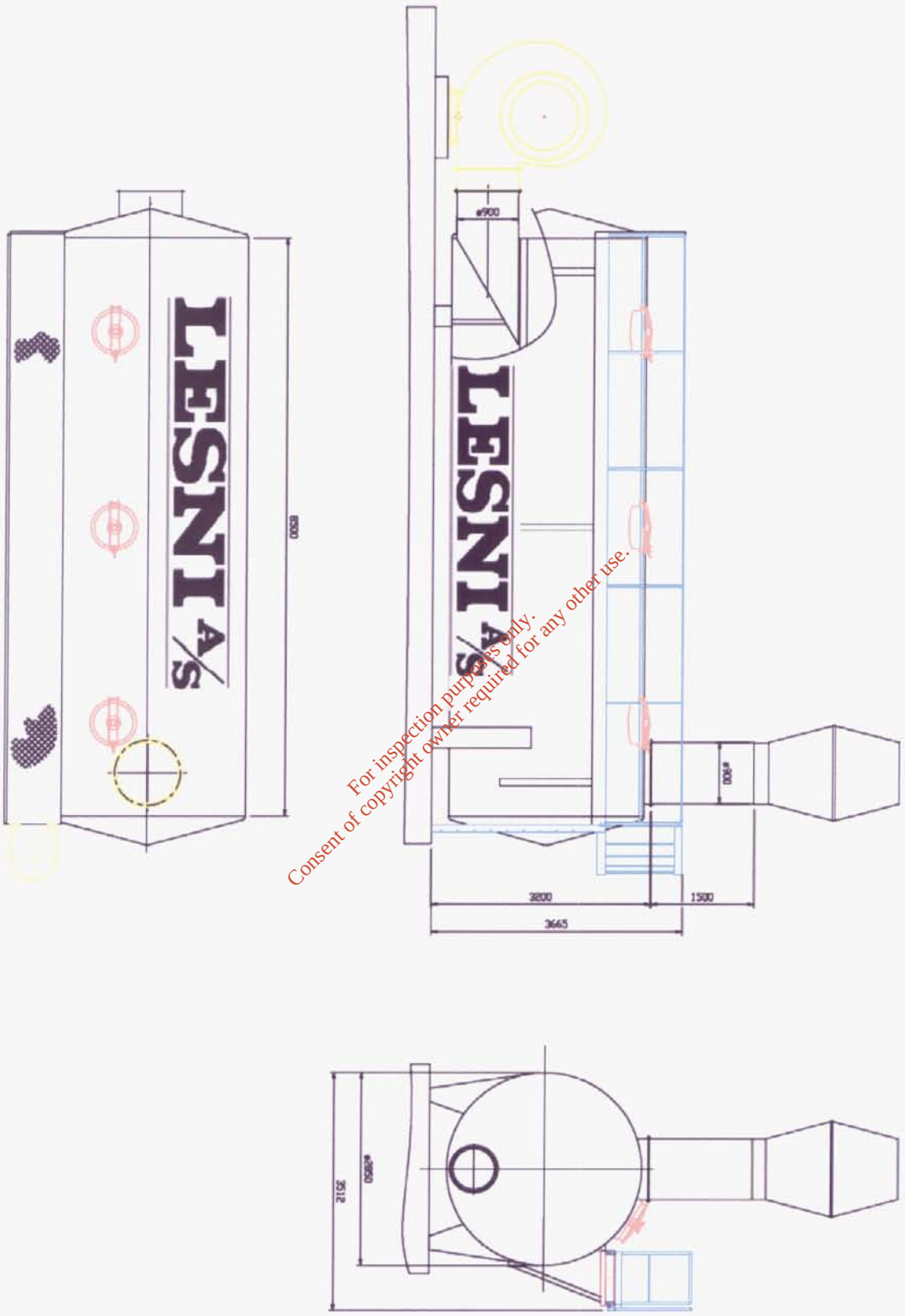
Where nothing else is mentioned the European General Conditions "No. ORGALIME SE 01" will apply.

I trust this offer will meet your interest, but we shall be glad to attend a bid review to discuss our options in details.

In the meantime, I remain at your service for any other information.

