□ AIRTIGHTNESS

- As a result of the difference between the internal and external air temperatures and pressures (e.g. wind pressure), an airflow will develop between the inner and outer surfaces of the external wall.
  - the wall material is porous
  - gap insulations may be incomplete (hand blocks, medium blocks, panels)
  - doors, windows – connection to the wall, special attention
  - high air insulation value window: 10 Pa pressure difference will result with 1,5 m^3/m^2h airflow

□ NOISE INSULATION (PROTECTION) REQUIREMENTS

- facades are subject to air noise loads (e.g. traffic noise)
- internal noise sources (talking, walking, radio, machinery, etc.)
- airborne (radiated) or air noise concept
  Both the radiated noise retardance property and subsequent requirements of walls are defined by the weighed air noise resistance value or R_W, its unit is the dB.
  The defined marginal values are given in the national MSZ 04-601-2 standard.
- Precise values for the air noise resistance are defined under laboratory conditions.
  R_W = laboratory value R_W' = on site value
  Single layer construction air noise resistance values may be relatively accurately forecasted in relation to their weight-per area value.

□ THE SELECTION OF INTERNAL WALLS BETWEEN APARTMENTS ON THE BASIS OF ACOUSTIC REQUIREMENTS

GUIDE

1. General noise insulation requirements are defined in the MSZ 04-601-2:1988 standard

Multi apartment building, apartment separator internal wall construction requirements, both in terms of air (radiated) noise and of knocking (transmitted) noise minimum values:

Walls between aparments: R'_w= 52 dB
Walls between apartments and stairwells: R_w = 52 dB
Slabs between aparments: R'_w = 52 dB (radiated noise)
L_{nw}'= 55 dB (transmitted noise)
Walls within apartments, without doors: R'_w = 37 dB

2. Materials selection for walls between apartments (acoustic standpoint)

The following table 1. shows internal wall solutions for various block systems (also appearing in the semester project block system selection) that satisfy interior, air noise resistance values for walls between apartments.

table 1.

No.	Chosen block system for walls	Construction suitable for internal separation of apartments
1.	POROTHERM 38, 44, N+F	30 cm POROTHERM noise resistant ceramic block with plastering on both sides
2.	HB 38	38 cm solid brick wall, plastering on both sides
3.	UNIPOR 38, N+F	Heat insulating block wall + • ≅10 cm total thickness, 1-2 layer gypsum drywall assembly, as
4.	LEIER MÁTRATHERM	

5.	Other, heat insulated cavity block system	increased noise insulation capacity, both sides finished with wallpaper as shown in appendix 1. • ≅12 cm total thickness, 1 layer HERAKLITH-C board, affixed, to increased noise retardance with plastering on both sides, as shown in appendix 2.
6.	YTONG G2, G4, N+F	30 cm solid grey sand brick wall

3. Materials selection for walls between apartments and stairwells

The following table 2. shows wall constructions in relation to various selectable wall systems satisfying air noise insulation requirements between apartments and stairwells.

table 2.

No.	Chosen block system for walls	Construction suitable for separation of apartments and stairwells
1.	POROTHERM 38, 44, N+F	• 24 cm POROTHERM 24/30 noise insulation brick block, both sides plastered
2.	HB 38	25 cm solid brick wall, both sides plastered
3.	UNIPOR 38, N+F	Heat insulation block wall +…
4.	LEIER MÁTRATHERM	+ …
5.	Other, heat insulated cavity block system	• 10 cm internal wall block wall or increased noise reduction wall • ≅10 cm total thickness, 1-2 layer gypsum drywall assembly, as increased noise insulation capacity, both sides finished with wallpaper as shown in appendix 1.
6.	YTONG G2, G4, N+F	25 cm solid grey sand brick wall

4. Slabs separating apartments

The air noise insulation minimum value requires the net unfinished slab weight per area to be not less than 480 kg/m^2, in addition, all finishings must be floating type.

5. Internal aparment walls without doors

The air noise insulation minimum value requires 10 cm-es internal brick wall block wall construction, or equivalent..

6. Walls between living room space and bathroom

Due to the allocation of piping and fixtures, dual layer wall construction ins necessary. This is satisfied, for example, by a dual layer wall constructed from either 10 cm or 6,0 cm thick ceramic internal wall blocks.

□ WALLS MADE OF SMALL ELEMENTS

- wall unit elements
  - brick / block unit
  - bonding mortar

1. MORTAR

- Building blocks will form a wall unit only if blocks placed on top of each other are properly bound by mortar.
- mortar attributes:
  - **corrects discrepancies (not even surface)**
  - transfers loads
  - bonds blocks
  - fills gaps
- symbol: H_f = mortar for binding
  H_v = mortar for plastering, face mortar
- mortar components: - mineral fill (sand)
  +
- binding agent: hydrated lime, cement + water
- pressure stress capacities: σ = 0,4 MPa lyme mortar
  σ = 2,5-9 MPa cement mortar
  σ = 1,0-2,5 MPa enriched lyme mortar

2. STANDARD SOLID SMALL BRICK

General information

- standard small brick - fire clay (sand-lime → frost resistance!!!)
- dimensions: old (6,5/14/29) versus today (6,5/12/25. Why not larger?
- What do we mean under the term: "brick size"?
- Stretching, heading course, barge, soldier course
- cut brick names: a 1 quarter bat, half bat, 3 quarter bat, queen closer, …(page #12)

Bonding rules:

- vertical joints,
- (over)lap,
- change the position of the stratcer and header bricks (course by course),
- possibly less bricks being cut

Layout of bricks in a given wall lenght

- Arrangement → "play" with mortar joints, detailed in book pages #40-45
- SAMPLES

3. WALLING BLOCKS

– (hi)story of development

- encrease the thermal insulation capacity
  - holes – the air insulates,
  - holes – to make the way of heat transfer longer,
  - larger holes – fill up with plastic foam,
  - the clay mixed with sawdust – decrease thermal conductivity / encrese thermal resistance)
- mortar - increase the thermal resistance
- leave out vertical mortar joint – flashed joint at blocks
- increase wall thickness
- additional insulating layer outside

Different Ytong

- A "whole system" as well
- fast building process
- high thermal ins. capacity
- easy to cut - flexibility in dimensions, shape, bonding
- deformation after production
- deformation under load
- lower load bearing capacity, **larger overlap under lintels**
- **reinforcement**

Bonding rules:

- average solution (turn)
- special thick wall block case (Half, cut)

4. **LINTEL** - to distribute vertical loads horizontally

- How does it work? (by moment: tension, preassure)
- prefabricated
- partly prefabricated
- monolithic (What's this?)
- overlap - support
- avoide cold bridges
- types