ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Aurubis Finland Oy
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-AUR-20160217-CBA1-EN
Issue date	09/01/2017
Valid to	08/01/2022

Nordic Bronze

Aurubis Finland Oy

Institut Bauen und Umwelt e.V.

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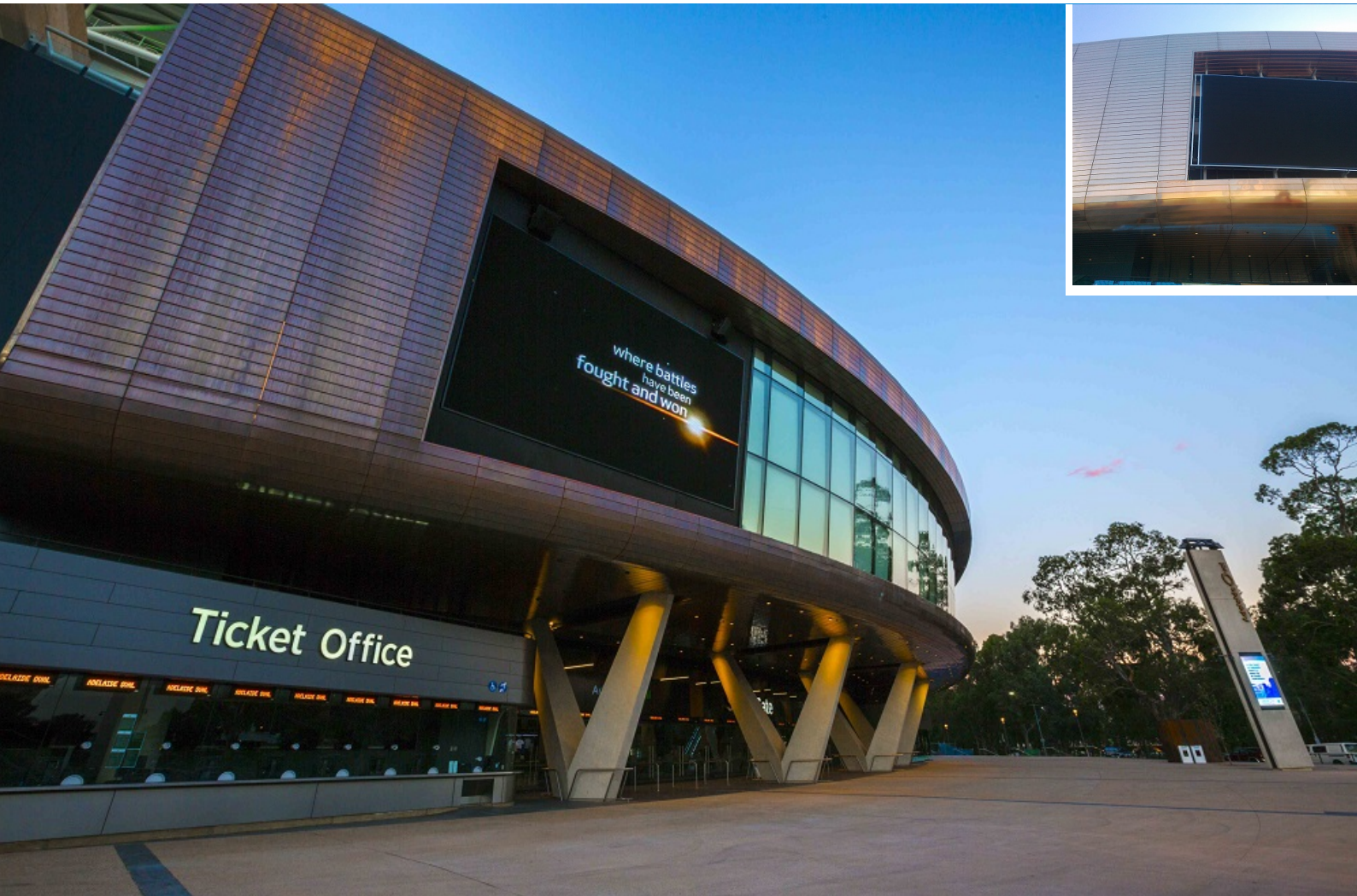

General Information

Aurubis Finland Oy	Nordic Bronze
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the Declaration** Aurubis Finland Oy P.O. Box 60 FI-28101 Pori, Finland
Declaration number EPD-AUR-20160217-CBA1-EN	**Declared product / Declared unit** 1 kg Nordic Bronze
This Declaration is based on the Product Category Rules: Building metals, 07.2014 (PCR tested and approved by the SVR)	**Scope:** The Core environmental product declaration refers to copperstripes and copper sheets produced by Aurubis at Pori Oy site, Finland. Depending on the surface quality, the product is availabe in different qualities. This EPD refers to the product Nordic Bronze. The Life Cycle Assessment is based on data from Aurubis Finland Oy in FI-28101 Pori. The plant is located in Pori, Finland. The data is based on the production year 2015.The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
Issue date 09/01/2017	**Verification** The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/ ☐ internally ☒ externally
Valid to 08/01/2022	
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	
Dr. Burkhart Lehmann (Managing Director IBU)	Manfred Russ (Independent verifier appointed by SVR)

Product

Product description
The Nordic Bronze product is an alloy of copper and tin (CuSn4) . When exposed to the atmosphere, the surface gradually changes to a stable, dark chocolate brown.

