

# **Inspection and maintenance of prepainted steel sheet**







This publication is aimed at anyone who is entrusted with responsibility for the maintenance of buildings with prepainted steel sheet roofing and cladding.

The brochure provides advice for the inspection and maintenance of prepainted steel sheet. It gives details of what should receive attention during inspection, and recommends when and how maintenance should be carried out.

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## Prelaq is worth looking after

Prelaq is the brand name of prepainted steel sheet from SSAB Swedish Steel. Prelaq is used for a wide variety of products, and is available in different versions and different combinations of steel sheet material and surface coating to suit all conceivable needs.

Prelaq has a long useful life. If correctly maintained, Prelaq will retain its properties for a very long time.

More detailed information on Prelaq is available in other publications that can be obtained on request from SSAB Swedish Steel.

### Inspection and maintenance

By specifying Prelaq, you will have taken an important step towards cutting future expenses for your property. You can carry out the inspection and maintenance yourself, but you can also entrust the work to specialist companies.

Regular inspection and maintenance makes good economic sense. If correctly carried out, this will ensure the longest possible useful life of the sheet steel.

### Several paint systems

Prelaq prepainted sheet has a core of metal-coated sheet steel that may be either Dogal hot-dip galvanized or Aluzink aluminium-zinc coated sheet.

Prelaq is available for a number of applications. By using an appropriate paint system, Prelaq can be produced to suit various environmental conditions and quality demands.

Prelaq Nova is an extra-thick, scratch-resistant polyester coating with a thickness of 50 µm (0.050 mm) for roofing and wall cladding.

Prelaq P 200 is a thick-film embossed plastisol coating with a thickness of 200 µm. This is used principally for profiled sheet.

Prelaq P 175 is a thick-film plastisol coating with a thickness of 175 µm. It is used mainly for long-strip roofing and fittings, since it can be worked without sustaining damage.

Prelaq P 100/P 100 is a coating applied to both sides of the sheet and is used only for gutters, downpipes and roof dewatering parts.

Prelaq PVDF is a smooth coating with a thickness of 30 µm. The coating has excellent colour-fastness, and PVDF is therefore used wherever the paint must retain its appearance for a very long period of time. The resistance to mechanical wear is lower than that of the thick-film coatings.

Prelaq Polyester is a 30 µm thick polyester coating. It can meet normal demands and is used principally for producing profiled sheet.

Prelaq rooftiles are a modern building material that meets today's strict quality demands.



## Factors that affect the useful life of Prelaq?

The environment around a building determines how the paint will age, although its durability varies with the paint system and also with the colour of a given paint system.

Solar radiation, weather conditions and proximity to the sea are factors that cause paint to age, although the paint is also affected by pollutants in the environment.

If the paint coat is damaged, the protection it provides to the sheet steel against environmental attack will be greatly reduced. Handling damage during installation or damage caused by a fitting or tool dropping onto the sheet may cause minor damage to the paint coat. But the useful life of Prelaq will be maintained if such damage, however small it may be, is quickly touched up. The sun affects the ageing of the paint coat in two ways: By ultraviolet radiation accelerating the ageing, and by the paint being heated by the sun. The colour selected will therefore also affect the useful life – light colours will last somewhat longer than dark colours. The useful life also depends on whether the material is used for wall cladding or roofing. South-facing roofing with a shallow pitch is affected more seriously by the sun than north-facing surfaces.

The useful life of the paint coat also depends on the environment to which the sheet is exposed. Sheet steel used in areas close to the coast is exposed to salt water, and its useful life will therefore

be shorter than sheet steel on buildings further inland. In addition, local industrial emissions, traffic and emissions from oil-fired plants also affect the useful life of the surface coating.

Thin prepainted coats are more sensitive to scratches and corrosion than thick-film coatings. This is particularly important if the sheet steel is used in marine environments and in polluted surroundings.

### Two yardsticks for useful life

If regularly maintained, a sheet steel roof may last 30–40 years, or even longer. Some Swedish buildings with sheet steel roofs date back to 1832, and the sheet steel is still in good condition due to the regular inspection and maintenance it receives. There are two different yardsticks for the useful life of prepainted sheet steel – the aesthetic and the functional.

