

Quality assurance



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Documentation and Final Product Control

At Simas Filters, we prioritise the quality of our products and services. All products sold have been documented in compliance with applicable requirements and standards.

The Simas team works closely with manufacturers in order to assure quality. As part of this collaboration, a final visual check of all products is performed before they leave production. This final check is supplemented by several tests or visual inspections if this is deemed necessary.

If the customer has particular requirements, we often help to obtain and prepare the required documentation. The final product check comes into play when new products with special specifications are introduced and need to meet a particular customer's requirements.

We endeavour to identify filter solutions that meet our customers' requirements. For this purpose, we work with suppliers and institutions such as universities and the Danish Technological Institute. When projects result in new filter solutions, we test them in partnership with our customers to ensure that they provide specific value such as higher productivity and cleaner production processes. New product solutions are tested according to all applicable parameters and standards before they are launched on site with customers.

Quality Assurance – Air Filters for General Ventilation

Simas Filters operates in accordance with applicable European and international regulations as well as industry standards. ISO 16890, the current standard for air filters, covers general ventilation filters. Additionally, all high-efficiency filters (EPA, HEPA and ULPA) are tested according to the EN 1822 and ISO 29463 standards which are described in detail below in this document.

ISO 16890

ISO 16890 is the international standard for general air filters which replaced EN 779 in 2018. This standard makes it easier to compare and choose filters that provide the protection needed. When choosing ventilation filters, both the desired indoor air quality and the surrounding environment should be assessed.

ISO 16890 classifies filters based on the particulate matter (PM) which makes it possible to see the relationship to both air pollution and our health. The ISO 16890 test determines filter efficiency and classification in one of three PM classes.

WHO, the World Health Organisation, has set limit values for PM₁₀ (0.3-10 µm) and PM_{2.5} (0.3-2.5 µm) which are 20 µg/m³ and 10 µg/m³ respectively. The very small particles PM₁ (0.3-1.0 µm), which ISO 16890 also covers, are the most critical for us humans. They pose a specific health risk.

PM1 filters are typically used to protect certain work and manufacturing processes. The selected air quality should be based on the needs and requirements within the area in question.

The table below illustrates the different filter types and filter classes according to ISO 16890 and their application for different dust and particle types.

Filter group	Filter class and efficiency	Application vs particles
Coarse filters Cf. ISO 16890 Effective for particles > 10 µm	ISO Coarse ≥ 65% (≈G2 cf. EN 779)	> Simplest applications > Protects against e.g. insects, leaves, sand, fly ash, textile fibres, hair
	ISO Coarse ≥ 80% (≈G3 cf. EN 779)	> Protects ventilation and air conditioning systems > Air from e.g. paint booths and kitchens
	ISO Coarse ≥ 90% (≈G4 cf. EN779)	> Prefilter and recirculation filter > Captures visible, fine dust, e.g. cement, pollen, fly ash, fog, wet paint
Medium and fine filters Cf. ISO 16890 Effective for particles 1 ≤ 10 µm	ISO ePM10 ≥ 50% (≈M5 cf. EN 779)	> Filtering of outdoor air to rooms with low-level requirements, e.g. workshops, storage rooms, garages
	ISO ePM10 ≥ 60%	> Prefilter for higher filter classes
	ISO ePM2.5 50-65% (≈M6 cf. EN779)	> Captures e.g. plant spores, cement dust and other particles that create drops, spots or dust deposits
	ISO ePM10 ≥ 85%	> In air conditioning systems for e.g. retail outlets and offices
	ISO ePM2.5 65-80%	> Pre- and recirculation in ventilation centres
	ISO ePM1 50-65% (≈F7 cf. EN779)	> Protects against lung damaging particles, e.g. colour particles and combustion particles
	ISO ePM1 65-80% (≈F8 cf. EN779)	> More demanding applications, e.g. offices, production areas, IT and control centres > Prefilter for HEPA and carbon filters
	ISO ePM1 ≥ 80% (≈F9 cf. EN779)	> Captures coarser particles in tobacco and metal oxide smoke, bacteria, mould and fungal spores

Eurovent Certification

Simas Filters offers filters that are certified according to the Eurovent Certified Performance (ECP) programme for air filters (FIL). It covers filter elements that are classified as ISO ePM1, ISO ePM2.5 and ISO ePM10 according to EN ISO 16890-1:2016.

