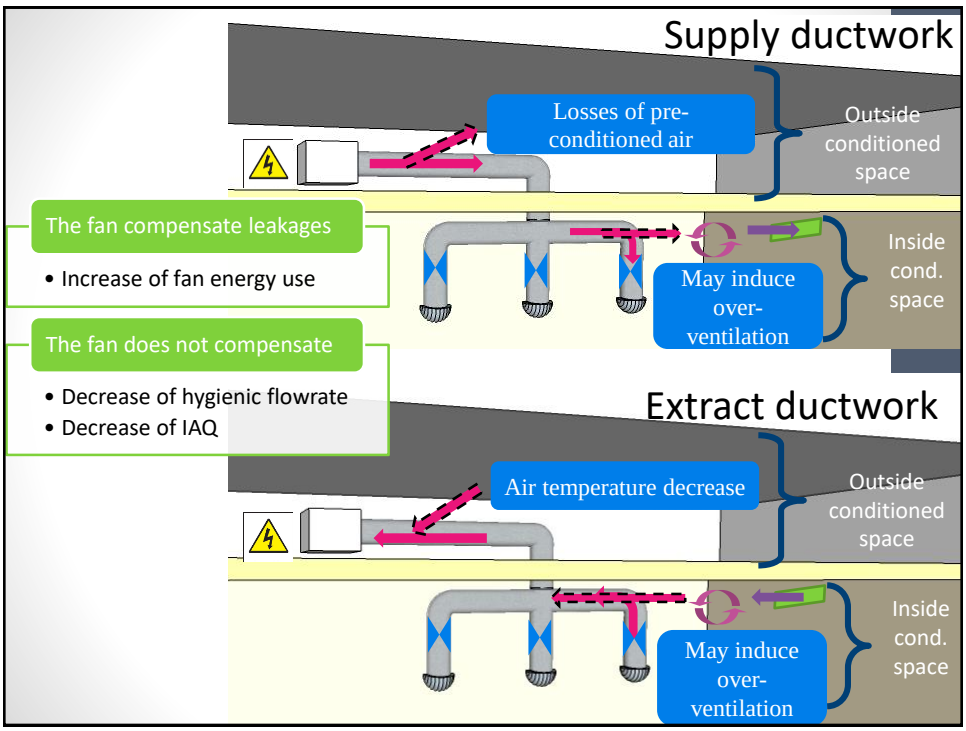
Why should we care about ductwork airtightness ?

Webinar on ductwork airtightness
January 25th, 2018
Valérie Leprince, PLEIAQ

Outline

- Impact of ductwork leakages
- Ductwork airtightness level
- Evolution in regulatory and programme requirements in EU countries
- Presentation of speakers

IMPACT OF DUCTWORK LEAKAGES



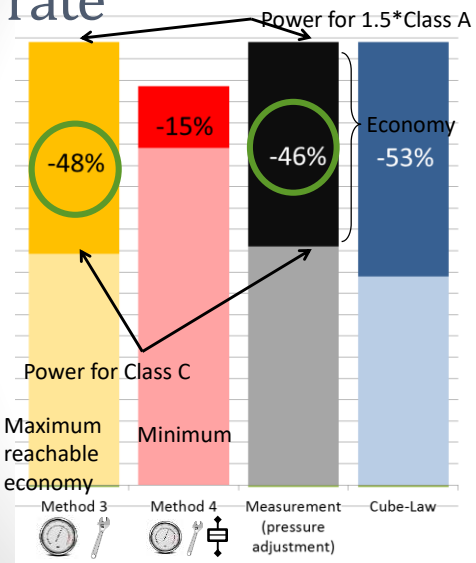
Fan energy use, test on laboratory replication of real ductwork system

- Area 18.7 m²
- Extract fan constant pressure
- 8 self- adjusting air terminal devices
- Airflow rate:
  - Max : 525 m³/h
  - Min : 260 m³/h
- Measurement and calculation method

Class C → Drilling → 1.5 *Class A

Source : (Berthault, Boithias, & Leprince, 2014)

Results for maximum airflow rate



- Decrease leakages from 1,5 class A to Class C can almost **divide Fan energy use by 2**

Source: Leprince, Carrié, AIVC 2017

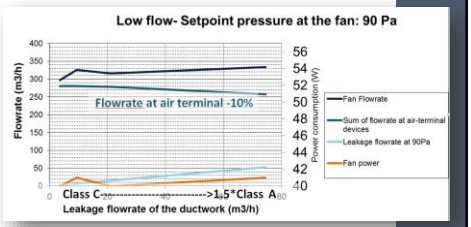
Energy use impacts

- Impact on overall building energy use:
  - According to (Soenens, 2011) the total energy consumption related to ventilation can **be reduced by over 30%** by achieving an airtight ventilation system.
  - According to (Dyer, 2011) in a pharmaceutical plant over a 30 years life of the building the energy **penalty** associated with excessive duct leakage is **more than 1.3 million dollars**

=> More studies on the impact on heating and cooling are needed

IAQ impacts

- Duct leakage:
  - Reduces flowrates at air terminal devices, unless fan compensates
    - A decrease of 10% of flowrate has been observed by (Berthault, 2014) if the fan is not re-adjusted
  - Suspicions:
    - Increases dust accumulation in filters, heat exchangers, ducts, …
    - Weakens contamination protection of sensitive areas (operating theatres, clean rooms, etc.)

