

RHEINZINK Systems Partner and  
 Full Stocking Distributor  
 150 Pine Street | Grayslake IL 60030  
 P: 847-478-8500 | F: 847-478-9500  
 zinc@sheetmetalsupplyltd.com  
 www.sheetmetalsupplyltd.com



Petter Dass Museum, Norway

**Patina Process**

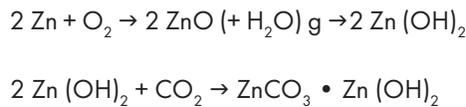
Since RHEINZINK blue-grey and graphite-grey alloys are natural metals, consisting mostly of zinc; it will weather according to its environment. When exposed to wetting and drying cycles, the surface will slowly develop a natural patina comprised of zinc carbonate. The patina is a crusty outer layer, which protects the underlying alloy and ensures its long life. The resulting color is a soft, blue-grey or graphite-grey, depending on the alloy.

In inland locations, the RHEINZINK patina forms through a process whereby the zinc undergoes a two-step chemical reaction: combining with water and oxygen to form zinc hydroxide and combining with carbon dioxide in free flowing air to form a dense

outer layer insoluble to water and a packed inner layer of alkaline zinc carbonate.



Picture of 'bright rolled' zinc undergoing patination, magnified several times.



This natural process is a result of local humidity, rainfall, snowfall, and air pollution levels. RHEINZINK applications in certain geographic locations may be exposed to differing types and amounts of air pollutants than in other areas which can affect the shade of the patina.

If, for some reason, the metal is in a constant state of dampness due to condensation accumulation or water infiltration, and there is an absence of CO<sub>2</sub>, the natural patina process will not continue. In this case, the zinc will continue to combine with water to form zinc hydroxide, a corrosion by-product referred to as white rust, which appears as a powdery white surface deposit. This phenomenon can be minimized by exercising

proper design, installation, storage, and handling procedures. (Refer to Chapter 1, Storage and Handling).

While the basis of the patina is alkaline zinc carbonate, additional substances are incorporated from the local environment. This is why the color of the patina can vary slightly from one place to another. In most environments, the surface does not typically require maintenance over its lifetime. (Refer to Chapter 1, Maintenance).

The formation of the patina is a process of the gradual growing together of patinated “freckles” and the rate of its formation is related to the slope of the surface. The patina will form faster on a slightly pitched roof than on a vertical wall surface. Ultimately, the natural patina forms to a uniform color. This is the essential aesthetic difference between patinated and painted surfaces. The slope-related patination speed can vary between six months and five years, depending on climatic conditions. The more exposure to wetting and drying cycles, the quicker the patina will develop. Finally, zinc is a self-healing material. When scratched, scuffed or fingerprinted, the metal will heal itself by patinating, through exposure to water, to match the surrounding metal and, with time, blend so that the scratch disappears.

RHEINZINK prePATINA blue-grey and graphite-grey are titanium zinc that have had their surfaces altered to resemble naturally aged zinc through a proprietary pickling process. This RHEINZINK-specific process brings out the natural color of the alloy and subtle grain texture running the length

of the material. RHEINZINK uses a sophisticated system during the preweathering process to ensure the best possible consistency of color. The patina color is determined by the composition of the alloy although it is possible to have slight variations from coil to coil, panel to panel or within an individual sheet or panel surface. Like other construction materials that exhibit tonal variations, owners, architects and installers should be aware and expect possible variations that will even out over time. On interior or highly visible applications such as large facades, it is recommended that the installer visually inspect for color consistency and variation. However, variations will dissipate as the material goes through wetting and drying cycles, developing its natural patina.

### **Patination of Zinc In Marine Environments**

Historically, zinc roofing has been used for over 100 years in coastal climates. Numerous European examples of old zinc roofs exist. The roof of the Bathhouse Retreat in Scheveningen, The Netherlands, was evaluated to be fully functioning when building renovations necessitated replacement. In addition, The Royal Danish Theatre dome in Copenhagen, Denmark was replaced prematurely as a result of storm damage after one hundred years of service. Both projects were renewed with RHEINZINK material. Proper detailing, fabrication and workmanship contribute to the longevity of zinc as a building envelope material. The durability of zinc as roofing, roof drainage, and cladding material is inherent in the zinc itself and is attributed to the ability of zinc to form a protective patina which prevents the zinc from oxidizing. The formation of a