The Eurovent Certified Performance (ECP) programme for air filters helps to create a common basis for assessing the various products. The specification of the certified filters helps the technical manager who then does not have to perform a detailed comparison and specification check.

Project managers, specialists and users are able to choose the certified products safe in the knowledge that the data are correct. The filters are verified by a third-party certification body.

Quality Assurance – EPA, HEPA and ULPA Filters

Filters with a high degree of filtration are manufactured under carefully monitored and controlled conditions. These highly efficient filters are tested in accordance with the standard DS/EN 1822 and ISO 29463. A test certificate is included for all filters that achieve so-called HEPA or ULPA classifications.

Each filter is also assigned a unique product number for full traceability. This ensures that, in the event of any production errors, we are able to identify the causes precisely and correct them effectively.

At Simas Filters, we have high expectations of our suppliers of high-efficiency filters. In addition to the tests specified above, each filter also undergoes a careful visual inspection to identify any defects before it is packed and shipped.

DS/EN 1822

When Simas Filters offers EPA, HEPA and ULPA filters, they are produced according to the applicable standards DS/EN 18122 and ISO 29463. The certified filter types and filter classes in the standard can be found in the following table.

Filter group	Filter class and efficiency	Application vs particles
High-efficiency filters Cf. EN 1822	E10 ≥ 85%	> Final filter for clean rooms in classes ≥ ISO 7 cf. ISO 14644
Effective for particles ≤ 1 µm	E11 ≥ 95%	> Areas with strict requirements, e.g. laboratories, hospitals, optical, pharmaceutical and lighting industries > Protects against e.g. toner particles, tobacco smoke, metal oxide fractions and oil fumes
EPA (Efficient Particulate Air filter)		

Filter group	Filter class and efficiency	Application vs particles
EPA (Efficient Particulate Air filter)	E12 $\geq 99.5\%$	> Final filter for the food, pharmaceutical, coating and electronics industries > Hospital areas with strict requirements, but not for leakage testing
	H13 $\geq 99.95\%$	> Final filter for clean rooms in classes $\geq$ ISO 5 cf. ISO 14644 > Captures e.g. bacteria, oil fumes in the earliest stages, aerosols and radioactive particles
HEPA (High efficiency Particulate Air Filter)	H14 $\geq 99.995\%$	> Hospitals and pharmaceutical industry with strict requirements for leakage tests > Final filter for clean rooms in classes $\geq$ ISO 4 > Very effective for viruses, aerosol microparticles
	H14 $\geq 99.995\%$	
ULPA (Ultra Low Penetration Air filter)	U15 $\geq 99.9995\%$	> Final filter for clean rooms in classes $\geq$ ISO 1-3 ,cf. ISO 14644
	U16 $\geq 99.99995\%$	> Captures the most harmful viruses and other aerosol microparticles
	U17 $\geq 99.999995\%$	

Other Air Filter Requirements

In many cases, Simas Filters goes beyond the requirements prescribed by the standards and test methods described here. We offer a wide range of air filters to meet specific requirements. Some of the main differences in filter specifications include:

- > **Filtration capacity:** Optimum filtering from the start, instead of low initial filtering.
- > **Pressure loss:** Including initial and final pressure loss, taking into account the ventilation system's energy consumption. Pressure loss is important – the higher the pressure loss over the filter, the greater the energy consumption.
- > **Life:** This very much depends on filter type, filter brand, application environment and degree of air pollution
- > **Leakage:** Filters are usually supplied from the factory without defects. Even so, sometimes after a short period of operation some filters may leak. This may be due to the use of cheap filters of poor quality or that the manufacturer's instructions have not been followed during

installation. Another reason may be that the system runs under too high and forced pressure conditions, which may cause leakage around the frame.

- > **Fire:** In addition to government authority regulations, filters should not contribute to a fire or develop toxic gases in the event of fire.
- > **Moisture:** Filters should not absorb moisture and thereby form a breeding ground for microorganisms. Research in recent years shows that filters can be a contributing cause of serious indoor climate problems.

