

Changes to the Technical Standards [Domestic and Non-Domestic]

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Context of Regulations: European system

- Health and Safety
- Remove barriers to trade !!! – Common market
 - Regulation 8 requires that materials, fittings and components used in the *construction of buildings* should be suitable for their purpose, correctly used or applied, and sufficiently durable, taking account of normal maintenance practices, to meet the requirements of these regulations. For example, external timber cladding for low-rise *buildings* that is readily accessible and replaceable need not be as durable as that which is to be used at a higher level on medium-rise *buildings*.
- CE Marks must be accepted
 - A verifier may only reject CE marked products if the declared performance on the accompanying declaration does not meet the regulation requirement or if the documentation is incomplete. If the verifier rejects a product the relevant trading standards officer must be notified (this is a requirement of the Construction Product Regulations). This will enable the UK government, where necessary, to notify the European Commission.

Scottish Building Standards

Section 1 : Structure



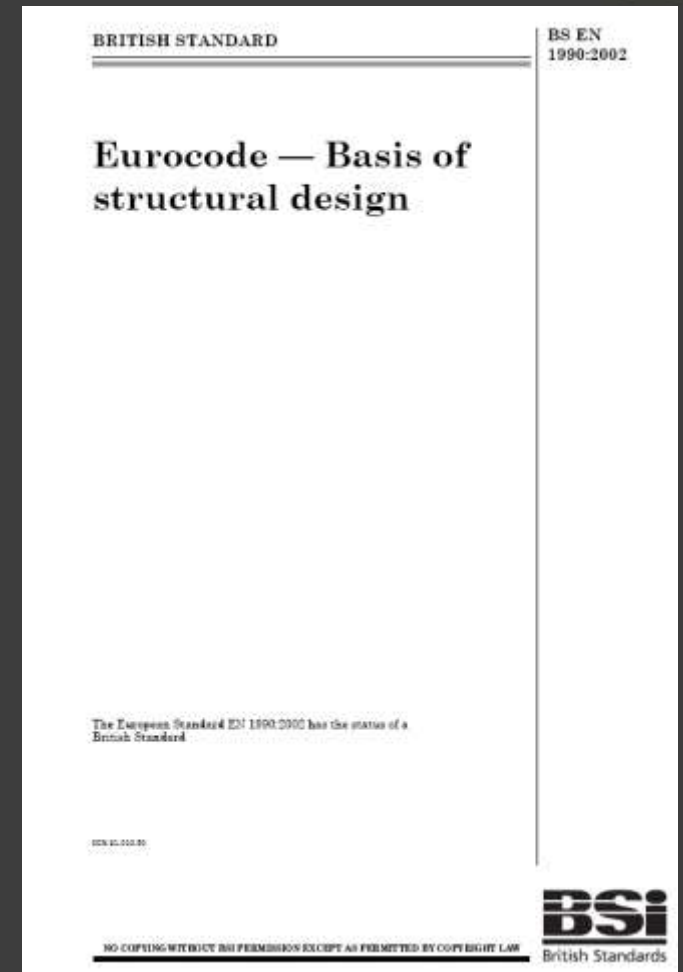
European influence - Eurocodes

- European Directives
- 25 years to develop
- Co-existed with British Standards since 2007
- Eurocodes will become the primary design codes
- Agreement with BSI
 - Withdraw when covered by a Eurocode
 - BS's still available but no 5 year review
- Alternative approach
 - Check designs
 - Check current wind and snow loadings



BS EN 1990 Basis of structural design

- 6 assumptions in Clause 1.3:-
 - design competence
 - construction competence
 - supervision and quality control
 - construction materials and products
 - maintenance
 - use of structure



Structural Eurocodes



- Design code + National Annex
- Disproportionate Collapse (75m² now 100m² or 15%)
- Small Buildings Structural Guidance – removed
 - Refer to BS8103-3:2009 Structural design of low-rise buildings.
Code of practice for timber floors and roofs for housing

