

ISO 10121-3

Guidelines and decision-making aids for selecting suitable molecular filters for general filtration applications.



ISO 10121-3

THE BENCHMARK FOR VERIFIED MOLECULAR FILTRATION PERFORMANCE FOR GENERAL FILTRATION APPLICATIONS

Modern buildings are exposed to a complex mixture of gaseous pollutants: ozone from urban environments, nitrogen and sulfur compounds from traffic and industry, volatile organic compounds emitted indoors and outdoors. These molecular contaminants pass through particulate filters unnoticed.

Yet they corrode electronics, damage sensitive materials, and compromise health and productivity.

Removing them is essential. Proving performance is critical.

ISO 10121-3 establishes a globally recognized testing and comparing methodology for evaluating the performance of gas-phase air cleaning devices used in general ventilation systems. It transforms molecular filtration from a theoretical claim into measurable engineering data.

Representative Challenge Gases in ISO 10121-3 Testing

ISO 10121-3 evaluates gas-phase filtration devices using defined challenge gases that represent different chemical behaviors and real-world pollution scenarios. Each gas interacts differently with adsorbent media, allowing a comprehensive assessment of both physical adsorption and chemisorption performance. Together, these gases provide a balanced and realistic evaluation of molecular filtration performance, reflecting the diverse challenges present in modern indoor and urban environments.

Toluene. Volatile Organic Compound (VOC) – Physical Adsorption

Toluene is a common solvent found in urban and indoor environments. In ISO 10121-3 testing, it represents non-polar VOCs that are primarily removed through physical adsorption on virgin or non-impregnated activated carbon. The unpleasant odor of VOC creates discomfort and decreases the indoor air quality.

Sulfur Dioxide (SO₂) Acidic, Corrosive Gas – Chemisorption

SO₂ is generated by combustion and industrial processes and is a major contributor to corrosion. In testing, it represents acidic inorganic gases that require chemically impregnated media for effective neutralization. SO₂ worsens indoor air quality and increases the risk for sick building syndrome.

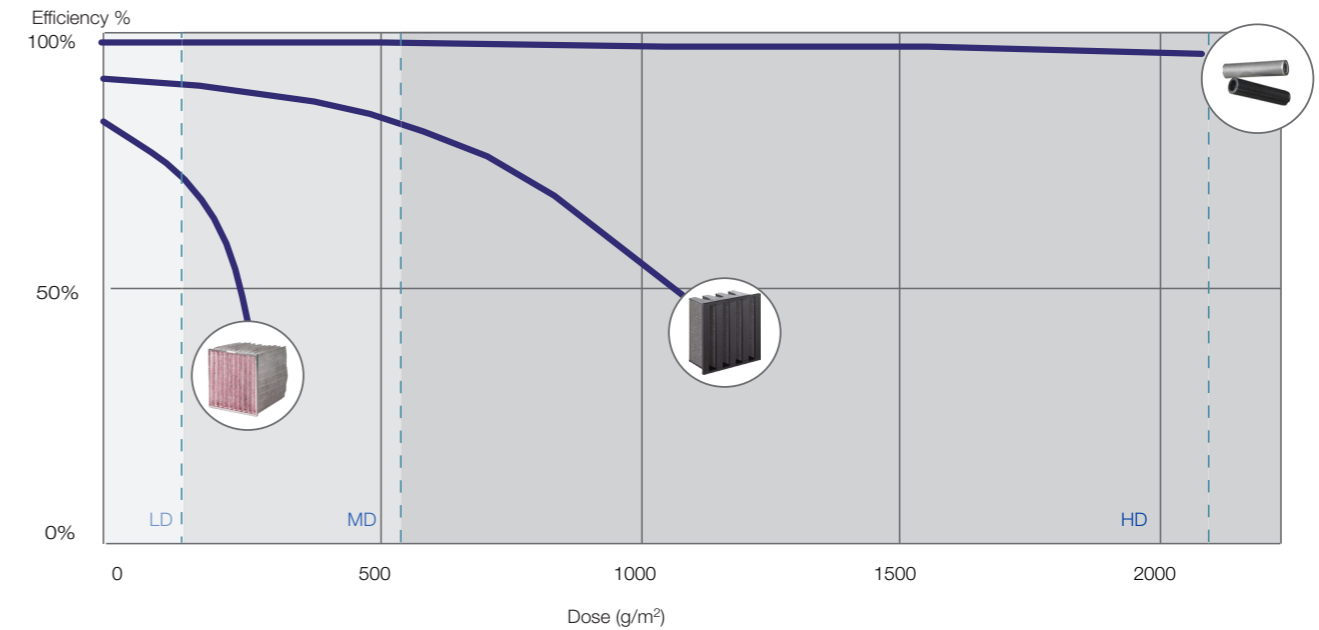
Nitrogen Dioxide (NO₂) Oxidizing Gas – Chemisorption

Common in traffic-related pollution, NO₂ challenges the filter's ability to remove reactive nitrogen oxides. Effective removal depends on specialized media formulations designed for chemical interaction.

