

MODEL KS-301-F

**HIGHT VOLUME FLOW SAMPLER FOR SOLID PARTICLES, AEROSOLS,
PAH AND PCDDS TSP, OR WITH PM10/PM2,5/1 PRESEPARATOR.
CONTAINER-MOUNTED VERSION
KÁLMÁN SYSTEM SINCE 1976**



1. Purpose

The HV sampler of type KS-301-F is suitable to perform continuous two stage (twenty-four hours or even longer) fractional sampling of airborne particles, solid particles and aerosols for time of periods Integrated with a chamber-type dual impactor provided with a circular gap shaped nozzle, the sampler enables 800 [m³] a day of airborne particles, aerosol, solid particles to be separated in two stages. The high volume of air gives enough concentrated samples to accomplish precise analysis of the contaminants. Thus after a sampling period of twenty-four hours provided that proper analytical facilities are available, the following elements can be detected:

- carcinogenic elements being adsorbed to dusty materials,
- heavy metals, radioactive elements,
- materials causing mutations,
- other toxic elements emitted by industrial processes to residential areas.

The instrument is equipped with PM10 preseparator of 10 [µm] cut-off size. As an option preseparators of PM2,5 [µm] PM1 cut-off size for measuring background contamination.

In order to increase the accuracy of the measurement, a thermometer is built in the suction unit. The electronic controller stores all the data and can be connected to USB port of a PC. The measurement obtained during a period of twenty -four hours can be stored in a file or can be printed. The method of measurement is in compliance recommendations of the EN 14907 standards. The KS-301-F sampler is built in a container.

2. Description of operation

The equipment presented in Figure 1. and 2. is a continuous high volume sampler, that consists of the following main parts:

- Suction unit and heated separation heads.
- Sampling pipe with container bypass, attachments, pipe supports.
- PM10 or PM2,5 preseparator, endfilter, suction pipe.
- Lateral channel blower attached to the engine with connection cord, electric appliance, base frame, vibration absorber.
- Measurement and control unit with connection cables, pipes and wires for pressure and temperature measurement, respectively.

From the inlet air flowing through the sampling suction unit /1/, short straight pipe section and air volume flow meter (2) the dust particles of larger will be separated by the double impactor stage - /3/, see Figure 1. -. The suction unit is designed according to the EPA recommendations and is provided with deflector bars that reduce the effects of wind speed and changes in wind directions, as well as a chamber to reduce the air speed. The particles of smaller size are separated by a filter plate of diameter 150 [mm] - /5/, Figure 2. - mounted in the filter case - /4/, Figure 2. -. Air of high pureness will be vented via the extension pipe /6/, lateral channel blowers /7/, - see Figure 1- , exhaust pipe /8/ to the atmosphere. The volumetric flow meter and evaluation unit /9/ measure the volume of intake air [m³/h], and the total volume of air flow through during the process of sampling [m³] and barometric pressure [bar] abs. and temperature of the intake air [°C] as well as the duration of sampling process.

Slow changes in volumetric flow due to clogged filters will be compensated and the volumetric flow maintained at a constant value by means of the frequency controller /9/.

3. Special advantages and features of the sampler

- Teflon-coated, small size - Ø 86*37 [mm] - impactor body tested and proven in practice,
- dust caught on the dual impactor can be evaluated by weight,
- identical materials used for catch plates and end filter,
- impactor body can be replaced at the same time as the end filter without the need of disassembly,
- the entire sampler surface - suction head, dual impactor filter cage and filter support - have been coated inside and outside using Dupont Teflon,
- the dual impactor stage of the sampler can be replaced, or replaced with spacer ring, as required by the measurement at hand,
- specially designed and precision-calibrated air volume flow meter,
- noise level less than 56 AdB, heatible insuction tube,
- custom-designees small-size hardware and software,
- outer temperature and atmospheric pressure measuring.

