TROX® TECHNIK
The art of handling air

FUME CUPBOARDS TO COMPLY WITH VARIOUS SAFETY OBJECTIVES

Fume cupboards are essential for laboratory work. Personnel and working materials are protected from contamination and potentially hazardous gases, dusts and aerosols as the air is removed from the room in an isolated manner. They perform a wide variety of protective tasks, for which the safety of the people working in the room is always the top priority. According to EN 14175, certified fume cupboards must meet three safety objectives:

1. Containment: gases, vapours and dusts must not enter the laboratory from inside the fume cupboard in dangerous concentrations

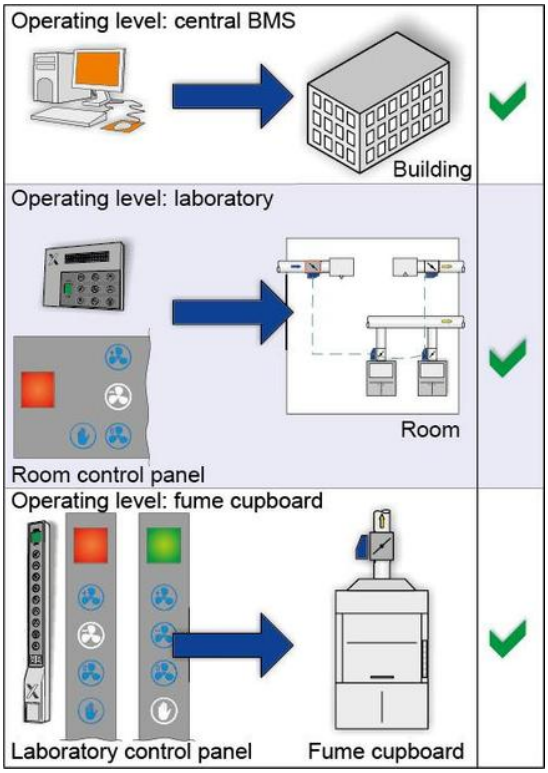
2. Purging: No explosive atmosphere may form inside the fume cupboard

3. Splash and shatter protection Laboratory personnel must not be harmed by flying parts or splashes

Compliance with the above points is ensured by the design of the fume cupboards and various control options. Individual demands on the ventilation control system, for example, due to architectural or operational conditions, can be directly and comprehensively taken into account with customised solutions from TROX. Our fume cupboard control systems are certified and meet the above protection goals at all times.

To your individual consultation!

NUMEROUS CONTROL OPTIONS FOR INDIVIDUAL REQUIREMENTS



For control options of fume cupboards, a distinction is usually made between standard/laboratory operation and special operating modes.

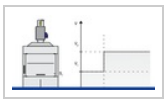
Standard/laboratory operation supports various control concepts that are registered and subsequently executed via acquisition systems such as sensors. The volume flow rates are adjusted either via graduated values or the respective operating situation, as shown below.

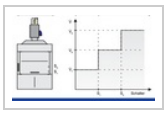
Special operating modes in the laboratory include, for example:

- Increased or reduced operation
- Shut-off modes for system shutdown
- OPEN mode of the controllers

These separate operating modes can be activated as standard operation depending on the situation.

DIFFERENT CONSTANT VOLUME FLOW CONTROL CONCEPTS (CAV)





The simplest variant of the volume flow rate adjustment is the control by means of a fixed value. Due to the constant volume flow rate, no separate sensor is necessary. Duct pressure fluctuations due to supply and extract air flows or room leaks are quickly and precisely detected by the control systems and immediately compensated.

For fume cupboards where the sash position influences the airflows, different volume flow rates can be set in increments. The control system can be set to either two or three steps of the sash window, sensors or switch contacts then determines different air volumes.

VARIABLE ADJUSTMENT OF VOLUME FLOW RATES ACCORDING TO THE OPERATING SITUATION

The most efficient and energy-saving way to adjust air volume flow rates is through a fully variable control. Sash position sensors or face velocity transducers are used here to measure the position of the sash and/or the actual inflow velocity of air. Existing air volume flow rates are then effectively controlled.

