



COLOR-COATED STEEL SHEETS AND COILS

ENVIRONMENTAL PRODUCT DECLARATION
ISO 14025

SSAB

General information

Owner of environmental product declaration	SSAB Europe Oy Harvialantie 420, FI-13300 Hämeenlinna, Finland
Product	Color-coated steel sheets and coils
Producer	SSAB Europe
Production site	SSAB's Hämeenlinna and Kankaanpää sites, Finland
Declared unit	1 kg of steel structures
Date declaration was issued	November 28, 2014
Valid until	November 28, 2019

This environmental product declaration includes several different color coatings and the results of environmental indicators declared in this declaration are average values for these products. The information in this environmental product declaration is based on production data for 2012. CEN standard EN 15804 serves as the core PCR.

Independent verification of the declaration, according to EN ISO 14025:2010

External Internal

Third party verifier



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This environmental product declaration provides information about the products referred to. The declaration is based in the requirements of standards EN 15804+A1:2014, ISO 14025:2010 and ISO 14040:2006. An environmental product declaration contains information about the raw materials, energy consumption, emissions originating during production, and about product recyclability. Unless otherwise stated, the product information is based on steel manufactured at SSAB's steel mill in Raahе (Finland).

SSAB specializes in steel and steel construction. SSAB's corporate responsibility is defined in the company's vision, strategy, values Code of Ethics, policies and management system. SSAB's production sites operate in conformance with certified ISO 14001 environmental management and ISO 9001 quality management systems. SSAB aims at continuous improvement and energy efficiency in all operations and customer solutions.

The most recent information about SSAB's products and services, product safety and use and environmental and social responsibility can be found on the company's website at www.ssab.com.

Product

APPLICATION

SSAB's color-coated steel products are used in the construction, electrical, electronics and engineering industries. Steel strength and formability, together with the corrosion protection provided by the galvanized and color coating are combined in the ready-to-use surface of SSAB's color-coated steel sheets. SSAB has the widest choice of colors on the market: 17 standard colors and hundreds of other color options. There is also a choice of different surface glosses and structures. The various coating options and their applications are:

- Pural® and Pural® matt - durable polyurethane-resin-based coatings for roofing
- Purex™ and Galea Pro – durable color coatings for construction, i.e. roofing sheets
- Hiarc®, Hiarc® matt, Hiarc® max and Hiarc® reflect developed especially for façades of a high architectural standard
- Polyester outdoor coatings are ideal for applications where coatings are not exposed to extreme weather conditions. The coatings are an economic choice for roofing and wall panels in warehouses and other buildings
- Polyester indoor coatings – indoor walls, ceilings, various products in the metal fabrication industry, such as lighting, electric heaters, appliance housing and cable racks
- ARS indoor coatings – ARS coatings have been designed for high wear resistance and easy cleaning. The coatings are used in the metal fabrication industry
- Structured polyester coatings – are ideal for products in the metal fabrication industry
- Colored laminates for indoors – are typically used in the walls and ceilings of ship cabins and in internal walls and doors in warehouses
- PVC food-safe laminate – used for walls, ceilings and shelves in processing plants in the food industry

TECHNICAL INFORMATION

Color-coated steel sheets and coils in accordance with this environmental product declaration are manufactured at SSAB's Hämeenlinna and Kankaanpää sites in Finland. The range of steel grades cold-rolled and metal-coated at SSAB's site in Hämeenlinna

is used as the raw material for SSAB's color-coated steel products. Hot-rolled steel coils made at SSAB's steel mill in Raahе are used as the raw material for cold-rolled and metal-coated steel. Products are delivered as coils and sheets, and as slit coil. Product thickness is in the range of 0.45 mm and 1.5 mm.

Product materials

Steel is an alloy of mainly iron and carbon, with small amounts of other elements used as alloying elements. These elements improve the chemical and physical properties of steel such as strength, formability and weldability. The alloying elements of steel are closely linked to its chemical matrix.

PRODUCT COMPOSITION

Cold-rolled and hot-dip galvanized steels are available with color-coating. Color-coated steels are made in accordance with standard EN 10169. The composition of SSAB's color-coated steel sheets and coils depends on the coating option:

- Zinc coating (Z) 100–450 g/m² is lead-free and has a minimum zinc content of 99%
- Pural® and Pural® - matt polyurethane-resin-based coatings
- Purex™ ja Galea Pro -maalipinnoite
- Hiarc®, Hiarc® matt, Hiarc® max and Hiarc® reflect coatings
- Polyester coatings
- Structured polyester coatings
- Color laminated for indoor use
- Food-safe laminate PVC

A color coating protects the surface side of hot-dip galvanized steel. The reverse side has been protected by a backing coat to protect the top surface against marking during the color-coating process and during transport, and to prevent the formation of white rust. The backing coat usually improves adhesion when color-coated steel is used, for example, in sandwich panels. If agreed on separately, coils and sheets can also be delivered with both sides painted solely with epoxy for subsequent surface treatment. If particular technical or aesthetic requirements are set for the reverse side, the paint must be selected accordingly.

