

Thanks to their durability, attractive looks, and cost efficiency, colour coated steel sheets are an excellent choice for various construction applications, such as roofs and facades. Selecting the right coating guarantees the product will last in its intended use.

● Applications

- Roofing
- Facades
- Flashings
- Noise barriers
- Rainwater systems
- Ceilings and internal walls

There are three main considerations for selecting colour coatings for construction products and projects: the building's intended service life, local weather conditions, and other possible special requirements. Based on these three factors, Ruukki has developed a product range that provides a suitable coatings for every need, ensuring the customer's standards for durability and appearance are met.

● Environmental conditions

Environmental conditions are one of the most important considerations for selecting a colour coated steel product. The colour coating will be exposed to ultraviolet radiation (UV) of the sun, which will gradually change the chemical composition of the paint. In time, the coating will fade and lose some of its gloss, and its corrosion protection will be reduced. Additionally, moisture, heat, air pollution, and various chemical compounds cause stress on the coating.

Individual colour coatings react to various weather conditions quite differently. Hence, the impact of the environmental conditions should be one of the main considerations for selecting the right coating. Colour coated steel sheets may be used in the atmospheric corrosivity categories C1 to C3, but in categories C4 and C5-I/M the suitability should be determined on a case-by-case basis.

The atmospheric corrosivity is defined in a standard on corrosion protection of steel structures by protective paint systems (Table 1).

Table 1. Atmospheric corrosivity categories (EN ISO 12944-2:1998)

Corrosivity category	Typical environment	
	Outdoors	Indoors
C1 very low		Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels.
C2 low	Atmospheres with low levels of impurities. Mostly rural areas.	Unheated buildings where condensation may occur, e.g. warehouses, sports halls.
C3 medium	Urban and industrial atmospheres with moderate sulphur dioxide loads. Coastal areas with low salinity.	Production spaces with high humidity and some impurities in the air, e.g. food processing plants, laundries, breweries, dairies.
C4 high	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, coastal shipyards and boatyards.
C5-I very high (industrial)	Industrial areas with high humidity and a highly corrosive atmosphere.	Buildings or areas with almost permanent condensation and high pollution levels.
C5-M very high (marine)	Coastal and offshore areas with high salinity.	Buildings or areas with almost permanent condensation and high pollution levels.

● Service life of buildings

Colour coatings are expected to retain their technical and aesthetical properties for extensive periods of time. Coatings should retain their performance specifications throughout the building's service life and require minimal maintenance costs. The indicative service lives for various types of buildings are defined in the standard EN 1990 (Table 2). The most common house has design service life of 50 years, which can be achieved with the most durable PVDF and Pural coatings. Agricultural and similar buildings have a service life of 15 to 30 years, which allows a wider range of coating alternatives.

Table 2. Indicative designed service life (EN 1990:2006)

Designed service life, class	Indicative designed service life, years	Examples
1	10	Temporary structures ¹⁾
2	10 25	Replaceable structural members
3	15 30	Agricultural and similar buildings
4	50	Residential buildings and other ordinary structures
5	100	Monumental buildings and other projects on land and water

¹⁾ Structures or parts thereof that can be dismantled for reuse are not considered temporary.

● Special requirements for building components

Roofing

Exposure to UV radiation is greater in roofs than in any other building surfaces. The coating must have good corrosion resistance, as stagnant water and wet debris cause continuous stress on the roof surface. Additionally, snow, ice and people walking on the roof abrade the surface, and thus the coating must be highly resistant to wear as well. Roofing sheets intended for cold seaming must also be formable, and the coating must tolerate forming by hand tools.

Facades

With regard to facades, the key consideration is that they must retain their appearance for decades. This can be achieved by selecting a colour coating that is easy to clean and highly resistant to staining.

Flashings

Flashings are generally a part of visible facades or roofs, and are similarly expected to stay clean and presentable for decades. Additionally, the coating should be both formable and resistant to wear.