HERE YOU CAN SEE CONTROL DIAGRAMS WITH DIFFERENT CONTROL STRATEGIES:

SASH DISTANCE SENSOR WITH LINEAR CONTROL STRATEGY

SASH POSITION SENSOR WITH SAFETY-OPTIMISED CONTROL STRATEGY

Volume flow rate

Face velocity

The measurement via a sash position sensor records its exact opening height. The volume flow rates are then controlled via a linear, stepless increase or decrease that adjusts according to the opening height. The minimum and maximum air volume that is controlled is limited by two fixed values. Sash distance sensors are best suited for fume cupboards with vertically opening sash, rooms with high airflow velocities/turbulances or rooms with pressure-controlled suspended ceilings.

Volume flow rate

Face velocity

The EASYLAB system with sash position sensor also has a safety-optimised control strategy. The controller uses the sash position sensor information and the opening width of the fume cupboard to calculate a theoretical face velocity. The volume flow controller then controles a calculated face velocity, programmed to the system, within certain volume flow limits.

FACE VELOCITY TRANSDUCER

Volume flow rate

Face velocity

Even more precise is the control via a face velocity transducer, which detects every possible leakage in the fume cupboard. The sensor measures the actual inflow velocity of all openings and controles them according to parameterised specifications within the volume flow rate limits. Face velocity transducers are preferably used for fume cupboards with vertical and horizontal sashes. In addition, the sensors detect thermal loads inside the fume cupboard so that the volume flow rate can be increased to safely remove the heat.

CLEARLY ARRANGED CONTROLS FOR INTUITIVE OPERATION

The operation of fume cupboards and the control system must be as intuitive and simple as possible. These include visual and acoustic signals in the event of errors or deviations, easy switching between operating modes and operation of the front sashes. Our control elements form an important part of the overall control concept and are certified according to EN 14175.

More convenience for all involved: In the spirit of the laboratory furniture manufacturers, our control elements contain an activation option for the fume cupboard interior lighting, a service interval display, as well as the option to control an automatic sash device.

Users benefit from the adaptive and sustainable design of the elements - functions that are not desired for a specific project are simply hidden. This makes foil adjustments or the replacement of the control unit in case of changes in use a thing of the past.

The integrated ECO display supports you in your efforts for more energy efficiency and sustainability. As soon as an optimisation of use is possible, the respective measure is signaled to the user. This is not only convenient, but also saves energy and resources.

In addition, the control panels have an integrated service socket so that the EASYLAB controllers can be efficiently commissioned and maintained

ATEX-CERTIFIED VOLUME FLOW CONTROL AND MONITORING FOR FUME CUPBOARDS

Certain areas in the laboratory and the general handling of explosive substances require components that are certified according to ATEX. In the laboratory area, this explosion protection is implemented by controlling constant volume flow rates.

With our TVR-ex controller, we offer you an ATEX-certified solution for these special requirements. Contact us at an early stage! We will discuss with you how much explosion protection is needed in your individual situation and will be happy to support you in the design and sizing of your explosion-proof areas.

To the ATEX volume flow controllers

SUITABLE PRODUCTS FOR YOUR FUME CUPBOARD

EASYLAB TCU3

EASYLAB controllers for the most demanding control engineering tasks

EASYLAB TCU3

FMS

Pour la surveillance des débits

FMS

TVLK

Optimised for use in laboratories and on fume cupboards

TVLK

TVR-EX

For the control of variable air volume flows in potentially explosive atmospheres (ATEX)

TVR-Ex

CONSULTING AND PROJECT DEVELOPMENT

I AM HAPPY TO ASSIST YOU

We will be happy to help you with the individual planning and implementation of air distribution strategies for your laboratories. Arrange your non-binding consultation now!

Patric Unterdorfer

Global Key Client Manager Pharma & Food

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