In addition to the color coating and backing coat, the composition of the product is affected by chromium-free pre-treatment and primers, which are

an important feature in the coating system. Pre-treatment improves corrosion resistance and the adhesion of primers. Primers are used to improve corrosion resistance and the adhesion of backing and top coats. The primers and pretreatment of coatings on color-coated steels for outdoor applications contain anti-corrosive substances. The primers, top coats and pretreatment used to products of electro- and electronics industry meet the requirements of RoHS Directive.

Table 1 shows a summary of the composition of Hiarc-coated, hot-dip galvanized steel in normal production (excluding packaging materials). The exact composition of steel varies depending according to material standards and customer requirements. This information given is based on cold-rolled steel produced at SSAB's sites in Finland.

SSAB actively tracks and anticipates future changes in environmental, safety and chemical legislation and complies with valid EU chemical regulations, such as REACH (1907/2006/EC) and CLP (1272/2008/EC). Communication and cooperation throughout the supply chain plays an important role and SSAB requires full REACH compliance from its subcontractors. SSAB tracks the list of Substances of Very High Concern (SVHC) and other legislative requirements to ensure products meet legal and customer requirements. In addition, SSAB observes and complies with the requests and recommendations of many customers to withdraw products containing hazardous substances in the customer sector.

Where the concentration % (w/w) in a product of substances restricted under the EU's chemical regulation (REACH) and recommendations phasing out hazardous substances in the building sector such as the requirements of BASTA (2014: A2) and Bygghvaru-bedömningen (Building Material Assessment, BVB, 2013) in Sweden and the priority list in Norway exceeds or corresponds to the limits referred to above, this is stated in Table 1. The guidelines for Swedish building product declarations (Föreningen för Bygghvarudeklarationer, BVD 3, 2007) have been taken into account with regard to the substances disclosed.

Table 1. Example of the composition of Hiarc-coated hot-dip galvanized steel

MATERIAL	CONTENT (%) OF TOTAL PRODUCT WEIGHT	NAME OF INGREDIENT	MAXIMUM CONTENT % (W/W)	CONTENT (W/W) OF TOTAL PRODUCT WEIGHT	CAS NUMBER
Hot-dip galvanized steel	98.2	Steel	98.2		
Thickness: 0.5 mm		Iron (Fe)		88.3	7439-89-6
		Manganese (Mn)	1.70%	1.7	7439-96-5
		Silicon (Si)	0.6	0.6	7440-21-3
		Carbon (C)	0.2	0.2	7440-44-0
		Zinc layer			
		> 99% Zinc (Zn)	6.2	6.1	7440-66-6
Coatings: Hiarc chromium-free pre-treatment	1.8	Other elements	100	3	

Remarks

Physical state: solid

Odor: odorless

Color: metallic gray

Boiling point: 2750°C

Melting point: 1450 – 1520°C

Steel density: 7850 kg/m³

More detailed information about the composition of different steels is available from national and international standards as well as from SSAB's website, at www.ssab.com. The values provided are based on European Standards EN 10219-1, EN 10025-2, EN 10025-3, EN 10025-4, EN 10025-6, EN 10130, EN 10268, EN10346 and EN 10169 requirements on maximum concentrations.

Measurements are done to a level of 0.02 µg/g (0.0000002%). Concentrations below this degree of measuring accuracy cannot be determined. The concentrations of chemical elements - such as zirconium (Zr), magnesium (Mg), cobalt (Co), arsenic (As), cadmium (Cd), zinc (Z), lead (Pb), antimony (Sb) and tin (Sn) - appearing as impurities in steel are very small. None of the constituent substances within the whole product exceeds the limits of the EU's chemical regulation (REACH) and recommendations phasing out hazardous substances in the building sector such as the requirements of BASTA (2014: A2) and Byggarbedömningen (Building Material Assessment, BVB, 2013), Swedish Building Product Declarations (Föreningen för Byggarbedömningar, BPD 3, 2007) and the priority list in Norway. No product contains substances restricted under REACH or included on the candidate list (SVHC).

