



BILLERUDKORSNÄS

# Billerud Flute®

Environmental Product Declaration



[www.billerudkorsnas.com](http://www.billerudkorsnas.com)



# BillerudKorsnäs

**BillerudKorsnäs** focuses on offering the packaging market sustainable materials (world-leading paper and board material) and new solutions that increase customers' profitability while at the same time reducing the overall environmental impact.

BillerudKorsnäs is driven by sustainability as a natural and integral part of the whole business and value chain. The raw material comes from responsibly managed forests and manufacturing takes place in resource-efficient production units that are constantly improved to minimize their environmental impact. BillerudKorsnäs has 8 production sites in Sweden, Finland and the UK. Production capacity is close to 3,000 ktonnes, with integrated pulp production. The range of products includes liquid packaging board, cartonboard, liners, fluting, sack- and kraft paper, speciality paper and pulp.

Through our products and solutions, we aim to be part of the response to the world's current major challenges.





This is an Environmental Product Declaration for Billerud Flute®, registered in the International EPD System ([www.environdec.com](http://www.environdec.com)). The declaration has been developed based on the results of a Life Cycle Assessment (LCA) and the Product Category Rules for Processed paper and paperboard (PCR 3214). Information and data given in this EPD can be used as upstream data by a customer who will perform a new EPD within the system boundaries given in a related PCR.

BillerudKorsnäs' operations for production in Sweden, Finland and the UK are fully certified in accordance with

- ISO 9001:2008 Quality Management System
- ISO 14001:2004 Environmental Management System
- PEFC™ Chain of Custody, license code PEFC/05-33-135
- FSC® Chain of Custody, license code FSC-C108771

In addition, certifications for food safety management systems, in accordance with ISO 22000/FSSC 22000, are in place where products are aimed for food contact.

GRUVÖN MILL – THE PRODUCTION SITE FOR BILLERUD FLUTE



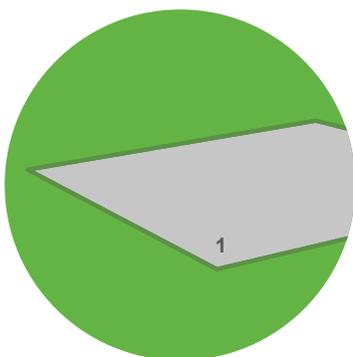
### DECLARATION OF CONTENTS

1. Unbleached semi-chemical pulp

| Billerud Flute | Distribution |
|----------------|--------------|
| NSSC* pulp     | 100%         |

### BILLERUD FLUTE

Billerud Flute (formerly New Billerud Flute) is a strong, semi-chemical fluting, based on 100% primary fibres. With its high strength and durability properties it is suitable for boxes exposed to long, demanding transport chains and high humidity. The product is commonly used for food applications, including fruit and vegetables, and for heavy-duty goods. Billerud Flute is available in grammages from 120 to 220 gsm (25–45 lb/MSF).\*\*



\* NSSC is a Neutral Sulfite Semi-Chemical pulp, i.e. a semi-chemical pulp named after the production process.

\*\* Within the paper industry lb/MSF stands for pounds per 1,000 square feet, while gsm is an acronym for grams per square metre.



**SYSTEM BOUNDARIES**

The international EPD system is a hierarchic approach based on the international standards:

- ISO 9001, Quality management system
- ISO 14001, Environmental management system
- ISO 14025, Type III environmental declarations
- ISO 14044, LCA – Requirements and guidelines

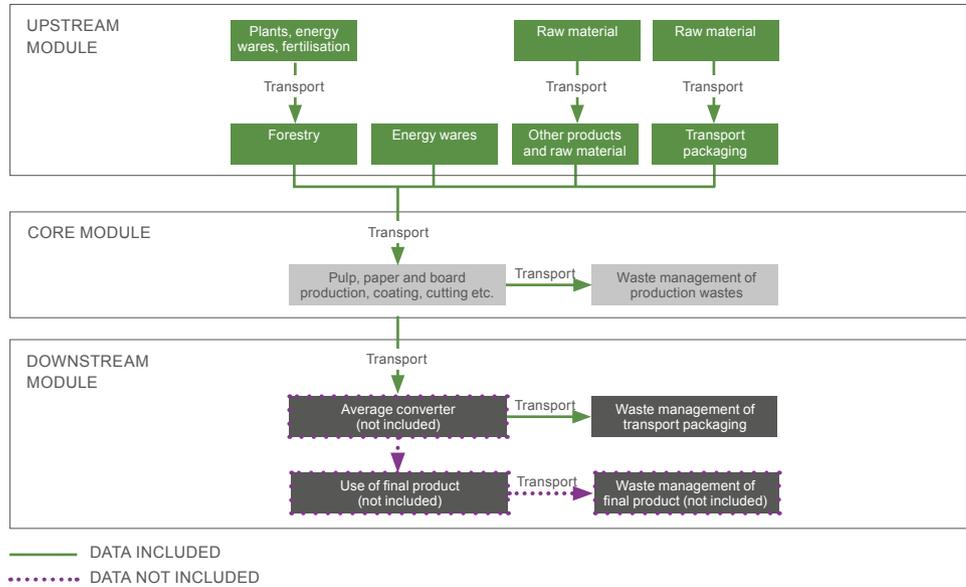
The systems are divided into three life cycle phases:

**UPSTREAM:** Forestry, production of fertilisers, energy wares and chemicals, auxiliary products and other raw materials, transport packaging.

