

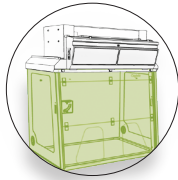
The AFNOR NF X 15-211: 2009 standard

A performance standard for the protection of laboratory technicians

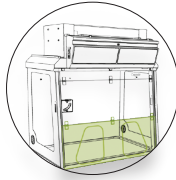
The AFNOR NF X 15-211: 2009 Standard, as referenced by ANSI Z 9.5:2012, was established by a team of experts (INRS, government bodies and professional unions), mandated by AFNOR. This standard applies to filtering fume hoods (also known as re-circulating fume hoods or ETRAF) designed for research work, analysis, teaching, etc. for all laboratories in which chemicals subject to occupational exposure limits (OEL or TLV-TWA) are handled. This text requires performance criteria relating to:



Filtration efficiency



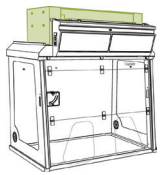
Containment efficiency



Air Face Velocity



Documentation



Filtration efficiency

Filtration efficiency is defined by the capacity of the filter to capture dangerous molecules handled inside the enclosure and determines the quality of air filtered downstream of the filter.



| | Class 1 | Class 2 |
|---|---|---|
| The classes established by AFNOR NF X 15-211 | Filtration fume hood with safety reserve | Filtration fume hood without safety reserve |
| | One main filtration level and one safety filtration level | One filtration level |
| Normal operating phase | Emissions concentration at the filter exhaust must be lower than 1% of the TLV | |
| Detection phase | The concentration at the filter exhaust must be lower than 1% of the TLV, and the automatic detection sensor must warn the user of any concentration spike at the main filter exhaust | The concentration at the filter exhaust must be lower than 50% of the TLV which the automatic sensor will indicate if equipped. |
| Safety phase | The concentration at the filter exhaust must be lower than 50% of the TLV, and maintain its efficiency for 1/12 of the filter life cycle as determined by the initial feasibility study | Not Applicable |

Classification according to the type of filtration

| | Filtration type according to the AFNOR NFX 15-211:2009 standard | Equivalent Erlab filtration type |
|------------------------------------|---|--------------------------------------|
| Particulate filtration* | Type P | HEPA |
| Vapor filtration** | Type V | AS - BE+ - F - K |
| Particulate and vapor filtration** | Type PV | HEPA AS - HEPA BE+ - HEPA F - HEPA K |

* The particulate filter must be at least type H14 in accordance with standard NF EN 1822-1

** Vapor filters must undergo two successive tests using cyclohexane and isopropanol for filters designed to capture Volatile Organic Compounds (VOC). Another test designed for acid vapors is performed with hydrochloric acid.



The most demanding standard in the world for ductless filtering fume hoods.

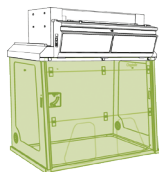
This standard requires guaranteeing the performance & safety of each fume hood which includes:

- Feasibility study of each chemical handling application, performed by our in-house chemists.
- Dedicated validation report of the filter's efficiency and required configurations.

Ductless filtering fume hoods must be accompanied by an [approved chemical booklet](#) containing an exhaustive list of the chemicals, that the manufacturer certifies can be handled in the fume hood under the conditions described in NF X 15-211: 2009 standard.

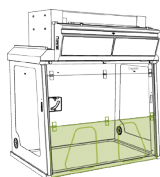
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A performance standard for the laboratory technicians protection



Containment efficiency of the enclosure

Containment efficiency is determined by the ability of the hood to keep the vapors or particles inside the enclosure preventing their release into the laboratory environment. To prove this efficiency, a test is performed according to the protocol described in the AFNOR NF X 15-211. SF₆ (Sulfur Hexafluoride) tracer gas is released into the enclosure and a grid holding sensors is placed opposite the handling ports. The concentration measurements at the sampling point of the grid must be less than 0.1 ppm SF₆ gas.



Air face velocity

Air face velocity is described as the ability of the hood to create a dynamic barrier between the operator and the handling.

For filtering fume hoods with fixed front panels, the air face velocity at all openings must be between 0.4 and 0.6 m/s, therefore, they must be equipped with a device to continuously monitor ventilation which is also an indication of good containment.



Documentation

Filtering fume hoods must be delivered with a booklet containing a list of approved chemicals for our filters, certified by the manufacturer, that can be handled in the conditions described by the AFNOR NF X 15-211:2009 standard. The following information must be indicated in the booklet for each chemical listed:

- The chemical name, formula, CAS number, boiling point, molecular weight, saturation and vapor pressure.
- The suitable filter type and its retention capacity during the normal operating phase.
- The type of detection sensor for the recommended filter(s).
- The name of the laboratory performing the test(s).

Erlab's R&D Laboratory has developed a booklet called the *Chemical Listing* which demonstrates their expertise in the field of molecular and particulate filtration. This booklet contains a list of approved chemicals for about 700 chemicals commonly used in laboratories. Every Erlab ductless fume hood is supplied with a *Chemical Listing* booklet and is in compliance with the AFNOR NF X 15-211:2009 standard.

International standards

Erlab products comply with the following standards to guarantee your safety:

Germany: DIN 12927 - France: AFNOR NF X 15-211: 2009 - U.K.: BS 7989 - USA: ANSI/AIHA Z9.5 / ASHRAE 110: 1995