In a normal environment, an undamaged coating of Prelaq P 200, Prelaq P 175 and Prelaq Polyester can be expected to have an aesthetic useful life of at least 10–15 years, Prelaq Nova 15–25 years, and Prelaq PVDF 20–25 years. These periods can be extended by regular inspection and maintenance.

If used as roofing, particularly with thin coatings, there is always some risk of damage by scratching, and corrosion may then occur in such damaged areas.

### The aesthetic useful life

is the period up to the time when the appearance of the paint coat has changed to such an extent that it no longer meets the demands. The degree of discoloration considered acceptable on a building depends on the person who does the assessment and the building to which the sheet steel is fitted. In certain cases, the aesthetic useful life comes to an end at the same time as the paint begins to flake off.

### The functional useful life

is the period up to the time when the sheet steel can no longer protect the load-bearing structure of the building or the insulation behind the sheet steel. The time varies widely depending on the coating applied to the sheet steel, the type of metal coating and its thickness and, what is most important, the environment to which the sheet steel is exposed.



The environment around the building determines the useful life of Prelaq, but prepainted steel sheet has a very long life if correctly maintained.

## Ageing of the paint coat

The paint coat sustains changes in time. The basic sequence of events is illustrated by the pictures below. The development consists of several stages and differs for type A and type B coatings as described below.

### A. Plastisol paint type

#### Stage 1

New steel sheet.

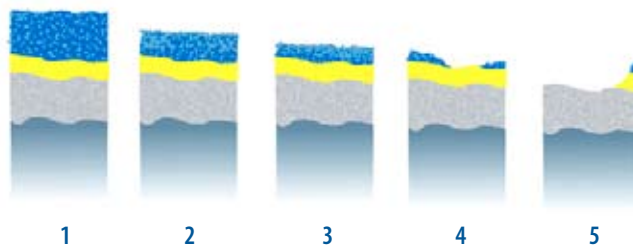
#### Stage 2

Binder residues appear on the surface in the form of chalking, which makes the surface lighter. The paint coat is thinner, but remains intact.

*Action:* If the chalking is considered unacceptable, it can be washed away.

#### Stage 3

The thickness of the plastisol may have been reduced to less than 140 µm, and the coat-



ing will crumble away when scratched.

*Action:* The degradation has progressed too far for the paint coat to be left in place. The existing paint should be removed before repainting.

#### Stage 4

The primer becomes visible. The top coat has partially eroded away.

*Action:* The degradation has progressed too far for the

paint coat to be left in place. The existing paint should be removed before repainting.

#### Stage 5

The primer and top coat have been partially worn away and the metal coating is visible.

*Action:* The degradation has progressed too far for the paint coat to be left in place. The existing paint should be removed before repainting.

### B. Polyester, Prelaq Nova and PVDF paint types

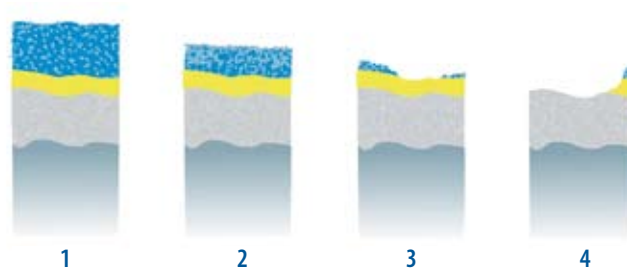
#### Stage 1

New steel sheet.

#### Stage 2

Binder residues appear on the surface in the form of chalking, which makes the surface lighter. The paint coat is still intact, but is thinner.

*Action:* If the chalking is considered unacceptable, it can be washed away.



#### Stage 3

The primer is becoming visible. The top coat has been partially eroded away.

*Action:* The existing coating can be cleaned and then painted over.

#### Stage 4

The primer and top coat have been partially worn away and the metal coating is visible.

*Action:* Clean the surface and remove any loose paint residues, paint with a wash primer and finish with a top coat.



## To restore the surface coating

Restoring of the paint coat may consist of measures aimed at:

- cleaning the surface coating
- touching up minor damage
- repainting the whole surface
- treating any corrosion damage

### Cleaning

Rainfall is often sufficient to keep the sheet clean. Any deposits of dirt that rainwater cannot wash away can be removed by means of a soft brush and water or by high-pressure washing. Take extra care when cleaning surfaces that are sheltered from rain and thus cannot be washed clean by rainwater.