4. Technical data

- Nominal volume flow without impaktor: qN = 48 [m³/h]
- Nominal volume flow with PM10 preseparator: qN = 30 [m³/h]
- Nominal volume flow with PM2,5 preseparator: qN = 30 [m³/h]
- End filter diameter: D = 150 [mm]
- Preseparator: PM 10/ or PM2,5
- Material of preseparator catch plates: Quarz or glass f. filter
- Precision of volume flow measurement: ± 3 [%]
- Precision of volume flow control: ± 3 [%]
- Automatic programmable sampling: 24 different time values
- Surface coating of sampler surfaces: approx. 40 [µm] Teflon
- Motor power consumption: 750 [W]
- Heating power consumption: 600 [W]
- Mains voltage, frequency: 230 [V], 50 [Hz]
- Footprint: approx. 700*700 [mm]
- Software AR-COM 301F
- PC communication USB

MODELL: KS-301-F
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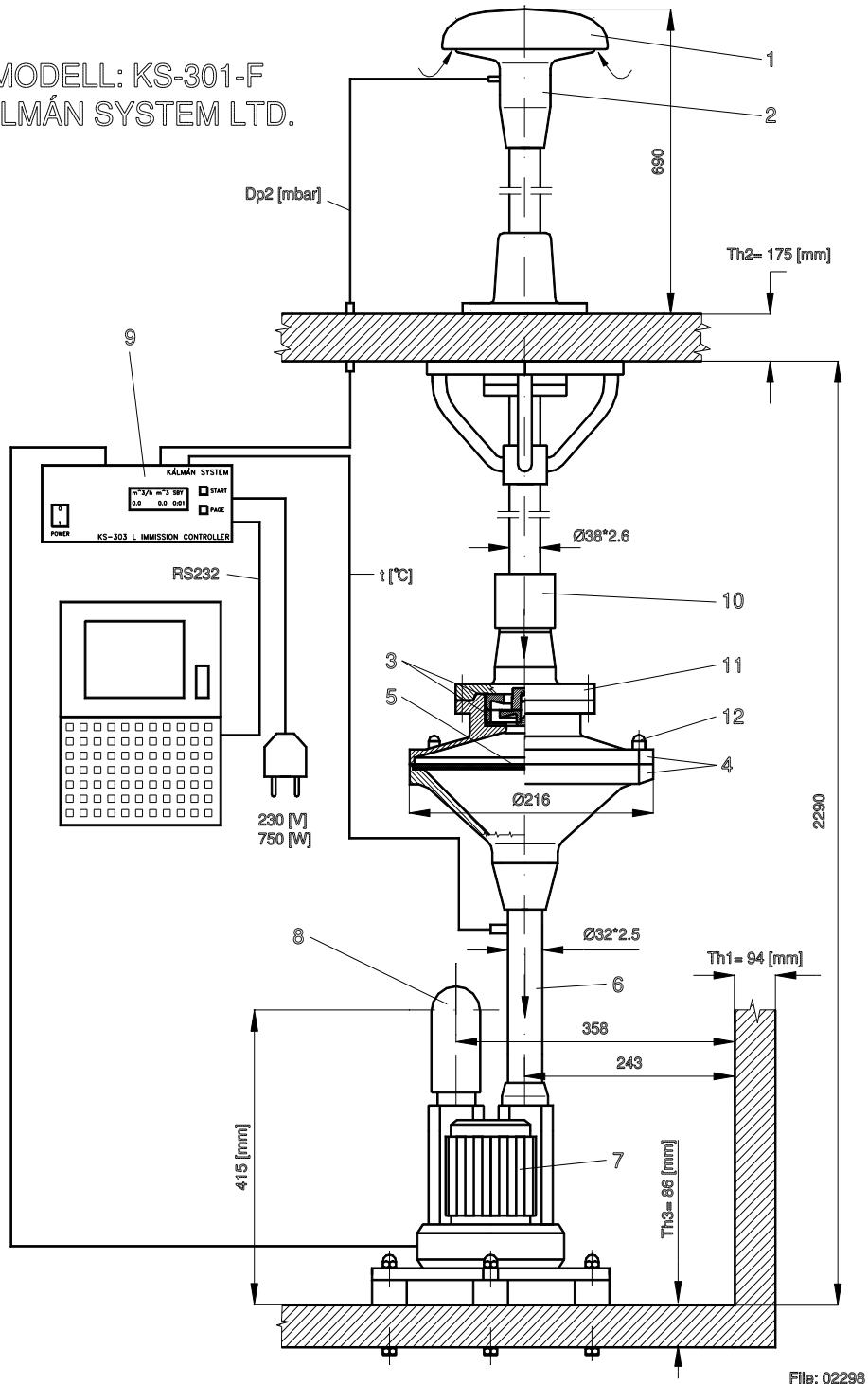


Figure 1.