Nordic Bronze is available in sheets or coils.

- Thickness range: 0.5 – 2.0 mm
- Maximum width: 780 mm.

This declaration is valid for the product Nordic Bronze.

Application
Nordic products are used for facades, roofs , roof drainage systems and other architectural elements of all shapes, as well as interior applications, decorations, ceilings, wall claddings

Relevant standards are: /EN 1172/ in combination with /EN 1976/, /EN 1652/, /EN 504/, /EN 14783/.

Technical Data
Test standards are: EN ISO 6507-1;2005; EN-ISO 6507-2:2005 , EN ISO 6892-1:2009, ISO 1811-2:1988-10, ISO 4739:1985-05

Physical and mechanical properties

Name	Value	Unit
Coefficient of thermal expansion	17	$10^{-6}K^{-1}$
Tensile strength	290 - 390	N/mm^2
Density	8860	kg/m^3
Proof strength	max 190	N/mm^2
Elongation	min 40	%
Hardness	70-100	HV

Base materials / Ancillary materials
The Nordic Bronze product consist of an alloy of copper and tin (CuSn4) according to /EN 1172/. The tin (Sn) content is 3.5-4.5%, the phosphorus content is 0.01-0.4 % and the remaining content is copper (Cu).

The cakes for Nordic Brass sheet production are supplied from Aurubis Stolberg and Schwermetall, in Germany, and only undergo rolling operations at Aurubis Pori.

Additives:

- Biodegradable rolling oil and emulsion which

is used for cooling and lubrication during the rolling process.
- Benzotriazole which is used as anticorrosive agent.

Reference service life
Copper has a long service life and durability. The rates of copper elutriation under normal atmospheric weathering are between 0.7 g/m²*a and 1.5g/m²*a.

LCA: Calculation rules

Declared Unit
The declared unit is 1 kg of Nordic Bronze.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Conversion factor to 1 kg	-	-

System boundary
Type of the EPD: cradle-to-gate - with options. According to "System limits" outlined in section 5.5. of the PCR, Part A: “Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report” the following life cycle stages are considered:
- Production, upstream raw materials & energy (Module A1-A3)
- Waste processing for reuse, recovery or recycling (Module C3)
- Benefits and loads beyond the product system boundary (Module D)

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account. The used background database has to be mentioned.

LCA: Scenarios and additional technical information

End of life (C1 - C4)

Name	Value	Unit
Collected separately	1	kg
Recycling	0.99	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Net scrap substituting primary material	-0,01	kg
Material loss	0	%

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 Kg Nordic Bronze

Parameter	Unit	A1-A3	C3	D
Global warming potential	[kg CO_2-Eq.]	7.72E-1	0.00E+0	6.62E-3
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	6.36E-11	0.00E+0	3.39E-13
Acidification potential of land and water	[kg SO_2-Eq.]	1.44E-3	0.00E+0	8.83E-5
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.65E-4	0.00E+0	2.35E-6
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.15E-4	0.00E+0	4.40E-6
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.66E-7	0.00E+0	3.31E-6
Abiotic depletion potential for fossil resources	[MJ]	8.06E+0	0.00E+0	7.28E-2

RESULTS OF THE LCA - RESOURCE USE: 1 Kg Nordic Bronze

Parameter	Unit	A1-A3	C3	D
Renewable primary energy as energy carrier	[MJ]	2.87E+0	-	-
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	-	-
Total use of renewable primary energy resources	[MJ]	2.87E+0	0.00E+0	6.89E-3
Non-renewable primary energy as energy carrier	[MJ]	1.11E+1	-	-
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	-	-
Total use of non-renewable primary energy resources	[MJ]	1.11E+1	0.00E+0	7.60E-2
Use of secondary material	[kg]	1.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	8.97E-3	0.00E+0	6.00E-5

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 Kg Nordic Bronze

Parameter	Unit	A1-A3	C3	D
Hazardous waste disposed	[kg]	9.08E-6	0.00E+0	1.46E-8
Non-hazardous waste disposed	[kg]	6.61E-3	0.00E+0	1.73E-3
Radioactive waste disposed	[kg]	1.20E-3	0.00E+0	1.29E-6
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	-1.00E-2	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0

References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin(pub.): Generation of Environmental Product Declarations (EPDs);
www.ibu-epd.de

ISO 14025
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 1172
EN 1172:2011: Copper and copper alloys - Sheet and strip for building purposes

EN 1976
EN 1976:2012: Copper and copper alloys - Cast unwrought copper products

EN 1652
EN 1652:1997: Copper and copper alloys - Plate, sheet, strip and circles for general purposes

EN 504
EN 504:1999: Roofing products from metal sheet - Specification for fully supported roofing products from copper sheet;

EN 14783
EN 14783:2013: Fully supported metal sheet and strip for roofing, external cladding and internal lining - Product specification and requirements;

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