

MODEL KS-303.150.10

HIGH VOLUME FLOW CONTINUOUS SAMPLER FOR AIRBORNE DUSTS AND AEROSOLS, WITH PM₁₀ OR PM_{2,5} BY OPERATION OVER 24 HOURS, FOR MEASUREMENT OF IMISSION BY ANY EQUIPMENT, OR FOR WORKING PLACE AREA, BACKGROUND POLLUTION MEASUREMENT

MOBILE VERSION



NEW - ENERGY - SAVING - QUALITY

1. Purpose

The **KS-303.150.10** type sampler can be used for continuous (24 hours or more) measurement of airborne dust, aerosols, solid particles by fractions, in two stages. The chamber system, the annular nozzle, and the double impactor are installed on the sampler. It provides a daily 700 [m³] filtering capacity in respect of aerosols, airborne dusts, solid particles. This important air capacity provides enough concentrated air sample for the high precision analysis. So pollutant particles of industrial origin, bonded to the dust, such as carcinogens, heavy metals, radioactive materials, and materials which may cause genetic deviations can be detect, when the necessary laboratory analysis hardware is available.

There is a **PM10** type (10 [µm] cut off) size preseparator for the unit. So it can be compared with any beta ray dust concentration meter which have it's own **PM10** preseparator. In aiming to separate the dust fraction of **2,5** [µm] or **5** [µm] respirable dust fraction, cut off preseparator with corresponding sizes are available optionally. The suction device and the flowmeter make one integrated unit. In aiming to increase the accuracy of measurement, the temperature of the intake air is measured.

The controlling electronic unit stores all measurement data, and it can transfer them to a PC by a USB port. 24 hours measurement data can be displayed in printed or in a file form.

This measurement method is in compliance with the Hungarian Standard No. MSZ 21454/2 as well as with the ISO guide-lines. The **KS-303.150.10** type sampler is being a mobile version. The unit must be protected against dribble water and direct heat radiation.

2. Technical description

The equipment presented in the **Figure 1.**, can be used for sampling of high flow-rate airborne dusts over 24 hours. It consists of the following part units:

- Suction device integrated with the flow-meter.
- Preseparator double impactor stage, filter support casing with connection device.
- Suction tube, with connection and thermometer sensor.
- Side chamber vacuum pump with motor, cables electric armatures and support.
- Noise reducer on the delivery side.
- Measurement and controlling device, pressure and temperature transducer, connection wiring.

According to the EPA guide-lines outdoor deflectors reducing the effect of wind speed and direction are used. So the suctioned air passes the velocity reduction chamber (1), a short straight pipe (2) and the double impactor stage (3) where the big particles are separated on the deflector plates of this latter, see **Figure 1.** The smaller particles are trapped by the 150 [mm] plane filter (5) placed in the filter casing (4). The well purified air passes the elongation pipe (6), the lateral channel blower (7), the (8) exhaust pipe then it is rejected to the atmosphere. The flow-meter unit (9) processes the pressure difference signal from the VENTURI meter (11), the input temperature signal (10) and so calculates the volume flow-rate of the suctioned air [m³/h], the total volume [m³] tested during the sampling, and the total time of the sampling. The frequency controller provides automatically the slow flow-rate adjusting which is necessary due to the chugging of the filter.

3. Advantages and special services provided by the sampler

- The flow-meter incorporated in the suction device, provides the flow measurement of the currently suctioned air;
- The standard 10 [µm] impactor of the PM10 **Figure 1., 2.** is small size (86x37), teflon coated body, several times used in the practice;
- The dust mass trapped on the double impactor can be evaluated according to it's weight;
- The material of the deflector plates is the same as that of the terminal filter;
- The impactor body can be replaced without disintegration, in the same time as the terminal filter;
- All the sampling surfaces (suction head, VENTURI meter, double impactor, filter casing, filter support) are coated by Dupont teflon both on internal and external sides;
- The double stage impactor PM10 of the sampler may be replaced by PM5 (labour health) or PM2 type pre-separator impactor (for background pollution measurement) in function of the purpose of the measurement;
- There is no rotating elements in the sampler, excepted the motor;
- Automatic flow-rate control;
- All measured and adjusted data are stored in the control unit, the data can be transferred to PC in files, or they can be printed,
- Accuracy tested VENTURI meter;
- Noise level lower than 56 [dB];
- In case of power break down, the control unit stores the data for 48 hours.

