PIR technology systems: High fire ratings with no compromise on energy efficiency

Roma, 10th of October 2019
About Huntsman

A global chemical business leader

Global manufacturer & marketer of differentiated chemicals

$9 billion

75 manufacturing, R&D and operations facilities in 30 countries

10,000 employees within four business divisions
- Polyurethanes
- Advanced Materials
- Performance Products
- Textile Effects

The Polyurethanes Division is the largest, capturing > 50% of Huntsman revenues
The sandwich panel market growth

Reasons of the fast growth:

- Modern design
- Convenient building technique
- Lightweight

PUR/PIR preferred insulation due to some key features like:

- Low thermal conductivity
- Easy manufacturing process
- Low moisture permeation

Source: Sinergy Consulting – Sandwich Panels – Sept 2018 (excl. ME, Africa)
About sustainability

All 17 2030 UN Sustainable Development Goals are important to our business:
Building Insulation Key Trends

Self-supporting panels providing fast-erecting, highly insulated buildings and fire safe designs

Superior processability and long-term panel durability to sustainably minimize natural resources extraction

Excellent thermal performance to reduce reliance on fossil fuels and CO₂ emissions
Energy Efficiency

1. Maximize solar gains
   - Insulated window frames
   - Window shutter

2. High insulation levels
   - Insulation boards, metal-faced panels, spray foam, SIPs, OCF and PU sealants...

3. Airtightness
   - Insulated duct pipes

4. Controlled ventilation
   - Hot water storage, refrigerators/freezers...

5. Energy efficient appliances
   - District heating/cooling, solar panels, windmills

6. Renewable energies

‘Low Lambda’ is a major driver for PU insulation growth in IB&B and Composite Panels

> 2020: increasing demand for thin & light solutions for thermal renovations (prefabricated elements, kits…)

Energy used to produce 1 m² of PU insulation: 100

Energy saved by using 1 m² of PU insulation: 1
Fire safety

Reaction to fire (SBI) EN-13823

Resistance to fire EN 1364-1, 1365-2

Application Tests e.g. Factory Mutual
Sustainable Construction

Increasing interest to allow credit points for “green” building certification with PU

- Energy efficiency
- Recycled and/or bio-based content
- Low VOC for good Indoor Air Quality
- Disclosure of material environmental footprint

Remember that PU shows good overall environmental performance when measured at the building level.

We must promote PU good environmental performance!
Huntsman
Composite Panels FR product Portfolio
## Huntsman CP FR product Portfolio

<table>
<thead>
<tr>
<th></th>
<th>DaltoPUR® FR</th>
<th>DaltoPIR® FR+</th>
<th>DaltoPIR® FR</th>
<th>DaltoPIR® HFR</th>
<th>DaltoPIR® XHFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double belt T (°C)</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>DaltoPIR® PRIM</td>
<td>Not required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Overall density (kg/m³)</td>
<td>39 - 41</td>
<td>38 - 42</td>
<td>38 - 42</td>
<td>38 - 42</td>
<td>38 - 42</td>
</tr>
<tr>
<td>I/P ratio (X/100)</td>
<td>165 - 180</td>
<td>165 - 210</td>
<td>165 - 210</td>
<td>250 - 265</td>
<td>250 - 280</td>
</tr>
<tr>
<td>SBI (EN 13823)</td>
<td>Min Cs3d0</td>
<td>Bs2d0</td>
<td>Bs2d0</td>
<td>Bs2d0</td>
<td>Bs1d0</td>
</tr>
<tr>
<td>FR (100 mm) (EN 1364-1 &amp; 1365-2)</td>
<td>(R)EI 15</td>
<td>(R)EI 15</td>
<td>(R)EI 30</td>
<td>(R)EI 30</td>
<td></td>
</tr>
<tr>
<td>Initial Lambda (mW/mK @ 10 °C)</td>
<td>18-22</td>
<td>18-21</td>
<td>18-21</td>
<td>18-21</td>
<td>18-21</td>
</tr>
<tr>
<td>FM Approvals Listed Identified Component</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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