

# Blücher Drainage Systems

14-12-2021

## Documentation guide for life cycle assessments of buildings

Ver: 1

Drafted by: Julie Hald

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Project: LCA Consultancy Blücher

Customer: Blücher Metal A/S

Project Manager: Christine Collin

## Blücher Drainage Systems in the Danish database LCAbyg

### Analysis

The first part of the study consisted of an examination of available data that could be representative of Blücher's products. The databases EPD Danmark, EPD Norge, the German IBU and the joint European database Environdec were included in the study. It is our assessment that right now, the two most representative data sets are the two solutions which have so far been used to document Blücher's corrosion-resistant drainage systems: Ökobau data for corrosion-resistant steel pipes or an environmental product declaration (EPD) from Blücher's steel supplier, Outokumpu.

Please note: According to the German Sustainable Building Council's (DGNB) 2020 manual, for products without an EPD to be certified, an uncertainty factor of 1.3 is applied, which means that emissions are increased by 30% in the calculation to compensate for uncertainties in the data set.

To assess which method is most representative for modelling Blücher's products, we have made a comparison of the two methods in the following section:

#### Method 1: Based on an EPD from the steel supplier

As the EPD from Outokumpu does not include the energy consumption for machining, welding and staining in Blücher's production, 30% is added to cover the environmental impact of the steel. This is modelled in the Danish database LCAbyg by using an uncertainty factor of 1.3. If this method is used for an LCA in a DGNB context, a DGNB uncertainty factor must also be added, as it is not a product-specific LCA. The product must therefore be modelled with an uncertainty factor of 1.6 in a DGNB context.

The steel supplier uses 65.2% recycled steel and an end-of-lifetime recycling percentage of 95%. The EPD covers the steel production in both Europe and North America and is thus representative of the steel imported by Blücher.

#### Method 2: Based on Ökobau data

The construction "Corrosive-resistant steel pipe" is chosen in the LCAbyg database and can be used directly. LCAbyg uses the German LCA database Ökobau, which contains standardised, generic data for a wide range of building materials and constructions. This database is used as a standard in the LCAbyg database for products for which there is no EPD.

This data set is also used for recycled steel in production, but the proportion is not specified. An end-of-lifetime recycling percentage of 95% is used and a 5% loss, which is taken to a waste deposit. The data set represents production in Germany. Denmark still recognises the use of data from German production if there is no accurate data from a Danish context.

As this solution is also based on generic data, an uncertainty factor of 1.3 would also be added in this case when the data set is used in a DGNB context.

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## 1.1.1 Comparison

Figure 1 shows a comparison of an Ø50-pipe with a metre-weight of 1.25 kg based on Method 1 and Method 2 respectively. DGNB's uncertainty factor is not included in Figure 1, as it is identical for the two methods.

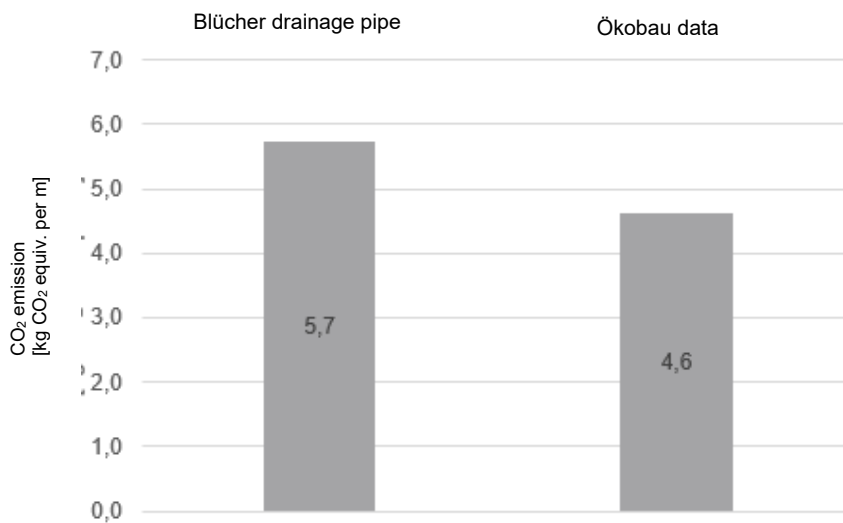


Figure 1: Comparison between Method 1 and Method 2.

Figure 1 shows that Method 2, using generic data from the LCAbyg database, results in a reduction of 1.1 kg CO<sub>2</sub> equivalents per metre drainage pipe, which corresponds to a 24% reduction.

We therefore recommend Method 2, as it gives the best result and is based on fewer assumptions in terms of emission on production of the drainage pipes.

**DGNB Uncertainty Factors**

Figure 2 is included to illustrate the importance of DGNB’s uncertainty factors. As previously described, an uncertainty factor of 30% is applied to products without an EPD, and if an industry EPD is used, an uncertainty factor of 10% is applied. The study is based on the assumptions described in Method 1, and the intention is to illustrate the effect of DGNB’s uncertainty factors.