**CORE:** Transportation of all materials (including wood) to the core processes,

production of internal and external pulp, production of paper and paperboard, cutting and packing of the products and treatment of waste generated from the production processes.

**DOWNSTREAM:** Distribution of the product to the customer and waste management of transport packaging.



**ENVIRONMENTAL PERFORMANCE**

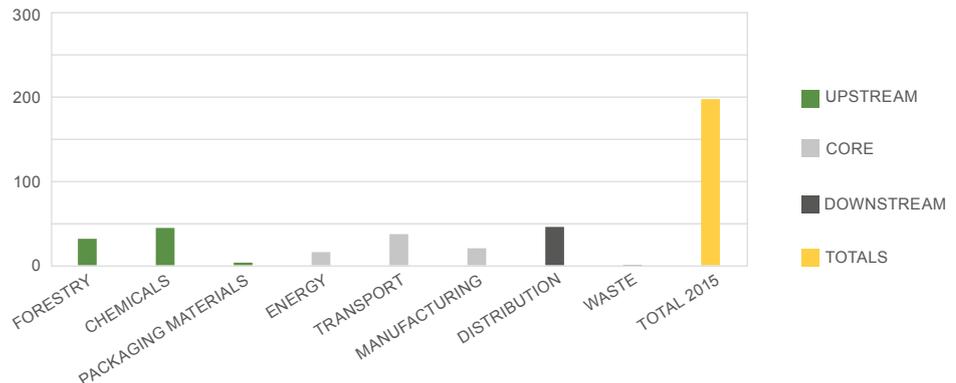
The environmental impact of three selected grammages representing a low, medium and high grammage within the product range are presented in the table below.

The declared unit is one tonne (1,000 kg) of the product delivered at the gate of an average converter/customer in Europe. As additional result, the environmental impact is presented also per 1,000 m<sup>2</sup>.

The carbon footprint (greenhouse gas emissions over the life cycle) is presented as an average for all grammages covered in the following diagram as global warming potential 100 years (GWP100) in kg CO<sub>2</sub> equivalents per tonne product. The relatively low emissions figures for this product are based on the high yield for the NSSC pulp, the small amount of chemicals used and the cross-recovery integration for chemicals and heat within the mill.

AVERAGE GREENHOUSE GAS EMISSIONS BILLERUD FLUTE 2015

kg CO<sub>2</sub>eq/TONNE





## POTENTIAL ENVIRONMENTAL IMPACT BILLERUD FLUTE

The table presents the potential environmental impact per declared unit as defined by the product category rules for processed paper and paper-board (CPC 3214). The impact presented per tonne is the same for all grammages within the product range. Data for the calculation is taken from the actual production of the product during 2015, without any corrections.

| BILLERUD FLUTE  | UPSTREAM | CORE                               | DOWNSTREAM                         | TOTAL                              | UNIT                    |
|---|----------|------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Global warming potential excl biogenic carbon (CO <sub>2</sub> eq.)           | 78.3     | 72.1                               | 45.6                               | 196.0                              | kg/tonne                |
| Global warming potential incl biogenic carbon (CO <sub>2</sub> eq.)           | -1,713.9 | 1,071.0                            | 49.0                               | -593.9                             | kg/tonne                |
| Acidification potential (SO <sub>2</sub> eq.)                                 | 0.41     | 0.69                               | 0.12                               | 1.22                               | kg/tonne                |
| Eutrophication potential (PO <sub>4</sub> <sup>3-</sup> eq.)                  | 0.18     | 0.67                               | 0.12                               | 0.97                               | kg/tonne                |
| Photochemical oxidant formation potential (C <sub>2</sub> H <sub>4</sub> eq.) | 0.07     | 0.20                               | -0.01                              | 0.26                               | kg/tonne                |
|   |          | BILLERUD FLUTE 120 GSM (25 LB/MSF) | BILLERUD FLUTE 160 GSM (33 LB/MSF) | BILLERUD FLUTE 220 GSM (45 LB/MSF) | UNIT                    |
| Global warming potential excl biogenic carbon (CO <sub>2</sub> eq.)           |          | 23.5                               | 31.4                               | 43.1                               | kg/1,000 m <sup>2</sup> |
| Global warming potential incl biogenic carbon (CO <sub>2</sub> eq.)           |          | -71.3                              | -95.0                              | -130.7                             | kg/1,000 m <sup>2</sup> |
| Acidification potential (SO <sub>2</sub> eq.)                                 |          | 0.15                               | 0.20                               | 0.27                               | kg/1,000 m <sup>2</sup> |
| Eutrophication potential (PO <sub>4</sub> <sup>3-</sup> eq.)                  |          | 0.12                               | 0.16                               | 0.21                               | kg/1,000 m <sup>2</sup> |
| Photochemical oxidant formation potential (C <sub>2</sub> H <sub>4</sub> eq.) |          | 0.03                               | 0.04                               | 0.06                               | kg/1,000 m <sup>2</sup> |