Yours sincerely,
For LESNI A/S

Sean Maamari
Sales Manager



Appendix 3: Dust Abatement Specifications

(i) Shot blasting unit

03/10 2006 20:10 FAX 001

DENNISON

DENNISON TRAILERS LTD
MAUDLINS CROSS
NAAS
CO.KILDARE

Tel: 045 866466
Fax: 045 906053
E-mail: daviddennison@dennisontrailers.com

FAX TRANSMISSION

To:	Kevin Lynchehaun	**From:**	David Dennison
Company:	Environmental Efficiency	**Date:**	Wednesday, 04 October 2006
Fax No:	01 2761561	**No. of Pages:**	5 (including this page)
Ref:	Blast Shop Extraction Equipment		

Kevin,

Please see following 4 pages of specification on the blast shop dust extraction system.
They are manufactured by Airmaster, model M90/2/5.5kw

Each extractor contains 90m sq of 350gsm polyester needlefelt filter media.

Hope this helps.

Regards

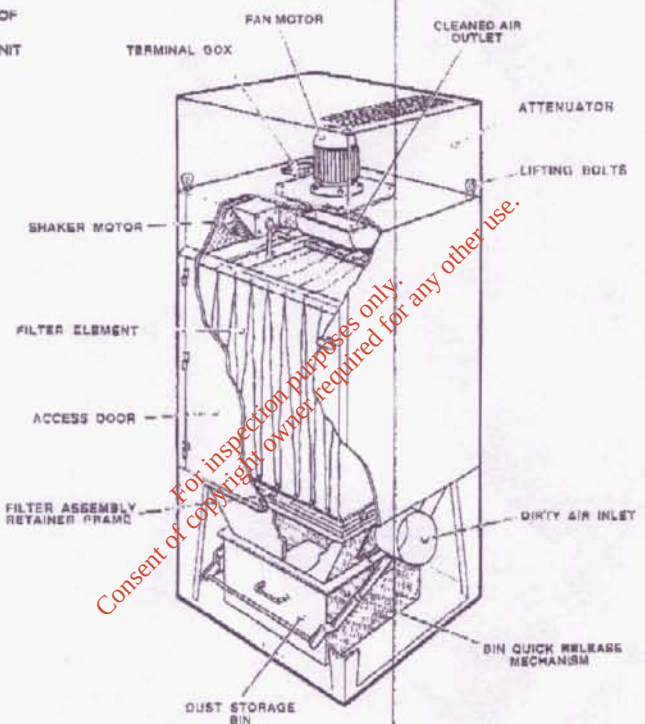
David.

Auto 'M' Dust Collectors Extended & Improved Range

The Airmaster Auto 'M' series has been considerably improved and extended to become the second generation of mechanical cleaning filters. They have been designed to provide economical and effective solutions to a wide range of dust problems throughout industry.

These units have been designed with maximum efficiency and durability as prime considerations and the concept of design has been kept as simple as possible to minimise capital and maintenance costs. By variation of filter fabric, fan and disposal method, each unit becomes tailored to the needs of your specific application so that an answer to your dust problem can be found within the Auto 'M' range.

SECTIONAL VIEW OF STANDARD 15M DUST CONTROL UNIT



- **Clean side maintenance** for a healthy environment.
- **Compact physical size** with all maintenance from the unit front.
- **Extended choice** of filter area - nine sizes from 7.5m² to 90m².
- Nine fans from 0.75kW to 18.5kW
- **Needlefelt** or various specialised filter media as alternative to cotton.
- **Tapered filter pockets** to assist shaker to release dust.
- **Automatic** electric filter shaking as standard.
- **Universal inlet** position for flexibility on installation.
- **Prewired** fan and shaker motors for easy installation
- **Fully weatherproof** units as a standard option.
- **Felt bottomed** quick release storage bin for easier removal and emptying.
- **Electronic timers** to control shake cycle and cascade multi-fan start.
- **Motors flameproof** or various other specifications as a standard option.
- **Stainless steel** construction or various other finishes such as epoxy
- **After sales** spares and service facilities.
- **CNC produced** quality and accuracy.