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Section 2 : Fire

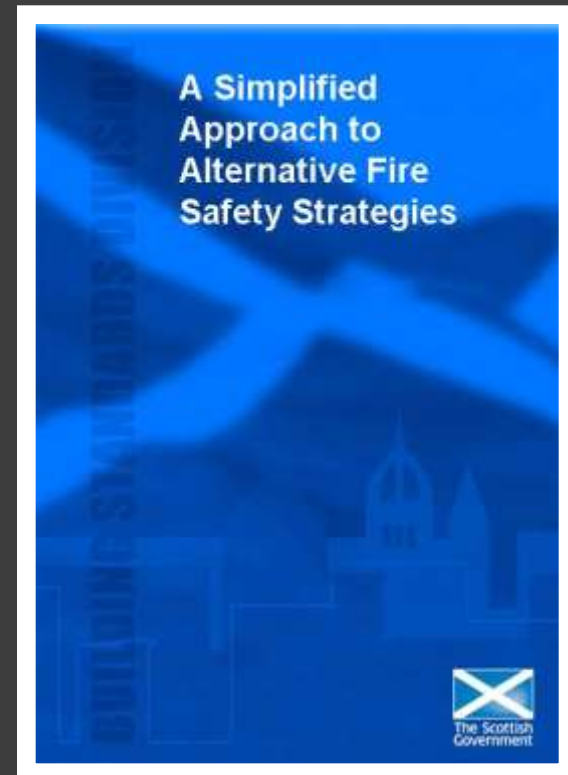
Fire

- There are more than 7000 reported fires in dwellings (e.g. houses , flats and maisonettes) every year in Scotland.
- There are around 3000 reported fires in non-domestic buildings every year in Scotland. * 39% deliberate
- *** Not in my estate/ Not on my watch???

- The purpose of the guidance in section 2 is to achieve the following objectives in the case of an outbreak of fire within the building :
 - *to protect life;*
 - *to assist the fire and rescue services; and*
 - *to further the achievement of sustainable development.****

2.0 Introduction

- Background
- Scope
- Alternative approaches



2.9 – Escape within dwellings

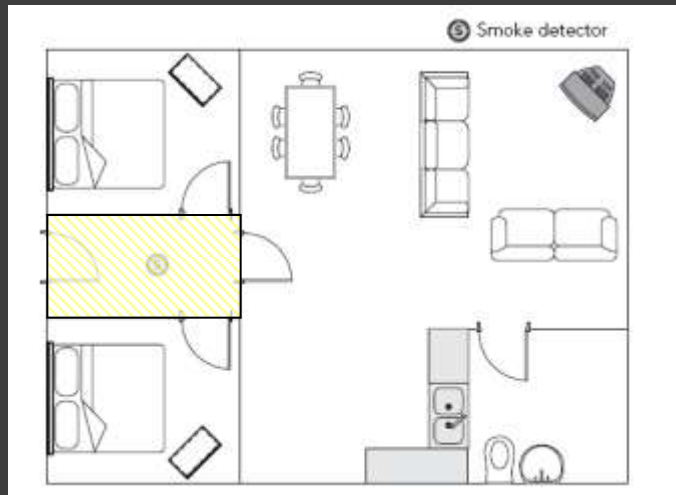
- Complete re-write
- Options - table
 - Basement storeys
 - Escape windows
 - Protected enclosures
 - Alternative exits
 - Open plan
 - houses and maisonettes
 - flats

2.9 and 2.11 – Open plan (Domestic)