The suction head and the filter casing can be removed by unscrewing the bolts on the elongation pipe. The dismantled filter and pre-separator casing is given in **Figure 3.** The plane filter support is a thick teflon coated plane plate, which provides absolute security in case of filter rupture.

4. Technical data

• Optimum flow-rate with preseparator	$q_N = 30 \text{ [m}^3/\text{h]}$
• Maximum flow rate	$q_{max} = 40 \text{ [m}^3/\text{h]}$
• Plane filter support sizes	$\varnothing 150, \varnothing 54/10, \varnothing 82/44 \text{ [mm]}$
• Pre-separator double impactor	$d(ae) = 10 \text{ [}\mu\text{m]} \text{ PM}_{10} \text{ or } 2,5 \text{ [}\mu\text{m]} \text{ PM}_{2,5}$
• Accuracy of the flow-meter	$2 \pm \text{ [%]}$
• Accuracy of flow rate controlling	$2 \pm \text{ [%]}$
• Height of the sampling	1450 [mm]
• Power supply and frequency	230 [V], 50 [Hz]
• Power consumption	750 [VA]
• Mass of the vacuum pump basis	17 [kg]
• Motor speed regulation	continuous by frequency adjusting
• Controlling of adjusted volume flow rate	automatic
• Space requirement	about 500x480 [mm]

