

New EU-PM-10–Reference Samplers to the specification of EN 12341

07.02.2000

The new Council Directive (1999/30/EU) of the European Union requires for “Reference method for the determination of the PM-10 fraction of particles”, the use of a reference sampler to the specification as shown in drawings in EN12341. ESM-Andersen produce and can supply the following reference samplers:

1. Low Volume Sampler (LVS) ; (Ref. No. 42545/55):

Reference sampler to the specification of norm EN 1234, the FH 95 K.

PM 10 μm (2,3 m³/h) Particulate Sampler –Small Filter Device (2,3 m³/h)

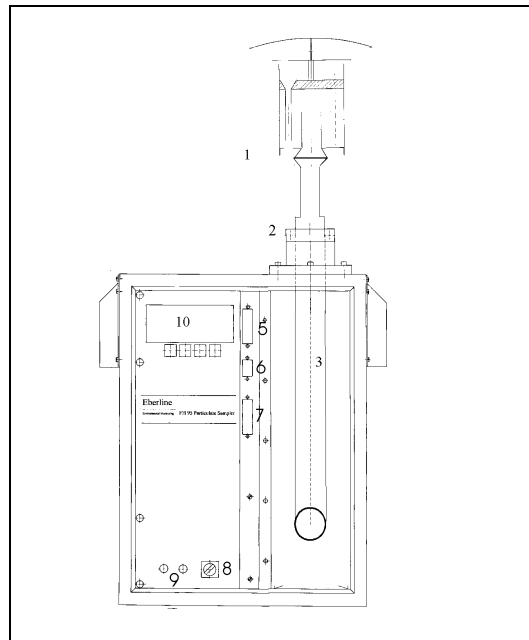


Diagram 1

- (1) PM-10 Small filter inlet with integral filter (filter diameter = 47 mm) ;
LVS (Low Volume Sampler) Inlet according to specification of EN 12341 Annex B 1
- (2) Connection for sample inlet
- (3) Tube
- (5) COM 1 : Data interface V 24/RS 232, 25 pole D-Sub-socket
- (6) COM 2 : Data interface V 24/RS 232, 9 pole. D-Sub-socket
- (7) I/O: status signals as relays contacts and two analog interfaces (free selectable)
- (8) Power switch
- (9) Fuses
- (10) Display for measurement data and operational menus, 4 control keys, 3 LEDs for the indication of the status signals

Diameter of the filter: 47 mm
Diameter of the dust spot: 41 mm
Air flow rate as 24 h average: 2,3 m³/hr, regulated

New EU-PM-10–Reference Samplers
to the specification of EN 12341

07.02.2000

Ref.-No. DPM10/2.3/01 (Ref.No. DPM 102301)

LVS-PM-10 reference sampling inlet (2,3 m³/h)
to the specification of the European guideline **EN 12341**

- PM-10 Small filter inlet with integral filter (filter diameter = 47 mm) ;
LVS (Low Volume Sampler) Inlet to the specification of EN 12341 Annex B 1
- This EN reference method has to be used for quality check of all PM-10 sampling systems
- Single stage impactor with **integrated filter holder** for use with circular filters with a diameter of 47 mm;
- With special surface protection using an aluminum EMATAL surface,
- Includes special water separator and easily exchangeable impactor baffle plate
Tube connections: M 12 x 1 ; 1/4 inch and hose connector

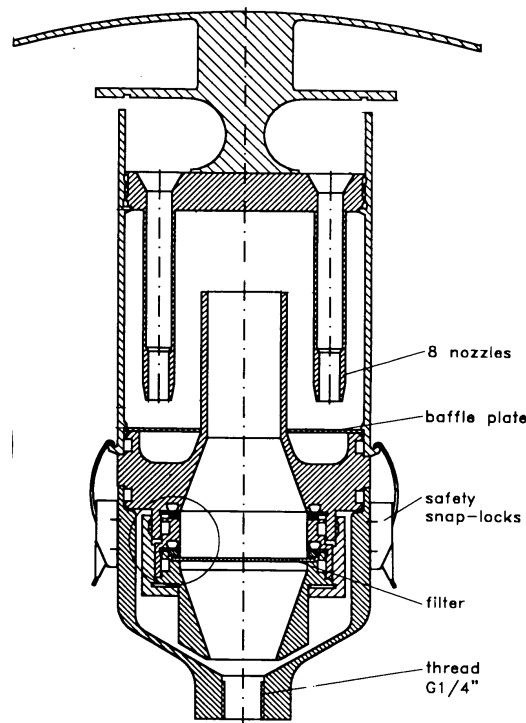


Diagram 2

New EU-PM-10–Reference Samplers to the specification of EN 12341

07.02.2000

Accessories for the EU reference inlet:

