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Air Infiltration and Ventilation Centre

Trends in building ventilation requirements and inspection in Ireland

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1 General introduction

This paper provides a background regarding building ventilation regulations and inspection requirements in Ireland. Ventilation requirements for new buildings are provided in the National Building Regulations, which apply to the whole of the Republic of Ireland.

The Building Regulations came into force in Ireland on the 1st of June 1992. The Building Regulations 1997 - 2022 set out the legal requirements in Ireland for the construction of new buildings (including houses), extensions to existing buildings as well as for material alterations and certain material changes of use to existing buildings. The Building Regulations are set out in a series of functional requirements, listed under the Second Schedule to the Regulations.

The related Technical Guidance Documents (Parts A - M respectively) provide technical guidance on how to comply with the Regulations in practical terms. Part L gives the requirements relating to the Conservation of Fuel and Energy in buildings and Part F gives the requirements relating to Ventilation. Where works are carried out in accordance with the relevant technical guidance, such works are considered to be, prima facie, in compliance with the relevant regulation(s). Significant amendments were introduced simultaneously to TGD L Conservation of Fuel and Energy and TGD F Ventilation in 2019. The impetus for the amendments in 2019 were two-fold, the increased focus on improving the energy performance of the building stock, and recognition of the important role of ventilation to optimise health and indoor air quality in energy-efficient buildings. In Ireland, the primary responsibility for compliance with the requirements of the Building Regulations rests with the designers, builders and owners of buildings. Interpretation of the legislation is, ultimately, a matter for the Courts and implementation of the Building Control system and enforcement is a matter for the local Building Control Authority. General information on building standards can be found on the Department of Housing, Local Government and Heritage Website [1].

2 National trends in IAQ requirements and market

2.1 *Requirements on ventilation of dwellings*

In Ireland, ventilation requirements for new buildings (and major renovations) are outlined in the Building Regulations, Part F (S.I. No. 263/2019 Building Regulations (Part F Amendment) Regulations 2019 [2] published by the Irish Department of Housing, Local Government and Heritage. Ventilation requirements for existing buildings, undergoing a retrofit are published by the National Standards Authority of Ireland in NSAI S.R. 54:2014/A2:2022 Code of Practice for the Energy Efficient Retrofit of Dwellings [3].

New Buildings

The Building Regulations apply to the design and construction of a new building or an extension, or a major renovation to an existing building. Part F of the Building Regulations applies to ventilation and was last revised in 2019 and has two Requirements, F1 and F2. F1 specifically refers to means of ventilation for people in buildings, and F2 refers to provisions to prevent excessive condensation in a roof.

Technical Guidance Document F (TGD F) [2] provides guidance in relation to the application of Part F of the Building Regulations and the minimum provisions to meet ventilation requirements in non-complex buildings of normal design and construction with different ventilation strategies. Section 1.2 of TGD F deals with ventilation methods for new dwellings and extensions including continuous mechanical extract ventilation, mechanical ventilation with heat recovery and natural ventilation. Section 1.3 of TGD F deals with ventilation methods for buildings other than dwellings, in particular, offices and car parks.

An additional guidance document on the Installation and Commissioning of Ventilation Systems for Dwellings-Achieving Compliance with Part F 2019 [4] is referenced in TGD F. It provides installation guidance for ventilation systems as defined by TGD F and provides guidance on how to achieve compliance with Part F of the Building Regulations. The Guidance within TGD F applies to all new dwellings and major renovations where a mechanical ventilation system is installed.

According to TGD F a minimum general ventilation rate is calculated based on occupancy or floor area (whichever is the greatest value) for centralized mechanical extract ventilation and mechanical ventilation with heat recovery, as follows:

5 l/s plus 4 l/s per person, e.g. 25 l/s for a five person, 3-bedroom semi-detached dwelling. This is based on two occupants in the main and second bedrooms, and a single occupant in the third bedroom. This should be used as the default value, if a greater level of occupancy is expected, then add 4 l/s per occupant.

Or

0.3 l/s per m^2 internal floor area, e.g. 30 l/s for a 100 m^2 dwelling.