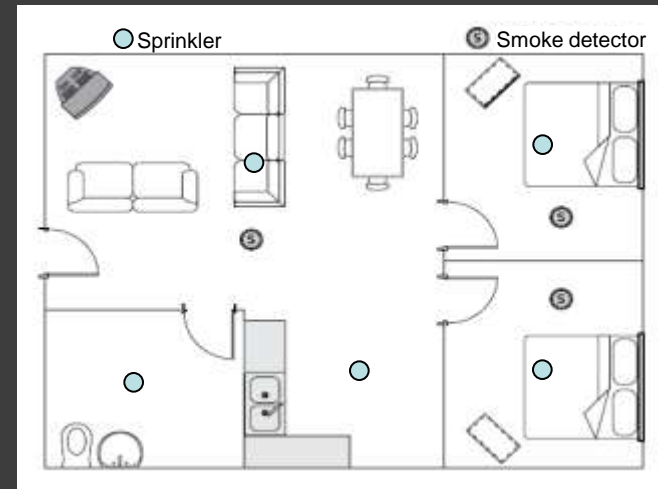
Smoke alarm – principal habitable room

- Living rooms 38%
- Kitchens 24%
- Multi-sensor alarms near bathrooms – reduce false alarms

Protected Enclosure



Sprinkler Protection, plus enhance fire detection and alarm system (LD1)



2.9 - Escape routes (Domestic)

- Smoke ventilation (natural)
 - Smoke stratification at height
- Smoke ventilation (mechanical)
 - depressurisation systems
 - pressurisation systems
- Fire hazard rooms and services
- Refuge within the building

2.13 Fire and rescue service water supply

- Standard amended – limitation removed for domestic buildings
- Water supply
 - public
 - private

2.14 Fire and rescue service facilities

- Title of Standard amended to Fire ‘and rescue’ service facilities
 - Fire-fighters operational duties are made on a statutory basis in the Fire (Scotland) Act 2005 as amended, which states: “Each relevant authority shall make provision for the purpose of –
 - a. extinguishing fires in its area;
 - b. protecting life and property in the event of fires in its area.”
- Complete re-write
- New table on Fire and rescue facilities
- Illustrative drawings added

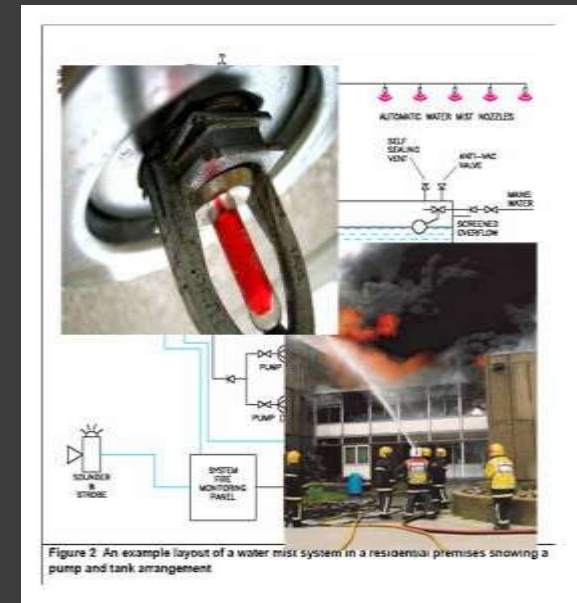
2.14 Fire and rescue services facilities

- Access level
- Physiological effects on fire-fighters
- 45m (was 60m) from riser outlets in non-sprinklered building
- Wet riser – required at 50m above FRS access level



2.15 Automatic Fire Suppression Systems

- Standard amended
 - *schools added*
 - *150 fires (62% deliberate)*
- 2 heads actuation in dwellings
- Water supply to domestic buildings
- Suppression in tall buildings (above 18m)
 - Sheltered housing
 - High rise domestic



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Section 3 : Environment

Site Preparation / Flooding

- **3.1 - Additional guidance on contaminants**
 - **3.1.9 Buildings and materials – receptors**
 - Structural effects
 - Serviceability
 - Health and safety
 - **Natural and Human sources**
 - Design must assess and deal with risks
 - Work on existing buildings more difficult
 - **Factors**
 - Presence of water
 - Contaminant concentration
 - Contact between materials and contaminants
 - Material sensitivity

