BUILDING AIRTIGHTNESS SOLUTIONS: SEALANTS AND PU-FOAMS

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BUILD THE FUTURE

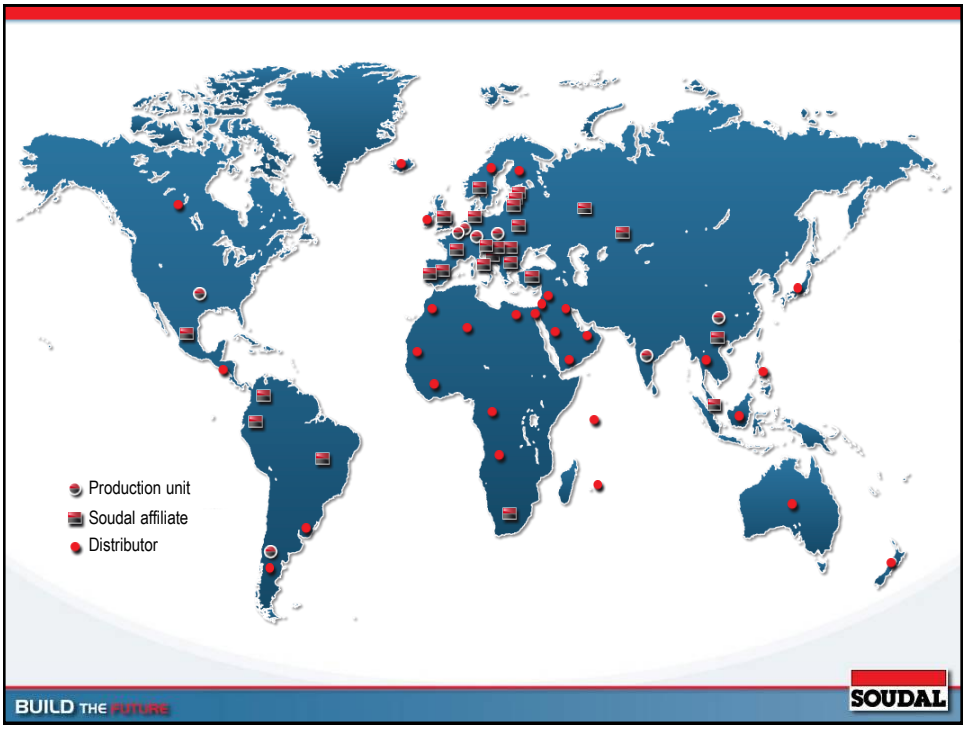
SOUDAL

Soudal

SWS
SOUDAL WINDOW SYSTEM

BUILD THE FUTURE

SOUDAL



Sealants

SWS
SOUDAL WINDOW SYSTEM

- Silicone (AC / Alcoxy / Oxime)
- Acrylics
- Hybrid polymers
- Polyurethane
- Polyisobutylene
- Bitumen
- Fire rated sealants
- Fast curing
- Primers & tools

PU Foams

- Handheld / gun / click & fix
- Construction foam
- Insulation foam
- Sound proofing foam
- All weather foam
- 2K-foam
- Isocyanate free foam
- PU mining foam
- Multi position foam
- Fire rated foam

Adhesives

- Contact neoprene & SBR
- 1K & 2K PU
- PVA wood
- Construction
- Floor / tile / glass fibre
- PVC
- Cyano
- Epoxy
- Chemical anchors

Hybrid polymers

- Industrial adhesives
- Parquet applications
- Sealing & bonding
- 2K
- High tack
- Crystal clear
- Ultra

Building chemicals in Europe

- Legislation on (level of) raw materials / chemicals (Reach, Biocides,…)
- Construction Products Directive is basis for:
  - Harmonised norms (CE marking)
  - Energy Perfomance of Buildings (EPB)
  - Sustainability
- CPD becomes CPR as of 1/7/2013, and…
- EN ISO 11600 for sealants becomes basis for harmonised norm / CE marking: hEN15651-1 to -5
  - Function: glazing, fassade (interior/exterior), sanitary, pedestrian walkways
  - Movement capacity: only apllies to elastic sealants: movement capacity from 7,5% to 25%

Construction joints

- Important unimportance
- Function
  - Weather sealing / water tightness
  - Cosmetical
  - Thermal insulation (thermal bridges)
  - Fire proofing
  - Acoustics
  - Burglar resistance
  - Airtightness
- And mostly a combination thereof…

