This material library has been created in support of the Net Zero Carbon Events, NZCE Measurement Methodology 2023.

It is intended to provide a start point for users (different industry representatives/stakeholders) to calculate emissions associated with materials commonly used at events in areas such as stand production, signage, and flooring along with appropriate carbon conversion factors (emission factors) for calculation.

The materials list has been compiled by industry stakeholders including organisers, suppliers, and general service provider (such as agencies, exhibit houses), to be as representative of the materials used as possible.

Each material has been categorised and sub categorised under its main area of use for ease of navigation, for example.

1.) Flooring
   - Covering
      - Carpet

As it has not been possible to list all materials and their varying types and specifications, material compositions have been included to assist users in identifying an appropriate match. It is recommended that users find the closest match for the material(s) they wish to calculate emissions for calculation if a direct match cannot be found.

The DEFRA (UK): Greenhouse gas reporting: conversion factors 2023 and Circular Economy and University of Bath: Inventory of Carbon and Energy (ICE) Database Version 3.0 emission factor databases as specified in the measurement methodology represent the primary source of emission factors. These cover the cradle to shelf and cradle to gate period (respectively) of the materials lifecycle and are appropriate for production calculation. Note these do not account for use or disposal. Supporting emission factors have been included that have been provided by suppliers and other external users, please see the limitations section below for more detail on their inclusion and use.

Each material has been assigned an appropriate emission factor based on its composition along with the correct corresponding unit of measure for calculation. The unit of measure refers to the unit required for calculation in conjunction with the allocated emission factor. See example below:

Name	Unit of measure	Emission Factor	Source
Chipboard	kg	0.400 kgCO2e	ICE - DB V3.0

Note: To calculate emissions for the use of chipboard a material commonly purchased in sheets (A x B x C mm), users would need to convert the materials area into weight in Kg to calculate the emissions. See 'how to use' section for guidance on this below.

How to Use:

The steps below provide simple guidance for calculating material emissions.

Step 1. Collect the data:

Data to be collected.

1. Material type
2. Weight, volume, area, or quantity of material (kg/Tonnes, m3, sqm, sheet)

Step 2. Locate an appropriate Emission Factor

Once the required data has been collected, users should locate the material (or closest match) in the materials library along with its correlating emission factor as shown below.

Material: Plywood

Emission Factor

Wood	ID	Unit of measure	Emission Factor	Source
Wood	Plywood	kg	0.681 kgCO2e	ICE - DB V3.0

Step 3. Correct unit of measure for calculation

As we can see the required unit of measure for calculation is ***weight*** in kg. This means that the user ***must*** calculate the materials weight before calculation unless they already have this data. In which this case please skip to step 5. Note: Not using the correct unit of measure is the most common mistake in carbon calculation, so it is essential that user pay attention to this in the calculations.

Some guidance has been provided on common material weights to aid users in converting units of measure to the required unit. Please refer to the 'weights & measures' tab in the material library document for detail.

Example:

Source data

100 m^2 12mm Plywood

Quantity Material

The user has collected data on the material and quantity used. However, the unit of measure required for calculation is weight in kg and requires the quantity data the user has collected to be converted before calculation.

Step 4. Converting data to the required unit of measure

Using the weights and measures tab the user has found an approximate weight per sqm weight for the material they are looking to calculate emissions for*.

Construction	
Plywood 12mm	7.25kg per sqm

As the user knows the area (m^2) of material used and the estimated weight per m^2 the below equation can be used to convert to the required unit of measure:

Area (m^2) x Per m^2 Weight = Total Material Weight

example: 100 (m^2) x 7.25 (kg per m^2) = 725kg

Step 5. Calculation

Now that we have calculated the correct weight of the material, we can now calculate the carbon emissions using the formula below.

Unit of Measure x ***Emission Factor*** = ***kgCO2e***

Example: 725kg (unit of measure) x 0.681 kgCO2e per kg (emission factor) = 493.73 kgCO2e (Total)

For users wishing to calculate tonnes of CO2e please use the formula below.

(kgCO2e) / (1000) = tCO2e Total

Example: 493.73kgCO2e / 1000 = 0.49 tCO2e

This process can be repeated as required for all materials in your carbon calculation projects.

** While effort has been made to assist users in converting materials with the provision of a reference library, this is intended as guide only and users are advised to conduct their own research in finding appropriate conversion metrics.*

Transportation / Logistics

To ensure, that transportation emissions for material commonly used in different regions are considered, we suggest to look at an LCA 'Cradle to Gate'.

Unless we know better (per category), we add 20% of emission factor equivalent to the material emission factor (CO2e of material +20%). This way we would ensure, that transportation of material is included in the material emission factor.

Limitations

Emission factors have been sourced from open sources that are aligned to the required and recommended data bases outlined in the NZCE measurement methodology. The factors issued by these bodies provide guidance for standard material specifications and do not account for the varied and nuanced options available.

These factors are representative of the materials Cradle to Gate and Cradle to Shelf periods of their lifecycle and are suitable for production calculation and align to the GHG protocols guidance on activity based reporting [link?].

Some supplier provided emission factors have been included in the absence of a closest match option. While these are generally supported by third party verification, this has not been scrutinised and their lifecycle periods have not been determined. These are to be used as a guide and at the users discretion.

It has not been possible to assign exact matches for many of the materials given the limitations of the freely available emission factors. In these instances, a common-sense approach to the best match has been used and has been indicated in the notes field provided.

Whilst it is recognised that the list is not exhaustive it will be updated periodically with more materials and emission factors as they become available, helping users calculate emissions more accurately and. The next phase of the materials library development will also focus on providing guidance on material re-use (to assist users in correctly apportioning emissions, and end of life treatment (waste disposal).

Disclaimer

The alignment with Greenview on the NZCE methodology is done by this working group.