Steel contains very small amounts of impurities originating from natural raw materials and not added during the steel production process. The amount of impurities in the steels is minimal and, based on knowledge of the toxicity of these substances and their metallurgical bond in the steel matrix, does not pose a risk to the environment or human health.

Production

Color-coated steel sheets and coils are made at SSAB's Hämeenlinna and Kankaanpää sites. Hot-rolled steel made at SSAB's steel mill in Raabe, which is also used as the raw material for cold-rolled steel, color-coated steel and cold-rolled steel made at SSAB's

Hämeenlinna site are used as the raw material for SSAB's color-coated products. Production of the hot-rolled steel used as the raw material is based on the use of iron ore as a raw material. The amount of scrap steel used varies between 20-30% of the steel charge depending on the steel grade being manufactured. In 2012, the average value was 20%. Use of raw materials and energy has been optimized in steel production.

When scrap steel is used instead of virgin raw materials in iron production, the carbon dioxide emissions originating in steel production decrease accordingly. Steelmaking at SSAB Raabe production uses scrap material

from SSAB's own production processes and material sourced from the scrap steel market. For reasons of process technology, the content of scrap steel in blast-furnace-based steel production cannot exceed around 30%. In addition, the amount of scrap steel in steel production is limited due to its availability. Once steel has been made, it can be recycled endlessly without weakening its properties.

Most of the energy used in ore-based steel production comes from coal, which is used as a reducing agent in iron-making. The mineral products formed in iron and steel production processes and the by-products generated in the coking process are

Table 2. Occupational exposure limits valid in Finland.

ELEMENT	OCCUPATIONAL EXPOSURE LIMITS (OEL), 8 H (MG/M ³)
Iron oxide, vapor, (Fe)	5
Zinc oxide, vapor	5
Chromium (II, III) alloys	0.5
Chromium (VI) alloys	0.05

recycled as industrial raw material or material to replace virgin resources. A high percentage of the dust originating in various processes is returned to the process to reduce waste and improve material efficiency.

LABELING AND PACKAGING

Products are labeled so as to be easily and permanently identifiable and traceable. Labeling complies with standards EN 10021 and EN 10204.

The packaging and protection of our steel products is usually determined when ordering. Steel bands, wood props, corner protection and other accessories supporting packaging are used as appropriate and according to customer requirements. Paperboard or polyethylene film is usually used as the packaging material for cut lengths. The bundles including wooden props are fastened with metal bands. Coils are delivered fastened without a base, protected by paperboard, wrapping paper or corrugated plastic and plastic end rings, metallic corner protection and binding straps.

SOURCING AND TRANSPORTATION

The general terms and conditions of all sourcing contracts require compliance with SSAB's Code of Business Ethics. Also ethical values, environmental concerns and energy efficiency are weighed up when choosing suppliers. As regards the main raw materials used in steel production at Raahе (Finland), limestone is shipped from Sweden, coal from North America and Australia, iron ore pellets are shipped from Sweden or come by rail from Russia. Finished products are transported by sea, road or rail combined. The company's own logistics unit is responsible for most of SSAB's transportation of raw materials and products.

SSAB's environmental concerns in respect of logistics are managed through a certified environmental management system. The aim is to increase the share of logistics contracts with partners who have signed up for energy efficiency agreements in the logistics and transport sector. Around 85% of SSAB's land transportations per tonne of products are carried by a partner signatory to energy efficiency agreements. Logistics companies outside an energy efficiency agreement are regularly encouraged to sign up to one. SSAB's international partners have certified environmental management systems. Logistics aims to optimize transport and maximize payloads and to combine transport as efficiently as possible.

Recycling and waste processing

Steel is a fully-recyclable material and scrap steel has a strong market position: steel recovered from structures and end-products at the end of their lifecycle is efficiently re-used to make new steel.

No hazardous waste is formed from end products and steel does not harm the environment. According to the European Waste Catalogue, the waste code for steel products manufactured by SSAB after their useful life is 17 04 05 (iron and steel). All packaging materials for steel products can be recycled.

INFORMATION ABOUT SAFE USE

Steel poses no hazards to the environment in the forms supplied. Some grades of steel contain alloying elements such as manganese, chromium, nickel, copper and silicon. None of these substances is released under normal or reasonably foreseeable conditions of use.

Dust and vapors may form when steel is melted, welded, cut or ground (or heated to very high temperatures). Long-term exposure to high dust and vapor concentrations may affect the health, especially the lungs. The composition of dust and vapor depends on the steel grade and methods employed.