Ref.-No. **DPM2.5/2.3/01DP**

PM 2.5 nozzle plate to change a DPM-10/2.3/01 into a **PM 2.5 inlet** DPM 2.5/2.3/01

Ref.-No. **DPM10/10/1/00PP**

spare baffle plate (exchangeable)

2. Low Volume Sampler (LVS) with 16 filter cassettes (42545/65-A3): Reference Sampler to the specification of norm EN12341 at 2,3 m³/h FH 95 SEQ Sequential Particulate Sampler with EU-PM-10- small filter (LVS) device inlet

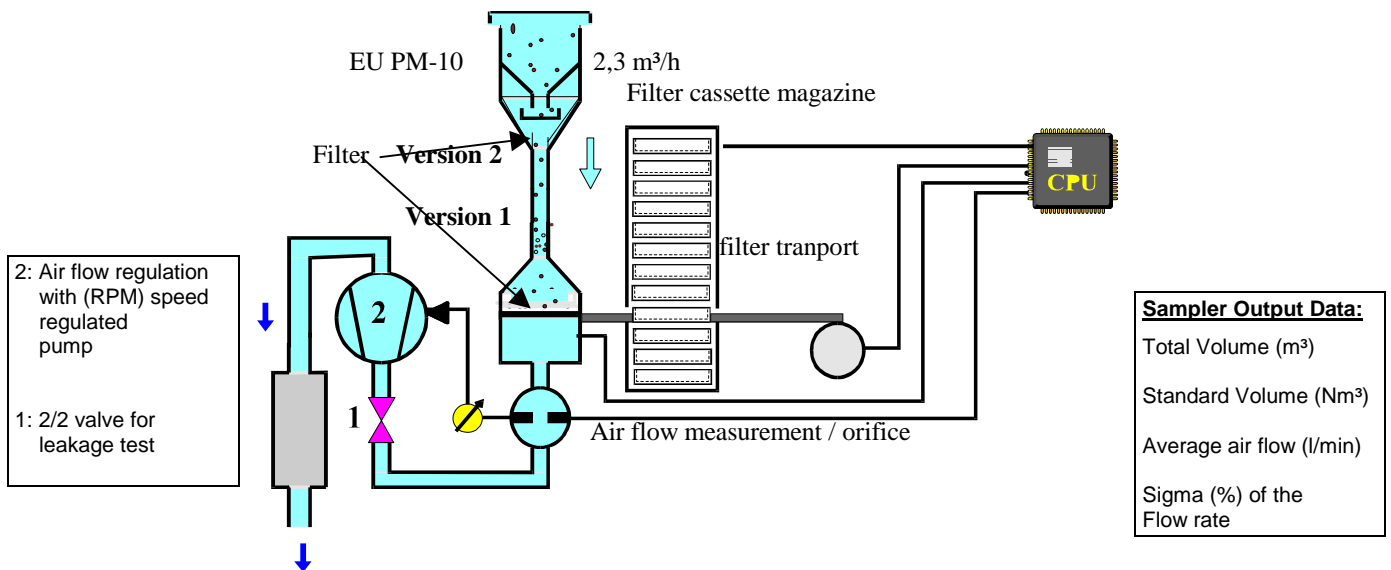


Diagram 3: Principle of Operation FH 95 SEQ (2,3 m³/h)

Version 1: Includes EU-PM-10 LVS inlet (EN 12341) + a **30 cm** long Extension Tube, sampling sequentially on the 16 filter cassette magazine (variation to EN 12341 LVS inlet)

Version 2: The filter holder is in the PM-10 LVS reference head (lower part)
The filter cassettes and the magazine are not used
= **EU-PM-10 reference measurement**

New EU-PM-10–Reference Samplers to the specification of EN 12341

07.02.2000

The FH 95 SEQ Sequential Particulate Sampler is designed for the automatic determination of the gravimetric mass concentration of suspended particulate in the ambient air.