Operation & Description

OPERATION

Dust laden air enters the unit through an inlet spigot located above the dust collecting bin. Large particles drop out into the bin as the air enters due to the drop in air speed and the sudden change in flow direction. The air is then drawn upwards through the filter bag where finer particles are collected. Finally the clean air is drawn through the fan and is discharged to atmosphere.

The fine dust deposit on the inside of the filter bag is dislodged by an automatic shaking mechanism and falls into the collecting bin.

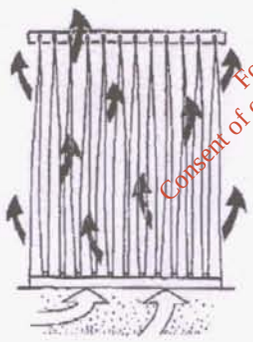
Access to the filter bag and shaker mechanism is through the large hinged access door on the front of the unit. Access to the fan motor for maintenance is easily achieved due to its location on top of the unit.

Where an attenuator is fitted this totally encloses the fan motor and discharge and is fixed in position by four toggle clips.

All Airmaster Auto 'M' filters are finished externally in a durable cream and brown synthetic enamel on a high build primer. Internal surfaces are primed only.

FILTERS

Each Auto 'M' module comprises of a housing containing a single filter element or bag in the form of a multi 'V' section having a common base. The base of the element is held in place by a retaining frame which is bolted and sealed to an internal flange within the unit. This arrangement minimises surfaces in contact with dust laden air. The apex of each pocket is held to a top frame which keeps the filters in tension. The standard filter media is cotton but for more arduous applications filters can be supplied in polyester needlefelt or other synthetic fabrics.



FILTER ELEMENT CHANGING

A major benefit of the Auto 'M' series is the easy and clean method of bag replacement. Since the filter is fixed at the bottom and shaken from the top, all the dust is retained on the inside of the pockets.

To remove the filter bag first unclip the elastic grips at the top; the bag then collapses still retaining the dust on the inside. The bottom can then be released by undoing nuts from the corresponding studs. By carefully folding the bag it can be removed from the unit without the operator being exposed to the dirty side of the filter element.

DUST DISPOSAL

Dust dislodged from the filter is normally collected in a rectangular quick release bin of 75 or 150 litre capacity clamped beneath a short hopper section. This bin may be removed for emptying by simply lifting a quick release locking lever and pulling the bin forward.

If required units can be provided with either a hopper with bagging off spigot and valve, circular 100 litre bin, or an open flanged base for location on a dust storage box. A further variation on the Auto 'M' has an open flanged base and weathercowl for silo venting.

FILTER SHAKING

The filter bag is cleaned by an automatic shaking mechanism, whereby a linkage from an electric motor rocks the pivoted bag top support frame for a period of between 5 and 10 seconds. The shake is controlled electronically to come into operation when the fan is stopped and incorporates a time delay to allow the fan to run down before the shake is activated. There should be a further delay to allow the dust to settle in the storage bin before the fan is restarted.

MOTORS & CONTROLLERS

The fan motors are standard metric frame sizes of the flange mounting, totally enclosed fan cooled squirrel cage type. Fan impellors are mounted directly on the shaft of the motors and are driven at approximately 2850 r.p.m.

The shaker motors are of the fractional horsepower, face mounting, totally enclosed fan cooled squirrel cage type running at approximately 900 r.p.m. They are mounted on a bracket under the lid of the unit. Both motors are normally prewired to a terminal box on the unit.

All motors are supplied with class F insulation and IP55 enclosure classification. Up to 4kW standard motors are dual voltage wide band, 220-240/380-415V; larger motors are spot voltage, normally 380 or 415V. Alternative specification motors are of course available.

The electrical controller combines direct on line starting and shaker control up to 7.5kW and auto star delta starting and shaker control for 11kW to 18.5kW. All fan motor contactors are fitted with overload protection.

Filter & Fan Selection

Selection of a suitable Auto 'M' starts with a knowledge of the volume of air to be handled; this may either be displaced air or be calculated to adequately control a dust producing source.