Welding must be left to trained people. Personal protective equipment must be used and sufficient ventilation must be ensured in compliance with safety legislation. Instructions on the welding of metals and metal alloys can be found on the website of, for example, the European Steel Association www.eurofer.org.

The use and handling of steel does not endanger people or the environment and there are no specific exposure limits in place for this reason. Neither have any first aid measures, measures in the event of fire or unintentional emission, or measures as regards the handling and storage of steel been specified. However, some occupational exposure limits have been specified for steel alloys and compounds. Exposure is minor when total dust concentration is below 5 mg/m³. The table below shows the occupational exposure limits valid in Finland.

Normal precautions should be taken to avoid physical injuries caused mainly by heavy products or sharp edges. Personal protective equipment such as special gloves and eye protection must be worn.

Color-coated steel is not classified as dangerous under the EU's chemical regulation (REACH) and so Safety Data Sheet or hazardous packaging, marking or transport rules and regulations are not required.

SAFETY

- Always wear gloves and protective clothing when handling steel products.
- Be careful of sharp edges and corners.
- Always use official lifting equipment when moving steel products.
- Never use binding straps to lift a product.
- Straps under tension may cause injury when cut and the outer ring of a coil may rebound outwards.
- Never go under steel products when they are being moved.
- Make sure the securing straps are sufficiently strong and firmly attached.
- Always follow the industrial safety provisions in force and find out whether the installation site is subject to any particular requirements regarding safety before beginning installation work.

Environmental profile

[Lausuma5 SSAB] This environmental product declaration covers the lifecycle of the product from cradle to factory gate, including an end-of-life recycling rate of 90% for steel, i.e. the external lifecycle impacts (“cradle to gate with options”). This means that a burden is allocated to the steel scrap that is used as an input to the steel making process, and a credit for the end-of-life (EoL) steel that is recycled. The lifecycle assessment in the environmental production declaration does not include information in the building stage, the use and operational stage nor the demolition stage.

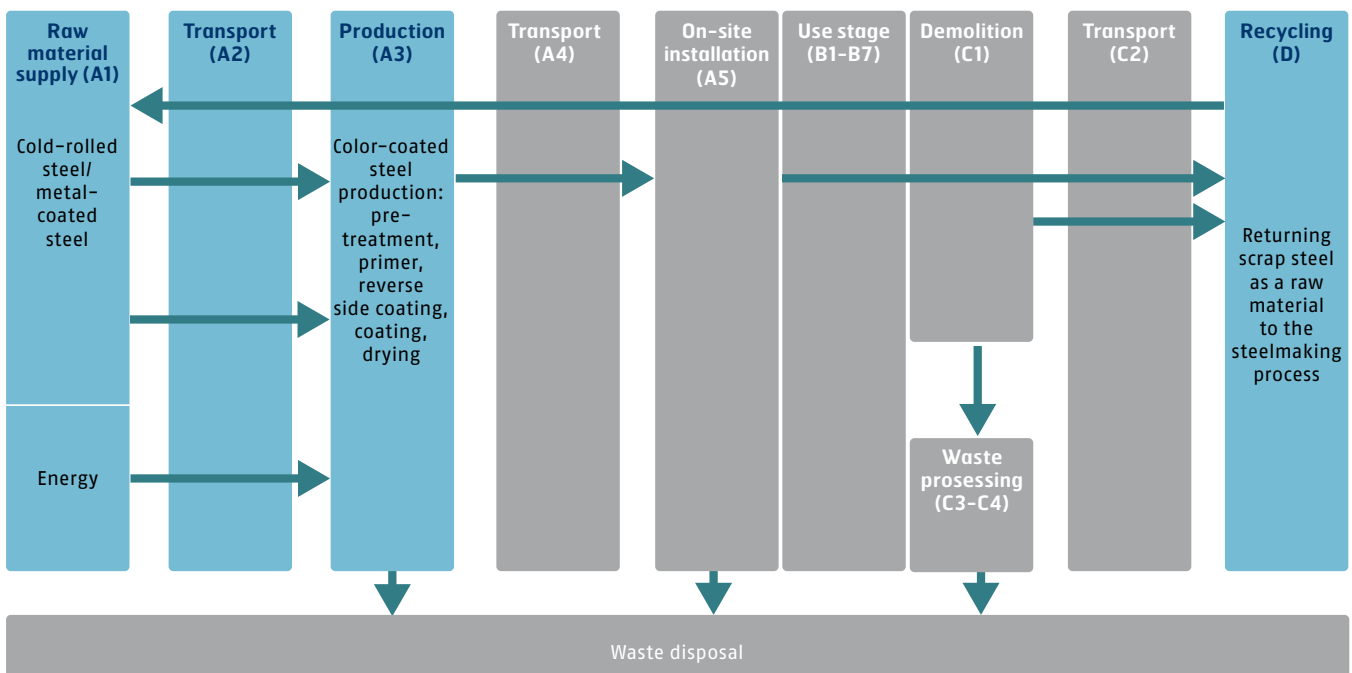
The impact of recycling has been calculated based on worldsteel’s (World Steel Association) LCA model so that the compensation is the difference between the primary and secondary production of a steel slab perceived with the acquisition of the recycling process. 1.092 kg of recycled steel is needed to produce