The FH 95 SEQ (2,3 m³/h air flow) can be configured as two different versions. These two versions can be configured using easily installed adapters. As shown in diagram 2: the two adapters are easily inter-changeable (adapter 1: with integrated filter, adapter 2: without integrated filter, for sequential sampling on the 16 filter cassettes held in the magazine). →

Version 1: This version with EU-PM-10 LVS small filter inlet (EN 12341) has a 30 cm long sample tube and adapter no. 2. The dust is sampled on one of 16 filter cassettes held in the magazine. This allows automatic programmable filter changes over several days for daily (24hr) samples. This unit features a change to the EN12341 Reference Method as the sample location and filter holder are now 30 cm lower, under the inlet, and below the 30cm Extension Tube.

Version 2: This version has the LVS (Low Volume Sampler) Inlet to specification of the EN 12341 Annex B 1 and adapter no 1. The filter is integrated into the LVS head. The filter cassettes and the magazine are not in use (see Diagram 2). This configuration corresponds to the EU-PM-10 reference measurement.

By using the two adapters, easy changeover between the single sample and sequential versions is possible. Using the 16 position filter cassette magazine, with a 24 hour sampling period, the system has a unattended operating time of 16 days.

Diagram 3 shows the operating principle of the FH 95 SEQ.

Each filter is marked and its pre-sampling weight is determined. The filter cassettes are placed in the filter magazine. The filter holder opens and a new filter is transported into the sampling position with the slider. The filter holder closes.

At the programmed start time, the pump is switched on. After the sampling time has elapsed (or the stop time has been reached), the pump is switched off and the accumulated volume flow for the filter is saved in memory. The instrument shows the “WAIT“ status, and prepares for the second time interval.

When the second start time is reached the filter holder opens. The used filter cassette is moved out of the sampling position and stored in the filter magazine. A fresh filter is transported into the sampling position. The filter holder closes and the pump is switched on. This procedure continues until the last filter has been exposed (max. 16 filter cassettes). The filters are re-weighed, the mass of the particulate sampled being determined by the difference in weight. The volume of flow is measured and kept at a constant level by means of a variable-speed pump.

The FH 95 SEQ can sample onto a single filter several times. This is important for special investigations such as traffic related sampling at rush hour times.

Once in the filter magazine, all filter cassettes are separated to minimise the influence of volatile components from the other filters stored in the magazine.

New EU-PM-10–Reference Samplers to the specification of EN 12341

07.02.2000

1. PM-10 High Volume Sampler

According to the European **Norm EN12341** (Annex B2), this sampler should be employed as the HVS-PM10 reference device (68 m³/h) to demonstrate the equivalence of other measurement methods. (or No.1 as alternative).

The **Andersen PM-10 Hi-Vol System** is the most widely used sampler, world-wide, for measuring the fine particles with an aerodynamic diameter lower than 10 µm.

The sampler is EPA designated as an approved method for the determination of PM-10 concentrations: No. RFPS-1287-063.

The particles are sampled on a 8" x 10" filter. The Hi-Vol Sampler has an optional "brushless" brushless motor

Volumetric flow control

The flow control is accomplished by restricting the air flow through a venturi. At a point in the flow stream, the air velocity will equal the acoustic velocity, or speed of sound. This is referred to as "choking" and is a characteristic of all VFC's. The PM-10 Hi-Vol Sampler utilizes this principle of choked or critical flow to maintain a constant flow rate of 68 m³/h.

Features:

- Accurately Samples Particles less than 10 Micrometers aerodynamic diameter
- Hi-Vol outdoor shelter, anodized aluminum
- Brushless blower motor
- Digital Timer, air flow chart recorder
- US-EPA approval: Federal Reference Method Number: RFPS-1287-063
- Europe: EN 12341 - Norm-Reference Sampler



ESM Andersen Instruments

Frauenauracher Straße 96 • D-91056 Erlangen/Germany •
Postal address: Postfach 16 60 • D-91051 Erlangen/Germany
Phone [++49] 91 31/90 92 62 • Fax [++49] 91 31/90 91 56
eMail: esm.andersen@esm-online.de
Internet: <http://www.esm-online.de/Andersen/>