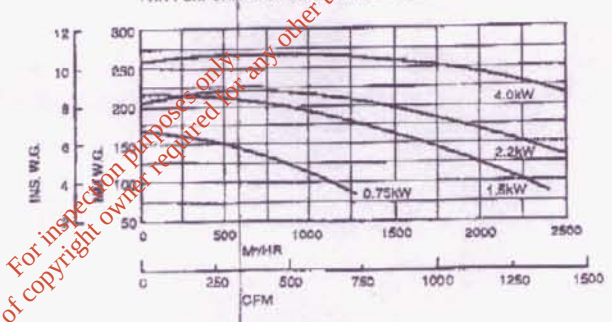
Knowledge of the dust characteristics allows the required filter area to be selected by means of the velocity of the air through the filter cloth. Knowledge of the dust characteristics, particle size and shape allows the type of cloth to be selected and with the appropriate filtration velocity allows the correct filter area to be determined. Fabrics may be selected from standard polyester needlefelt or with a variety of finishes such as flame retardant, aplropic or hydrophobic; for simple applications woven cotton may be used.

The required fan may be determined from the graphs by selecting the power above the intersection point of required volume and calculated system resistance. In determining the system resistance allowance has to be made for the pressure drop across the filter elements; for calculation purposes this may be assumed as a nominal 75mm wg but it can vary with the dust and dust loading. If an attenuator is fitted a further allowance of 15mm wg should be made.

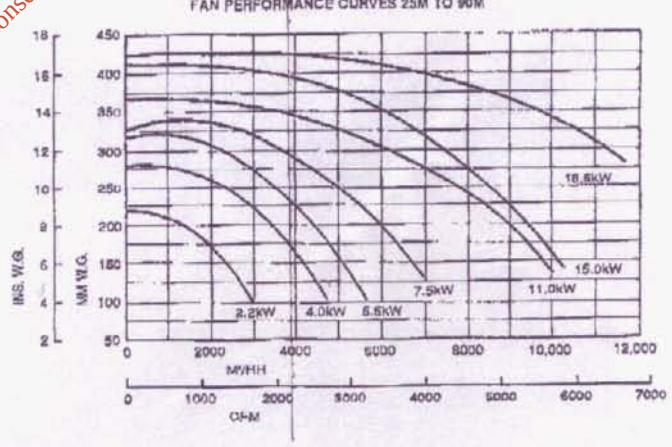
7.5M	7.5m²	0.75 to 1.5	1	100, 125, 150 & 190 dia.	1 — SIDE OR REAR
15M	15m²	0.75 to 4.0	1	100, 125, 150 & 190 dia.	1 — SIDE OR REAR
25M	25m²	0.75 to 7.5	1	200(H) x 450(W)	1 — SIDE OR REAR
30M	30m²	0.75 to 7.5	1	200(H) x 450(W)	1 — SIDE OR REAR
42M	42m²	2.2 to 15.0	1	300(H) x 450(W)	1 — SIDE OR REAR
50M	50m²	2.2 to 15.0	1 or 2	200(H) x 450(W)	2 — SIDE OR REAR
60M	60m²	2.2 to 15.0	1 or 2	200(H) x 450(W)	2 — SIDE OR REAR
75M	75m²	4.0 to 18.5	1 or 2	200(H) x 450(W)	3 — REAR
90M	90m²	4.0 to 18.5	1 or 2	200(H) x 450(W)	3 — REAR

NOTE: *All inlet spigot dimensions are outside.*
All dimensions in millimetres.