## USE OF RESOURCES

The table presents the total resources used in the upstream, core and downstream phases for all grammages within the product range as the amount of resources used per tonne produced is the same for all grammages. Data for the calculation is taken from the actual production of the product during 2015, without any corrections.

| BILLERUD FLUTE                           | UPSTREAM | CORE     | DOWNSTREAM | TOTAL    | UNIT                  |
|--|----------|----------|------------|----------|-----------------------|
| <b>Material resources, renewable</b>     |          |          |            |          |                       |
| Biomass                                  | 893      |          |            | 893      | kg/tonne              |
| Other                                    | 8.9      | 2.4      | 8.0        | 19.3     | kg/tonne              |
| <b>Material resources, non-renewable</b> |          |          |            |          |                       |
| Gravel                                   | 28.0     | 8.1      | 1.2        | 37.3     | kg/tonne              |
| Sodium chloride (rock salt)              | 33.2     | 0.014    | 0.012      | 33.2     | kg/tonne              |
| Sulphur                                  | 6,059.8  | 0.02     | 0.03       | 6,059.9  | g/tonne               |
| Soil                                     | 0.0      | 4.3      | 0.002      | 4.3      | kg/tonne              |
| Other                                    | 7.1      | 1.5      | 0.72       | 9.3      | kg/tonne              |
| <b>Energy resources, renewable</b>       |          |          |            |          |                       |
| Energy from biomass                      | 48.8     | 10,808.5 | 36.4       | 10,893.7 | MJ/tonne              |
| Energy from hydropower                   | 50.2     | 841.5    | 50.6       | 942.2    | MJ/tonne              |
| Other                                    | 66.4     | 3.5      | 21.8       | 91.7     | MJ/tonne              |
| <b>Energy resources, non-renewable</b>   |          |          |            |          |                       |
| Crude oil (resource)                     | 17.7     | 17.1     | 7.0        | 41.9     | kg/tonne              |
| Hard coal (resource)                     | 7.6      | 0.6      | 3.4        | 11.7     | kg/tonne              |
| Lignite (resource)                       | 8.1      | 0.2      | 9.4        | 17.6     | kg/tonne              |
| Natural gas (resource)                   | 5.2      | 0.8      | 1.3        | 7.2      | kg/tonne              |
| Uranium (resource)                       | 0.5      | 0.1      | 0.3        | 0.9      | g/tonne               |
| Other                                    | 0.39     | 0.02     | 0.04       | 0.44     | kg/tonne              |
| <b>Secondary resources</b>               |          |          |            |          |                       |
| Electricity use at manufacturing         |          | 390.0    |            | 390.0    | kWh/tonne             |
| <b>Water use</b>                         |          |          |            |          |                       |
| Total water use                          | 0.7      | 102.0    | 0.2        | 102.8    | m <sup>3</sup> /tonne |
| Water use at manufacturing               |          | 90.0     |            | 90.0     | m <sup>3</sup> /tonne |
| <b>Waste</b>                             |          |          |            |          |                       |
| Hazardous waste                          |          |          |            | 0.40     | kg/tonne              |
| Other waste                              |          |          |            | 46       | kg/tonne              |



## ADDITIONAL ENVIRONMENTAL INFORMATION: POTENTIAL ENVIRONMENTAL GAIN

### Waste minimisation

All products produced at the Gruvön are based on primary fibres with high strength properties enabling reduction of packaging weight.

### Recyclability and recovery

Billerud Flute is recoverable through material recycling and energy recovery in accordance with the material requirements in EN 13430:2004 and EN 13431:2004.

### Waste handling

All board and paper products produced by BillerudKorsnäs meet the targets specified in the EU's waste management hierarchy within the EU Waste Framework Directive 2008/98/EC as well as the essential requirements of the EU Packaging Waste Directive 94/62/EC.