3.3 Improved Flood guidance

- Change of emphasis (“may occur” -> higher risk (when?))
- Flooding leads to damage
 - Materials (plasterboard etc.)
 - Services (electrical etc.)
 - Structure (timber and galvanised frames etc.)
 - Health and safety risks
- Design for flooding – high risk areas
 - Increase capacity
 - Retaining walls
 - Garages below? – assess
 - Change finishes –contamination?
 - Floating homes
- 3.3.1 “requires subsoil drainage” (Adjacent ground) rather than “treatment could include a field drain system”



3.14 Ventilation

- Change to the wording of the standard
 - Previously based on “fortuitous ventilation“
 - Balance shifted towards calculated ventilation

- Guidance within 3.14.2 revised
 - Word fortuitous removed – now infiltrating air
 - “reduction of infiltrating air improves energy efficiency (see Section 6)

3.14.2 Table

Recommended ventilation of a dwelling		
	Ventilation recommendations	Trickle ventilation [1]
Apartment	A ventilator with an opening area of at least 1/30 th of the floor area it serves.	12,000 mm ²
Kitchen	either: a. mechanical extraction capable of at least 30 l/sec (intermittent) above a hob [3]; or b. mechanical extraction capable of at least 60 l/sec (intermittent) if elsewhere [3]; or c. passive stack ventilation	10,000 mm ²

- Minimum trickle vent increased from 10,000mm² to 11,000mm²
- Buildings with open-flued combustion appliances – extract rates for fans should be reduced
- Existing buildings > 10m³/h/m² at 50pa – trickle ventilation may be reduced to 8000mm² for apartments and 4000mm² for all other rooms

Guidance within 3.14.10 revised

- As buildings are constructed to lower infiltration rates, mechanical ventilation may be necessary to deliver the effective ventilation needed to provide a healthy living environment
- “where infiltration rates of less than $5\text{m}^3/\text{h}/\text{m}^2$ at 50 Pa are intended” – new phrase emphasises the direction
- BRE Digest 398 suggested guidance on mechanical extract ventilation

3.15 Condensation

- Now applies to non-domestic buildings rather than only “dwellings”
- Provision of supporting guidance to this standard
 - BS 5250:2002 control of condensation in buildings
 - BR262 Thermal insulation: avoiding risks



3.17 - Biomass guidance introduced

“Biomass as a solid fuel comes in different forms with the most common being woody biomass. Wood burning appliance technologies are such that modern appliances are now designed to efficiently burn specific wood fuel types including logs, wood chips, wood pellets and wood thinnings.

Guidance given for solid fuel appliance installations may also be appropriate for biomass appliance installations however, depending on the complexity of the system there may be additional issues to consider particularly in relation to safety, noise, flue sizing, ventilation and fuel storage.

3.21 - Guidance provided on flueless gas appliances installation and ventilation

- *Flueless* gas heating appliances obtain the necessary air for combustion and disperse the products of combustion from and to the *room* or space within which they are located. As condensation could occur when *flueless* appliances are used as the only means of heating a *room* or space then not withstanding BS 5440-2:2000, the appliance standard BS 5871-4: 2007 provides additional installation and ventilation guidance for independent *flueless* gas fires, convector heaters and heating stoves with a heat input of not more than 6kW in a *domestic building* or a commercial *building*.