In addition to minimum general ventilation rates, minimum boost extract rates are calculated for centralized mechanical extract ventilation and mechanical ventilation with heat recovery, which are:

- Kitchen - 13 l/s,
- Utility room – 8 l/s,
- bathroom – 8 l/s,
- and sanitary accommodation (no bath or shower) – 6 l/s.

These minimum boost rates may need to be increased to achieve the general ventilation rate. Examples of flow rates for typical dwellings in Ireland are given in Appendix A of TGD F 2019 and in section 6.0 of the NSAI Ventilation Validation Registration Scheme Master Document [5]. For mechanical ventilation with heat recovery, supply and extract rates should be nominally balanced. Airflow supply rates should be greater or equal to extract rates. In all cases, the supply airflow rate should be no greater than 15% above extract airflow rate.

For naturally ventilated dwellings, the minimum total equivalent area of background ventilators providing general ventilation should be 42,000 mm^2 with an additional 7,000 mm^2 for each additional 10 m^2 floor area above the first 70m^2 of floor area measured. For single storey dwellings situated at ground level or on any storey up to four storeys, an additional 7,000 mm^2 per dwelling should be provided. These correspond typically to a general ventilation rate of approx. 0.5 ACH. Table 3 in

Part F of the Technical Guidance document to the Building Regulations (2019) [2] summarises basic ventilation provision using background ventilators and specific provision for extract and purge ventilation at air permeability > 3.0 $m^3/(hr.m^2)$ and < 5.0 $m^3/(hr.m^2)$.

Existing Dwellings

In the case of material alterations or change of use of existing buildings, the adoption without modification of the guidance in TGD F may not, in all circumstances, be appropriate. In particular, the adherence to guidance, including codes, standards or technical specifications, intended for application to new work may be unduly restrictive or impracticable.

NSAI S.R. 54:2014 & a2:2022 is a Code of Practice for the Energy Efficient Retrofit of Dwellings that provides guidance for these dwellings [3]. This guide provides specific guidance on ventilation in existing dwellings undergoing an energy retrofit.

Changes over the last years & changes foreseen

Since 2019, the following changes have been implemented In Ireland:

- In all new dwellings, ventilation systems should be designed by competent designers and they should be installed, balanced and commissioned by competent installers, e.g. Quality and Qualifications Ireland accredited or Education Training Board or equivalent. When systems have been commissioned and balanced, they should then be validated by a competent person to ensure that they achieve the design flow rates. The validation should be carried out by a person certified by an independent third party to carry out this work, e.g. Irish National Accreditation Board (INAB), National Standards Authority of Ireland (NSAI) certified or equivalent [6].
- Similar to new dwellings, where new mechanical extract ventilation or mechanical ventilation with heat recovery systems are being installed as part of a major renovation (as defined in Part L 2019), these also should be designed by competent designers and they should be installed, balanced and commissioned by competent installers.
- TGD F was revised in 2019 to outline minimum provisions for ventilation and included a new section providing the minimum provisions for centralized continuous mechanical extract ventilation.

The National Standards Authority of Ireland Ventilation Validation Registration Scheme [6] was also introduced in 2019.

Requirements for air pressure testing on all new dwellings, on all development sites including single dwelling developments in accordance with I.S. EN ISO 9972:2015 [7], to show attainment of backstop value for the air permeability of 5 $m^3/hr/m^2$, was also introduced in TGD L Dwellings.

- Mechanical ventilation should be used in dwellings where the air permeability is less than 3 $m^3/hr{\cdot}m^2$.

Further changes are anticipated following the publication of the recast – Energy performance of Buildings Directive [8].

2.2 *Ventilation systems in residential buildings stock and market*

Following the changes to Part F of the Building Regulations in 2019, 81% of new dwellings in Ireland installed mechanical ventilation, primarily whole house mechanical extract ventilation (50%) and mechanical ventilation with heat recovery (30%). By contrast, less than 40% of new builds before 2020 installed mechanical ventilation systems when built.