### Biodegradability

BillerudKorsnäs products are based on pulp consisting of cellulose, hemicellulose and some lignin which will be degraded by micro-organisms in nature. The decomposition time required depends on several factors such as temperature, humidity, microbiological activity, and pH. For a product to be classified as

biodegradable, at least 90% shall be biodegraded under aerobic conditions, according to the standard EN 13432:2000. As this varies between products and grammages, more information is provided by BillerudKorsnäs upon request.

### Uptake of carbon dioxide in growing forests

Carbon stocks are increasing in Swedish forest ecosystems, mainly in the living biomass, due to the fact that the forest growth rate is higher than the harvest rate. The high growth rate is a result of silvicultural legislation and sustainable forest management practices. The long-term forest management is to a large extent driven by the demand for round wood from the forest industry. According to the Swedish Environmental Protection Agency, an amount corresponding to more than 80% of all greenhouse gas emissions in Sweden 2015 was captured by the net forest growth. Future scenarios for harvest rates in Sweden over the next 20 years conclude that the harvest rate will remain significantly lower than the growth rate.

## BILLERUDKORSNÄS' ENVIRONMENT TARGET AREAS

BillerudKorsnäs is actively pursuing improvement to minimize the environmental impact from all parts of the operations. It is BillerudKorsnäs' vision to entirely phase out fossil fuels from the production. To this end, the company replaces fossil fuels with bioenergy and continually invests in process optimization to decrease the use of resources and increase energy efficiency. BillerudKorsnäs' climate related targets were in late 2017 submitted for approval by the Science Based Targets initiative. The approval scientifically ensures that the company contributes to the global work to minimize greenhouse gas emissions and to combat global warming. Updated information is found on BillerudKorsnäs' website.

### Fossil-free production in Sweden

- The proportion of biofuels used in the manufacturing processes shall be further increased, from 97.6% as in 2015, in order to get fossil fuels entirely phased out at all Swedish production sites.

### Fossil-free transportation within Sweden

- The fuels used for BillerudKorsnäs' domestic truck transportation of wood and finished goods shall be fossil free.

### Increased energy efficiency

- The amount of energy used in production shall be lowered. The energy efficiency is measured as the energy use per tonne of product produced.



## DEFINITIONS

### Acidification

Decrease of the pH value in terrestrial and water systems.

### Eutrophication

Eutrophication is the disturbance of the nutritional balance in the soil and waters due to an added amount of nutrition. In aquatic systems, this leads to increased production of biomass, which may lead to oxygen deficiency and fewer living organisms.

### Global warming potential

Global warming is caused by increases in the atmospheric concentration of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases, such as methane and nitrous oxide, that absorb and reflect heat. The global warming potential (GWP) is declared as CO<sub>2</sub> equivalents. The amount of biogenic carbon (CO<sub>2</sub>eq.) presented is captured from the atmosphere by forest growth during the upstream phase and stored in the specific product as carbon until it is released again during later phases. Carbon is still stored in the product when it reaches the customer.

### Hazardous waste

Wastes such as chemical waste, used oil, soot and radioactive waste from the production of nuclear power are classified as hazardous.

### Photochemical oxidant formation

Hydrocarbons and volatile organic carbons (VOCs) contribute to ground level ozone formation, which has toxic effects on humans and vegetation.

### PCR

Product Category Rules specify Environmental Product Declaration requirements for a specified sector or product category.  
See [www.environdec.com](http://www.environdec.com)

### Uptake of carbon dioxide in growing forests

In photosynthesis, carbon dioxide from the atmosphere is removed and stored in the growing biomass. In Sweden, the forest growth rate is higher than the harvest rate, in forest land leading to a net removal of CO<sub>2</sub> from the atmosphere.

### Water use

Water use at manufacturing is the total amount of water used for cooling and the production process at the board and paper mill. Water use in upstream, core, and downstream phases is the total amount of water used for all processes related to the product.

## REFERENCES

Swedish Environmental Protection Agency  
National Inventory Report Sweden 2017,  
Greenhouse Gas Emission Inventories 1990–2015  
IVL report: Life cycle assessment of  
BillerudKorsnäs virgin fiber-based packaging  
materials, December 2017

## VERIFICATIONS

EPD Program: The International EPD® System  
Note: EPDs from different programs may not be comparable  
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Production of CTMP–2015  
Product Category Rules (PCR) review was conducted by: The Technical Committee of the International EPD® System. Chair: Massimo Marino  
Contact via [info@environdec.com](mailto:info@environdec.com).  
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PCR: Product category rules for processed paper and paperboard (CPC 3214), Version 2016-04-01  
Independent verification of the data according to ISO14025 (external): Martin Erlandsson ([martin.erlandsson@ivl.se](mailto:martin.erlandsson@ivl.se)): 2018-02-16  
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We challenge  
conventional packaging  
for a sustainable future



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