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Section 4 : Safety

Standard 4.13 (Domestic only)

- Introduction of a new standard for 'Security'

Solutions

1. Secured by Design
2. Using Doors and windows tested and certified by a notified body
3. Using Doors and windows manufactured to recognised product standards

Standard 4.5 Electrical Safety

- Professional expertise
- Approved Certifiers of Construction for electrical installations

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Section 5: Noise

- First major review in over 20 years
- Increase in noise complaints - Lifestyle changes
 - External (Now includes roofs) and Internal
- New defined term - Traditional Building (Built before 1919)
- Revised Standard 5.1
- Design Performance Levels raised and Example Constructions added
- Post-completion Testing
- New Standard 5.2 and Generic Internal Constructions

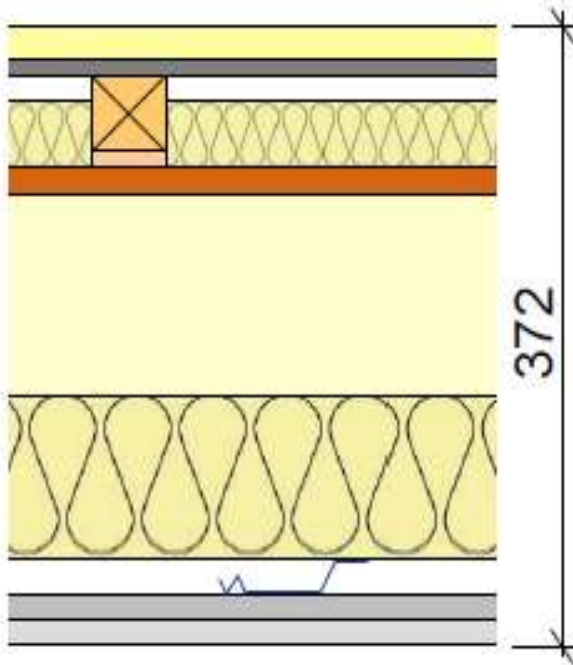
New Build and Conversions Performance Levels

Airborne sound (min $D_{nT,w}$)				
	Current New Build and Conversions (dB)		2010 New Build and Conversions (dB)	Increase (dB)
	Mean	Ind		
Walls	53	49	56	+3
Floors	52	48	56	+4
Impact sound (max $L'_{nT,w}$)				
Floors	61	65	56	+5

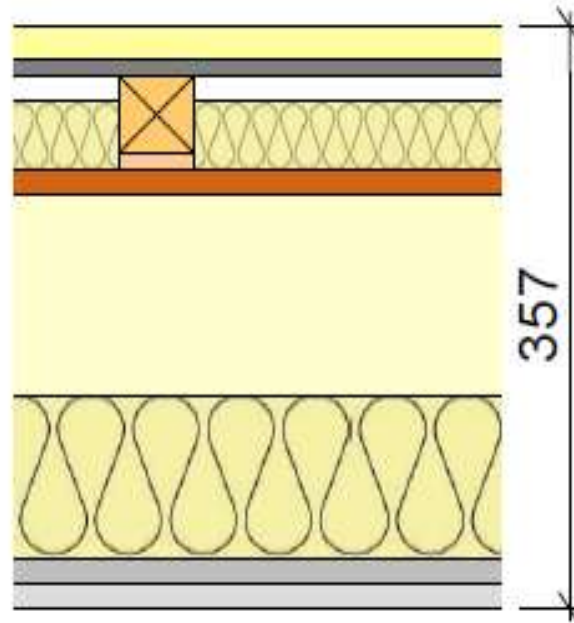
Example Construction - Timber Floors Comparison

