

How to

Convert a linear element to kg/m² (For custom material input)



1. Purpose

The FaCE Tool asks for custom material quantities in kg/m² (see *Figure 1*). For linear elements (LE's) (e.g., mullion body, pressure plate, Horizontal louvre, linear flashing component), this can be confused with a façade-based kg/m²(FSA) which refers to the geometrical arrangement of the entire facade unit/system under analysis. This note shows how to produce a kg/m² of the component over a 1m² coverage area. The LE's percentage coverage for the specific case study(kg/m²(FSA)) can be applied later in the FaCE Tool workflow.

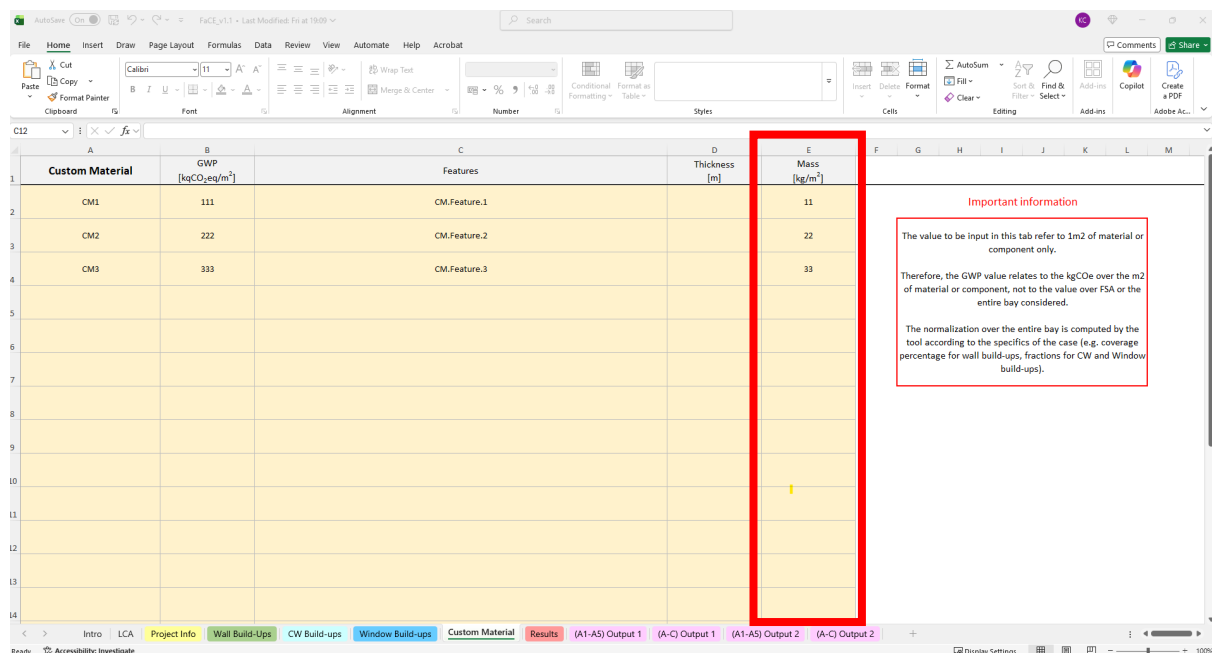


Figure 1 – FaCE Tool - Custom material kg/m² input location

2. Calculation from metre length

Linear elements are typically quantified in Environmental Product Declarations (EPDs) as a mass per unit length (kg/m). To express this as kg/m², the linear mass must be distributed across an equivalent coverage area (1m by 1m).

The conversion requires:

- The **linear mass** as kg per metre length (**kg/m**),
 - If the supplier has provided a figure for a linear length greater than 1m divide the linear mass given by the length stated to give the kg/m rate.
- The **coverage width, w** (m): the width of the visible face of the LE.
- Dividing the linear mass by the coverage width.