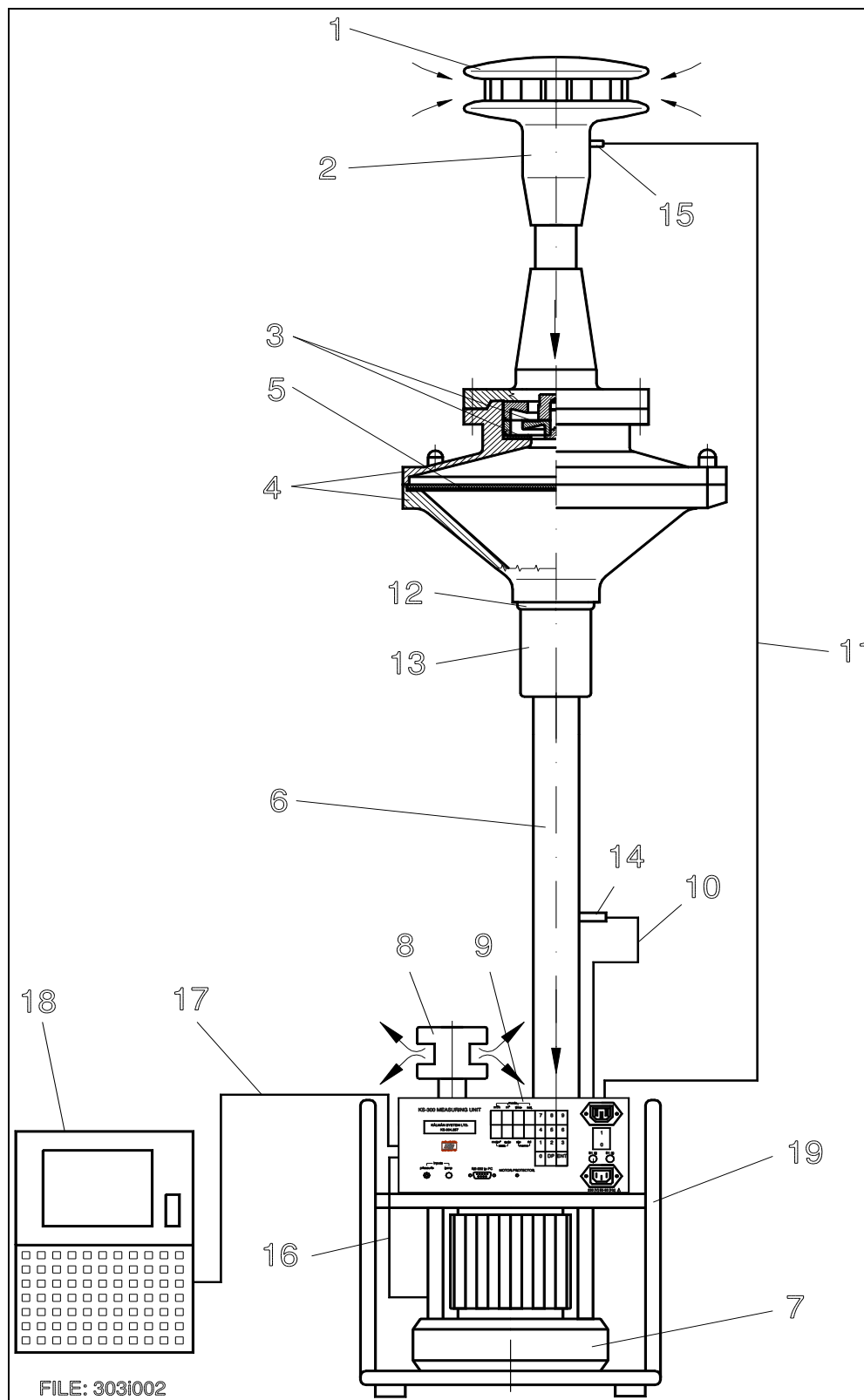


Figure 1.

