Universidad de Valladolid

Airtightness and energy impact of air infiltration in residential buildings in Spain

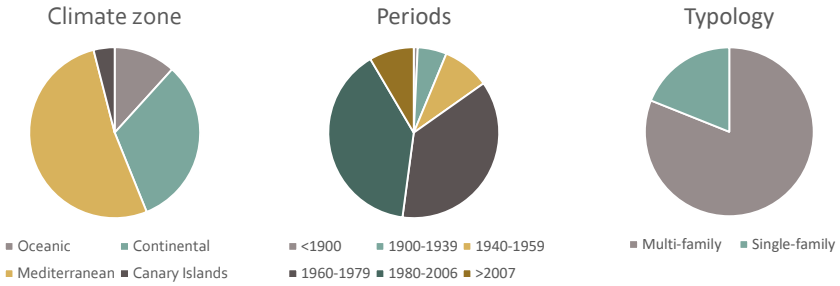
Irene Poza-Casado, Alberto Meiss, Miguel Ángel Padilla-Marcos and Jesús Feijó-Muñoz
GIR Arquitectura & Energía, Universidad de Valladolid

40th AIVC – 8th TightVent & 6th venticool Conference, 2019. Ghent, Belgium

1

1 Introduction

- No airtightness requirements in national building regulations
- Sample: 400 cases
  - Multi-family and single-family
  - Different periods of construction
  - 9 locations: Continental, Mediterranean and Oceanic climates



2

2 Testing method and energy impact assessment

- Fan pressurization method. ISO 9972
- $n_{50} > n_{nat}$

$$n_{nat} = \frac{n_{50}}{N}$$

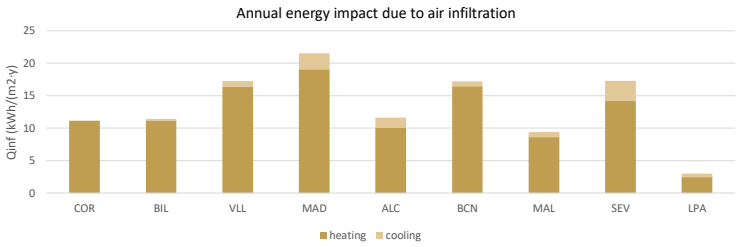
- Energy load

$$Q_{inf} = C_p \cdot G_t \cdot V_{inf}$$

Where:

Q_{inf}:annual energy loss [kWh/y] for heating $Q_{inf\ -H}$ and cooling $Q_{inf\ -C}$
C_p: volumetric heat capacity of the air
G_t : annual degree days [kKh/y]

3 Results & Conclusions



Airtightness results and energy impact due to air infiltration

Parameter	unit	COR	BIL	VLL	MAD	ALC	BCN	MAL	SEV	LPA
n_{50}	h^{-1}	4.61	4.67	4.99	7.29	7.78	9.73	6.89	8.88	5.43
q_{50}	$m^3/(h \cdot m^2)$	3.58	3.47	3.76	5.93	6.26	7.49	5.16	6.81	4.60
n	-	0.62	0.62	0.64	0.61	0.61	0.59	0.60	0.58	0.59
G_{t-H}	kKh/y	54.89	56.86	80.09	63.48	33.24	44.90	34.46	38.50	9.86
G_{t-C}	kKh/y	0.12	1.32	3.91	8.21	5.30	1.99	3.12	8.30	
$Q_{inf\ -H}$	$kWh/(m^2 \cdot y)$	11.10	11.15	16.41	19.07	10.02	16.44	8.61	14.21	2.43
$Q_{inf\ -C}$	$kWh/(m^2 \cdot y)$	0.02	0.26	0.80	2.47	1.60	0.73	0.78	3.06	0.54

Thank you!

Acknowledgements

The test campaigns that allowed this work were supported by the Spanish Ministry of Economy and Competitiveness (BIA2015-64321-R) under the research project *INFILES: Repercusión energética de la permeabilidad al aire de los edificios residenciales en España: estudio y caracterización de sus infiltraciones*. The attendance to this conference has been possible thanks to the program Movilidad de Doctorandos UVa 2019.