



PRELAQ[®]

Prepainted sheet steel for buildings

SSAB
TUNNPLÅT



On the cover: IThis Media College is located in the new Arabiastranden district of Helsinki City, Finland. The Ark-house architectural practice has used the exciting design opportunities offered by pre-painted steel sheet and its properties. The building is popularly known in Helsinki as the "Lego House".
Foto: Jussi Tiainen

Graphics Education Centre in Uppsala, Sweden. 6 000 m² of long strip roofing of Prelaq Nova.



The use of coated steel sheet as building material increases its field of application for a number of reasons. The material can be formed into components by profiling, pressing or bending. It can be sheared and punched. The paint coat can be formulated to give it a variety of properties to suit different applications and environments. In many ways, prepainted sheet steel is an obvious material for the future.

This publication is intended to assist in the important task of selecting the right product and offers advice on its use.

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The information in this publication is valid at the time of printing and is intended to provide general guidance for the use of the product. Subject to changes as a result of continual product development. The information and data must not be regarded as guaranteed, unless specifically confirmed in writing.

Why prepainted steel sheet for buildings?

Coated steel sheet strip offers exceptional opportunities for creating attractive and functional buildings. The versatility of sheet steel in terms of form and colour offers wide freedom to the architect and building owner.

Prefabricated components made of Prelaq provide short building times and easy handling on site.

Due to the good formability of the sheet steel and paint coat, Prelaq can be used in advanced forming operations.

Prelaq is very well suited for rollforming. Due to the recent development of sophisticated rollforming machines, architects can design very modern buildings, virtually without limitations.

In addition to being suitable for rollforming, Prelaq sheet can be pressed and worked in a number of other ways. The paint systems and colours have been developed into an array of different colours, with the option of metallic

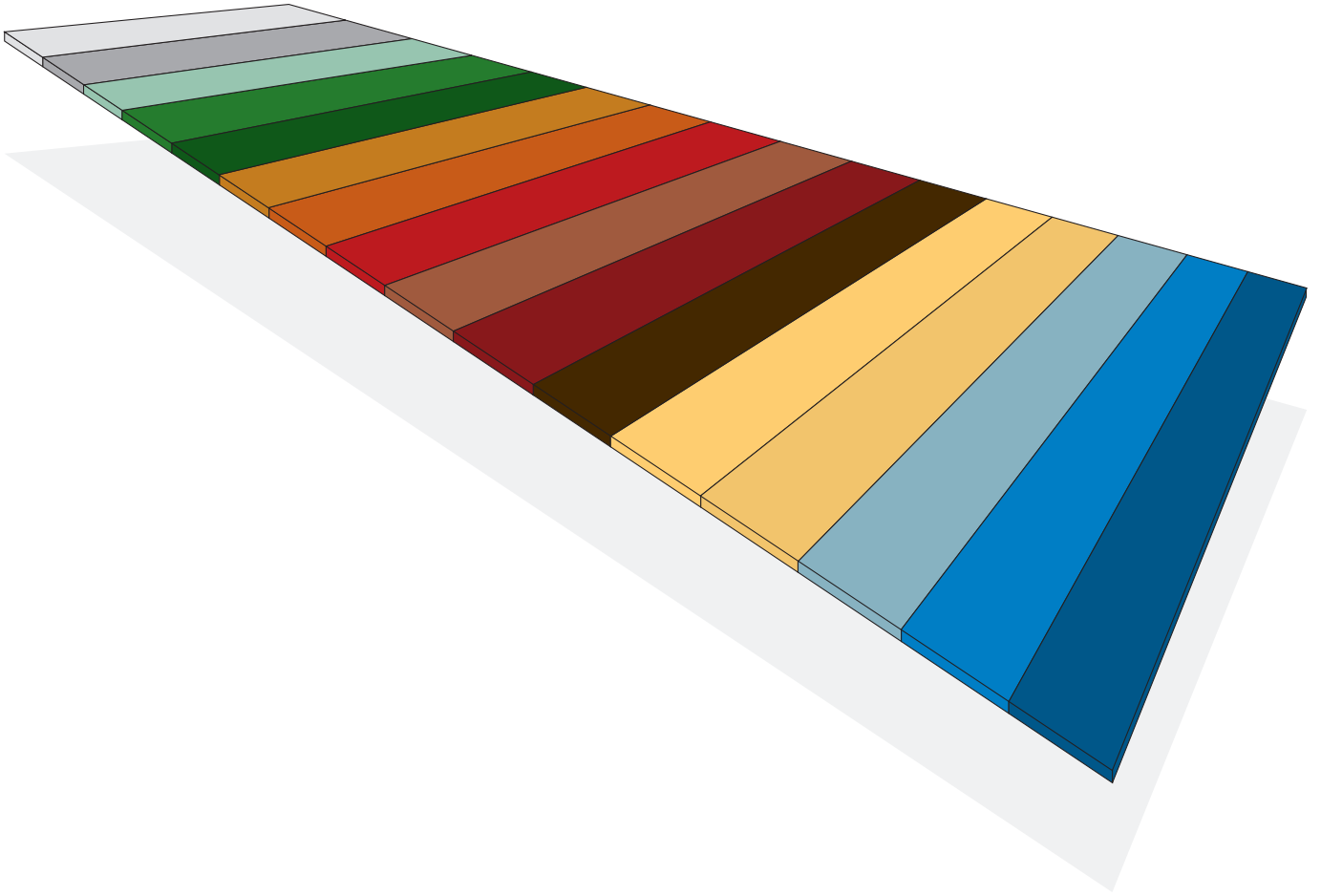
and textured surfaces. Prepainting has several objectives. It gives the sheet steel an attractive appearance, while also protecting it against corrosion. Since widely varying demands are made on appearance, outdoor durability and workability, Prelaq is available with a number of paint systems and with different steel grades that impart different properties to the product. The zinc and paint coatings on the steel assure that Prelaq has good resistance to corrosion.