Scenario (1) shows Blücher’s products modelled as in Method 1 including DGNB’s uncertainty factor, which increases the calculated CO<sub>2</sub> emission by 1.7 kg. Scenario (2) is shaded, as it is a fictitious scenario showing the size of the uncertainty addition if a joint industry EPD were produced. The uncertainty factor would thus be reduced to 1.1, which would reduce the uncertainty addition to 0.6 kg CO<sub>2</sub> equivalent.

A joint industry EPD based on Outokumpu’s production would thus reduce emissions to a figure that is close to the calculated emissions for generic data in a DGNB context. A product-specific EPD would, with these assumptions, be below the generic data in an LCA based on DGNB’s guidelines. It is possible that other manufacturers of steel pipes are able to achieve an even lower emission than the generic data.

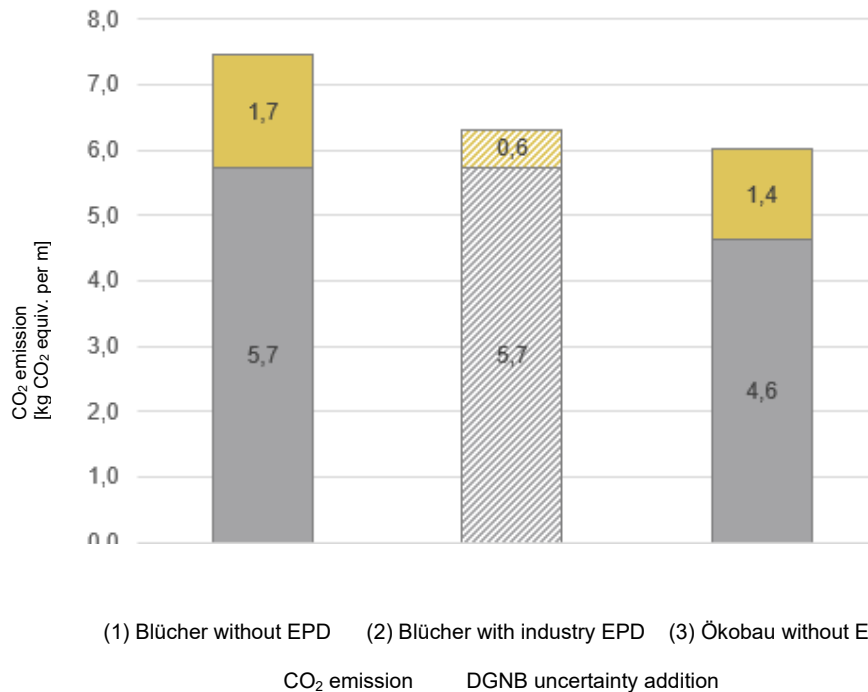


Figure 2 Illustration of the effect of DGNB’s uncertainty factors.

## Recommendation

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We recommend using the Ökobau data set “Corrosion-resistant Steel Pipes” to model Blücher’s corrosion-resistant drainage systems. Table 1 shows the metre weight of the available pipe dimensions, which must be entered in the LCAbyg database under “Building material” to ensure that the metre weight corresponds to the product used. To change the metre weight in LCAbyg, an editable copy of the construction must be produced.

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Table 1 Metre weight based on pipe dimensions

Pipe dim.	Weight [kg/m]
Ø40 mm	1.02
Ø50 mm	1.25
Ø75 mm	1.95
Ø83 mm	2.15
Ø110 mm	2.85
Ø125 mm	3.32
Ø160 mm	5.48
Ø200 mm	8.32
Ø250 mm	10.47
Ø315 mm	17.70

## Guide for entry in LCAbyg

- **Create** a new project.
- Press the tab **Building model**.
- **Right click** on the building part “*Drainage*” and press “*Create and add building part*”
- Enter **the name** of the building part, e.g. “*Blücher corrosion-resistant drainage system*”.
- Choose a group and an associated sub-group from the two dropdown menus (e.g. “*Drainage*” and “*Downpipe from roof*”).
- Press “*Create*”.
- Right-click on the new building part and press “*add construction*”.
- Use the search function to find the construction “Corrosion-resistant steel pipe” and insert it.
- Now insert the quantity in metres in the details window on the right.

Because “Corrosion-resistant steel pipe” is a standard construction, it cannot be changed, and a copy must therefore be created before the metre weight can be changed. Do this in the following way:

- Right-click on the construction and choose “*Duplicate and replace*” to create an editable copy. It is now possible to change the metre weight.
- In the next column, “*Building material*”, choose the building material “Utility water, corrosion-resistant steel”.

In the details window on the right, now enter the quantity in kg/m (marked in red on Figure 3).