In the private renovation market to an A rating, the main systems installed are continuous mechanical extract systems. In the social housing market, major renovations are to a cost optimal level of B2 and do not require advanced air tightness or mechanical ventilation, the main ventilation strategy is natural ventilation with intermittent extract fans in accordance with S.R. 54 guidance. Given the extent of ductwork, mechanical ventilation with heat recovery does not lend itself to retrofit to the same degree. Decentralised mechanical ventilation systems are still a small proportion of the market but they are seen as more viable in retrofitting, given the absence of ducting.

The impact of the changes to the Building Regulations in 2019 can be seen in the significant increase in the proportions of new builds with mechanical ventilation systems compared to new builds prior to the revisions.

An NZEB Ventilation training course was developed and introduced in 2019 by Waterford Wexford Education Training Board (ETB). This course was rolled out to a further five ETBs throughout Ireland in 2022.

2.3 *Requirements on ventilation of non-residential buildings*

Requirements for the ventilation of non-residential buildings are outlined in Part F of the Second Schedule to the Building Regulations [2], which provides for ventilation requirements in buildings other than dwellings. Such Regulations are mandatory.

Technical Guidance Document (TGD) F 2019 provides guidance in relation to compliance with the requirements of Part F of the Second Schedule to the Building Regulations. General guidance for buildings other than dwellings is provided under Paragraph 1.3.1 of TGD F 2019. Paragraph 1.3.2 of TGD F 2019 provides specific guidance for offices and Paragraph 1.3.3 provides specific guidance for car parks.

Part F 2019 applies to any works that result in a material change of use to a building undergoing a major renovation.

A general ventilation rate of 10 l/s per occupant for buildings is deemed appropriate where there are no significant pollutant levels. This rate is based on controlling body odours with low levels of other pollutants. Where there are significant levels of other pollutants, adequate outdoor air supply can be achieved by following the calculation method provided in CIBSE Guide A.

The Building Regulations are updated at regular intervals and are published for public consultation. The Department of Housing, Local Government and Heritage (DHLGH) engages regularly with stakeholders when updating the Building Regulations. The general ventilation rate of 10 l/s per occupant, as referred to above, has been in place since 2009.

2.4 *Ventilation systems in non-residential buildings stock and market*

At the time of writing there is no Irish published data relevant to the stock and market of ventilation systems in non-residential buildings.

3 National trends in energy requirements and market

3.1 *Energy requirements*

Energy requirements on ventilation

Part L of the Building Regulations and associated TGD L 2022 for Dwellings and for Buildings other than Dwellings provides the mandatory requirements on the conservation of fuel and energy for dwellings and for buildings other than dwellings. Part L applies to all new buildings and to all works to existing buildings, including extensions, material alteration, material changes of use and major renovations. The European Union (Energy Performance of Buildings) Regulations [8] supports the European Union's commitment to a clean energy transition, energy efficiency and decarbonisation of the building stock. These Regulations apply to works, to a building in which a material alteration or change of use takes place or to a building undergoing a major renovation. Table 4 in TGD L Dwellings 2022 [2] outlines the minimum performance levels for mechanical ventilation systems in new dwellings (see Table 1).

Table 1 - Minimum energy performance levels for mechanical ventilation systems in new dwellings (Table 4 in TGD L Dwellings 2022)

System type	Performance
Maximum Specific Fan Power (SFP) for continuous supply only and continuous extract only	0.6 W/litre/sec
Maximum SFP for balanced systems	1.2 W/litre/sec[1]
Minimum Heat recovery efficiency	70 %

[1] *For balanced systems with heating coils, add 0.3 W/litre/sec*

3.2 *Other drivers in energy performance*

Climate Action

Ireland's Climate Action Plan 2023 (CAP23) [10] is the second annual update to Ireland's Climate Action Plan 2019 [11]. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021 [12]. It sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050. It builds on Climate Action Plan 2023 and outlines how Ireland will accelerate the actions required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