SSAB Tunnplåt has long experience of producing prepainted sheet steel. Our choice of paint systems and our way of manufacturing our products are based on knowledge accumulated over 30 years. Prelaq cladding on buildings provides safe and durable weather protection, low maintenance costs, and thus sound economics. Coil coating is an industrially controlled process, and so is the

subsequent production of components in tailored sizes. This contributes to rational building and short construction times.

Steel is an environmentally appropriate building material. At the end of its useful life, it can be remelted and used for new products.

SSAB Tunnplåt supplies Prelaq to its customers in the form of coils, and the material is then used for manufacturing various components and products.



For a true colour reproduction, order a colour chart at www.prelaq.com

Products and applications

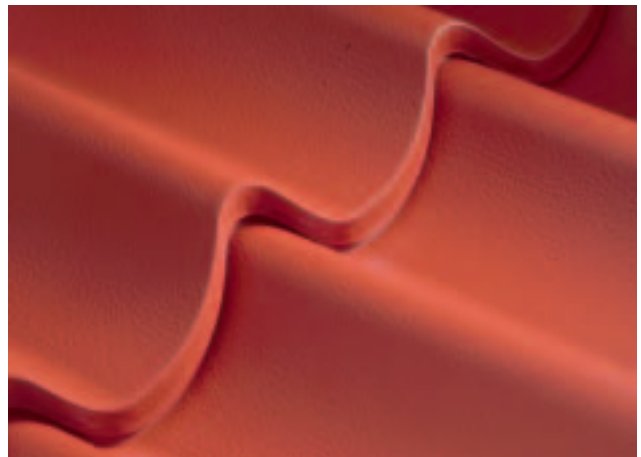


Profiled sheet steel

By being formed into a linear profile in a roll-forming line, flat sheet can be given stiffness and strength, which enables it to become load bearing. Profiles can be used in a variety of ways, usually for roofing and wall cladding,

but also for floor structures and load bearing sheet for wide roof spans.

Profiled sheet steel represents a major field of application for Prelaq. Steel with standardized structural steel is used for load bearing profiles.



Steel roof tiles

Steel roof tiles are used principally for residential buildings. Steel tiles are light compared to concrete tiles, for instance, and can very well be used for replacing concrete tiles or pantiles.

Just like profiled sheet, steel roof tiles are produced in a rollforming and pressing line. This enables a sheet to be formed into attractive shapes.



Long strip roofing

Long strip roofing dates back to the 19th century and is largely a craft. The sheets are joined together by folding. Coated steel sheet is now used for this application.

Long strip roofing conforms to very strict demands on functionality, flexibility and appearance, and can also be used on roofs with curved or spherical surfaces.



External cassettes

External cassettes of sheet steel are one of the frontage material options that provide great aesthetic freedom. Prelaq offers opportunities for creating a wide variety of expressions, for creating different pattern effects, and for emphasizing certain parts

of the frontage. This is achieved by varying the widths, lengths and heights of the cassettes and the sizes of the joints between them. Further literature on frontage cassettes is available from SSAB Tunnplåt.



Sandwich panels

The use of sandwich panels, principally as wall cladding or roofing material, is an attractive option for profiled sheet steel walls and other prefabricated element construction. A sandwich panel consists of a core of cellular plastic or mineral wool, and an outer sheet steel skin

bonded to each side of the core. The core material and outer skins interact to make the elements very strong and thus suitable for use as load bearing elements for wide spans. Sandwich panels can be fitted quickly, and provide good thermal insulation and air tightness.