In polluted areas, a detergent solution may be needed to get the sheet clean. An ordinary dishwashing detergent or an industrial detergent may be used. Dose the detergent in accordance with the maker's recommendations. Then rinse thoroughly or use a high-pressure washer.

### Washing advice

- Stronger solutions than those recommended may damage the paint.
- Rinse thoroughly so that all detergent residues are removed.
- Avoid organic solvents or abrasive cleaning products.
- Apply the cleaning agent from the bottom upwards. Rinse from the top downwards.

- Work with caution. Excessive washing may do more harm than good.

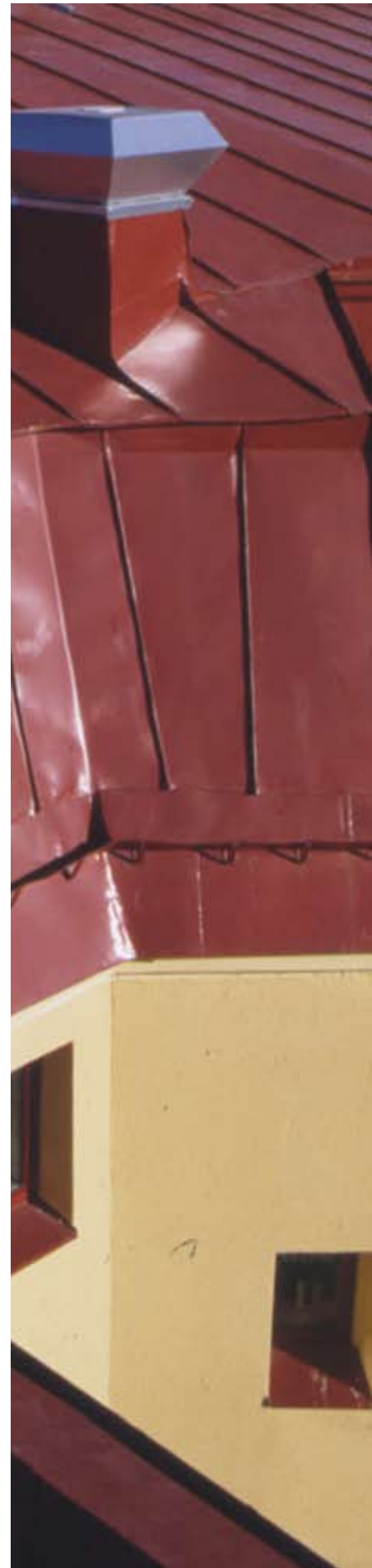
### Touching up

If the paint coat has sustained minor damage by scratching, it can be repaired by touching up. A narrow paint brush can then be used to paint only the area that has been scratched. Use air-drying paint. But since this paint can be expected to gradually discolour differently from the paint applied at the factory, it is important to apply the paint only where it is actually needed.

### Corrosion

Treat corrosion damage as follows:

1. Scrape, grind or sandblast away any loose organic material.
2. Remove all rust by sand-blasting or by rubbing down the sheet to the bare metal in the damaged area. Clean with an alkaline degreasing agent, such as a 5% caustic soda solution, with some dishwashing detergent added to it. Carefully rinse the surface with water and allow to dry.
3. Paint with a zinc-rich primer.
4. Paint with a top coat as described on the following pages.





### Treatment of edge corrosion

Edge corrosion does not usually occur in normal environments. But it may occur in aggressive environments and should then receive attention to ensure that the sheet will remain intact. The work described in 1–5 below should then be done.

In aggressive environments, it may be advisable to protect exposed cut edges when the sheet is first installed.

1. Rub down or scrape away all loose paint or corrosion residues. Rub down a narrow area of adjacent original paint.
2. If there is red rust on the edge, rub down or blast away all such red rust down to the bare metal.
3. Clean with an alkaline degreasing agent, such as a 5% caustic soda solution with some dishwashing detergent added to it.
4. Paint the prepared surface with a zinc-rich, anti-corrosion primer.
5. Paint with a top coat, also onto the rubbed-down surface. If edge corrosion has occurred, take special care to ensure that the paint encloses the cut edge all round (the paint around the edge should be similar in shape to the head of a match).

