



AUB Environmental Product Declaration

according to ISO 14025



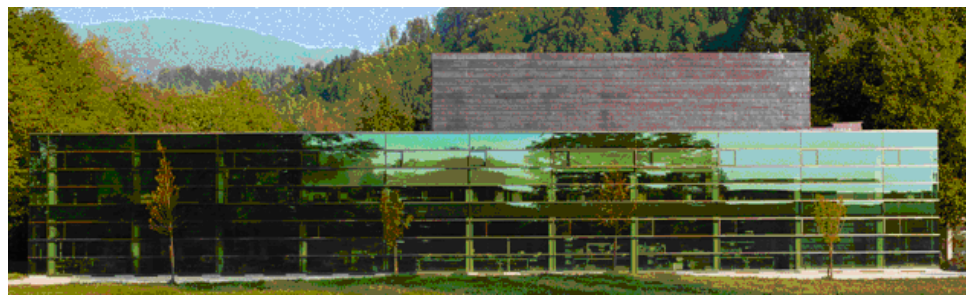
**TECU[®] - Copper Strips and
Copper Alloys**

KME Germany AG

Declaration Number
AUB-KME-30807-E

ARBEITSGEMEINSCHAFT UMWELTVERTRÄGLICHES BAUPRODUKT E.V.
www.bau-umwelt.com





Summary

**Environmental
Product-Declaration**

**ARBEITSGEMEINSCHAFT
UMWELTVERTRÄGLICHES
BAUPRODUKT E.V.**

www.bau-umwelt.com



Program holder

KME Germany AG

Klosterstrasse 29

49074 Osnabrück



Declaration holder

AUB-KME-30807-E

Declaration number

TECU[®] Copper Strips and Copper Alloys

This declaration is an environmental product declaration according to ISO 14025 and describes the environmental performance of the building products mentioned. It is intended to promote the development of environmental and health compatible construction.

All relevant environmental data is disclosed in this validated declaration.

The declaration is based on the PCR Document ,Construction Metals: 2004-11'.

**Declared
building products**

This validated declaration authorises the holder to bear the official stamp of the Association. It only applies to the above mentioned products for three years from date of issue. The declaration holder is liable for the information and evidence on which the declaration is based.

Validity

The **declaration** is complete and contains in detail:

- Product definition and physical data
- Information about raw materials and origin
- Specifications on manufacturing the product
- References for product processing
- Information on product in use, singular effects and end of life
- LCA results
- Evidence and verifications

Content of the declaration

1th August 2007

Date of issue

Signatures

Prof. Dr.-Ing. Horst J. Bossenmayer (Chairman of the AUB)

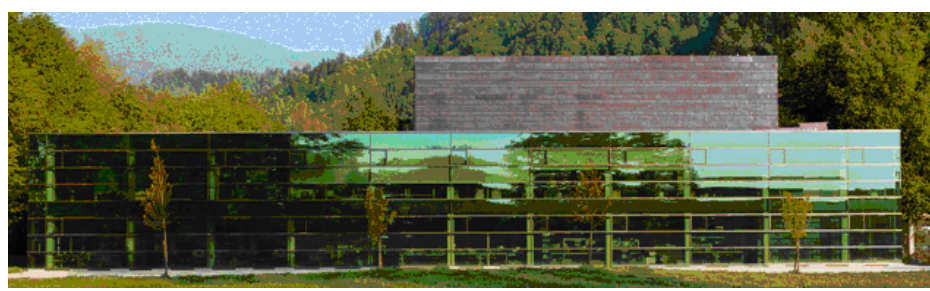
This declaration, and the rules which it is based on, have been verified by the Independent Advisory Board (SVA) according to ISO 14025.

**Verification of the
declaration**

Signatures

Prof. Dr.-Ing. Hans-Wolf Reinhardt (Chairman of the SVA)

Dr. Eva Schmincke (Verifier appointed by the SVA)



Summary Environmental Product- Declaration

The material TECU® is copper Cu-DHP manufactured according to DIN EN 1172. The declaration also includes the surface qualities TECU® Oxide, pre-oxidised brown on both sides, TECU® Patina, green on one side pre-coated with patina, along with the Cu-Sn-alloy TECU® Bronze and the Cu-Al-alloy TECU® Gold.