Rain gutter systems

More than 90% of all downpipes and gutters in Sweden are made of pre-painted sheet steel. Pre-painted sheet steel products are also gaining increasingly widespread use in the rest of Europe.

Manufacturers produce effective and easily installed systems based on double sided pre-painted sheet steel.

Materials

Galvanized sheet steel as the substrate material

The substrate of all Prelaq products consists of galvanized sheet steel.

The mechanical properties of the steel are selected to suit the application of the end product. As an

example, structural steel is used for a component designed to meet clearly defined strength requirements (see Table 1).

Formable mild steels are used if the sheet is to be formed in a severe manner or if the sheet is to be

worked manually, for instance, by a sheet metal worker (see Table 2).

Table 1

Hot dipped galvanized structural steel conforming to European standard EN 10 326				
SSAB designation	European standard designation	Min. yield strength, $R_{p0.2}$ N/mm ²	Min. tensile strength, R_m N/mm ²	Elongation A80 ¹ % min.
SUB 250	S250GD+Z	250	330	19
SUB 280	S280GD+Z	280	360	18
SUB 320	S320GD+Z	320	390	17
SUB 350	S350GD+Z	350	420	16

Designation example: S250GD+Z275 (where Z275 is the weight of the zinc coating)

1) For $t \leq 0.70$ mm, the value is two units lower.

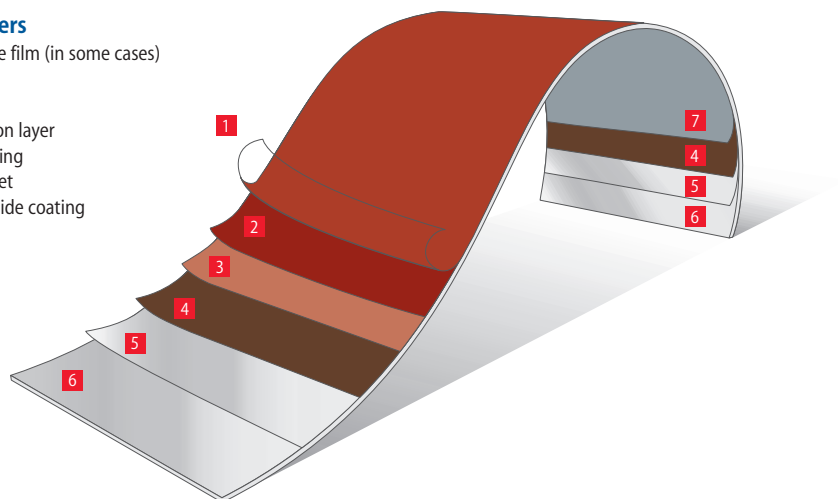
Table 2

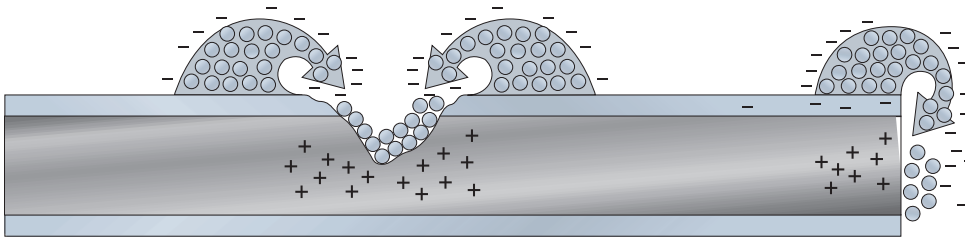
Hot dipped galvanized mild steels conforming to European standard EN 10 327				
SSAB designation	European standard designation	Yield strength, $R_{p0.2}$ N/mm ² approx.	Max. tensile strength, R_m N/mm ²	Elongation A80 ¹ % min.
PLX	-	180		36
FAX	DX52D+Z	300	420	26
FA	DX51D+Z	-	500	22

1) For $t \leq 0.70$ mm, the value is two units lower.

Paint layers

1. Protective film (in some cases)
2. Top coat
3. Primer
4. Passivation layer
5. Zinc coating
6. Steel sheet
7. Reverse side coating





Zinc coating

The zinc coating provides the sheet steel with double protection against corrosion. It serves as an effective barrier that excludes oxygen and moisture, and it provides cathodic protection at cut edges and at any

point where the zinc coating has been damaged.

