AQM - AIR QUALITY MONITOR

ISOFLURANE / DESFLURA NE / SEVOFLURANE DETECTOR

DETECTION OF ANAESTHETIC GAS - AT VERY LOW LEWELS

AQM 1 air quality detector **2020**

Low level detection of anaesthetic gas in laboratories

AQM1 is a new instrument, combining the functions of gas detection, gas monitoring and gas alarm in one instrument. The instrument has very efficient airflow intake to sample anesthetic gas from ambient air.

ISOFLURANE used as anesthesia for small animals.

Q.: To whom did we develop this instrument
A.: AQM 1 is designed for laboratories and animal hospitals working with ISOFLURANE./ Sevoflurane and / Desflurane

Q.: What is the unique quality of this instrument

A.: Anesthetic gas is generally difficult to detect at very low level <100 PPM. ISOFLURANE can be detected by smell, when level reach above 800 PPM. However recommended working conditions in the laboratories is 10 PPM - 100 PPM. Smell is therefore not a usefull indicator. ISOFLURANE is used for anesthesia of small animals, eksperimental use and medical research. AQM detect ISOFLURANE at level > 10PPM.

AQM 1

This instrument is developed as independent vapour monitor. When connected to a PC it can also operate as frontend datalogger and data monitor. The instrument is designed with a very large analog meter, and gives high visuel reading. Easy to follow the trend of vapour level in ambient air - and easy to read.

Environmental regulations for laboratories in Denmark and Northern countries, advice that laboratory workers should not be exposed to low levels of Isoflurane >10 ppm.

Workers in laboratories, are however often exposed to continuous low level Isoflurane, escaping from the system. During operations and eksperimental use, handling small animals in laboratories.

Characteristics: AQM 1

- Analog monitor - data logging,
- ISOFLURANE, vapour alarm.
- Very fast reaction, when exposed to gas leak.
- Air flow - monitor. Can be remote controlled,
- Very low level detection >10 ppm - <100 ppm,
- AQM1 can be adapted for speciel purposes, and different gasses,

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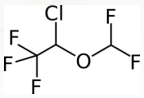
ISOFLURANE

anesthesia of small animals, in clinical research.

Most laboratories in the medical sector use ISOFLURANE for anesthesia of small animals. ISOFLURANE has the advantage that the gas in small dose of 2 - 5% will bring the animals to sleep, and shortly after stop of gas, the animal wake up, without damage.

ISOFLURANE is always administered with a vaporizer in conjunction with air and/or pure oxygen. Often nitrous oxide is also used.

Molar mass of ISOFLURANE is 184,5 g/mol, and is heavier than air.



Formula; $C_3H_2ClF_5O$

AQM 1

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CON.DA AQM 1 Isoflurane vapour detector, monitor ISOFLURANE in a linear analoge reading from >10 ppm - <100ppm. Highly efficient, compared to other similar gas detectors. The instrument combine efficient software with creative hardware and is capable to register very early evaporation of ISOFLURANE >10ppm. Integrated in the instrument is a large analoge meter, giving the laboratory workers clear visual indication, if ISOFLURANE vapour increase in the laboratory. The instrument has an integrated alarm, and will activate a audible signal if a preset alarm level is surpassed. The alarm level can be set individually and match the aircondition and airflow in the laboratory.

Analog meter

Most instruments today are designed with digital displays, and much information can be gained designing instruments with digital display. With AQM 1 we integrated a very large analog meter in the instrument, similar to a speedometer in the car. It is indeed possible to design the carpanel with digital display, nevertheless most cars come with analog meter. The main information for laboratory is to observe the trend - if volume of Isoflurane is increasing or decreasing in laboratory. For continous monitoring, analog meter gives very clear visuel indication, also not trained laboratory workers find it easy to learn and understand.

Vapour detection

AQM 1 is developed for low detection of ISOFLURANE >10PPM

Besides ISOFLURANE, this instrument also has capability to monitor other types of gas. At CONDA we calibrate AQM 1 on the basis of reference gas. In situations where customers are exposed to other gas that need monitoring, the factory should be consulted to verify and test what gasses AQM 1 can be calibrated to monitor, within the required range.

AQM—Air quality monitor

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Is ISOFLURANE escaping ?

ISOFLURANE is not supposed to escape from the system. The room should be well ventilated. However, some ISOFLURANE often escape. And very often it can not be detected by smell or other means.

AQM1 gives very early information, if ISOFLURANE is detected in the airflow of the room. The instrument is calibrated to register ISOFLURANE from >10ppm - 100PPM The analog meter gives a very vísible and clear reading.

AQM 1 can be used as a stand alone detector on the laboratory table - very close to the operator. Or it can be used as an wall monitor. Experience in the individuel laboratory will quickly teach best place to position the meter, and most suitable location for early warning.

Air circulation in the laboratory, is not only a factor of airflow and ventilation. Individual conditions in the laboratory influence Isoflurane vapour. Only when a meter is applied does it become visible, how Isoflurane behave when it escape from the system.