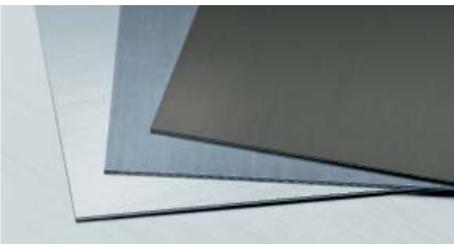
uniform patina on a roof cladding may occur within 6 months to 5 years depending on the aggressiveness of the environment. The composition of the patina depends on the project’s location. Zinc is highly corrosion resistant inland as well as in marine environments. Regardless of location, wear rates of the metal are relatively similar.

When using the natural RHEINZINK-PATINA LINE surfaces in areas subject to a marine climate, white deposits may develop on the surface due to the salt in the atmosphere. These natural deposits integrate into the natural patina and because of the colour contrast, are more visible on the darker, RHEINZINK-prePATINA graphite-grey surface. This will not affect the function or expected service life of the material when used on facades, roofs or other cladded building components. The natural patina will appear lighter when used in locations where the air contains chlorides. When used in environments where sulphur levels are higher, the patina may appear somewhat darker than usual.

The highest wear rates are found in heavily polluted industrial areas, where sulfur dioxide concentration is very high. In general, with proper design, fabrication and installation the realistic roof life expectancy also ranges between 100 to 120 years in marine atmosphere and 150+ for wall cladding. For more on this, please reference on Chapter 1, “Environmental Benefits of RHEINZINK”.

**RHEINZINK-prePATINA**

RHEINZINK prePATINA is material treated with a thin, clear temporary protective layer (dry film thickness: 2 to 3 µm per side) that helps prevent white rust formation during fabrication, transportation, storage and installation. Additionally, this thin, organic layer protects against fingerprints and makes fabrication easier.

**Properties of RHEINZINK prePATINA organic surface layer:**

- Provides temporary resistance against corrosion
- Temporary anti-fingerprint properties
- Helps with fabrication – Oil-Free Roll Forming
- Solders Easily

The duration of this thin layer protection depends on the conditions at the site. On vertical surfaces that are partly or completely protected from rain, the organic surface layer will last for a long time, but will erode more quickly when fully exposed to the weather.

**RHEINZINK prePATINA:**

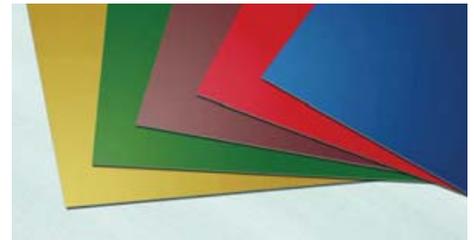
- is not resistant to acids and strong alkaline solutions and offers only limited protection against acidic or alkaline building materials and climatic conditions.

- is not to be cleaned abrasively (e.g. stainless steel wool) as the thin layer can be removed.
- should not come into contact with de-icing salt in the winter, especially when water is present. Diluted salt solutions (de-icers) can affect the underlying metal. Red Rosin paper should never be used with RHEINZINK.
- is slightly glossy when new. The gloss decreases as the clear layer washes away through exposure to rain and snow.
- may be ordered with strippable plastic film for added protection during fabrication, transportation and installation.

The natural patina will appear lighter when used in locations where the air contains chlorides. For more on this, please refer to the previous page and "Patination of Zinc In Marine Environments." When used in environments where sulphur levels are higher, (e.g. industrial pollution), the patina may appear somewhat darker than usual.

**RHEINZINK-COLOR**

COLOR LINE is colored zinc that can be used to augment any project. Currently available in five shades: RHEINZINK-blue, RHEINZINK-tile-red, RHEINZINK-moss-green, RHEINZINK-pearl-gold and RHEINZINK-nut-brown.

**RHEINZINK-INTERIEUR**

This innovative line unleashes new creativity for interior design possibilities. Like the classic patina line, this material is easy to profile and is perfect for cladding curved walls. Imagination is the only limitation. Available in RHEINZINK-INTERIEUR blue-grey and RHEINZINK-INTERIEUR graphite-grey surfaces.