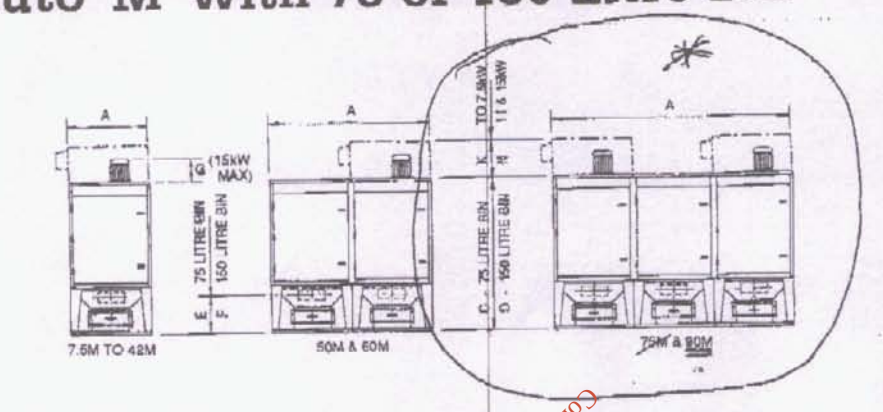
FAN PERFORMANCE CURVES 7.5M & 15M

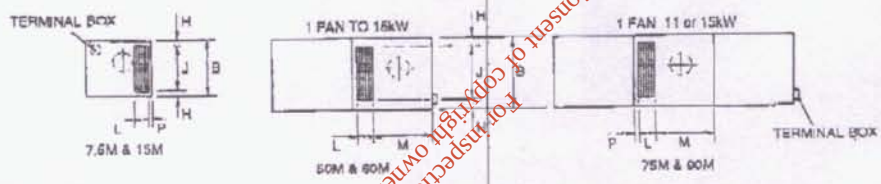


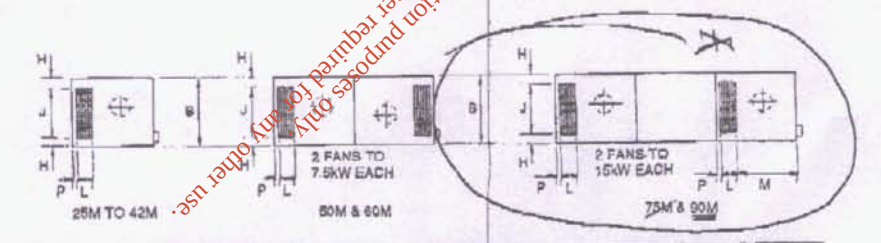
FAN PERFORMANCE CURVES 25M TO 90M



Auto 'M' with 75 or 150 Litre Bin







UNIT	UNIT DIMENSIONS MM														MAX. WEIGHT KG	
	A	T	S	B	E	I	J	A	G		H	M	P			
7.5M	930	760	1456	1753	485	780	245	45	660	425	225	470	-	30	150	160
15M	930	760	2008	2303	485	780	305	45	660	425	225	470	-	36	200	210
25M	1120	1010	2213	2513	565	865	365	155	700	500	250	834	-	36	290	310
30M	1120	1010	2467	2767	565	865	365	155	700	500	250	834	-	36	330	350
42M	1700	1010	2767	3067	815	1115	475	155 137	700 736	500 -	250 394	1034 1288	- 700	416 40	420 430	440 450
50M	2240	1010	2213	2513	565	865	755	155	700	500	250	834	665	36	500	520
60M	2240	1010	2467	2767	565	865	755	155	700	500	250	834	665	36	600	640
75M	3360	1010	2213	2513	565	865	755	155	700	500	250	834	665	36	680	740
90M	3360	1010	2467	2767	565	865	755	155	700	500	250	834	665	36	800	860

All inlets protrude nominally 50mm from face of unit. For inlet dimensions see previous page
All discharge dimensions are from face of unit as shown for indoor attenuator discharge.

NOTE: If installation height is limited, splitter flanges may be incorporated between hopper and filter body; this increases height by 70mm.

(ii) Welding Line

BIA

Working Place Safety Board

General Association of the professional Societies for Industry.

Date:12.02.2004 Tob/So

2 TEST CERTIFICATE

(Translation into English language of the original German version)

N° 200420707/6210

1.	**Customer:**	Freudenberg Vliesstoffe KG 69465 Weinheim
2.	**Test specimen:**	Filter media
2.1	**Manufacturer:**	Freudenberg Vliesstoffe KG
2.2	**Type, designation**	One-layer filter media / FE 2507
	Marking:	FE 2507
2.3	**Intended use:**	Filter material to be applied in dust removal machines and in apparatus for the separation of dusts according to BIA principles (01/2003 issue)
2.4	**Date of fabrication:**	August 2000 and 10/2003

2.5 Further details: see test report

3. Testing:

3.1 Type of test: Test of Compliance

3.2 Date of testing: 01/2001 and 02/2004

3.3 Test method, requirements: DIN EN 60355-2-69 annex AA (08/99); alteration to IEC 60355-2-69, DIN IEC 61J/94/CD (05/99); Resolution number 019 of the "Erfahrungsaustauschkreises der Prüfstellen im EK 33"; BIA rules for the examination of filters to be used in machinery and apparatus for dust removal (01/2003 issue).