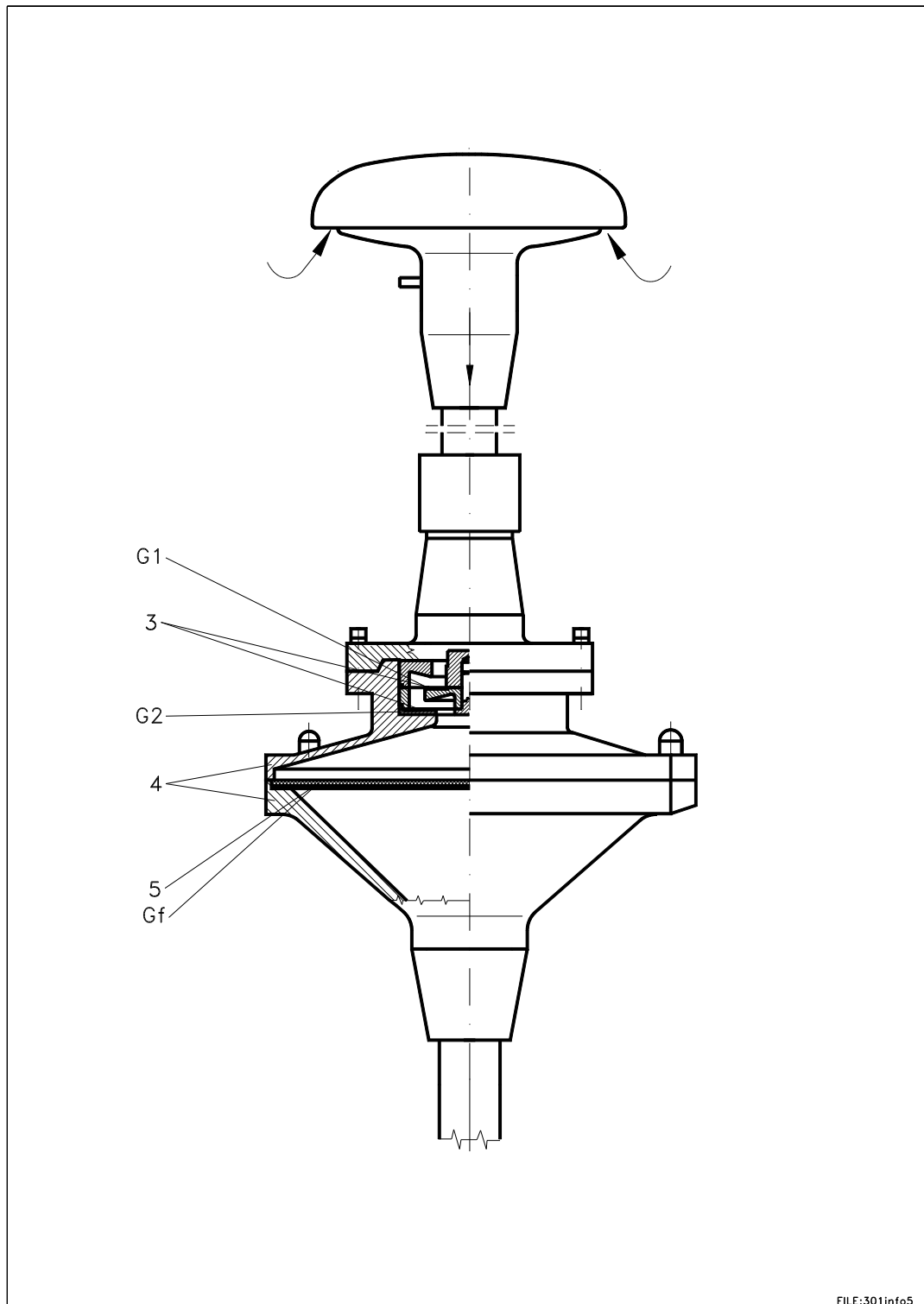


Figure 2.