Quality Assurance – Filter Media, Filter Bags and Filter Cartridges

Simas Filters supplies a wide selection of filter media, filter bags, filter cartridges and other filter elements. After consultation with our technical filter experts, each filter solution is precisely adapted to the customer's specific application area. After production, the filters undergo a quality inspection before the product is sent to the customer.

Each filter solution complies with different standards and directives depending on whether it is to be used for food contact, operate in potentially explosive areas or filter dust based on a defined filter class. This is discussed further in the following sections.

Quality Assurance – Filter Housings

Our production and quality assurance of filter housings is based on the use of stainless steel, aluzinc or galvanised steel and a design of so-called industrial quality. This means that filter housings are of good appearance even without surface treatment. They may have small scratches and visible marks after spot welding and staining. However, we always strive to minimise dents, sanding marks and burrs as much as possible.

If a customer requires something other than what is set out above, this should be specified early on in the process to ensure that we pass the correct information to our production team before manufacturing begins.

The filter housings are what we call theoretically tight. This means that they have not been pressure tested. Tightness is achieved by sealing the housings from the inside with an ordinary assembly sealant that is suitable for the purpose. This sealing is performed by the supplier/Simas Filters and is, as a rule, performed before delivery to the customer. Any excess sealant is removed so that the filter housing looks neat from the outside.

Any deviations from the above can be agreed on a case-by-case basis.

Agreements on the production of filter housings include the following specifications:

- > Agreement on steel quality: Specifications and any documentation are agreed in advance and are based on what the filter housing is to be used for.
- > Agreement on production quality. Simas Filters is able to supply several different types of filter housings and qualities.
- > Connection options in the filter housing are agreed before production begins.

Simas Filters offers customised filter housings that are designed to the customer's specifications. At a minimum, our filter housings meet the requirements and standards described above.

ATEX Filter Housings

Simas Filters offers customised filters and filter housings for businesses that require ATEX-certified solutions. These products are tested and supplied with the necessary documentation to ensure compliance with the requirements of the applicable ATEX zone in which they are to be installed.

The customer's requirements for an ATEX solution must be clearly stipulated in writing early on in the process to ensure that Simas Filters is able to pass on the necessary information to our production team before manufacture of the housing begins. Based on these requirements, Simas Filters is able to assess whether we can offer a solution that meets the business's operational and quality standards.

The customer's requirements for an ATEX solution must be documented in writing early on in the process. This allows us to assess whether it is possible to offer a solution that meets the operational and quality standards required by the business.

Quality Assurance – Carbon Filters

Simas Filters offers a wide range of active carbon filter solutions. The active carbon media undergo regular testing by the manufacturer to ensure that they maintain the necessary absorbent properties required by the specific media.

We maintain ongoing communication with the manufacturer of the active carbon media to ensure compliance with applicable international regulations and standards, e.g. REACH and ISO 10121-3.

Simas Filters supplies products in full compliance with the REACH regulation (EC) no. 1907/2006. We focus, in particular, on compliance with REACH regulations in order to protect human health and the environment against the risks that may be associated with chemical substances.

ISO 10121-3 is a test method that helps determine the efficiency and capacity/life of the active carbon filter.

The table on the following page shows examples of active carbon filter types with different degrees of protection.

Filter group	Filter class and efficiency	Application vs particles
Filters using active carbon Not standardised Very effective against odours, many types of gas and for water purification	Non-impregnated carbon	> Captures foul odours in e.g. hospitals, airports, hotels and other public buildings > Removes harmful gases from recirculation air > Filters the air for microelectronics > Absorbs e.g. hospital odours, kitchen and cooking odours, decomposition odours, tar substances, petroleum and kerosene vapours as well as slightly volatile hydrocarbon solvents
	Impregnated carbon	> Control centres in e.g. airports, computer and server rooms > Input and recirculation air for aggressive environments and e.g. microelectronics > Absorbs acid fumes, sulphur compounds, nitrogen dioxide and nitrogen oxide, hydrogen chloride, chlorine gases, ammonia, amines and other solvents

Other Standards and Quality Requirements

A number of other standards and regulations must be complied with, depending on the industry in which the customer's workplace operates and the products that require protection in the production area. They have been adopted to protect humans and the environment against harmful dust, smoke particles and vapours.

