

# Trends in building ventilation requirements and inspection in France

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## SUMMARY

French regulation regarding residential ventilation dates from 1982. Almost every new residential buildings constructed since then are equipped with a mechanical ventilation system. For non-residential buildings, the regulation dates from 1979 and does not impose the installation of a ventilation system as a prescriptive requirement. Nevertheless, if air renewal relies only on windows opening, a significant windows area is necessary (according to the floor area) for the building to be considered compliant with the regulation. This paper is a short summary of a VIPaper that will be published on the AIVC website with the same title.

## KEYWORDS

Ventilation, regulation, France

## 1 RESIDENTIAL BUILDINGS

The French Regulation for residential buildings ventilation mainly relies on the « *Arrêté du 24 mars 1982 relatif à l'aération des logements* »<sup>1</sup>. This text gives requirements on ventilation system in every new dwelling since 1982.

Its main requirements are:

- Overall and continuous air renewal,
- Air inlets (natural or mechanical) in main rooms, which can be adjustable or self-adjustable but cannot be closed.
- Air exhausts in kitchen, bathroom(s), toilet and any utility room.
- Ventilation system must be able to reach given air flow rates
- Minimum flowrate must be maintained continuously depending on whether the system is demand-control (with a technical accreditation)

In practice, those requirements defined above have usually been achieved by using centralized-mechanical exhaust-only systems. Those systems have two-stages exhaust rates in kitchens (the user switch to maximum flowrate pushing a button, or pulling a string). Cooker-hood are not mandatory, they are assumed not to be needed thanks to this two-stages flowrate, usually recirculation cooker-hood are installed in order to comply with EP-requirements on airtightness.

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<sup>1</sup> J.O., « Arrêté du 24 mars 1982 relatif à l'aération des logements » (1983).

Almost all new residential buildings with exhaust-only ventilation are equipped with a humidity-based demand control system. The humidity regulation is, most of the time, not done through sensors but mechanically, thanks to a humidity-sensible tress, inside inlets and exhaust devices, that adjusts their opening size.

Table 1 : Installed system in new dwellings in the last 10 years according to the French database of airtightness data<sup>2</sup>

	Single houses	Multi-family dwellings
None	0%	0%
Other	1%	1%
Heat recovery	3%	1%
Extract only (constant flowrate)	2%	4%
Extract only, HR -demand control on extraction	4%	3%
Extract only, HR demand control on extraction and inlet	89%	91%

Table 2: Ventilation systems in France Building Stocks (air.h 2007 + INSEE 2017)

	Total dwelling stock (in million)	Ratio
No ventilation	3560	10%
Room by room ventilation	10760	31%
Overall natural ventilation	6058	17%
Overall mechanical ventilation	14437	42%

Given the high rate of non-conformity observed, the energy performance regulation RE2020 imposes since January 2023 a mandatory inspection of the ventilation systems for every new residential buildings. This inspection shall be performed by a qualified tester (by qualification named “Qualibat 8741”).

The inspection is mandatory only once at commissioning.

Every control performed shall be recorded by the tester on an online platform<sup>3</sup> that provides general statics on the performance of ventilation systems.

## 2 NON-RESIDENTIAL BUILDINGS:

The French regulation about non-residential buildings ventilation mainly relies on the “code du travail” (work code) for building occupied with workers (article R.4212-1 until R. 4222-21) and on the “Règlement sanitaire Départemental Type” (named RSDT) article 62 to 66 linked to the “Code de la santé publique” (Public Health Code), for any buildings (inc. receiving public).

These two regulations (RSDT and Work code) define air flow rates. Work code applies in new or existing buildings if workers are in it. RSDT applies to any new building built after 1979 (including those with workers).

Those two codes make the distinction between rooms with no specific source of pollution such as classrooms, dormitories, offices, cinemas, restaurants, sports buildings etc. In those rooms there is a requirement on the supply air flow rate. And rooms with specific air pollution

<sup>2</sup> Bassam Moujalled, Valérie Leprince, et Adeline Bailly Mélois, « French database of building airtightness, statistical analyses of about 215,000 measurements: impacts of buildings characteristics and seasonal variations », in *Proceedings of the 39th AIVC conference « Smart ventilation for buildings »* (39th AIVC conference « Smart ventilation for buildings », Antibes Juan-Les-Pins, France, 2018).

<sup>3</sup> <https://www.observatoire-national-ventilation.developpement-durable.gouv.fr/>

sources such as bathrooms, showers, toilets, laundry, commercial kitchen. In those rooms there is a requirement on the extracted air flowrate.

Either a ventilation system is installed (mechanical or natural) or if the windows area in each room is sufficient it is considered that air replacement can be done through airing and the installation of a ventilation system is not required.

Table 3: Air flow rates for non residential buildings, required by health code and work code

Kind of enclosure	Qmin (m <sup>3</sup> /h) per occupant	
	Health code	Work code
School	15	-
High-school and university	18	-
Sleeping spaces (dormitory, etc.)	18	-
Office rooms	18	25
Meeting rooms	18	30
Shops	22	
Bar and restaurant	22	30
Gymnasium (per athlete)	25	
Swimming pool	22	
Gymnasium (per onlooker)	18	
Workshop and light physical work areas	-	45
Other workshops	-	60

AIR.H estimated in a 2007 study for ADEME that more than 57% of the square meter surface of the French stock of commercial buildings was equipped with an overall ventilation system or air handling unit.

About half of offices, shops and education buildings have as yet no ventilation system.

There is no mandatory inspection for non-residential buildings.

### 3 REFERENCES

J.O. Arrêté du 24 mars 1982 relatif à l'aération des logements (1983).