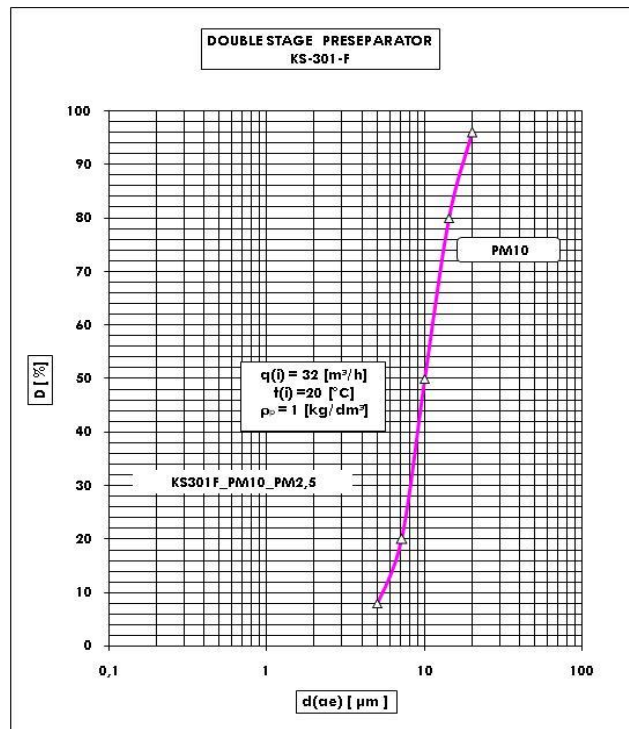


Figure 3.

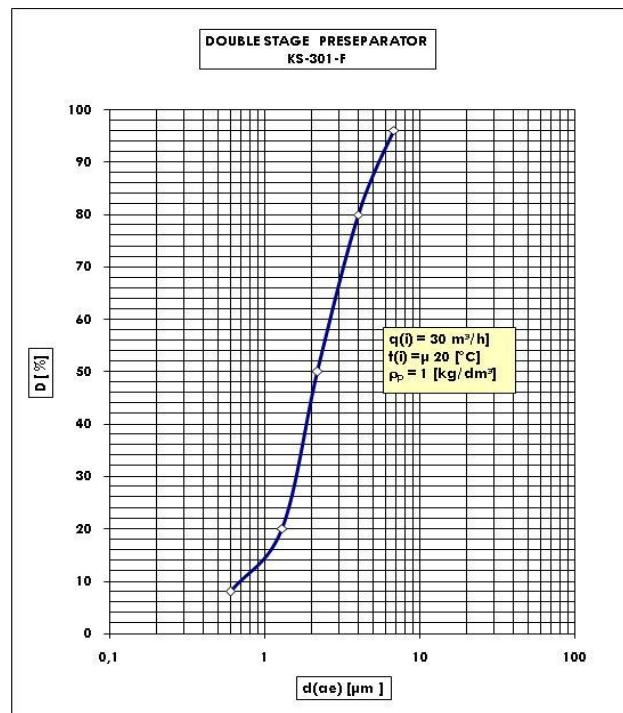


Figure 4.



**Közép-Tisza-vidéki Környezetvédelmi,
Természetvédelmi és Vízügyi Felügyelőség
Környezetvédelmi Laboratórium**

5000 Szolnok, Tiszaliget

Tel./Fax: (06 56) 428-150
Web: <http://www.kotiktfv.kvvm.hu>

Postacím: 5002 Szolnok, Pf. 25
E-mail: ktkvflabor@ktkvf.kvvm.hu

CERTIFICATE

This is to certify that the
Environmental Protection Laboratory of the
Central Tisza Regional Inspectorates for Environment, Nature and Water
has performed the equivalence test of the
KS-303.150.10 type airborne dust sampler with PM10 preseparator
of the

Kálmán System Ltd. H-1125 Budapest, Trencsényi u. 16.
LTD FOR THE DEVELOPMENT MANUFACTURE AND MARKETING
OF INSTRUMENTS FOR ENVIRONMENT PROTECTION
according to the MSZ EN 12341:2000 standard:

"Air quality. Determination of the PM10 fraction of suspended particulate matter.
Reference method and field test procedure to demonstrate reference equivalence
of measurement methods."

Based on the measurements performed according to the standard,
we certify that the chamber type double stage impactor (with annular slit nozzle) PM10
preseparator of the KS-303.150.10 type airborne dust sampler
fulfills the - $Cl_{95} \leq 5 \mu\text{g}/\text{m}^3$ - the comparability conditions, and the equivalence with the
reference instrument.

Certificate Number: 6/2005

Szolnok 15. July 2005.



Nagy Gábor



Ember Albert

Laboratory Director Közép-Tisza-vidéki Környezetvédelmi, Természetvédelmi és Vízügyi Felügyelőség
Measurement Director
KÖRNYEZETVEDELMI LABORÁTORIUM
5000 Szolnok, Tiszaliget
Tel./fax: 56/428-150

5. Literature

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