How to improve ductwork airtightness

THE SCANDINAVIAN SUCCESS STORY

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BRIEF HISTORY

- until1960's : ducts prepared on site, mainly rectangular – airtightness and balancing unknown, no attention cleanliness, energy performance etc.
- 1950's: wake-up in Sweden to quality and airtightness of ductwork – classes A and B introduced (AMA 1966)
- 1970's: classes A and B adopted by Eurovent (doc. 2/2) *(NOTE! A is the lowest class)*
- 1970's: breakthrough: factory-made circular ducts and components *also : standard dimensions*

BRIEF HISTORY (2)

- 1983: class C introduced (Sweden, AMA 1983) – in addition, requirements for commissioning and maintenance – class C adopted in revision of Eurovent 2/2
- 1986-1987: new ventilation regulations in Finland

  -airtightness classification also for air handling units (AHU)

  -requirements MANDATORY

  -also attention to system and ductwork cleanliness

  -attention to commissioning and maintenance, too

BRIEF HISTORY (3)

- 1990's:
  -class D introduced in practical guidance (Sweden, AMA 1988)
  -cleanliness: European prestandard ENV 12097
  -European standards in preparation for airtightness – a lot based on Nordic experiences – already at draft stage adopted in practice in several European countries

- 2000-2004
  -European standards PUBLISHED
    -airtightness: EN 12237, EN 1507, also in EN 1751 (dampers and valves), EN 1886 (AHU's)

- 2003:
  -classes D ja E introduced on REGULATORY level (Finland)
  – minimum now class C for ducts and A for AHU's

TODAY

- Impact of airtightness recognized in European energy performance standards (EN 15242), including:
  - -typical loss 6% in ducts of class A
  - -typical loss 2% in AHU's of class L3 *

…but 2,5 times higher leakages are given as default, reflecting the European state-of-art

See EN 15242 / 7.2.2.2 for more information

**) L3 for AHU's (EN 1886) corresponds A for ducts*

BUT STILL *(bits and pieces from real life)*

- Leakages in lots of existing European duct systems higher than acceptable even in the lowest class A – ending up in unnecessary additional energy need up to 5-15%
- In addition, air flows deviate from design values typically +10…-20% , *->but after 2 year's use even +20…-90% (average maybe -20%)*

Improving – but slowly…

What do we need ?

- We need each day approximately
  - 1 kg solid food to eat
  - 3 kg water to drink
  - 15 kg fresh air to breathe

->->->

HEALTH - PRODUCTIVITY

- We need fresh air to spaces indoors

…for health, well-being and productivity

…with minimum energy consumption ->->

-> we need AWARENESS (again)

GLOBAL CLIMATE CHANGE **MAY** BE WORSE THAN WE THINK.

… if it is then we must also improve our ventilation systems

..airtightness is one important element here, too !!

We need to conduct air into the rooms in a CONTROLLED way
-right amount
-right time
-right place
-right conditions

..and if the system is leaky -> WE SIMPLY CANNOT DO IT!!

(IF THE CLIMATE CHANGE IS NOT SO BAD, we still can improve the systems and keep the global leadership ☺

TODAY'S GOOD NORDIC VENTILATION SYSTEMS ARE…

- **clean**
- **AIRTIGHT**
- **balanced**
- controlled
- Demand-based

- ***Energy-efficient – including well- designed ducts, heat recovery, demand-control, low fan energy …***

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