Technical leaflet
Charring rate of EGGER OSB

Calculation of the EGGER OSB charring rate

General
EN 1995-1-2 (EUROCODE 5) specifies the calculation method for calculating the charring rate of wood and wood-based materials as explained below.

For EGGER OSB 3 the characteristic density $\rho$ is declared to be 600 kg/m$^3$. For EGGER OSB 4 TOP, according to DOP-745-02, the declared density in the thickness range $>10$ mm to $25$ mm is $\geq 620$ kg/m$^3$.

Determining the charring rate of EGGER OSB boards
According to EUROCODE EN 1995-1-2, 3.4.2 (9), the charring rate of wood-based panels with a density of 600 kg/m$^3$ (conservative calculation) can be determined using the following formula

$$\beta_o = 0.9 \cdot k_p \cdot k_h$$

(1)

where

$$k_p = \frac{450}{\rho} \cdot 0.5 = \frac{450}{600} \cdot 0.5 = 0.86603$$

$$k_h = \frac{20}{t_p} \cdot 0.5$$

for a panel thickness $< 20$ mm

$$k_h = 1.0$$

for a panel thickness $\geq$ are $20$ mm.

According to formula (1), the charring rate for OSB boards with the following thickness is calculated with:

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Nominal thickness} & \text{OSB/ 3 acc. to EN 300 density} \geq 600 \text{ kg/m}^3 & \text{EGGER OSB 3 density} \geq 600 \text{ kg/m}^3 & \text{EGGER OSB 4 TOP density} \geq 620 \text{ kg/m}^3 \\
\hline
{t_p} = 12 \text{ mm} & \beta_o = 1.01 \text{ mm/min} & \beta_o = 1.01 \text{ mm/min} & \beta_o = 0.99 \text{ mm/min} \\
\hline
{t_p} = 15 \text{ mm} & \beta_o = 0.90 \text{ mm/min} & \beta_o = 0.90 \text{ mm/min} & \beta_o = 0.89 \text{ mm/min} \\
\hline
{t_p} = 18 \text{ mm} & \beta_o = 0.82 \text{ mm/min} & \beta_o = 0.82 \text{ mm/min} & \beta_o = 0.81 \text{ mm/min} \\
\hline
{t_p} \geq 20 – 25 \text{ mm} & \beta_o = 0.78 \text{ mm/min} & \beta_o = 0.78 \text{ mm/min} & \beta_o = 0.77 \text{ mm/min} \\
\hline
{t_p} > 25 \text{ mm} & \beta_o = 0.78 \text{ mm/min} & \beta_o = 0.78 \text{ mm/min} & \beta_o = 0.78 \text{ mm/min} \\
\hline
\end{array}
\]
According to the CE declaration of performance DOP-745-02, the following requirements for the characteristic density apply to EGGER OSB 4 TOP:

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Density [ kg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 - 10 mm</td>
<td>≥ 620</td>
</tr>
<tr>
<td>&gt;10 - 25 mm</td>
<td>≥ 620</td>
</tr>
<tr>
<td>&gt;25 - 40 mm</td>
<td>≥ 600</td>
</tr>
</tbody>
</table>

**Determination of the failure time (D) of panels**

According to EUROCODE EN 1995-1-2, C.2.3, the failure time for fire protective claddings made of wood-based panels can be determined by the following formula:

\[ t_f = \left( \frac{h_p}{\beta_o} \right) - t_r \]  
(2)

with:

- \( t_r = 4 \text{ min} \)
- \( t_f \) – failure time, in minutes
- \( \beta_o \) - is the design charring rate for one-dimensional charring under standard fire exposure, in mm/min
- \( h_p \) - thickness of the cladding made of wood-based panels, in mm.

In case of fire protection claddings made of wood-based materials, the time of the beginning of the burning \( t_{ch} \) of the building component should be determined with

\[ t_{ch} = t_f \]

**Determination of the failure time (E) of horizontal cladding at the joints**

A joint does not have an effect on the separating performance if it is backed with a batten or a structural element, which will prevent the travel of hot gases into the structure.

According to EUROCODE EN 1995-1-2, E.2, the failure time to horizontal claddings made of wood-based panels due to fire load from below can be determined according to the following formula

\[ t_{ins} = \sum t_{ins} \cdot k_{pos} \cdot k_j \]  
(3)

with

- \( t_{ins} \) - basic insulation value, in minutes (up to 60 minutes fire resistance period \( t_{ins} = 1.1 \cdot h_p \))
- \( k_{pos} \) - position coefficient (uninsulated, fire exposed side - 0.8; unexposed side - 0.6 / Table E.3 and E.4)
- \( k_j \) - joint coefficient for non-backed joints according to Fig. 1
Figure 1: Joint coefficient $k_j$ for non-backed joints

<table>
<thead>
<tr>
<th>Type of panel joint</th>
<th>$k_j$</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>0.2</td>
</tr>
<tr>
<td>b</td>
<td>0.3</td>
</tr>
<tr>
<td>c</td>
<td>0.4</td>
</tr>
<tr>
<td>d</td>
<td>0.4</td>
</tr>
<tr>
<td>e</td>
<td>0.6</td>
</tr>
</tbody>
</table>

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