Thermally Activated Building Structures

Low energy heating and cooling

www.rehau.uk/tabs

#expectmore from REHAU
What is TABS?

Thermally Activated Building Structures

New commercial buildings are facing the combined challenge of meeting sustainability requirements and avoiding overheating whilst creating a comfortable environment for the occupants.

TABS uses a building’s concrete mass to store heat energy, allowing heating and cooling operations to be carried out at low-energy saving temperatures. It does this by circulating hot or cold water through REHAU PE-Xa pipes within the concrete slab of the building.

The slab effectively becomes a giant thermal accumulator extracting heat from the space in the day and cooling the building at night.
“A key reason for specification of REHAU TABS was the REHAU EVERLOC™ jointing system.”

Anders Heating Limited
What are the benefits?

A healthy climate

Thermally activated building structures have the following benefits:

- Low investment and operating costs
- "Comfort cooling" without draft effects
- Reduced air exchange in combination with ventilation systems
- No Sick Building Syndrome
- Use of renewable energy sources
- Low flow temperatures mean efficient performance of alternative energy sources
- Increased revenue by reducing required height per floor, allowing for the potential to add an additional floor
- Quick and easy installation
Energy saving benefits

**Air Conditioning**
- Reduced air volumes when combined with TABS so smaller plant and fan size required
- Reduced energy consumption

**Chillers**
- TABS uses closer to ambient temperatures (15-18°C) versus typical chiller temperatures of 6-12°C
- This increases the COP of the chiller

Advantages

50% lower capacity operating costs

30% lower investment costs

Applications

- Office
- Transport hubs/Stations
- Retail
- Museums/Galleries
- Hospitals
- Sports centre/arena

University of Leicester, School of Medicine – The largest ‘non-residential’ project in the UK to have Passivhaus standard.
How does it work?

Radiant heating & cooling

TABS works by using radiant heating & cooling to achieve more comfortable temperatures.

The thermal comfort of a person is determined by:
- The person’s activity
- The person’s clothes
- Air temperature
- Air speed
- Air humidity
- Surface temperature

Radiant Heating and cooling benefit:
- More energy efficient compared to air based systems
- Higher comfort level for building occupants
- Greater design freedom
- Reduced air movement (better for allergy sufferers)
- Low maintenance

The difference between air & radiant heating & cooling

Air cooling perceived temperature: **25°C**

Air heating perceived temperature: **18°C**

Radiant cooling perceived temperature: **25°C**

Radiant heating perceived temperature: **20°C**

Thermal loss and heat transfer in the human body

Conduction: Transfer of heat by surface contact

Convection: Transfer of heat by air movement

Evaporation: Transfer of heat by evaporation of water

Radiation: Transfer of heat through electromagnetic radiation
“With the University of Northampton keen to create a low carbon campus, REHAU TABS was the ideal choice”

Paul, Amroc Heating
Our system - pipe and fitting

Over 850 million fittings manufactured worldwide

Beyond the REHAU PE-Xa pipe, the jointing system plays a central role. Over 850 million fittings have been installed worldwide with no leaks, REHAU EVERLOC™ consists of only 2 components making it the installers choice.

- Compression sleeve
- Fitting

REHAU EVERLOC™ offers the following benefits:
- Fast and easy to install
- No hot works on site, no mess
- 10 year comprehensive warranty
- No O-ring
- Installation is immediately able to handle pressure loads
- REHAU fittings embedded in the concrete are also covered by our comprehensive warranty

REHAU offer 3 main installation options for thermally activated building structures:

**In-situ concrete slabs**
- Large circuits possible
- Minimal connections within structure
- Around 300m² installed per day (2 people)
- Can sit anywhere within structural slab

**Precast concrete planks**
- Off site construction methods
- Quick to install on site
- Easy connections into building services
- High cooling capacity of up to 90 W/m²

**Pre-fabricated mesh**
- Fast installation
- Can be used for PT slab applications
- Better outputs when near slab surface
- Ideal for Tichelmann Loops
- Two options available - sTABS or TABS module

* Post and pre tension (PT) slabs and hollow core slabs are also available
## Case studies

### Summary

#### White Collar Factory

<table>
<thead>
<tr>
<th>Type</th>
<th>Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>TABS, PE-Xa pipe and fittings</td>
</tr>
<tr>
<td>Description</td>
<td>Over 150km of pipe installed across 15 floors</td>
</tr>
</tbody>
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#### School of Medicine, University of Leicester

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<th>Type</th>
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<tr>
<td>Product</td>
<td>TABS, PE-Xa pipe and fittings</td>
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<tr>
<td>Description</td>
<td>Leicester University's new Centre for Medicine is the largest non-residential project in the UK to have been built to the Passivhaus standard</td>
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#### University of Northampton

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<tr>
<td>Product</td>
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<tr>
<td>Description</td>
<td>40,000m of pipework installed</td>
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#### Tate Modern, London

<table>
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<tr>
<th>Type</th>
<th>Gallery</th>
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<tbody>
<tr>
<td>Product</td>
<td>TABS, PE-Xa pipe and fittings</td>
</tr>
<tr>
<td>Description</td>
<td>More than 24,000m of pipework installed with REHAU EVERLOC™ fittings</td>
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Scoring a ‘Very Good’ rating, the new Tate building is predicted to use 50% less energy than a typical gallery and generate 44% less carbon than current building regulations demand.