

Virtual Impactor

PM2.5 Sampler for Flue (Model VI-PM2.5)



Conforms to JIS · ISO sampling method of PM 2.5 / PM 10 in flue exhaust gas
(JIS Z 7152 / ISO 13271)



Summary / Feature

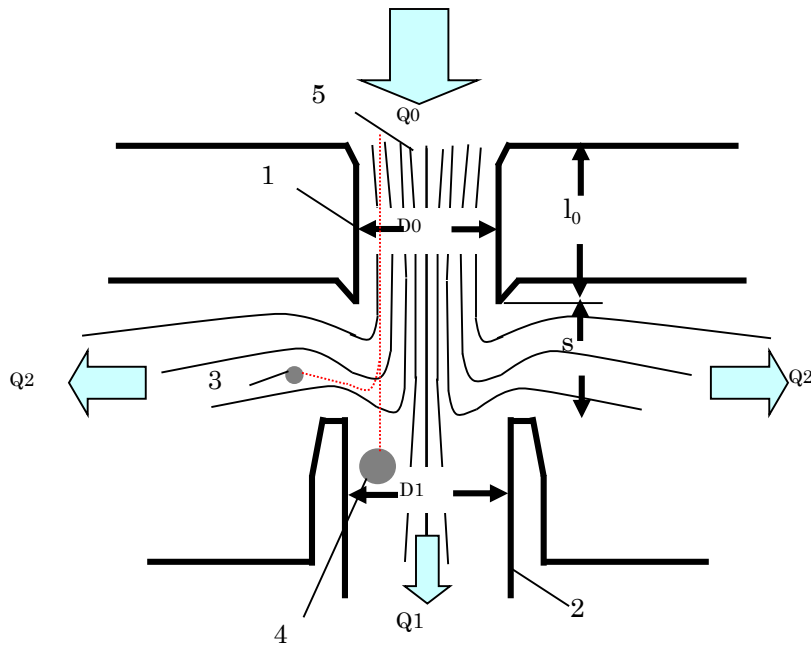
Virtual impactor VI-2.5 is a product which can classify and sample a particle group into three types such as over 10 μm , 10 ~ 2.5 μm and below 2.5 μm , using a two-step virtual impactor.

Different from the traditional cascade impactor system or cyclone system, the virtual impactor system has a structure that prevents particle re-scattering or rebounding and thus enables to measure particles in the flue more accurately.

Moreover, by use of digital monitoring unit which displays instant / integral suction flow rate and data logger, the record can be left when sampling and the flow monitoring work could also be reduced.

This product conforms to JIS Z 7152: 2013 「Measurement method of PM 10 / PM 2.5 mass concentration in exhaust gas by virtual impactor」 and ISO 13271: 2012.

Principle of Measurement



- 1 Particle acceleration nozzle
- 2 Particle collection nozzle
- 3 Locus of the fine particles in the mainstream
- 4 Locus of the coarse particles in the side stream
- 5 Gas stream line
- D_0 Particle acceleration nozzle diameter
- D_1 Particle collection nozzle diameter
- l_0 Particle acceleration nozzle length
- s Distance from exit of particle acceleration nozzle to entrance of particle collection nozzle
- Q_0 Total flow rate
- Q_1 Flow rate of the side stream
- Q_2 Flow rate of the mainstream

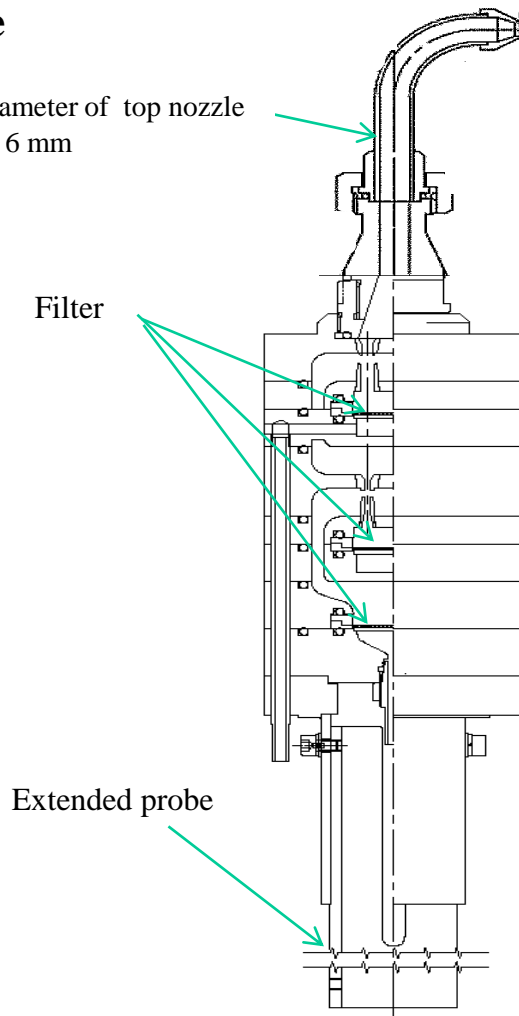
The classification of virtual impactor is based on the principle that when particles accelerate or slow down in a gas flow, particles swerve from the streamline of gas by inertia. The main parameters which determine operating principle and performance of classification stage are shown in the upper figure.

First, the basic composition of classification part is made of a particle acceleration nozzle and a particle collection nozzle. They are in the same axis and the diameters are D_0 and D_1 respectively.

Next, sampled gas flows through the nozzle and is accelerated according to D_0 and the total flow, and then the part of the flow goes to the direction of the collection nozzle. The flow rate which flows through a particle collection nozzle (called side stream flow rate) is about 10% of the total flow rate, and the main portion (the mainstream) of the flow changes direction and bypass the collection nozzle. As a result, particles which are larger than a certain diameter of aerodynamics (cut-off size) accompany with the side stream and go through the collection nozzle, and then are collected on a collection filter. Particles which are smaller than cut-off size move to next classification part accompanied with mainstream.