with solid joist

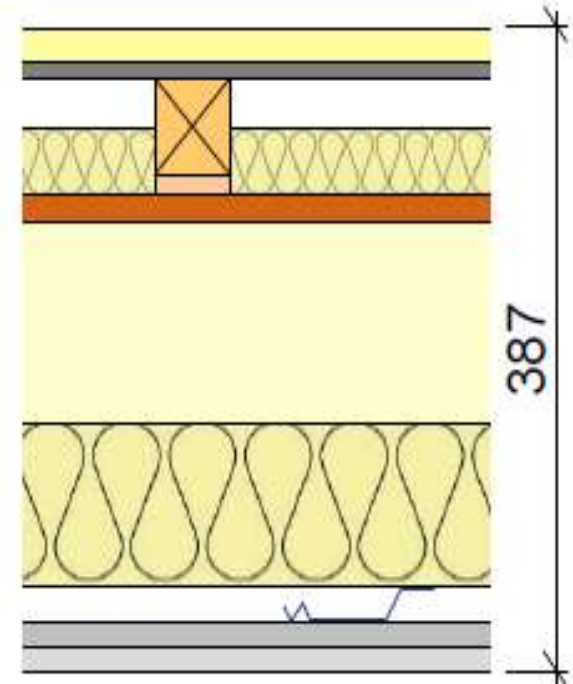
Current Guidance



Commonly Built



Example Construction



Post-completion Testing



New Build	No. of attached dwellings	No. of tests for separating walls [houses, flats or maisonettes]	No. of tests for separating floors [flats or maisonettes]
Example Constructions	2 – 20 21- 40 Over 40	2 3 1 extra for every 20	2 3 1 extra for every 20
Other constructions	2 – 10 11 – 20 21 – 30 Over 30	2 3 4 1 extra for every 10	2 3 4 1extra for every 10

Post-completion Testing

	No. of attached dwellings formed by conversion	No. of tests for separating walls [houses, flats or maisonettes]	No. of tests for separating floors [flats or maisonettes]
Conversions	1 - 5 6 - 10 Over 10	2 3 1 extra for every 5 dwellings	2 3 1 extra for every 5 dwellings

Post-completion Testing

Phased introduction of testing:

- 1 May 2011 – flats / maisonettes and residential buildings
- 1 October 2011 – houses and conversions
- Testing carried out by persons with relevant recognised expertise in acoustics for sound insulation testing

Doors and Services

- Entrance doors in domestic only - provision of a perimeter seal to doors in separating walls
- Services in common areas – plant, lifts, ventilation systems, drainage pipes
- Design of building services - their position in the building in relation to rooms used for sleeping

Guidance to 5.2

- Internal insulation to walls and intermediate floors
 - apartments in dwellings; and
 - rooms in residential buildings used for sleeping
- Min airborne sound insulation Level of 43 dB Rw
- Internal doors in non-domestic buildings only
 - seal and door density of 25kg/m²

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Section 6: Energy

Assessment methods

- Domestic

- Existing Dwellings - RdSAP
- New Dwellings - SAP2009 (Updated)

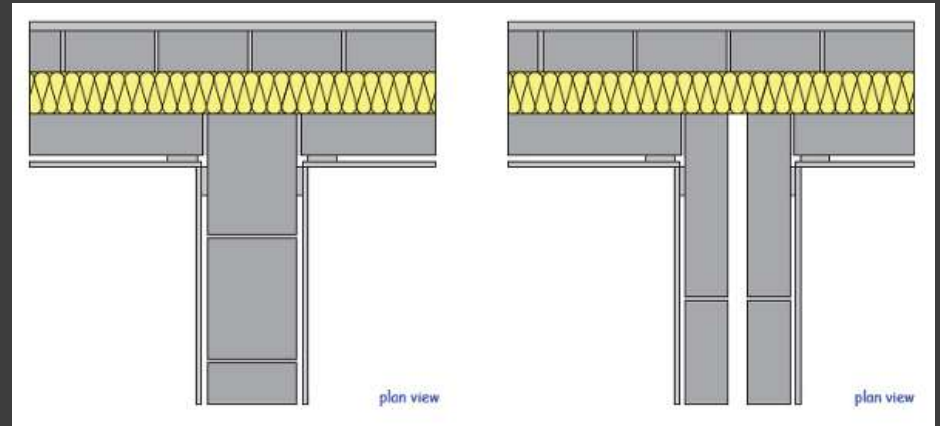
- Non Domestic

- All Non-domestic buildings - iSBEM
- <http://www.ncm.bre.co.uk/>
 - [5 August 2010: iSBEM v4.0.c update now available](#)