Simas Filters' experience and in-depth filter knowledge can help you identify a filter solution that meets applicable standards and regulations in your industry.

VDI 6022

Certification of an HVAC system under VDI 6022 ensures that the system meets the market's most stringent hygiene requirements.

Materials, including filters, that are certified under VDI 6022 undergo in-depth tests to ensure that materials cannot contribute to the growth of bacteria or fungi. Materials are also tested for whether they release harmful substances or fungal spores.

VDI 6022-certified materials are easy to clean as the surface is sealed and resists certified cleaning and disinfecting agents.

Regulation (EC) No. 1935/2004

Simas Filters supplies filter solutions, e.g. filter bags and filter cartridges, which are suitable for direct contact with food. They have been tested in accordance with the European Regulation (EC) 1935/2004, which stipulates that materials that are intended to come into direct contact with food must not emit substances that can be harmful or impair the quality of food.

Regulation (EC) No. 2023/2006

Regulation (EC) No. 2023/2006 lays down the rules for good manufacturing practice (GMP) for materials and articles intended to come into contact with food, as listed in Regulation (EC) No. 1935/2004 Annex I.

Regulation (EC) No. 2023/2006 further aims to ensure that companies manufacturing these materials and articles implement and use an effective quality control system. This system must guarantee that correct procedures are followed and that the correct materials are used.

FDA

The FDA (Food and Drug Administration) is an American authority which certifies and investigates materials that are to be used in contact with foodstuffs and medicine. This certification is the American counterpart to Regulation (EC) No. 1935/2004. Some businesses require filter solutions that comply with FDA good regulations. For this reason, Simas Filters is also able to supply products that comply with FDA requirements and test methods.

Fire Classification

Filters should not contribute to a fire or develop toxic gases in the event of a fire.

DS/EN 13501 has replaced DIN 53438, which is still applicable today, e.g. in tender descriptions. Air filters used in a building's ventilation system must not increase the fire load in the building, and filters must comply with EN 13501.

Simas Filters offers filters that are certified according to various fire standards. Our double extractor filters for commercial kitchens or canteens are certified to DS/EN 16282-6 and classified so that they can be used safely over thermal processes.

The ATEX Directive

ATEX stands for ATmosphere EXplosible which refers to explosive atmospheres. Certified ATEX products are designed to work safely in environments with dust and gasses where there is a risk of explosion without the products themselves contributing to this hazard.

Simas Filters offers filter solutions that comply with the stringent requirements contained in the ATEX Directive 2004/34/EU and subsequent regulations.

ISO 9001

Simas Filters is certified in accordance with the international quality management system ISO 9001. In line with our ISO 9001 certification, we work systematically, on a daily basis, to secure high quality in both our products, processes, and our customer service.

Simas Filters products are produced in compliance with relevant industrial requirements and international filtering standards. We work closely together with several big filter manufacturers of which most of them are certified in relation to ISO 9001. This enables us to deliver filters of high quality that have been produced under safe and secure production conditions.

ISO 14001

At Simas Filters, we want to minimise the environmental impact of our processes and products. We address applicable environmental and sustainability issues on a day-to-day basis. Many of our most important suppliers are certified to ISO 14001, and we set environmental requirements in our Code of Conduct for our business partners.

Our filters also comply with current standards and regulations on the environment, including the REACH Regulation (EC) No. 1907/2006, which aims to protect human health and the environment against harmful and dangerous chemical substances.

Concluding Remarks

This documentation of Simas Filter's quality management should not be seen as an exhaustive description of our activities and standards. There are many and complex requirements that we ourselves and our filter solutions have to meet and contribute to support.

We work continuously to improve our quality processes and to document how we and our products comply with applicable legislation and industry-specific standards.

Find out more about how we can help you with filters to protect your employees, processes and environment. Visit us at www.simasfilters.dk.