Rainwater systems

Due to the stress caused by stagnant water and debris, the gutters and downspouts of rainwater systems must have an excellent resistance against corrosion and scratching. To achieve this, the colour coated steel sheet must be coated on both sides.

Ceilings and internal walls

Internal surfaces of buildings should be easy to clean and highly resistant to staining.

● Selection criteria for colour coatings

Colour coated steel products are used as a construction material in both indoor and outdoor applications, and are similarly subject to a wide range of environmental conditions. UV and wear resistance requirements for building components may vary greatly according to local conditions. The designed service life of a building sets specific requirements on the coating. The various colour coatings were developed to meet these ever-changing criteria. As long as the coating is selected correctly, the surface will meet the criteria set for it.

PVDF coatings (polyvinylidene difluoride coatings) are unique in terms of resistance to both high and low temperatures, as well as to weather and chemicals. The special properties of PVDF are based on the combination of inorganic pigments and the molecular structure of the paint, ensuring a truly lasting colour. The PVDF HB (High Build) coating has an exceptionally thick primer layer, which contains anti-corrosive pigments. The coating is suitable for even the most demanding conditions. If you want the best available coating for your facade, PVDF is the choice.

The Pural and Pural Matt polyurethane coatings were developed especially for roofing. With a combination of inorganic pigments and robust chemical composition, the coatings are designed to withstand extreme temperature changes and provide excellent resistance against UV radiation and colour fading. The thick Pural coating has excellent formability and handling properties, not to mention exceptional resistance to corrosion. Pural's excellent formability and scratch resistance are obtained by using polyamide particles in the paint mixture. The Pural coating is clearly the best option for roofing solutions.

Purex, Ruukki's latest hybrid coating, is produced with the most up-to-date coating technology. With its low gloss and structured surface, Purex' appearance is a perfect fit to the trends and styles of current architecture. Due to its excellent formability, Purex offers versatility at a reasonable price. The main applications of Purex include roof panels and profiled steel roofs for new or renovated buildings, such as holiday homes or detached houses.

Polyester coatings have adequate mechanical properties and weather resistance. Being affordable, polyester coatings are recommended for applications with a short expected service life. Polyester is a good alternative for indoor use in dry conditions.

- Recommended applications for coatings**

A suitable coating can be found for almost any construction part, project or module, as long as the local weather conditions, designed service life, and other possible special requirements are taken into account.

Tables 3 and 4 show the recommended applications for the various coatings provided by Ruukki.

- Recommended coatings for outdoor use**

Table 3.
Roofs and facades

Coating warranty	EN 12944-2	Roof coatings				Facade coatings		
		Pural Pural Matt EN 10169-RC5	Galea Pro Purex HB EN 10169-RC4	Purex EN 10169-RC4	Polyester EN 10169-RC3	PVDF HB EN 10169-RC5	PVDF PVDF Matt EN 10169-RC4	Polyester EN 10169-RC3
General, years	C2	20	15	15	10	20	20	10
	C3	20	15	15	10	20	20	10
Application-specific, years	C4	up to 10 ¹⁾	¹⁾			up to 10 ¹⁾		
	C5-I/M	¹⁾				¹⁾		

¹⁾ As corrosivity categories C4 and C5-I/M are extremely demanding, Ruukki may provide only a special limited warranty on a separate agreement – please contact Ruukki Metals' Technical Customer Services for colour coated products.

The maximum recommended corrosivity category for zinc-coated steel sheets without a colour coating is C2.

- Recommended coatings for indoor use**

Table 4.
Ceilings and internal walls

EN 12944-2	Coatings for indoor use						
	PVDF HB EN 10169-CPI 4	Pural EN 10169-CPI 4	Food safe laminate EN 10169-CPI 4	PVDF EN 10169-CPI 4	Purex EN 10169-CPI 4	Polyester, outdoor EN 10169-CPI 4	Polyester, indoor EN 10169-CPI 2
C1							
C2							
C3							
C4	¹⁾	¹⁾	¹⁾				
C5	¹⁾						

¹⁾ With certain limitations – please contact Ruukki Metals' Technical Customer Services for colour coated products.