SAP 2009 Specification

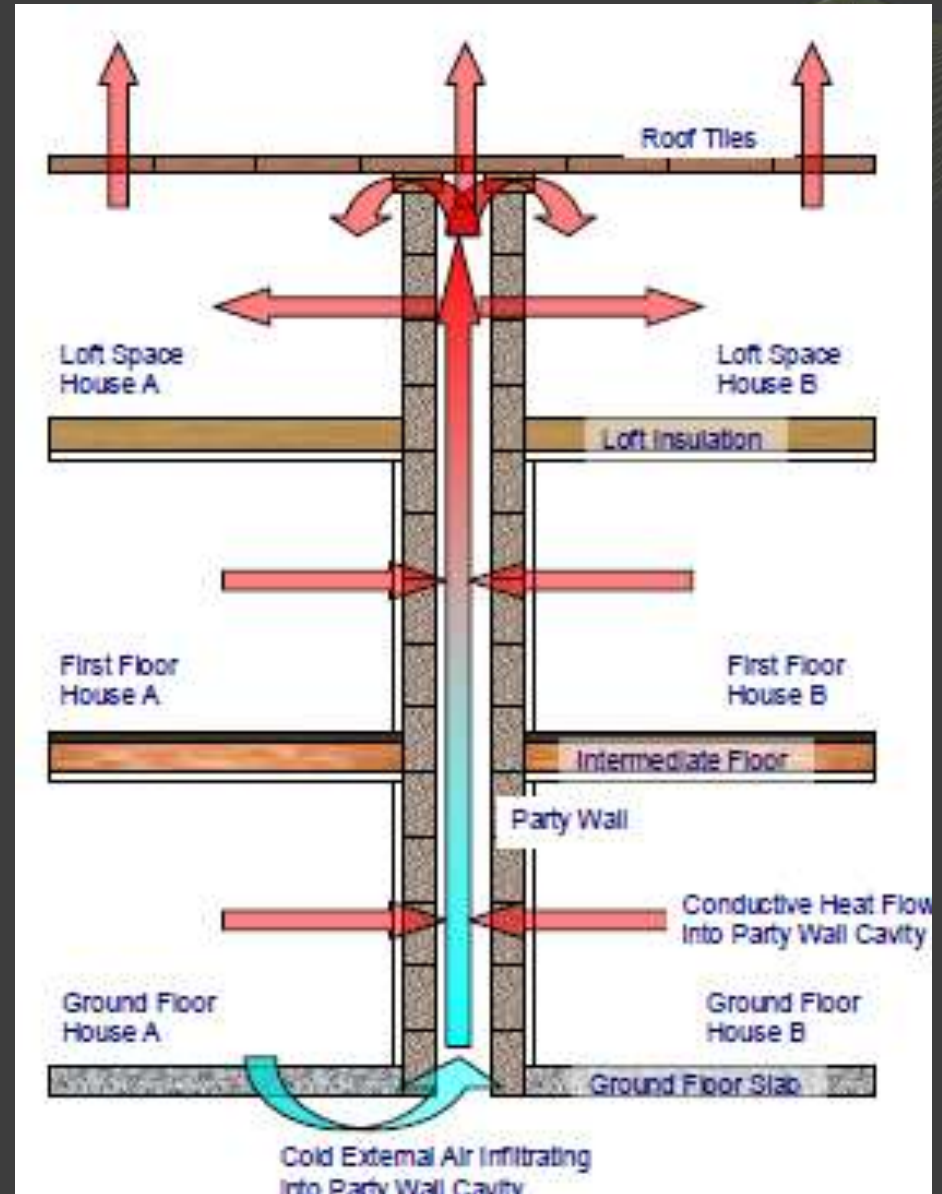
- Key changes

- Monthly calculation for heating (based on BS EN ISO 13790)
- Cooling included
- Thermal mass allowed for explicitly
- Party wall heat loss →
- Thermal bridging
- Updated weather data
 - *was average 1960 – 1979*
 - *now average 1987 – 2006*
- Amended data on internal gains
- Changes to treatment of boiler efficiency
- Heat pumps
- Treatment of community heating (up to 5 inputs)
- Hot water demand revised
- Appendix Q items included in the calculation directly
- Carbon emission factors revised



