

The TwinHead is a special version of the Cambustion SCS which allows realistic reproduction of human cigarette smoking, dilution, retention and exhalation of the smoke. It is suitable for:

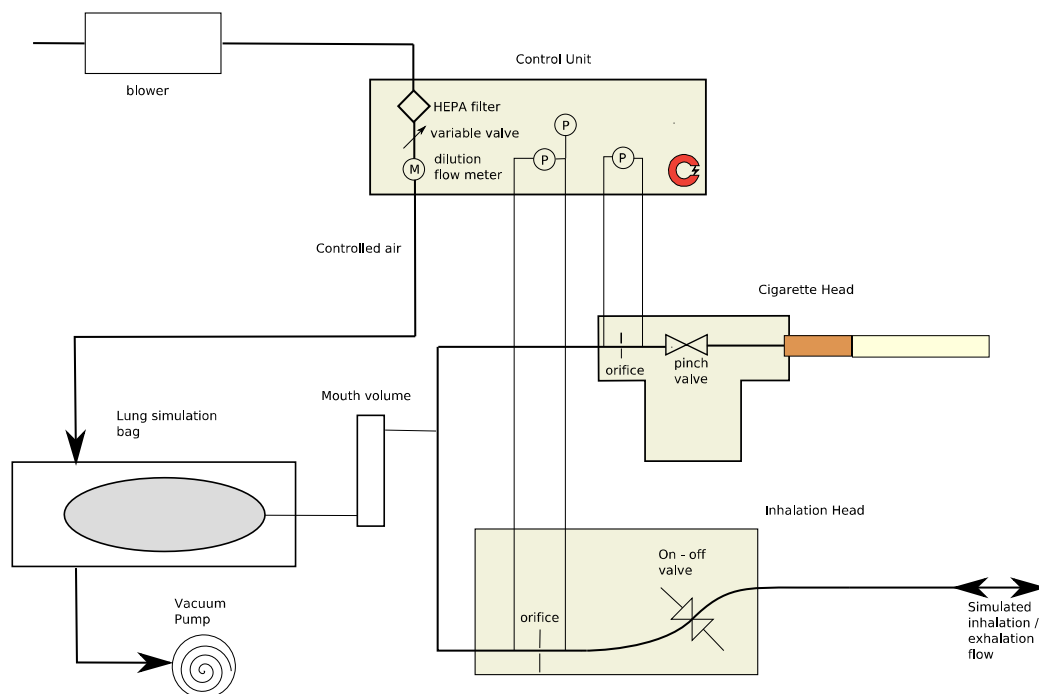
- Sidestream exposure & passive smoking investigations
- Retention studies
- Testing of artificial mouth & lung models
- Testing of human smoking measurement equipment.

In addition, the TwinHead SCS can be operated as a normal SCS for investigations of directly inhaled cigarette smoke.

Lung Simulation Configuration:

For studies into the retention of cigarette smoke in lung models, and for investigation of passive smoking and environmental exposure, the SCS TwinHead is used with a lung simulation bag:

Constant Flow Inhalation Simulator Configuration



The cigarette is mounted in a head which includes an orifice flow meter and a valve to stop the flow completely between puffs on the cigarette.

The inhalation head is similar but with an orifice and valve sized for higher flow rates.

The flow through the whole system is driven by inflation and deflation of the lung bag, which is controlled by air pressure in the chamber around it. The system incorporates automatic detection of lung full & empty conditions.

In typical operation, the system would control an inhalation through the cigarette, which would be retained in the mouth volume for a short time before dilution and transfer into the lung bag by an inhalation through the higher flow head. This would be retained in the lung volume for a period of time for particle agglomeration and aging before exhalation.

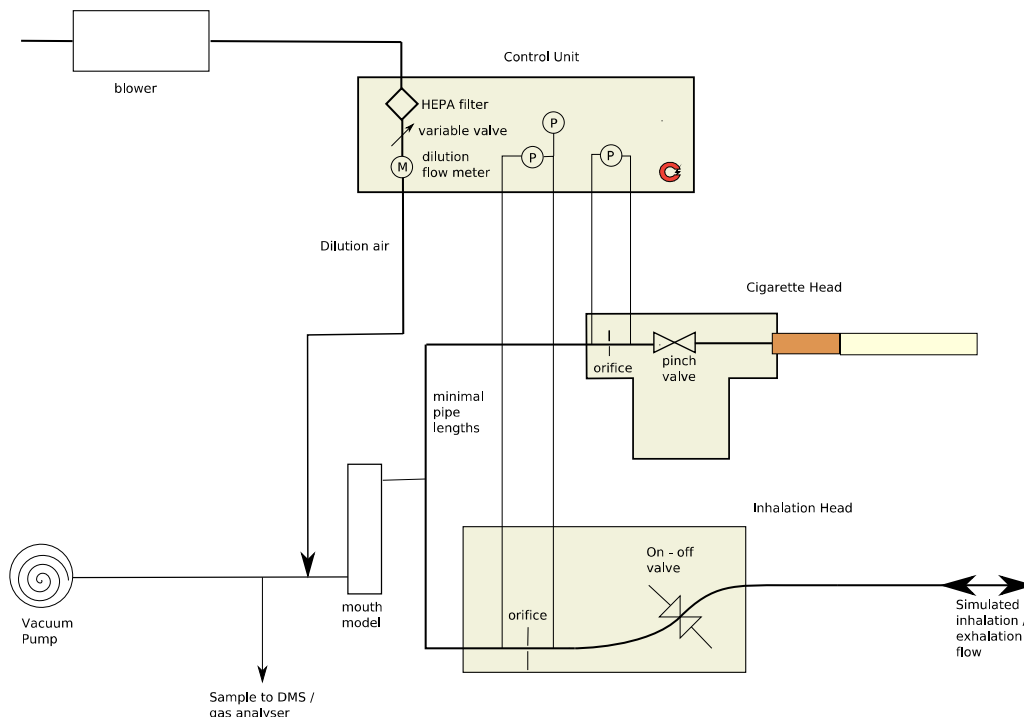
Early generation lung models can be mounted inside the bag to simulate deposition and growth more realistically.

For retention studies, the aerosol is typically sampled from the exhaled stream. In exposure studies, the cigarette and inhalation heads would be mounted in a chamber representing a typical room, and gas and aerosol measurements made of the accumulated smoke from exhalations and the cigarette smouldering between puffs.

Inhalation Sampling

The SCS can also be used for direct measurement of the inhaled cigarette, including only the effect of dilution and mouth processing. This configuration is appropriate for acquiring input data for computer lung modelling, and for validation of computer mouth models:

Lung Simulator Inhalation Sample Configuration



The system provides dilution into a constant total flow, making data processing easy as the time integrated concentration measured by the analyser is proportional to the total mass produced by the cigarette. This eliminates the need to correlate the concentration measurement with the varying cigarette flow.

Specifications

Cigarette flow rate	0-5 slpm (83 cc/s)
Breathing flow rate	-100 - +100 slpm (inhalation & exhalation)
Flow profile data rate	10 – 25 S/s
Lung volume (standard)	5 litre



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