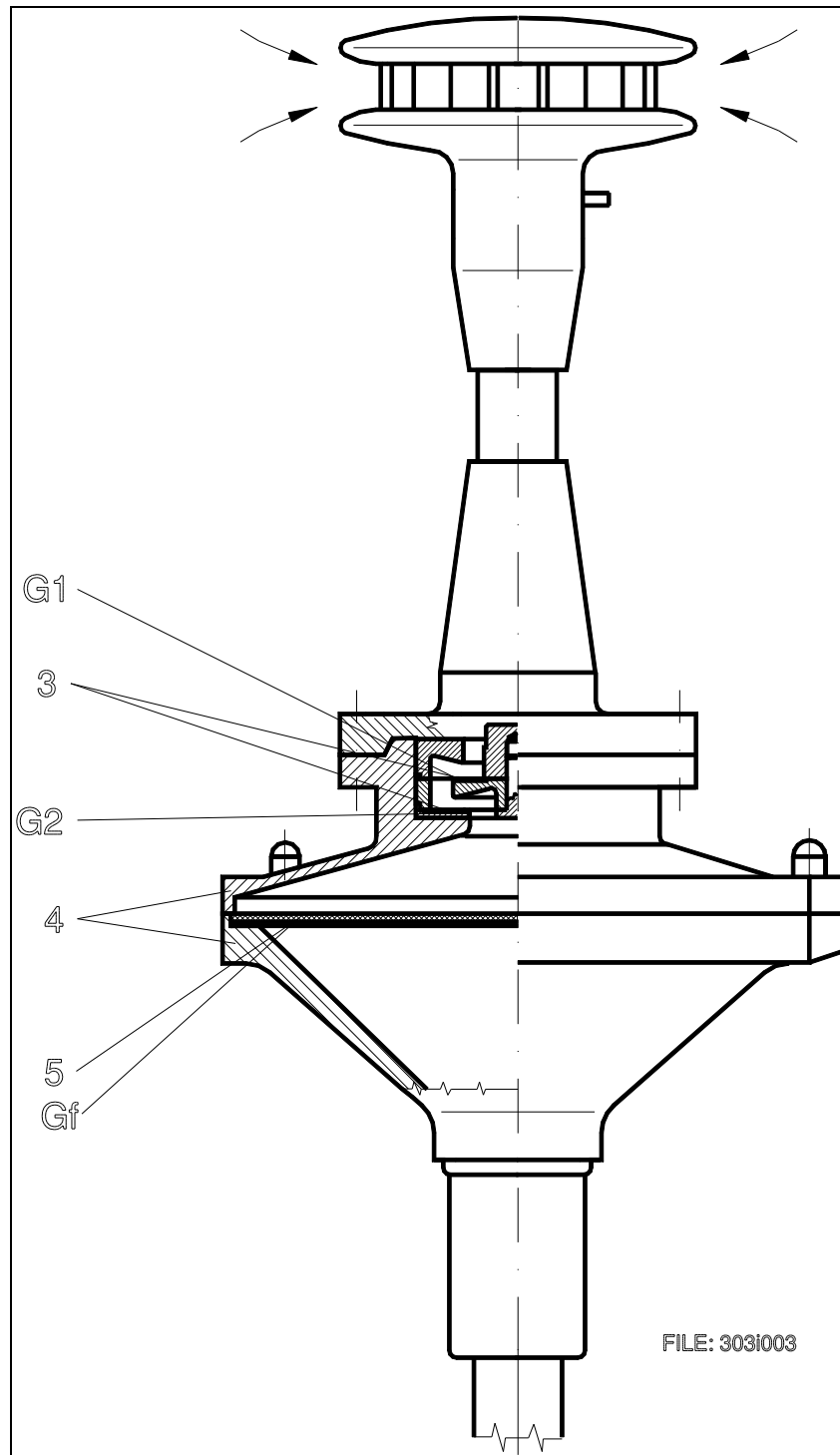


Figure 2.

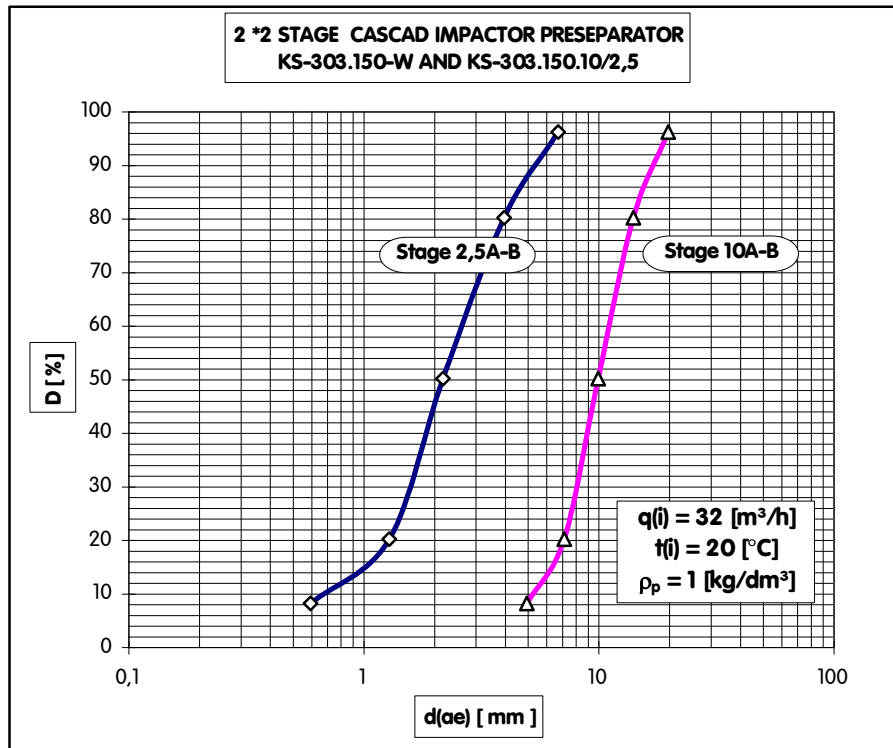


Figure 3.