4. Asessment, suitability: The filter media FE 2507 complies with the requirements related to dust removal machinery and apparatus, for categories of application "M", at an Air-to-Cloth-Ration of 200m³/m²/h (0,056m/s).

Special remarks:

This test certificate is valid only for filter media, rawgas side: labelled side.
The deduction concerning the working safety of the whole dust removal device, given on the basis of this certificate is not allowed.
This test certificate substitutes test certificate 200120888/6210.

5. Validity of test certificate

As long as the underlying safety-technical requirements (3.3) are in force, the present Test Certificate applies to all products equal to the test specimen and manufactured at the la test on:

01.03.2007

Conformity with the test specimen will not be verified by the testing institute.

Period of validity may be extended upon request.

6. General remarks:

The present Test Certificate consists of 5 pages. Pages 1 to 3indicate the overall test result; they shall only be published with the full wording being quoted. The complete Test Certificate also includes the test protocol containing all pertinent details.

The present Test Certificate does not warrant the use of the GS-label, BG-label or CE-mark.

In all other respects the rules of Procedures for Testing and Certification carried out by the Test and Certification Bodies in BG-PRÜFZERT shall apply in conjunction with the General Business Conditions of the Hauptverband der gewerblichen Berufsgenossenschaften e. V. .

For the assessment:	For the testing:
Dipl.-Ing. Hans-Ulrich Tobys	**i.V. Christian Sollik**
Certification officer	**Head of Testlaboratory**

Test Protocol

1.	**Test conditions:**	DIN EN 60355-2-69 annex AA (08/99); alteration to IEC 60355-2-69, DIN IEC 61J/94/CD (05/99); Resolution number 019 of the "Erfahrungsaustauschkreises der Prüfstellen im EK 33"; BIA rules for the examination of filters to be used in machinery and apparatus for dust removal (01/2003 issue).
2.	**Type of test:**	Test of Compliance
3.	**Applicant:**	Freudenberg Vliesstoffe KG
4.	**Sample to be examined:**	Filter media
4.1	Method of construction:	One-layer filter media
4.2	Description	FE 2507
4.3	Marking:	FE 2507
5.	Categorie:	- M -

6. Details supplied by the filter media manufacturer:

6.1	Material and Type:	Polyester
6.2	Weight /area ratio:	240 g/m^2
6.3	Air permeability:	300 m^3/m^{2}h a 200 Pa
6.4	instream side:	Labelled side
6.5	Colour:	White

7. Test of the penetration degree of the filter media

7.1	Air to Cloth Ratio:	200m^3/m^{2}h

7.2 Frontal stream speed: 0,056 m/s

7.3 Requirements for the use category - M -

Maximum concentration degree allowed: < 0,10 %

7.4 Test results:

Medium penetration degree:

0,05% (6 measurements)

Standard variance: 0,01 %

By Air-to-Cloth-Ratio of 200m³/m²h corresponding 0,056 m/sec facing stream velocity, the penetration is undoubtedly < 0,10%.

The requirements concerning the removal efficiency of the filter media for categorie - M – are complied.

8. Resistance of the penetration stream

The resistance of the penetration stream of the filter media is taken before the test, by means of some quartz dust.

8.1 Air-to-Cloth-Ratio: 200m³/m²h

8.2 Frontal-stream speed: 0,056 m/s

8.3 Test result:

Medium resistance against penetration: 150 Pa (6 measurements)

9. Air permeability test: 270 m^3/m^2h

The air permeability of the filter media is taken before the test, by means of quartz dust, with a pressure loss of 200 Pa.

10. Test of the ratio weight/area 240 g/m^2

10. Marking

The requirements are fullfilled.

Working Place Safety Board

–BIA-

Qualified Reporter

Christian Sollik