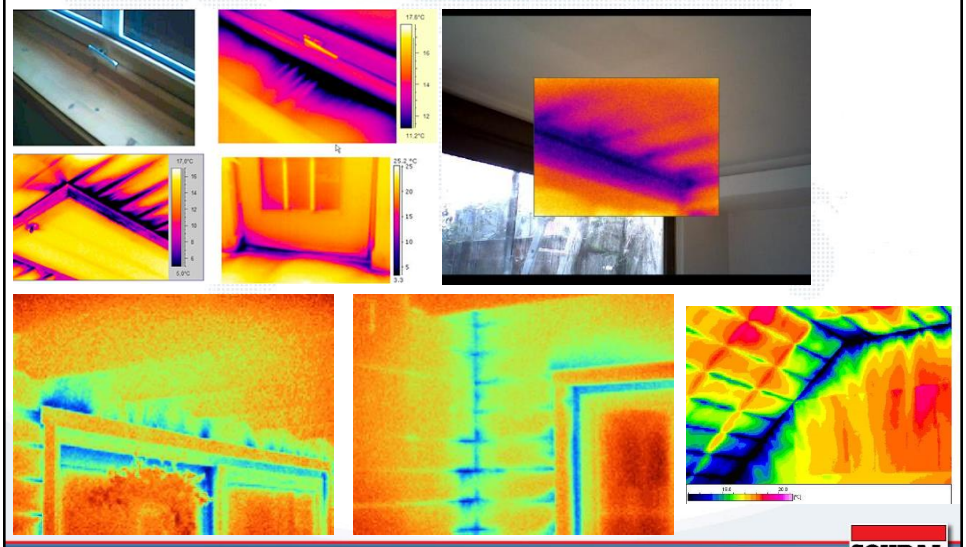
Sealants

PU-foams / adhesives

Condensation risc

- Cold surfaces inside: mould
- Often result from poorly executed building knots:
  - Airleaks
  - Thermal bridges
  - Or a combination of both

Airtightness



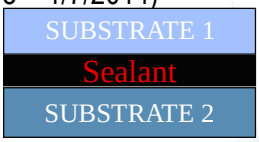
Airtightness of construction materials

- (Inter)national norms relating to airtightness of sealants and foams
  - NONEXISTENT
  - No specific norm on airtightness of sealants
  - Even no product norm on PU-Foams
- EN 12114: Air permeability of building components and building elements
  - General test method (in case there are no product specifications)
  - Only for laboratory testing (as opposed to 'in situ' testing)
  - Max. pressures can be chosen: 50, 100, 200, 500, 1.000Pa
  - 3 pulsations and then gradual steps both positive and negative pressure

Sealants and airtightness: cohesion/adhesion

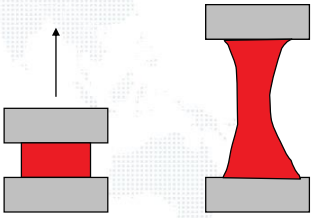
- Cohesion: sealants are airtight from their nature:
  - can generally contribute a lot to airtightness
- Adhesion: you also need a bond to the substrate(s)/supports

- Sealants can easily take the form of all kinds of shapes when applied in a joint (or as adhesives if used in a thin layer)
- Check for CE marking (transition period: 1/7/2013 – 1/7/2014)
  - hEN15651-1: fassade interior and exterior
  - hEN15651-2: glazing
- Check for quality labels
- Use the right product for the job and apply it the right way



Sealants and airtightness: movement capacity

- ISO EN 11600, now hEN15651: max % of total joint width a sealant can permanently take without shearing
- Lowest category
  - 7,5% and 12,5%
  - Plastic or elastic (P or E)
  - Acrylics
- All other sealants: silicones, PU's, hybrids
  - 20% or 25%
  - All elastic
  - Softer sealants, or harder sealants (LM or HM)
  - Application: F or G (Façade or Glass)



Sealants and airtightness: adhesion

- Make sure supports are clean, free of dust and grease
- Check substrates:
  - Most sealants work better on some substrates
  - There are also sealants that work on almost all substrates: hybrid sealants for example, even on wet surfaces (see video at the end)
  - Typically problematic: PE, PP, PTFE
- Watch application temperature (acrylics can even freeze during storage)
- Check curing time of product
  - RH can also have major impact on curing (time)

Sealants & Adhesives

- Hybrid sealants: permanently elastic
  - Excellent adhesion on almost any substrate
  - Diverse, low modulus and high modulus
  - High movement capacity (20-25LM or HM – EN-ISO 11600)
  - No cracks under UV-radiation
  - Paintable
  - Adhesion on damp surfaces
- Silicone sealants: permanently elastic
  - Excellent adhesion on glass, metals.
  - Ideal for airtight glass sealing
  - High movement capacity (20LM – 25LM)
  - Very resistant to UV

Sealants & Adhesives

- Specialties
  - Self adhesive acrylic to glue vapourbarriers

SWS : system approach

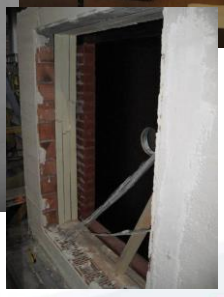
Window connection joints

Inside

Outside

Research at University of Ghent

- Testing according to EN12114



Airtightness

UNIVERSITEIT GENT

Standard cavity wall construction

Passive cavity wall construction

Airtightness Results

Façade element	Beschrijving opstelling	Flow at 50 Pa [m³/h/m]						
		underpressure	abs. dev.	overpressure	abs. dev.	average	Class	abs. dev
Standard	casing, empty	**30,90**	0,97	**35,23**	1,11	**33,07**	C	1,04
	casing, mineral whool	**2,61**	0,13	**3,31**	0,15	**2,96**	C	0,14
	casing, Flexifoam	**0,95**	0,09	**1,59**	0,12	**1,27**	B	0,10
	casing, Flexifoam, Acryrub	**0,01**	0,06	**0,00**	0,08	**0,00**	A	0,07
	plaster, profile, Acryrub	**0,08**	0,03	**0,06**	0,03	**0,07**	A	0,03
	Plaster, SWS-foil, inside	**0,08**	0,03	**0,27**	0,03	**0,18**	A	0,03
	Plaster, SWS-foil, side	**0,08**	0,03	**0,24**	0,03	**0,16**	A	0,03
Passive	pleister, flexifoam, droog,	**0,03**	0,03	**0,00**	0,04	**0,02**	A	0,04