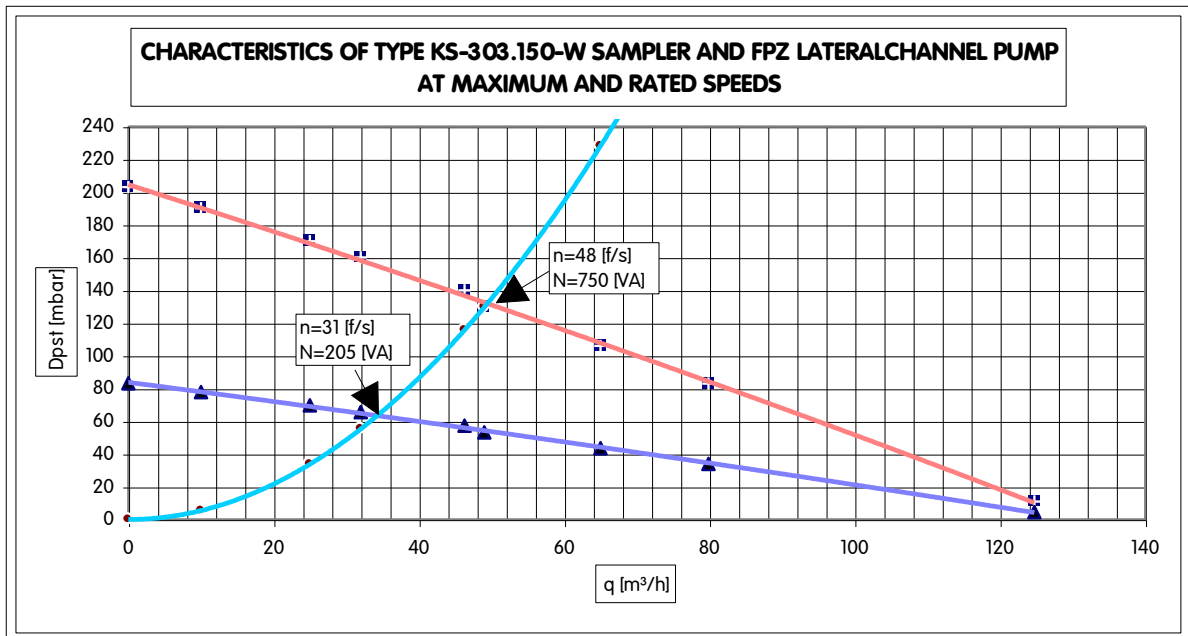


Figure 4.



Figure 5.



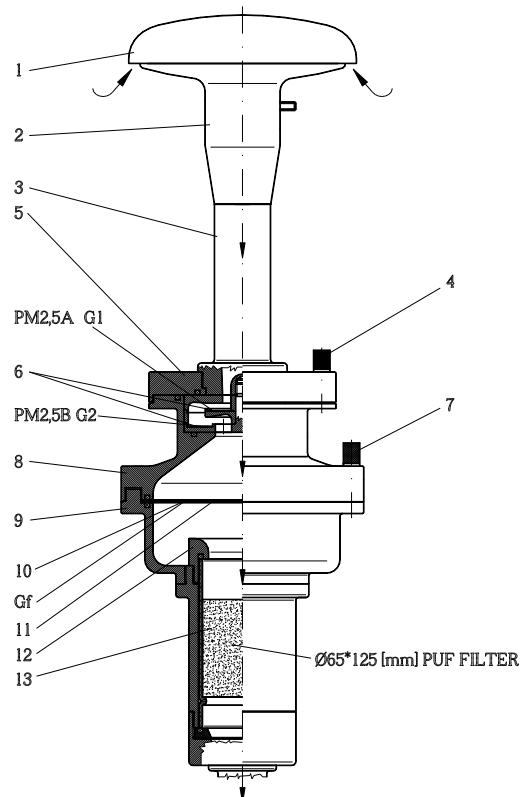
Figure 6.

5. Literature

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KS-303.150.10 + PUF



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