Product Description

The fields of application of the TECU® copper sheets and strips and TECU® copper alloys are roof cladding, façade designs, and roof drainage systems.

Range of Application

The **Life Cycle Assessment (LCA)** was carried out according to DIN ISO 14040 et seq. corresponding to the requirements of the AUB-Guidelines for Type III Declarations. Specific data from the company KME, the German Copper Institute (DKI) and data from the data base "GaBi 4" were used. The LCA includes raw material recovery and energy generation, raw material transportation, the actual manufacturing phase of the products, use phase and recycling of the copper strips.

Scope of the Life Cycle Assessment

The use phase of the copper strips is divided into various areas of application. This involves applications for roofs, roof drainage and façades. In the End of Life phase, the material treatment of copper scraps was modelled, implying that copper scraps are thought to be a direct replacement for the primary copper cathode. Fusing the scraps is not necessary. The resulting credit in copper yielded, is calculated as a substitute for the primary copper production.

TECU® Copper strip /-sheet (bright rolled / surface treated)				
Parameter *	TECU® Classic Production	TECU® Oxide Production	TECU® Patina Production	Recycling-** potential
Primary energy, non-renewable	12.08	19.22	18.23	-2.30
Primary energy, renewable	1.27	1.41	1.59	-0.15
Global Warming Potential GWP100	0.81	1.35	1.20	-0.18
Ozone Depletion Potential ODP	$0.09 \cdot 10^{-6}$	$0.12 \cdot 10^{-6}$	$0.15 \cdot 10^{-6}$	$-0.03 \cdot 10^{-6}$
Acidification Potential AP	$2.82 \cdot 10^{-3}$	$6.60 \cdot 10^{-3}$	$3.53 \cdot 10^{-3}$	$-1.38 \cdot 10^{-3}$
Eutrophication Potential EP	$0.27 \cdot 10^{-3}$	$0.32 \cdot 10^{-3}$	$0.32 \cdot 10^{-3}$	$-0.14 \cdot 10^{-3}$
Summer smog Potential(POCP)	$0.22 \cdot 10^{-3}$	$0.28 \cdot 10^{-3}$	$0.27 \cdot 10^{-3}$	$-0.11 \cdot 10^{-3}$

Results of the Life Cycle Assessment

)* units of the individual impact categories analogue to table 2

)** Recycling potential applies respectively for all TECU® products listed in table 1

TECU® Copper strip (alloyed)					
Parameter	Unit per kg	TECU® Gold Production	TECU® Bronze Production	Recycling potential	
				Gold	Bronze
Primary energy, non-renewable	[MJ]	23.26	13.53	0.05	0.30
Primary energy, renewable	[MJ]	2.65	1.99	0.003	0.02
Global Warming Potential GWP100	[kg CO2-eqv.]	1.54	0.78	$3.5 \cdot 10^{-3}$	0.02
Ozone Depletion Potential ODP	[kg R11-eqv.]	$0.17 \cdot 10^{-6}$	$0.11 \cdot 10^{-6}$	$0.5 \cdot 10^{-9}$	$3.4 \cdot 10^{-9}$
Acidification Potential AP	[kg SO2-eqv.]	$3.79 \cdot 10^{-3}$	$1.54 \cdot 10^{-3}$	$28 \cdot 10^{-6}$	$1.8 \cdot 10^{-3}$
Eutrophication Potential EP	[kg PO4-eqv.]	$0.23 \cdot 10^{-3}$	$0.13 \cdot 10^{-3}$	$2.7 \cdot 10^{-6}$	$18 \cdot 10^{-6}$
Summer smog Potential(POCP)	[kg ethylene -eqv.]	$0.32 \cdot 10^{-3}$	$0.12 \cdot 10^{-3}$	$2.1 \cdot 10^{-6}$	$14 \cdot 10^{-6}$

Produced by: PE INTERNATIONAL, Leinfelden-Echterdingen



In addition, the following **evidence and verifications** are also described in the Environmental Product Declaration:

- Atmospheric corrosion and surface loss (washing away), measurement of the rates of corrosion and the washing away of copper ions due to precipitation over a test period of 5 years (1995 – 2000)
- Calculation model to predict copper washing away rates based on European environmental data (Period under observation 1980 – 2000)

Evidence and verifications