

WADOS

Wet And Dry Only precipitation Sampler

Precipitation-Collector that automatically separates wet-only and dry-only deposits

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Samples wet-only-precipitation and dust-fall for later chemical analysis

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Can be combined with an Automatic Sample Collector, which automatically changes the sample-bottle. Capacity: 20 x 1 l - bottles

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Made in accordance with the requirements of OECD and WMO concerning the "WET ONLY PRECIPITATION SAMPLING"



WADOS mounted on the roof
of a Container



Automatic Sample Collector
inside of a Container

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Automatic Sample Collector, internal view



Outdoor – Application: WADOS with a Housing for the Automatic Sample Collector



Special Features

Basically the unit consists of two containers symmetrically placed on a cross-arm.

A common lid is moved through a driving mechanism, controlled by an electronic device to cover either the one or the other collecting funnel. A precipitation detector senses rain or snow and communicates with the electronic controlled driving mechanism.

- The collecting funnels meet the standard of WMO and ISO. They are made of Polyäthylen and have a catchment orifice of 314 cm².
- The wet only collecting funnel and the sample-bottle is separated by a narrow pipe to minimize a vaporation. The sample-bottle is made of Polyäthylen too and has a volume of 1 l, optionally 2 l.
- The sample-bottle can be easily detached by unscrewing it.
- The special design of the WADOS and the robust mechanism provide high reliability especially under severe conditions like strong wind and snow-fall.
- The driving mechanism is fitted out with a strong motor.
- The lid is designed with a ball-and-socket joint and seals the collecting funnel even when it is not in a correct position.
- The controlling circuit of the driving mechanism has some special features:
It ensures a permanent current controlled pressure between the lid and the funnel. When the lid touches the rim of the funnel, consequently the motor requires more current and indicates to the electroni circuit to switch off. It is triggered at a certain height of the current which is proportional to the pressure. This pressure is important for a proper seal.
The motor power rises up automatically when e.g. ice blocks the driving mechanism. In addition, the direction of the movement alternates automatically several times. The lid tries to close the container again and again (max. 8 times) till the ice is broken away.
- The collecting funnel of the wet-only part is fitted out with a controlled heater. The temperature is held at 8°C to melt snow and ice precipitation.
- Power requirement: 16 VAC, 1 A for the driving mechanism and precipitation detector. 24 VAC, 3,5 A for the heating unit.
- All inputs are protected against overvoltage.
- Precipitation Detector senses the beginning and the end of any precipitation by measuring the resistance of a copper grid. It is in the form of a cone so it can sense the precipitation from all direction.
A protectional tube surrounds the rain detector cone. Safeguarding it is from heavy wind and pollution caused by birds. A ring is situated on the top of the sensing cone to catch hail and ice-pellets and causing them to melt.
The electronic device of the detector has a special heating unit. It controls the surface temperature: The temperature remains constant at 20°C and rises to 50°C when the precipitation occurs. The high temperature will evaporate the remaining drops after the rain has finished.
The detector communicates with the electronic device which controls the movement of the lid. It responds to the signal by opening and closing. To prevent excessive back and forth movement of the lid at extremely light precipitation, a time delay for return of the cover is incorporated in the control circuit. On the other hand the lid opens immediately at the beginning of rain-fall.

Working Principle:

When the precipitation detector senses precipitation, the lid which has protected the wet-only container shifts to the dry-only container in which the dust-fall-out is collected. The collecting funnel of the wet-only part is now open and the water is gathered and funneled into a sample bottle. A filter situated over the bottle prevents the deposits of leaves etc. The bottle is housed in the upper part of the tube which blocks out heavy light. It can be easily detached by unscrewing it. Normally the sample is minimal enough to be poured into a small bottle. This sample can easily be stored in a refrigerator.

The wet-only part of the WADOS is designed with a heating unit which melts snow and ice precipitation. The heating device is situated in the base of the collecting funnel. Therefore the snow will not melt immediately. It will only melt when the lid is returned back. The purpose of this procedure is to minimize loss through evaporation. The heater is controlled by a thermostat and the temperature is held between 8 and 10°C. Normally the water will freeze again when it is drained into the sample bottle.

The dry-only deposit is collected in the dry-only container. To get the dry-only sample the whole container is put away and changed through a new one. There exists different methods to get the dust-fall out: One can put distilled water or an adhesive film into the collecting funnel to bind the dust-fall.

Options:

Automatic Sample Collector:

It is a box with 20 sample-bottles in it, each with a volume of 1 l. A "pipe-finger" controlled by a clock rotates and changes automatically to the next bottle every day. The whole box is held continuously at a temperature between 2 – 6 C° by means of a refrigerator unit and a heater unit. Both are controlled by an electronic thermostat.

A fan takes care of a good temperature-spreading inside the box.

The box is the size of a common refrigerator. A pipe connects the wet-only part of the WADOS and the automatic sampler. It is mounted instead of the sample-bottle. The pipe itself is made on Teflon and surrounded by a stainless-steel tube. This tube protects and isolates the pipe which is fitted out with a controlled heater to avoid freezing the water running down.

The pipe has a length of 2,5 m. In the most cases, the automatic sampler is housing in an airpollution-measuring container and the WADOS is attached outdoors and fixed on the side-wall of the container.(see picture on the first page). For this purpose a special device to seal the hole in the wall will be delivered.

Housing for the Automatic Sample Collector:

For Outdoor –Applications, the sampler can be housed in a small container, mad of Al or stainless steel as an option. It has a mounting pole to attache the WADOS. The connection between WADOS and Automatic Sample Collector is obtained by a short pipe which is situated inside the tube.