If the sheet is exposed to moisture, a galvanic couple will be formed, in which the steel is the cathode and the zinc is the anode. The anode "sacrifices itself" and forms

corrosion products that prevent further damage. Further corrosion is impeded and the process ceases.

A limited number of zinc coating thicknesses (see Table 3) are used for Prelaq for building applications.

Table 3

Zinc coating		
Designation	Coating mass, g/m ² ⁽¹⁾	Coating thickness per side (approx.), µm
Z 275	275	20
Z 350	350	25

1) The metal coating is measured in weight classes and specifies the total weight of metal on both sides of the sheet. Measured in accordance with the triple spot test specified in EN 10 327.

Table 4

Range of sizes ¹	
Width mm	Thickness mm
700-1500	0.4-1.5

1) The thickness and width cannot be combined freely, and are dependent on the grade of steel and the weight per metre run.

Paint systems for different requirements

Prelaq is available for a number of applications. The sheet steel can be coated with different paint systems in order to match Prelaq to different environmental conditions and quality requirements.

The paint coatings have been developed together with paint suppliers both on the basis of laboratory tests and by following up the material in practical service in construction over a period of many years. Detailed facts concerning every paint

system are given in special product leaflets. Data concerning our paint coatings is assembled in a material specification in a pocket at the end of this publication.

Table 5

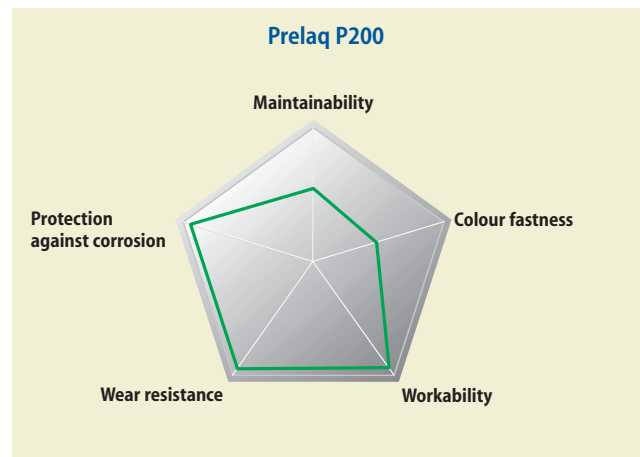
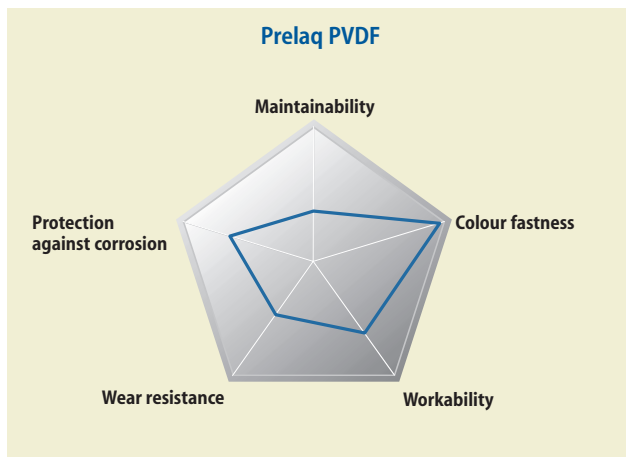
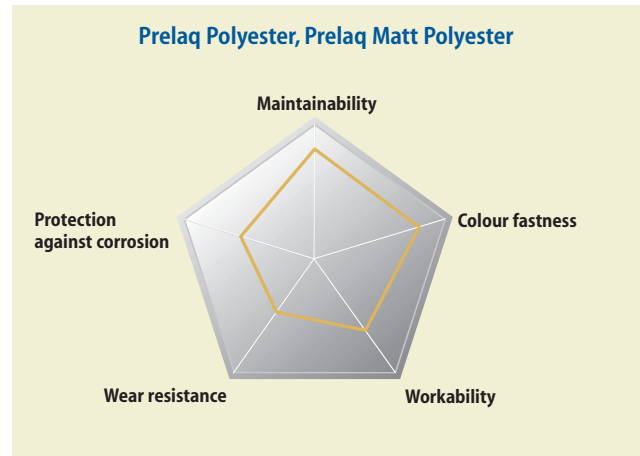
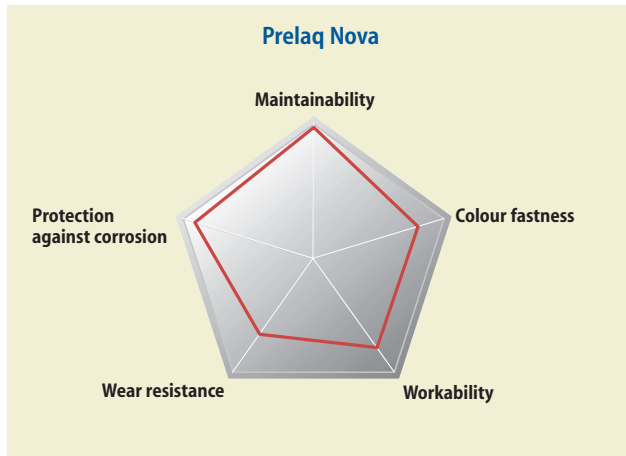
Paint systems		
Paint system	Paint type	Surface
Prelaq Nova	Polyester	Textured
Prelaq Polyester	Polyester	Smooth
Prelaq Matt Polyester	Polyester	Textured
Prelaq P 200	Plastisol	Embossed
Prelaq PVDF	PVDF	Smooth