Party walls

- Solid party walls treated as adiabatic (no heat loss)
- Cavity walls which have a thermal bypass
 - Unfilled cavity no effective edge sealing $0.5 \text{ W/m}^2\text{K}$
 - With effective sealing $0.2 \text{ W/m}^2\text{K}$
- Fully filled cavity with effective sealing treated as adiabatic



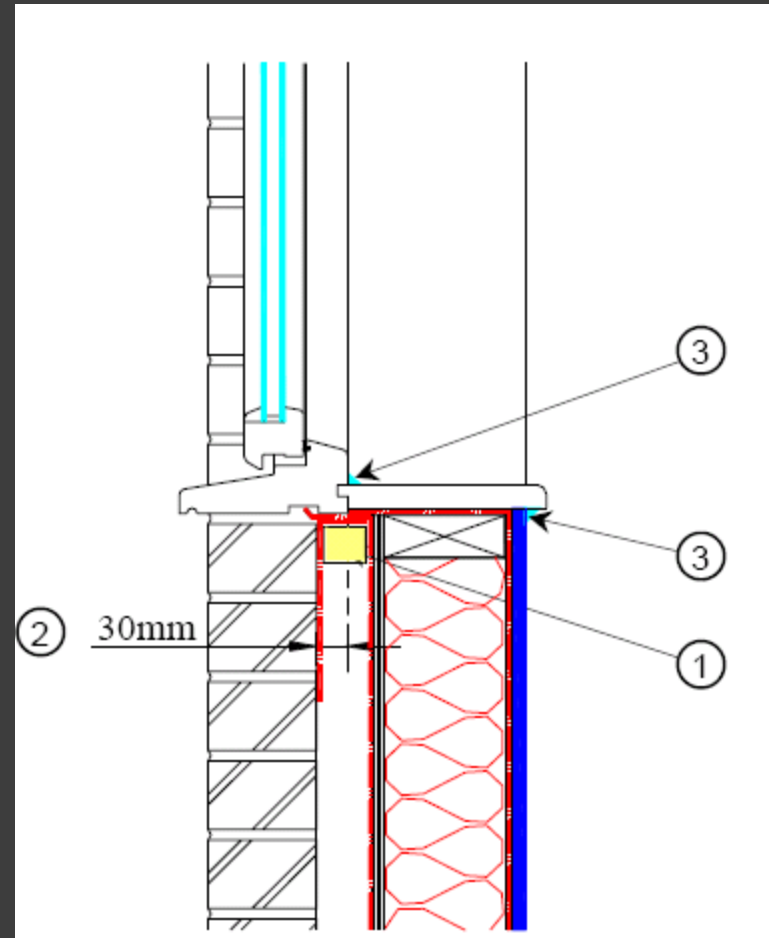
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Thermal bridging at junctions

- Default ($\psi = 0.15$) – severe penalty if no steps to reduce bridging
- Sum (length x psi-value) for each junction (including junctions with party walls)
- psi-values from:
 - accredited construction details (accreditation scheme to be set up)
 - calculated in accordance with BR 497 (+25%)



Where to now?

- Climate Change (Scotland Act) 2009 – Section 63 -improving existing buildings – mandatory or incentivised?
- Europe – Energy Performance of Bldgs Directive upgraded
 - more robust EPC's Non-D 1000m² -> 500m² then 250m²??
- Const Products Regs – Compulsory CE marking late 2012-2013 and MCS certification
- Improve the enforceability of the regulations
- New Verifiers?
- Section 7 – Sustainability
- Air tightness testing
- LCBE