AQM 1 react very fast to leak of ISOFLURANE. The instrument will instantly give the operator information of defect handling, og leak in the system. It adds value, to create a robust system of anesthesia.

ISOFLURANE

ISOFLURANE is the most commonly used inhalation anesthetic for experimental use in mice and is preferred when mice need to be anesthetized for longer periods. Usually the ISOFLURANE concentration is 1,5%. ISOFLURANE is always administered in conjunction with air and / or pure oxygen. In earlier years ethers was the preferred gas used for anesthetics, however ETHERS are highly flammable and therefore ISOFLURANE is preferred, being considered a stable non - explosive inhalation anesthetic. ISOFLURANE is also preferred, as the effect of anesthesia diminishes very rapidly after end of use. When used in laboratories for anesthesia of small animals, animals will wake up 2 - 5 minutes after end of use. ISOFLURANE utilizes a bypass vaporizer. The vaporizer change the ISOFLURANE fluid to ISOFLURANE vapor, and deliver a controlled amount to patient.

ISOFLURANE is supposed to remain in the anaesthetic system to be used for operation of the patient, larger animals or research on small animals. It is not supposed to escape the system. Nevertheless, it is very difficult to avoid that small amount of ISOFLURANE vapour slips out of the system. Doctors and staff in the laboratory must avoid long term exposure to ISOFLURANE. If ISOFLURANE escape the system it will cause operator drowsiness, and possible discomfort.

Laboratories using ISOFLURANE are usually equipped with ventilation systems, with high airflow, and often also point ventilation with suction / excavation close to the operators.

Also in well ventilated rooms, ISOFLURANE can often be detected by smell. After longer period of use, some ISOFLURANE escape the system. How much and where the vapour is concentrated in the room is difficult to determine. AQM 1 is the suitable instrument to give information. When laboratory workers complain they smell ISOFLURANE, the level has already reached above > 1200 PPM. And this happen regularly.

Veterinary anesthesia performed on animals by a veterinarian. Anesthesia is used for a wider range of circumstances in animals than in people, due to animals' inability to cooperate with diagnostic or therapeutic procedures. Veterinary anesthesia includes anesthesia of the major species: dogs, cats, horses, cattle, sheep, goats, and pigs, as well as all other animals requiring veterinary care such as birds pets, and wildlife

Anesthesia is required for many surgical procedures which require the patient to be immobile, unaware, and without pain. Furthermore, anesthesia aims to minimize the surgical stress response. In addition, certain diagnostic procedures require anesthesia, notably stomach or airway endoscopy, bone marrow sampling, and occasionally ultrasound. Aggressive animals may require anesthesia in order to handle and perform a physical exam or obtain blood for testing. Exotic animals frequently require anesthesia for simple procedures (such as taking a radiograph or catheter placement) due to lack of domesticity. Animals may require anesthesia for therapeutic procedures, such as urinary catheterization to relieve obstruction, injection into a mass, or removing fluid from the eye to treat glaucoma.

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AQM 1 Streaming of data

CONDA AQM 1 vapour monitor, is basically a gas detector with advanced software. In most installations the instrument will serve its purpose, to monitor the level of vapour in the laboratory, and activate alarm when a critical alarm level is registered.

In the development of the instrument, we have designed the software to stream data continuosly, if connected to a PC. The instrument streams data with the option to be stored in Excel etc. for data-logging and data storage. In some installations it serves a purpose to register if the level of ISOFLURANE increases over time, during longer period of laboratory work. It may also serve a purpose to monitor where in the laboratory gas vapour rise, to determine the need to increase ventilation and air flow in the laboratory. Eventually it will be learned how laboratory workers administrate the anesthetic system, and avoid escape of ISOFLURANE.

AQM 1 react very fast - usually within 30 sec. when exposed to ISOFLURANE vapour. The advantage is, that the operator gain immediate knowledge, why and from where ISOFLURANE escaped the system. He will learn the system, and he will learn handling the system to avoid escape of ISOFLURANE. Constant monitoring is not only a precaution for safety and protection to keep a safety level of ISOFLURANE in the laboratory, it is also a proactive educational tool - to teach and educate operators to handle anaesthetic systems correctly and avoid leakage.

Networking AQM 1 monitors.

In larger premises with several laboratories or points of operations, AQM 1 can be connected in network to one PC, logging data with individuel nodes. Each instrument can have an individuel set-up, to match the position of the instrument in the laboratory. The software has build-in protection with password for laboratory manager, to log-in on any individuel instrument in the network and change certain factory setting.

AQM 1 is a reasonable priced instrument compared to other instrumentation on the market - suitable for ISOFLURANE detection. In the design of AQM 1, it had high priority to utilise cost optimised solutions to keep the instrument within the finansiel limits of laboratories. We hope that we have suceeded to match the finansiel expectations of end users, though cost of instrument should not be a deciding factor. Laboratories exposed to ISOFLURANE, working with anestehsia will find that a relative small investment in protection, adds quality in daily handling to laboratory workers and the medical staff.

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