The EU Energy Performance of Buildings Directive (EPBD) 2010/31/EU [12] sets requirements for Member States to improve the energy performance of buildings and make an important contribution to the reduction of greenhouse gas emissions. This Directive requires that all new buildings are nearly zero energy buildings by the 31st December 2020 and where a major renovation (i.e. where more than 25% of the surface area of the building envelope undergoes renovation) is carried out on a building, the building should be improved to cost optimal level where this is technically, functionally and economically feasible. This was transposed in Ireland for dwellings by the European Union (Energy Performance of Buildings) Regulation 2019 (S.I. No. 183 of 2019) [13] and for Buildings other than Dwellings by the Building Regulations (Part L Amendment) Regulations 2017 (S.I. No. 538 of 2017) [14]. In addition to the above a further amendment to the Energy Performance of Buildings Amending Directive 2018/844 brought in a requirement for existing non-residential buildings to install building automation and control systems in buildings with heating, ventilation and air-conditioning systems with an effective rated output of over 290kW. This was transposed in Ireland by the European Union (Energy Performance of Buildings) Regulations 2021 (S.I. No. 393 of 2021) [15]. Another driver for energy performance is the EU Energy Efficiency Directive which requires the publication of a National Energy Efficiency Action Plan (NEEP) [16]. Ireland is also a signatory to International agreements such as the High Ambition Coalition (HAC) a global effort to limit the global temperature rise to 1.5°C, the Beyond Oil and Gas Alliance (BOHA) focused on transitioning away from global oil and gas production and the Climate and Clean Air Coalition Ministerial.

Financial incentives, funding and supports

The Sustainable Energy Authority of Ireland (SEAI) [17] provides different financial supports to private homeowners wishing to improve the energy performance of their homes:

- Home Energy Upgrade scheme – this is available to homeowners wishing to carry out a deep retrofit of their home and achieve an EPC rating (referred to as Building Energy Rating in Ireland) of B2 or better (< 125 kWh/m^2/hr)
- Individual Energy Upgrades – grants are provided for individual home upgrade measures where a homeowner may not want/ need to upgrade several measures at the same time.
- Fully Funded Energy Upgrades – free home energy upgrades are provided for those at risk of fuel poverty and they are fully funded by the state.

In 2024, Ireland will begin a Home Energy Upgrade Loan Scheme. The loan scheme is backed by the Irish Government and the European Investment Bank and will provide low-cost loans to homeowners to upgrade the energy performance of their home, making energy upgrades financially viable and reducing one of the big barriers in improving the energy performance of the Irish housing stock.

Outside of the Sustainable Energy Authority of Ireland (SEAI) Deep Energy Retrofit Pilot programme, where it was mandated, mechanical ventilation did not feature on mainstream grant programmes before the current Part F of the Building Regulations.

In regard to social housing, the Energy Efficiency/Retrofitting Programme (EERP) was launched in 2013 with the aim of funding the retrofit of social homes requiring insulation and energy upgrade works. To the end of 2021 and with regard to the “shallow retrofit” (phase 1 and 2 works), over 74,000 local authority owned properties have been retrofitted under the programme with a total exchequer spend of €166 million.

The programme was, in light of Programme for Government commitments, revised in 2021 and set a target for the sector of 36,500 local authority owned dwellings to be retrofitted to a BER rating of B2/Cost Optimal Equivalent (CoE). The revised programme provides for a significant upscaling in the level of funding available and focuses on ensuring that the fabric of the home is upgraded and an energy-efficient heating system is provided. Since the implementation of this newly revised programme in 2021, 5,766 dwellings have been retrofit to B2/CoE with Exchequer funding of €162.7 million recouped to the local authorities. It is expected that by 2030, 70% of all social housing in Ireland will be A or B rated.

3.3 *Changes over the last years & changes foreseen*

Dwellings

Performance levels for the energy consumption for mechanical ventilation as per table 4 in TGD L were changed in 2019 vs 2011 and are summarised below (Table 2).