1 kg of steel in secondary production. An average of 20% scrap steel is used in steel production at the Raabe steel mill. The benefits and loads of the scrap steel used by a steel mill are accounted inside the worldsteel’s life cycle model system boundary. To avoid double calculation, these are not reported again separately as use of secondary material.

The lifecycle benefits of the by-products originating in steel production have been allocated to steel production in accordance with worldsteel’s lifecycle model. Allocation of by-products is calculated as reducing environmental impacts in the production of hot-rolled steel by 5-10%, and an average of 8%.

All values apply to 1 kg of color-coated steel produced at SSAB’s Hämeenlinna site. Table 3 below shows the environmental indicators based on the lifecycle assessment of SSAB’s color-coated steel sheets and coils.

Picture 1. System boundaries of lifecycle assessment.



The chart describes the lifecycle stages of steel structures. Lifecycle assessment excludes the lifecycle stages in a gray background.

Table 3. Environmental profile of color-coated steel

PARAMETER	UNIT	PRODUCT STAGE	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
		RAW MATERIAL SUPPLY AND MANUFACTURE OF STEEL PRODUCT	RE-USE, RECOVERY, RECYCLING POTENTIAL
PARAMETERS DESCRIBING ENVIRONMENTAL IMPACTS			
GWP Global warming potential	kg CO ₂ equiv.	2.81	-1.32
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv	1.01x10 ⁻⁸	4.14 x10 ⁻⁸
AP Acidification potential of soil and water sources	kg SO ₂ equiv	6.62 x10 ⁻³	-2.07 x10 ⁻³
EP Eutrophication potential	kg (PO ₄) ⁻³ equiv	6.74 x10 ⁻⁴	-9.16 x10 ⁻⁵
POCP Formation potential of tropospheric ozone	kg ethene equiv	6.29 x10 ⁻⁴	-6.52 x10 ⁻⁴
ADP-elements Abiotic depletion potential	kg SB equiv	2.01 x10 ⁻⁴	-1.32 x10 ⁻⁵
ADP-fossil fuels Abiotic depletion potential	MJ, net calorific value	30.2	-13.9
PARAMETERS DESCRIBING RESOURCE USE AND PRIMARY ENERGY			
Use of renewable primary energy used as energy carrier	MJ, net calorific value	1.28	0.82
Use of renewable primary energy resources used as raw material	MJ, net calorific value	0	0
Total use of renewable primary energy resources	MJ, net calorific value	1.28	0.82
Use of non-renewable primary energy used as energy carrier	MJ, net calorific value	20.2	-1.1
Use of non-renewable primary energy used as raw material	MJ, net calorific value	11.6	-11.3
Total use of non-renewable primary energy resources	MJ, net calorific value	31.8	-12.4
Use of secondary material	kg	–	–
Use of renewable secondary fuels	MJ, net calorific value	–	–
Use of non-renewable secondary fuels	MJ, net calorific value	–	–
Net use of fresh water	m ³	1.94 x10 ⁻²	-3.40 x10 ⁻³
OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES			
Hazardous waste disposed	kg	0.12	0.02
Non-hazardous waste disposed	kg	4.18 x10 ⁻⁴	3.70 x10 ⁻²
Radioactive waste disposed	kg	6.83 x10 ⁻⁴	4.44 x10 ⁻⁴
OTHER ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS			
PARAMETER	UNIT	PRODUCT STAGE TOTAL	
Components for re-use	kg	–	
Materials for recycling	kg	–	
Materials for energy recovery	kg	–	
Exported energy	MJ per energy carrier	0.04	

SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on the Nasdaq OMX Nordic Exchange in Stockholm and has a secondary listing on the Nasdaq OMX in Helsinki. www.ssab.com

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