Structure

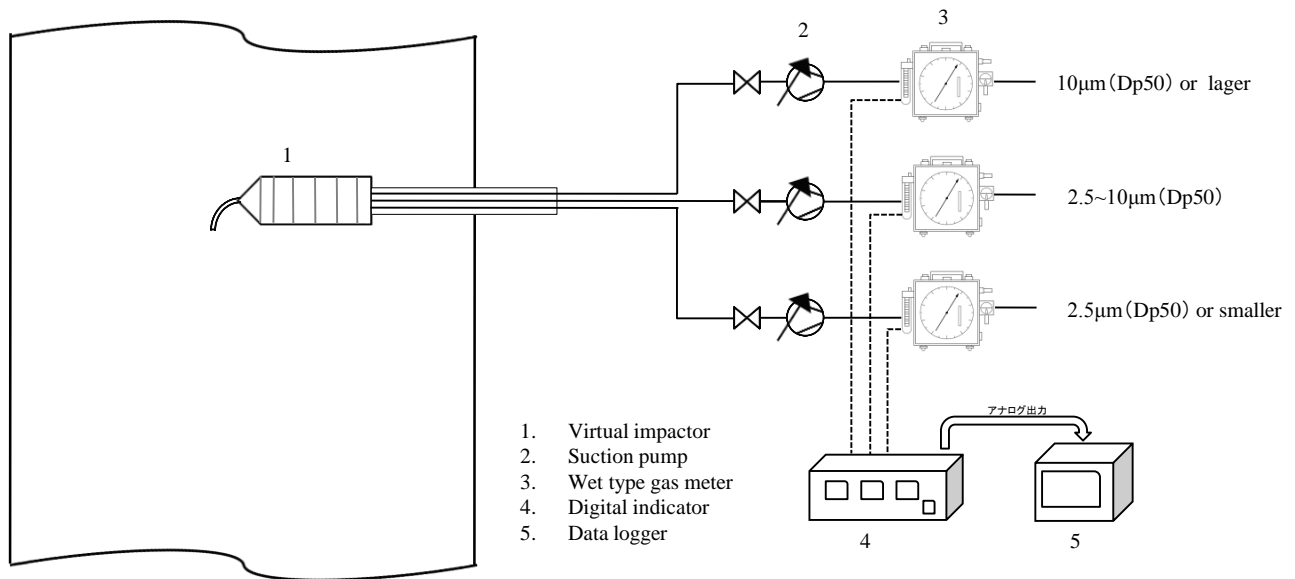
5 types of inner diameter of top nozzle
 ϕ 3.5, 4, 4.5, 5, 6 mm



model	items
VI-2.5Z	A set of Virtual Impactor VI-2.5 Including the model with ※ mark (VI-101, 102(selectable nozzle diameter), 107, 108)
※VI-101	Virtual Impactor, body
※VI-102	Nozzle 3.5mm, made from titanium, type L
VI-103	Nozzle 4.0mm, made from titanium, type L
VI-104	Nozzle 4.5mm, made from titanium, type L
VI-105	Nozzle 5.0mm, made from titanium, type L
VI-106	Nozzle 6.0mm, made from titanium, type L
※VI-107	Carrying case
※VI-108	Probe tube, made from SUS, length : 80cm
VI-109	Suction pump for the 10.0 μ m sampling line
VI-110	Suction pump for the 2.5 to 10.0 μ m sampling line
VI-111	Suction pump for the 2.5 μ m sampling line
VI-112	Wet type gas meter for 1L, with center cable
VI-113	Wet type gas meter for 5L, with center cable
VI-114	Digital recorder
VI-115	Digital indicator, with 3 lines
VI-116	Stand for impactor

※ Please feel free to contact us for more information about nozzles of other sizes as well as probe tubes.

Flow Diagram



* Please do not hesitate to consult about line composition.

Specification

Virtual Impactor		
Outside dimension	V.I body	L150mm × φ77mm
Suction nozzle	Tip diameter	φ 3.5mm/ φ 4mm/ φ 4.5mm/ φ 5mm/ φ 6mm (selective)
Suction flow rate	V.I. body	PM2.5: 10.3 L/min 2.5-10 µm: 1.2 L/min Over 10 µm: 1.0 L/min

Option		
Digital Indicator	3 lines indication (10µm, 10-2.5µm, 2.5µm)	Indicate instant flow rate and integral flow rate
Digital recorder	Sampling time, integral flow rate etc.	Record large quantity of detailed information
Wet type gas meter	10µm or larger Sample line ※1	W-NKDa-1B
	2.5~10µm sample line ※1	W-NKDa-1B
	2.5µm or smaller Sample line ※1	W-NKDa-2.5B
Sampling pump	Every Sample line	Please inquiry for more information
Sampling hose	Every Sample line	Please inquiry for more information

※1 Cut off diameter means 50% of separate efficiency

* Please contact us if you want a different specification or line composition. * The specification may be changed without notice.

Dylec TOKYO DYLEC CORP.

Head Office:
 Naitocho Bldg, 1 Naito-Machi, Shinjuku-Ku, Tokyo 160-0014, Japan
 TEL: +81-3-3355-3632 FAX: +81-3-3353-6895

Nishinohon Office:
 53-4 Nakagoryo-cho, Higashikujo, Minami-ku, Kyoto 601-8027
 TEL: +81-75-672-3266 FAX: +81-75-672-3276

<http://www.t-dylec.net/> e-mail: info@tokyo-dylec.co.jp