Table 2 – Changes of performance levels for the energy consumption of mechanical ventilation (Table 4 in TGD L)

System type	Performance (2011)	Performance (since 2019)
Maximum Specific Fan Power (SFP) for continuous supply only and continuous extract only	0.8 W/l/s	0.6 W/l/s
Maximum SFP for balanced systems	1.5 W/l/s	1.2 W/l/s*
Minimum Heat recovery efficiency	66%	70 %
	** For balanced systems with heating coils, add 0.3 W/l/s*	

Buildings other than dwellings

Building Regulations are updated at regular intervals and are published for public consultation. Part L 2017 provided for Nearly Zero Energy Buildings (NZEB) requirements in accordance with the requirements of the Energy Performance of Buildings Directive (EPBD). Article 5 of the EPBD also requires that every 5 years, Ireland undertakes a Cost Optimal Study to establish minimum energy performance requirements. The 2023 Cost Optimal Study for Ireland revealed some differences compared to the 2018 study: The study proposed reviewing certain requirements in the next full review of Part L of the Building Regulations for Buildings other than Dwellings, particularly for elements where significant gaps were identified

4 National trends in the inspection of ventilation systems

4.1 *Requirements on the inspection of ventilation systems*

Requirements for inspection of ventilation systems are mandatory for dwellings and are covered in the National Standards Authority of Ireland Ventilation Validation Registration Scheme [6]. Checks and measurement methods broadly follow the guidance given in I.S. EN 14134:2019 Ventilation for buildings – Performance testing and installation checks of residential ventilation systems.

4.2 *Inspection Protocols*

4.1.1 New Dwellings and Major Renovations of Existing Dwellings

Additional guidance is provided to Part F TDG on installing and commissioning ventilation systems for Dwellings—Achieving Compliance with Part F 2019 [4]. It provides detailed guidance on requirements for both mechanical and natural ventilation systems.

This guidance document includes details that should be left with the building owner, including information required to use and manage the system appropriately. The installation and commissioning must be recorded and should include details regarding visual and system performance checks, and must record the air flow measurements for intermittent and continuous mechanical ventilation systems. Details (including calibration certificates) of instruments used in the testing must also be provided.

A certified Independent third party should carry out validation of the ventilation system. The third party should hold certification that is recognised by the Irish National Accreditation Board (INAB), National Standards Authority of Ireland (NSAI). The NSAI scheme commenced in September 2019. The NSAI has currently 49 Validators registered on its scheme (as of 04/10/2023). The role of the ventilation validation certificate is to ensure that the ventilation system achieves the design flow rates.

An example of the NSAI ventilation validation certificate is provided in Appendix A at the end of the document.

The validation of the ventilation system should be done when the system has been installed, balanced and commissioned by competent installers.

Requirements on measuring devices Calibration certificates requirements are set in paragraph 7.0 of the NSAI Ventilation Validation Registration Scheme Master Document. The Domestic Ventilation Compliance Guide states

that the instrumentation must be calibrated annually by an accredited laboratory such as INAB, UKAS or similar approved. It also states that instrumentation used for measuring airflow rate must provide a measurement accuracy of ± 5%.

Valid certificates for ventilation validation and an air tightness certificate are required for a certificate of compliance to be issued by a Building Control Local Authority.

5 National trends in Innovative Systems and market

TGD D - Materials and Workmanship - 2013 [18] (paragraph 0.10) provides that the process of Agrément certification applies to those products and processes which do not fall within the scope of existing construction standards, either because they are innovative or because they deviate from established norms. NSAI Agrément assesses, specifies testing, and where appropriate, issues Agrément certificates confirming that new building products, materials, techniques and equipment are safe and fit for purpose in accordance with the Irish Building Regulations and with the terms of the certificate. Such certificates may be in addition to, but not conflict with, CE marking. Such NSAI Agrément Certificates certify compliance with the requirements of the Building Regulations. The first NSAI Agrément Certificate for ventilation systems was awarded in 2021 for AERECO demand controlled ventilation systems [19].

TGD F 2019 states: Where works are carried out in accordance with the guidance in this document, this will, prima facie, indicate compliance with Part F of the Second Schedule to the Building Regulations. However, the adoption of an approach other than that outlined in the guidance is not precluded provided that the relevant requirements of the Regulations are complied with. That means that the innovative system should have an NSAI Agrément Certificate.