On overlapping sheets, edge corrosion may be more difficult to treat in the way described above, since the underside is not accessible for cleaning. This can be solved by sealing the edge, i.e. cleaning as described above and then applying a jointing compound over the joints.

A typical satisfactory system for this purpose is Seamseal from Delvamade in England.

### Repainting

Repainting of a sheet surface may be found necessary due to discoloration, flaking or corrosion, or simply in order to change the colour.

Repainting of external sheet steel must always be done in a professional manner, using thoroughly proven paint systems. Suppliers of repainting systems provide instructions for how repainting should be carried out when their particular systems are used. If the work is done by an experienced painting contractor, his personnel will have all of the necessary knowledge for carrying out the work all the way from inspection to finish painting. The following rules should be used for guidance:

- 1a) If the zinc or aluminium-zinc coating has been worn

away, paint the sheet with a zinc-rich primer.

1b) If the paint has been worn away but the zinc coating is undamaged, paint the sheet with a wash primer.

2. Paint with a top coat. If the previous paint is intact, it can first be washed to ensure that the adhesion is good, and the top coat can then be applied.

### Repainting of plastisol-coated sheet

For Plastisol P 175 and P 200: When the thickness of the original paint has been reduced from the original 175  $\mu\text{m}$  and 200  $\mu\text{m}$  respectively to around 140  $\mu\text{m}$ , this indicates that the original paint has been degraded to such an extent that it must be removed before repainting. The second criterion is the adhesion. This should be checked by a person who has experience of such testing. The testing should be uniformly distributed over the surface of the roof or wall.

### Repainting of polyester, PVDF and Prelaq Nova

Thorough cleaning of the sheet as described earlier is generally sufficient. Rinse with warm water at high pressure. Any loose paint that is not removed by washing or high-pressure rinsing should be removed mechanically.-



### Overpainting of unexposed Prelaq Nova and polyester

The method at overpainting of Prelaq Nova and polyester is different whether the sheets have been exposed to outdoor environment or if the sheets are new or unexposed.

The top coat on Prelaq Nova and polyester has a little content of wax to make the sheet easier to form. This can cause adhesion problems at overpainting. For an aged Prelaq Nova and polyester, this wax layer on the surface is vanished through weather exposure. The cleaning could then be done with a simple washing.

It is essential that this is considered before painting.

Below follow a general recommendation how the sheet surface should be treated before painting.

1. Clean the surface, by using an alcaleic cleaner and a Scotch Brite sponge.
2. Rinse with water.
3. One layer of primer
4. One or two layers of top coat

The supplier of the paint

should give detailed recommendations for the pretreatment before painting for his paint.

### Painting work

The sheet surfaces that are to be touched up or repainted must be dry, and all dirt and fatty substances must have been removed. New sheet steel may sometimes be coated with an extra film of wax, and this must also be removed.

To reduce the risk of colour mismatch, the paint must be thoroughly mixed. Don't apply the paint in direct sunlight or at temperatures below 5°C. The relative humidity must not be higher than 80 percent. Check that all previous paint adheres firmly. This check can be done in accordance with the paint supplier's instructions. Remove all loose paint and other particles by means of a scraper and steel brush. Carefully wire-brush or sand-blast all surfaces on which there is red rust. Clean with an alkaline degreasing agent, such as a 5% caustic soda solution, with some dishwash-

ing detergent added to it. Preferably use a high-pressure washer. Rinse with clean water and leave the sheet to dry.

