

“*Capteur Individuel de Poussières*” (CIP 10) The Individual Dust Collector, was developed on the basis of theoretical studies on the cyclonic and anticyclonic flow, conducted by E. Quinot in the mid 20th century. The first instrument based on this principle, the Turbo-sensor is described by Quinot and Kueffer ⁽¹⁾. The Turbo-sensor was developed using a vacuum rotary cup.

Following on that work, the Centre for Studies on Coal Research of France (CERCHAR) developed the dust collector 3 CPM (Mining Dust Sensor Dust) which used a rotary cup filled with polyurethane foam ⁽²⁾. It was equipped with a cyclone particles selector to separate fine dust which was collected in the cup. The unit was operated at an air flow rate of 3 m³ / hr (50 L / min) and was designed for area measurements. This device became the dust sampler of reference for *Charbonnages de France*.

In the 1970's, Mr. Paul Courbon, Head of the Dust Laboratory at CERCHAR developed and patented the personal sampler version, consisting of a spinning cup equipped with a polyurethane foam. That version, is the present day CIP 10 with a flow rate of 10 L / min.

In further refinement, the fine fraction of dust was separated by a separate size selective foam selector. The sampler was tested at Charbonnages de France and the US ⁽³⁾ Mine Safety Health Agency.

Reservations were expressed about the operation of its selector. A new selector was developed in collaboration with the Laboratory of Aerosol INRS (National Institute for Research and Safety) and tested by the same laboratory ⁽⁴⁾. The rotary foam filtration efficiency was also measured as a function of the rotational speed of the cup ⁽⁵⁾.

After these refinements, the personal aerosol sampler CIP 10 was widely deployed into Charbonnages de France and in the mineral extraction industry (quarries).

The first to commercialize the CIP 10 sampler was Sensidyne Corp., and subsequently HTML and finally ARELCO (Tecora today). The initial patent CERCHAR was successively transferred to these corporations.

The results of the sampling measurements of physical efficiency as a function of aerodynamic diameter of the particles and evaluation of the performance of the CIP 10 for the capture of respirable aerosols were published after an international study 2001 ⁽⁶⁾.

The Metrology Laboratory of the INRS Aerosols contributed to the development of new versions of the CIP 10. Successively device, the selector of the thoracic fraction ⁽⁷⁾ and the selector of the inhalable fraction ⁽⁸⁾ were developed.

Also the INRS, developed a rotary cup for collecting the particles in a liquid substrate, for sampling microbiological aerosols ⁽⁹⁾. All these developments were patented by INRS.

The use and calibration of the sampler CIP 10 are described in detail in a recent French standard ⁽¹⁰⁾.

References

Editor's note: All these references can be found in our literature section on our website

www.airsamplingdevices.com

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