6 Impact of the COVID-19 pandemic

The Department of Health established a National Expert Group during the Pandemic, they provided advice on the Role of Ventilation in Reducing Transmission of COVID-19. The Group worked with the Irish Government to inform sectoral guidance and public information regarding ventilation [20].

Several training programmes have been designed and provided by Educational Training Boards to upskill the workforce on NZEB requirements with regards to air tightness and ventilation. See for example: http://nzeb.wwetbtraining.ie/ and https://www.loetb.ie/nzeb-fundamentals

During the pandemic, the NZEB training courses on ventilation were delivered partially online.

7 Other points of attention or trends

7.1 *Acoustic requirements*

Noise generated by ventilation fans which may propagate through incorrectly designed ducts and ductwork can disturb the occupants of a building. Noise minimization should be considered through the specification of quieter products, the correct design of ductwork and fittings and installation and mounting of units to manufacturer's instructions. Further Guidance is available in BS 8233 "Guidance on sound insulation and noise reduction for buildings" [22]. Installation of sound attenuators in ductwork may be used to reduce noise levels from equipment. The average A-weighted sound pressure level in noise sensitive rooms such as bedrooms and living rooms is recommended not to exceed 30 dB LAeqT. In less sensitive rooms, such as kitchens and bathrooms, noise level is recommended not to exceed 35 dB LAeqT. Noise from a continuously running mechanical ventilation system on its minimum rate is recommended not to normally exceed these levels. The noise index LAeqT is used in BS 8233 1999 where T is the duration of the measurement. If the noise from the sound source is steady (e.g. fluctuating by up to 3 dB), a measuring time of 1 minute will be adequate and the LAeq, 1 min level will be similar to the dB (A) level used elsewhere. If the noise from the sound source fluctuates more than this, a longer measuring time (T) will be required.

The Department of Housing, Local Government and Heritage (DHLGH) introduced an informative video and an informative leaflet

aimed at raising awareness of the general public on the importance of ventilation in homes.

8 Conclusion

With the recast EPBD introducing new Indoor Environmental Quality requirements, the recently introduced provisions in Ireland for all new NZEB dwellings to be air tightness tested and to have their ventilation system validated by independent experts may be further extended to include all or part of major renovations as the cost-optimal level for major renovations moves towards buildings with greater air tightness and better energy performance.

In parallel, national campaigns will be needed to raise awareness for the citizens on the importance of proper ventilation and indoor environmental quality in buildings and on the requirement for regular maintenance of ventilation systems, similar approaches to other building services.

9 Example of mandatory flowrate for typical buildings

Technical Guidance Document (TGD) F 2019 provides guidance on how to achieve adequate and effective means of ventilation in non-complex buildings of normal design and construction. It deals with ventilation methods for new dwellings and extensions, and with ventilation methods for buildings other than dwellings, in particular, offices and car parks.

A general ventilation rate of 10l/s per occupant for buildings is appropriate where there are no significant pollutant levels. This rate is based on controlling body odours with low levels of other pollutants. Where there are significant levels of other pollutants, adequate outdoor air supply can be achieved by following the calculation method provided in CIBSE Guide A.

For classrooms, guidance is 8 L/s (Dep. Education)

For residential buildings, two approaches are used.

0.3 L/s per m^2 and 5 L/s +4 L/s per person.

If the occupancy is not known then it is assumed 2 people per bedroom for the first two bedroom and 1 person per subsequent bedroom.

Whichever number is the greatest this is the number that is used. It typically equates to between 0.3 and 0.6 ACH.

This is described in the regulations as the general ventilation rate.

9.1 *Dwellings*

Scenario 1

House of 90 m² (2.5m height), 1 main room, 3 bedrooms (1 master (2 adults), 2 kids), 1 kitchen, 1 bathroom and 1 toilet

90 m^2 x 0.3 =27 l/s

5+ (4x4) = 21 l/s an unknown number of occupancy so assumed 2 people in 2 bedrooms

Design Flow Rate – 27 Litres/s

The system must have the capacity of plus 25% of this value 27 x 1.25=33.75 Litres/s

Scenario 2

Apartment of 50 m², 1 main room, 1 bedroom), 1 kitchen open on the main room, 1 bathroom with toilets

50 m^2 x 0.3=15 Litres/s

5+ (4x2) =13 Litres/s - an unknown number of occupancy so assumed 2 people in first bedroom.