Ozone (O₃) Highly Reactive Oxidant – Catalytic / Reactive Removal

Ozone forms through photochemical reactions and is also generated by certain electrical equipment. Due to its strong oxidative properties, it can degrade materials and impact occupant comfort.

Exemplary representation of the typical separation efficiency for toluene



Product performance examples for toluene

Product	RedPleat Carb	DriPak GC	VariSorb XL SAAFCity	AstroSorb III	SAAF Canister
Depth	45 mm	525 mm	292 mm	292 mm	450 mm
Reference Gas					
Toluene	vLD 55	LD 65	MD 80	HD 90	HD95
SO ₂	vLD 35	vLD 50	vLD 55	HD 75	HD 90
NO ₂	vLD 30	vLD 50	LD 75	MD 75	MD 75
Ozone	vLD 55	LD 65	MD 75	HD 90	HD 95

The classifications vLD, LD, MD and HD indicate the relative adsorption capacity and expected service life of the filter under defined operating conditions.

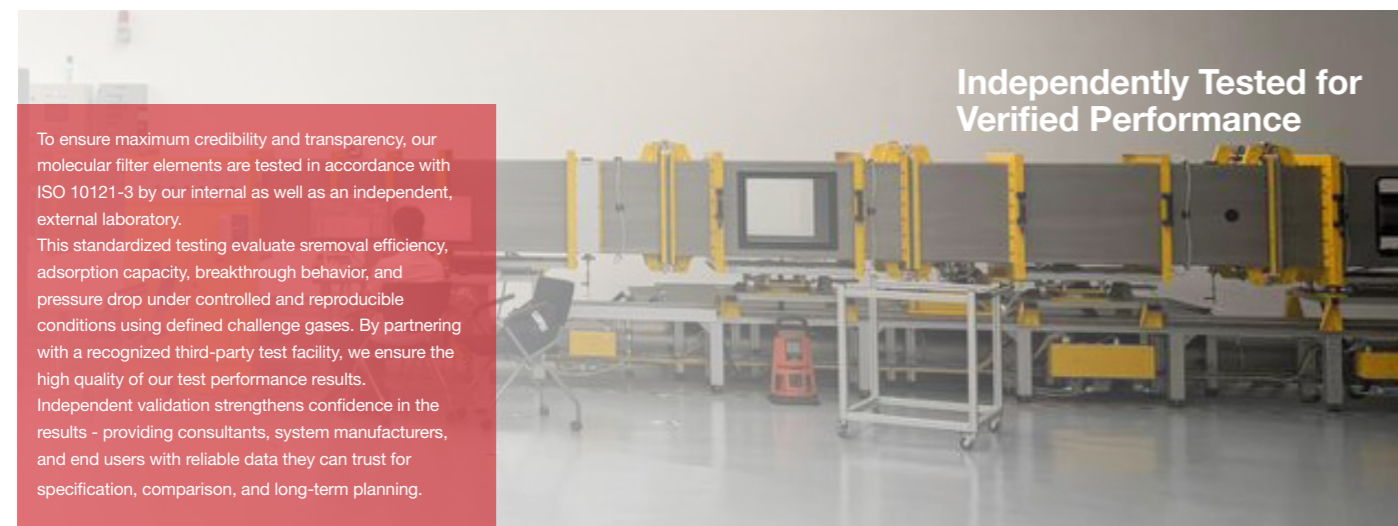
- **vLD (very Light Duty)** refers to filters designed for very low contaminant loads and not meeting the minimum requirements of the LD category.
- **LD (Light Duty)** filters provide lower adsorption capacity and a comparatively short service life.
- **MD (Medium Duty)** filters offer approximately four times the lifetime and capacity of LD filters*
- **HD (Heavy Duty)** filters achieve roughly sixteen times the lifetime and capacity of LD filters*

The percentage value represents the average removal efficiency.

Example

- LD 75 = 75% average efficiency over a shorter service interval
- MD 75 = 75% average efficiency maintained over a medium service interval
- HD 75 = 75% average efficiency sustained over an extended service life

The duty level defines how long the stated average efficiency can be maintained.



Independently Tested for Verified Performance

To ensure maximum credibility and transparency, our molecular filter elements are tested in accordance with ISO 10121-3 by our internal as well as an independent, external laboratory. This standardized testing evaluate removal efficiency, adsorption capacity, breakthrough behavior, and pressure drop under controlled and reproducible conditions using defined challenge gases. By partnering with a recognized third-party test facility, we ensure the high quality of our test performance results. Independent validation strengthens confidence in the results - providing consultants, system manufacturers, and end users with reliable data they can trust for specification, comparison, and long-term planning.

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