European Copper Institute
Copper Alliance

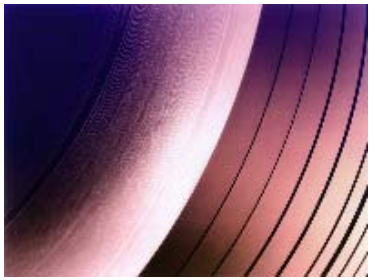
LIFE CYCLE ASSESSMENT DATA
COPPER SHEET

PRODUCT DESCRIPTION

material: **COPPER**
product: **ROOFING SHEET** (0.6 mm)
unit: m^2
context: **CRADLE TO GATE**
Without use phase
With use phase

MODELLING PARAMETERS

	Process	Allocation of Byproducts
mining:	**GLOBAL**	GOLD (by value)
refining/smelting:	**EUROPEAN**	MOLYBDENUM (by value)
fabricating:	**EUROPEAN**	NICKEL SULPHATE (by value)
recycling:	**EUROPEAN**	SILVER (by value)
		SULPHURIC ACID (by value)
		STEAM (not allocated)



RESULTS

Energy Consumption	0,14	GJ/m^2
Global Warming Potential	10,60	kg CO_2-equiv/m^2
Acidification Potential	0,068	kg SO_2-equiv/m^2
Eutrophication Potential	0,0040	kg PO_4-equiv/m^2
Ozone Depletion Potential	5,26E-07	kg R11-equiv/m^2
Photochemical Ozone Creation Potential	0,0040	kg Ethene-equiv/m^2

last updated January 2012

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Explanatory note on Life Cycle Data for Copper Sheet

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General remarks

Life Cycle Assessment is a scientific tool to assess the environmental impacts of products. It is increasingly being used during the design phase to optimise across the initial production, the use phase and the end of life, reflecting disposal or recycling. For metals, a typical "cradle to grave" study covers the mining and extraction of raw materials, fabrication, transportation, use, and recycling/disposal, including energy and all other product supplies required. ISO guidelines require the underlying life cycle inventories to have undergone independent peer review.

From this initial concept, Life Cycle Assessment is now being used as a marketing and decision making tool to make comparisons between materials and products for similar end use applications. This use of the assessment of environmental sustainability as a comparison tool in order to select environmentally friendly products needs to be approached with some caution.

In such comparisons, detailed checks must be made to ensure that the system boundaries are comparable. In particular, this must be the case for the scope, the functional unit and the use phase. Life Cycle Assessment results strongly depend on the choice of material. Individual impacts (e.g. global warming, acidification, ozone depletion, etc.) do not have equivalent environmental effects. Only a comparison of identical impact categories leads to appropriate and meaningful statements. The aggregation of impacts to one single indicator should also be avoided when making comparative studies. A preferred approach to decision making is one that takes into account the importance of national or local priorities with regards to the different impact categories.

Comparison of roofing materials

In comparing copper architectural sheets with other roofing materials, any comparison only by weight is not relevant. Life cycle assessments should be based on the functional unit, with a sheet thickness of 0.6 mm being the most commonly available in the EU market today. The use phase of copper roofing is also one of the longest, easily reaching well over 100 years, with models showing that it takes more than 6,000 years for a typical sheet to erode to 50% of its initial thickness.

In comparing different material solutions, the complex interactions between function, inclination, installation structure and material choice need to be understood and evaluated. One m^2 of sheet may not necessarily be equivalent to one m^2 of roof, or one m^2 of building surface. The economic value of copper scrap, based on its ability to be recycled 100% without any loss in performance, must also be taken into account.

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