Design Flow Rate – 15 Litres/s

The system must have the capacity of plus 25% of this value 15 x 1.25=18.6 Litres/s

9.2 *Non-residential*

Classroom with 25 pupils + 1 teacher. 50 m^2 and 3 m height

(25 + 1) x 8 l/s per person=208 l/s or 748 m^3/h

V = 50 m^2 x 3 m=150 m^3 that would be n = 5 ACH

Office with 1 person. 12 m^2

1 x 10 l/s per person = 10 l/s

10 References

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[14] Irish Statute Book, Legislation, S.I. No. 538/2017 - Building Regulations (Part L Amendment) Regulations 2017 https://www.irishstatutebook.ie/eli/2017/si/538/made/en/print

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[17] Sustainable Energy Authority of Ireland https://www.seai.ie/

[18] Department of Housing, Local Government and Heritage (2021) www.gov - Technical Guidance Document D – Materials and Workmanship (www.gov.ie)

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Appendix A - Example of the NSAI ventilation validation certificate

Ventilation validation certificate

NSAI

Dwelling address	**2 Block E, The Paddocks**
Dwelling type	**Apartment**
Total floor area	**76.59** m²
Ventilation system	MEV
Date of test	01/04/2021
Installer/builder (if applicable)	**Builder or Installer**
Validation certificate number	1.91.0xx.20.001

Supply air	**Presented design supply air flows rates**		**Measured supply air flow rate at trickle**		**Measured supply air flow rate at boost**	
	Trickle	**Boost**	**Trickle**	**Tolerance check**	**Boost**	**Tolerance check**
Living room (1)						
Dining room						
Playroom						
Study room						
Reception room						
Bedroom 1						
Bedroom 2						
Bedroom 3						
Bedroom 4						
Bedroom 5						
Bedroom 6						
	0.00	**0.00**	**0.00**		**0.00**	

Extract air	**Presented design extract air flows rates**		**Measured extract air flow rate at trickle**		**Measured extract air flow rate at boost**	
	Trickle	**Boost**	**Trickle**	**Tolerance check**	**Boost**	**Tolerance check**
Kitchen	11.17	13.06	11.10	-0.6%	13.60	4.2%
Utility room	6.86	8.19	6.40	Within 1 l/s	9.10	Within 1 l/s
Bathroom/Ensuite (1)	6.81	8.28	6.60	Within 1 l/s	8.30	Within 1 l/s
Sanitary accommodation (no bath or shower) (1)						
Bathroom/Ensuite (2)						
	24.83	**29.53**	**24.10**	**-3.0%**	**31.00**	**4.99%**

RESULTS	
Allowable supply trickle error/uncertainty*	**0.00 l/s**
Allowable supply boost error/uncertainty*	**0.00 l/s**
The total measured supply **trickle** air flow rate was within tolerance of the presented design trickle air flow rate	**FAIL**
The total measured supply **boost** air flow rate was within tolerance of the presented design boost air flow rate	**FAIL**
Trickle supply > trickle extract but ≯15%	
Boost supply > boost extract but ≯15%	
Check on individual minimum **boost** extract rates	**PASS**
Option on compliance that the measure system achieved the presented design air flow rates:-	**PASS**

Overall comments:-

Comments on design:-

The design flowrates provided to the NSAI Validator matched the NSAI design sheet which follows the general ventilation requirements outlined in Clause 1.2.2/1.2.3 of TGD to Part F of the Building Regulations.

SIGNED	*Mr Validator, 23/09/2020*	
	Report print date & time	**13/01/2025 13:02**

* Measured error/uncertainty = 1 l/s < 10 l/s or 10% > 10 l/s

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The Air Infiltration and Ventilation Centre provides technical support in air infiltration and ventilation research and application. The aim is to promote the understanding of the complex behaviour of the air flow in buildings and to advance the effective application of associated energy saving measures in the design of new buildings and the improvement of the existing building stock.