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Airtightness

Timber frame

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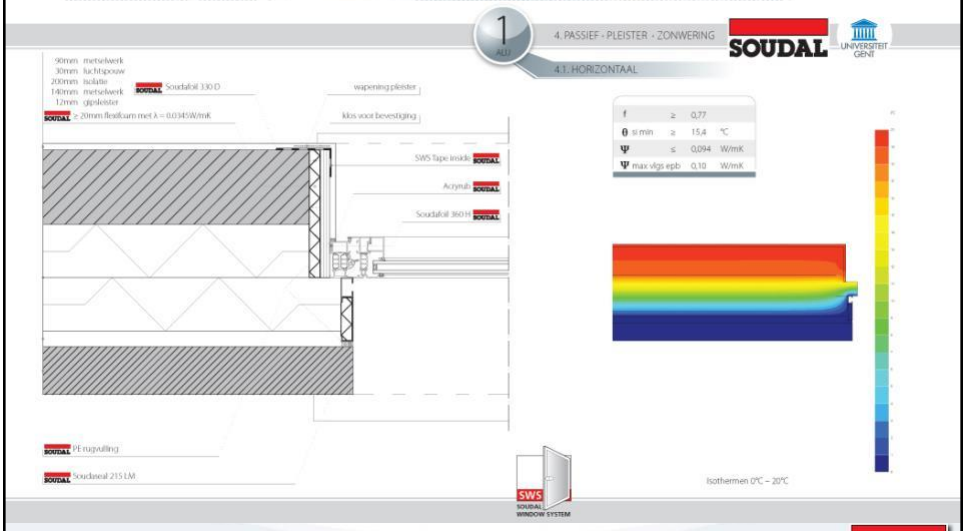
Flexifoam



PU-foams: airtight?

PU-foam can be airtight !

- If used in the correct joint dimensions
- If used between 2 airtight building elements
- If self-expanding
- If flexible

... Thus combining insulation and airtightness

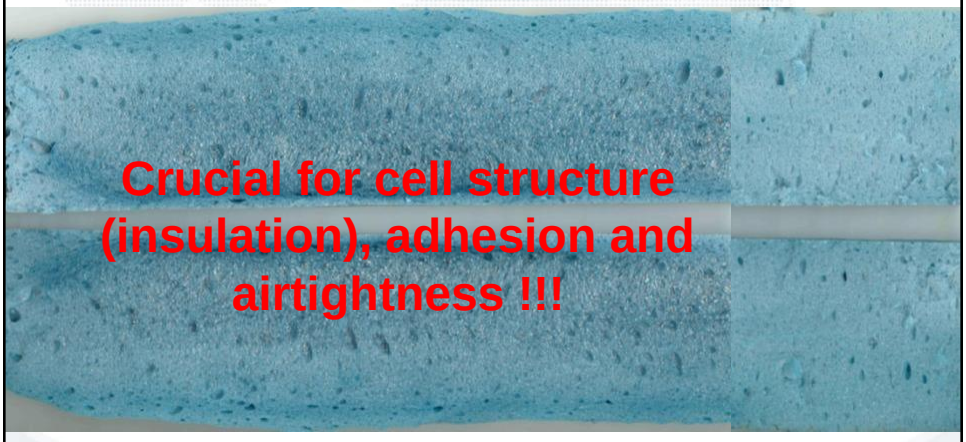
➔ **Flexifoam®**

➔ **Elasticity: 9000 cycles at 12,5% movement** *(ift report 105 35276)*

➔ **Airtight: A < 0,1 m³/[h.m (daPa)$^{2/3}$]** *(ift report 105 33428 – EN12114)*

➔ **Thermal insulation: λ = 0,0345 W/m.K** *(MPA report 070598.1)*

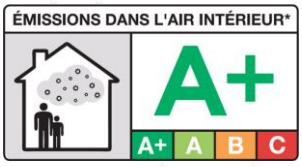
To moisten or not to moisten



Without With

Emission

- Indoor air quality is getting more of a concern with airtightness
- Sustainability: Leed, Breeam, …
- France: mandatory emissions class labelling
  - All construction products used indoors
  - Highest class is A+
  - Measured after 28 days
- Germany
  - GEV: adhesives for floor coverings
  - EC1(R), EC1 Plus are the highest classes
  - Harder to achieve



Websites

- General
  - www.soudal.com
- Airtight window installation
  - www.soudalwindowsystem.be
- Hybrids: sealing and bonding
  - www.fixall.eu