This gives:

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$$kg/m^2 = (kg/m)/w$$

NOTE: This approach is independent of LE spacing / configuration within the study bay under analysis. Spacing / Configuration is required later in the FaCE Tool, when calculating the % coverage per m² of façade surface area.

3. Calculation from cross sectional area and material density

If the supplier has not provided a kg/m figure, kg/m can be calculated from cross sectional area and material density: Where:

- A is net material cross-sectional area (m²),
- ρ is density (kg/m³). For example, aluminium density (ρ) is commonly taken as 2700 kg/m³ unless otherwise stated.

This gives:

$$kg/m = A \times \rho$$

4. Worked example

Convert an aluminium mullion extrusion from section geometry into kg/m².

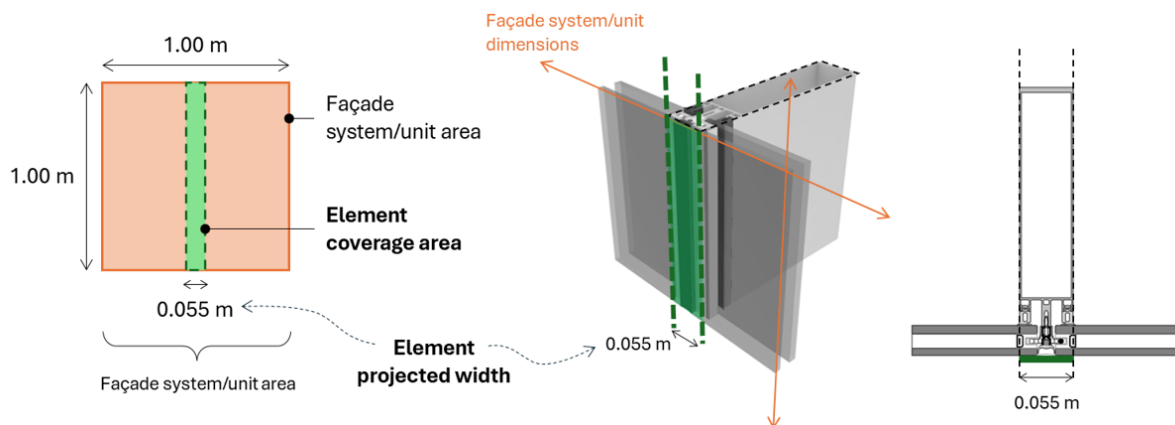


Figure 2 – Aluminium mullion example

Parameter	Value	Notes / units
Density ρ	2700 kg/m ³	density of the material - aluminium
Net cross-sectional area, A	1350 mm ²	Void areas excluded
Coverage width, w	55 mm	Projected visible width used for “coverage”

Table 1 – Worked example: Aluminium mullion parameters

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a. Step 1. Convert section area to linear mass (kg/m)

Convert area to m²:

$$A = 1350 \text{ mm}^2 = 1350 \times 10^{-6} \text{ m}^2 = 0.00135 \text{ m}^2$$

Calculate linear mass:

$$\text{kg/m} = A \times \rho = 0.00135 \times 2700 = 3.645 \text{ kg/m}$$

b. Step 2. Convert kg/m to kg/m² using the coverage width.

Convert width to metres:

$$w = 55 \text{ mm} = 0.055 \text{ m}$$

calculate kg/m²:

$$\text{kg/m}^2 = (\text{kg/m}) \div w = 3.645 \div 0.055 = 66.27 \text{ kg/m}^2$$

c. Result to enter into the FaCE Tool:

66.3 kg/m

5. Notes and common pitfalls

- Be consistent with the coverage width (**w**): it must match the width used in later percentage coverage calculations in the FaCE tool (e.g. Visible face, cap width).
- Use net material area (exclude voids). Do not use the bounding box area of the profile.
- Split assemblies by component and material where possible (mullion body, pressure plate, caps, brackets, thermal breaks, gaskets). Each can have its own kg/m and (sometimes) its own effective coverage width.

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