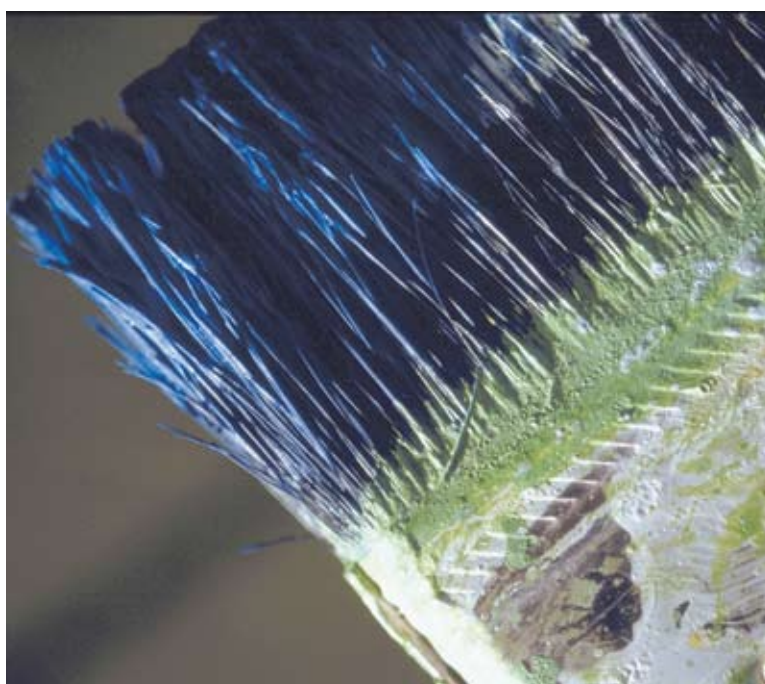
Choose the paint system to suit the surface and damage:

1a. If the zinc layer has been lost, the sheet must be painted with a zinc-rich primer.

1b. If the paint has been worn away but the zinc coating is undamaged, paint the sheet with a wash primer.

2. If the old paint is intact, it can be cleaned in the usual way and then repainted.

Use a paint brush, roller or spray gun for the work. Use a narrow, soft paint brush for touching up small areas.



## Annual inspection

The sheet steel surfaces of the building must be inspected annually to enable effective maintenance to be carried out. The following should be checked during the annual inspection, and the necessary action should then be taken.



Check	Action
<b>Condition of the paint</b> , signs of chalking, discoloration or surface cracking, particularly where rainwater cannot keep the surface clean.	Evaluate the condition and assess whether washing, cleaning, treatment of edge corrosion, touching up or repainting is necessary.
<b>Dirt in the gutters.</b> Blocked gutters increase the risk of corrosion and consequent water leakage into the building.	Remove the waste from the gutters, since this binds moisture and corrosive substances.
<b>Accumulations of waste on the sheet</b> increase the risk of corrosion, since the surface under the waste is kept continually humid.	Remove the waste so that the sheet surfaces can dry out.
<b>Damage to the paint coat</b> increases the risk of corrosion. Check whether the paint coat is damaged, even if the building is new.	Consider whether touching up, repainting or changing of individual sheets is necessary, depending on the extent and type of damage.
<b>Loose fasteners, pop-rivet stems, drilling swarf</b> or other metal objects resting directly on the roof could cause corrosion.	Remove the swarf and/or metal objects.
<b>Wrong or incorrectly fitted fasteners</b> could cause both leakage and corrosion.	Replace the incorrect fasteners. If the thread is stripped, change to the next larger size.
<b>Edge corrosion</b> at cut edge of overlapping sheets and sheet ends. The corrosion can spread unless treated in good time.	Clean thoroughly the corroded edge and repaint as described earlier.



## 1

Environment \_\_\_\_\_ Year and month of installation \_\_\_\_\_

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SSAB Tunnplåt AB is the largest Scandinavian steel sheet manufacturer and a leader in Europe in the development of high strength steels.

SSAB Tunnplåt, which is a member of the SSAB Swedish Steel Group, has a turnover of SEK 9 billion and employs around 4400 persons in Sweden. Our annual production capacity is more than 2.5 million tonnes.

SSAB Tunnplåt has an environmental policy that involves continual improvements to the efficiency of processes and environmental plants, and the development of the environmental properties of our products from the life cycle perspective.

We manufacture the following products in modern, high-efficiency production lines and rolling mills for strip products:

**DOMEX<sup>®</sup>**  
hot rolled steel strip

**DOCOL<sup>®</sup>**  
cold reduced steel sheet

**DOGAL<sup>®</sup>**  
metal coated steel sheet

**ALUZINK<sup>®</sup>**  
aluminium-zinc coated steel sheet

**PRELAK<sup>®</sup>**  
prepainted steel sheet

**DOBEL<sup>®</sup>**  
film-laminated steel sheet

We assist our customers in selecting the steel that is best able to improve their competitiveness. Our strength lies in the quality of our products, our reliability of supply and our flexible technical customer.

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