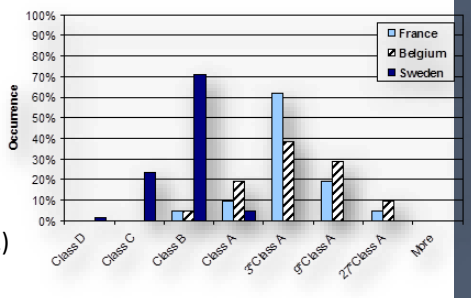


=> More studies on this field are needed

DUCTWORK LEAKAGE LEVELS

Ductwork leakage levels

- SAVE-DUCT project has shown striking difference between Sweden, Belgium and France (Carrié, 1999)
  - In **Sweden,** since 1966, the AMA tightness requirements have been raised to reach **Class C** for every ductwork since 2007 (Andersson, 2012)
- In US: duct leakage in 11 large buildings shown to represent on average **28% of the fan flow** (Modera, 2013)



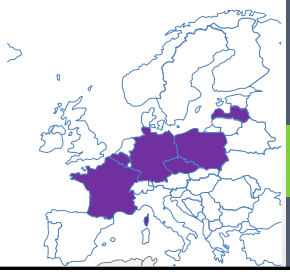
EVOLUTION IN REGULATORY OR PROGRAMME REQUIREMENTS

Evolution in regulatory or programme requirements

- In **Sweden** ductwork airtightness is required
  - Since 1966
  - Since 2007: **Class C** required
- In **Portugal** for large building
  - Since 2006 ductwork leakage below **1.5 l/s.m² under 400 Pa**
- In **Belgium**
  - Taken into account in calculation method, but no minimum requirement
- In **UK**
  - **Test mandatory** for system with design flows **> 1 m³/s**
  - For low pressure ducting no test required but taken into account in calculation
  - Test typically performed by ducting contractor
- In **France**
  - Since 2013
  - Effinergie + label requires **Class A**
  - Test has to be performed by a **qualified** independent **technician**

How ductwork airtightness is taken into account in regulations?

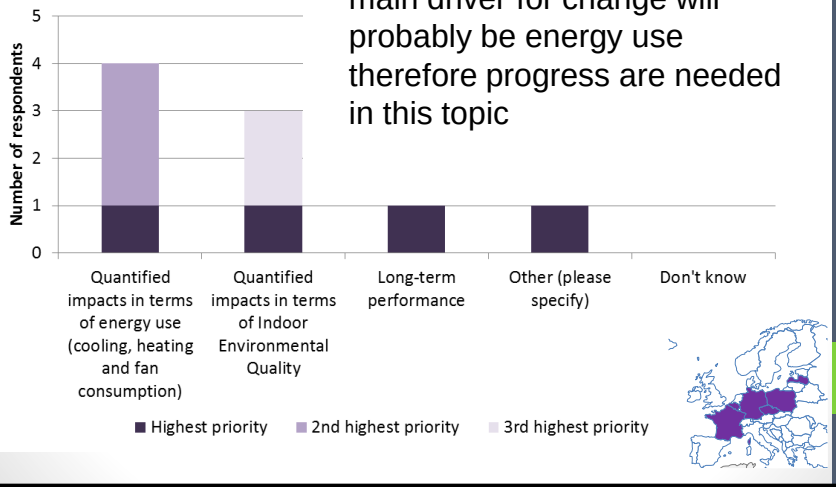
- Result of a Tightvent Airtightness Association Committee (TAAC) survey
  - Only France (RT2012) and Belgium (EPB) consider ductwork airtightness as an input in EP-regulation
    - But there is no minimum requirement
    - In France if a value better than default value is used then it has to be justified (testing or certified quality approach)
  - Awareness is low



Source Leprince, Carrié, Kapsalaki, AIVC 2017

What is in your view the progress needed to promote ductwork airtightness in your country?

- As for building airtightness the main driver for change will probably be energy use therefore progress are needed in this topic



PRESENTATION OF SPEAKERS

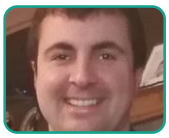
Ductwork airtightness: standardisation's ongoing work and an overview of status and trends in Sweden, Japan, Spain and Portugal

Lars-Ake Mattsson

- CEN TC 156/WG3, Sweden
- European ductwork airtightness class, on-going standardization work and status in Sweden

Masaki Tajima

- KUT, Japan
- Status of ductwork airtightness in Japan and on-going work at ISO on ductwork airtightness



Rodrigo Sanz

- Gonal Driving Air, Spain
- Market trends in Spain and Portugal, an industry point of view