Paint systems	Applications
Prelaq Nova is a special extra-thick variant of polyester coating. It has a wear-resistant, textured surface achieved by polymer grains being mixed into the top coating. It also has better forming properties than ordinary polyester.	Prelaq Nova is used for long strip roofing, profiled sheet, steel roof tiles, voil components, and external panels.
Prelaq Polyester is a smooth polyester coating. Polyester is a cost-effective system and is currently the most common paint system for sheet steel for the building industry.	Prelaq Polyester is used principally for profiled sheet steel and associated fittings, and is intended for roofing and externals panels to which normal requirements apply.
Prelaq Matt Polyester is a matt polyester coating with a textured surface. Its properties are otherwise similar to the above coating.	Prelaq Matt Polyester is particularly well suited for steel roof tiles.
Prelaq P 200 is a thick plastisol coating with an embossed surface that has high mechanical wear resistance and high resistance to corrosion. Prelaq P 200 is easy to work and can be bent without limitations.	Prelaq P 200 is used mainly for external panels and fittings in corrosive environments, also in areas close to the sea. Should not be used in central and southern Europe.
Prelaq PVDF is a smooth coating. The coating has excellent colour fastness, and PVDF is therefore often specified wherever strict demands are made on the paint retaining its appearance for a very long time. Prelaq PVDF can be supplied with a protective film that prevents damage to the surface during transport and fitting.	Prelaq PVDF is used mainly for external panels, wherever very strict demands are made on colour fastness. Not suitable for use close to the sea.
Prelaq NoConDrop is a special sheet for roofing in humid environments. The underside of Prelaq NoConDrop is coated with a thin fabric capable of absorbing condensation and preventing condensation dripping. For further information, see the special publication for Prelaq NoConDrop. The paint system used on the front of the sheet steel is principally Prelaq Polyester.	Prelaq NoConDrop is used mainly for producing profiled sheet with condensation-absorbing properties. The sheet is used for attic areas and for uninsulated buildings and cantilever roofs.
Prelaq reverse side paint consists as standard of a coating based on epoxy paint. It is formulated to suit adhesive bonding applications.	Prelaq reverse side paint is used on the back of the sheet. This paint system is designed to meet less stringent demands than other paint systems on protection against corrosion and resistance to mechanical wear. The reverse side of the sheet can be painted with other paint systems to special order.

Coating properties

These diagrams give a guide to the technical properties of the material in a number of important areas.

The greater the distance from the centre of the figure, the higher the value of the corresponding property.



Paint applied by rollers

Zinc coated sheet is painted in an accurately controlled continuous process. The sheet steel is carefully cleaned and chemically pre-treated, and the paint is then applied by rollers in two stages, i.e. primer and top coat. Between the two coatings, the paint is dried and cured in an oven. The sheet can also be painted on both sides with a two-coat system.

The second oven is followed by an embossing and lamination unit, in which thicker coatings are embossed with a pattern or the fabric for NoConDrop sheet is applied. The reverse side is marked with the Prelaq logo, which allows for subsequent identification of the material.

Testing and inspection of Prelaq



Exposure outdoors in a marine environment

Standardized methods are used for testing prepainted sheet steel.

The durability of Prelaq is continuously assessed by exposure outdoors.

Sheet steel test pieces are constantly exposed to the atmosphere on the west coast of Sweden, and also in Poland and Florida, USA.



Adhesion test as per EN 13 523-6



Marking on the reverse side of the sheet.

Prelaq material undergoes comprehensive testing to determine the following typical properties:

- Thickness of the paint film
- Adhesion
- Colour
- Gloss
- Bendability
- Rapid deformation
- Drawability according to the Erichsen cupping test.

The requirements and test methods conform to European standard EN 10 169-1.

The steel is subjected to tensile testing in order to document its mechanical properties.

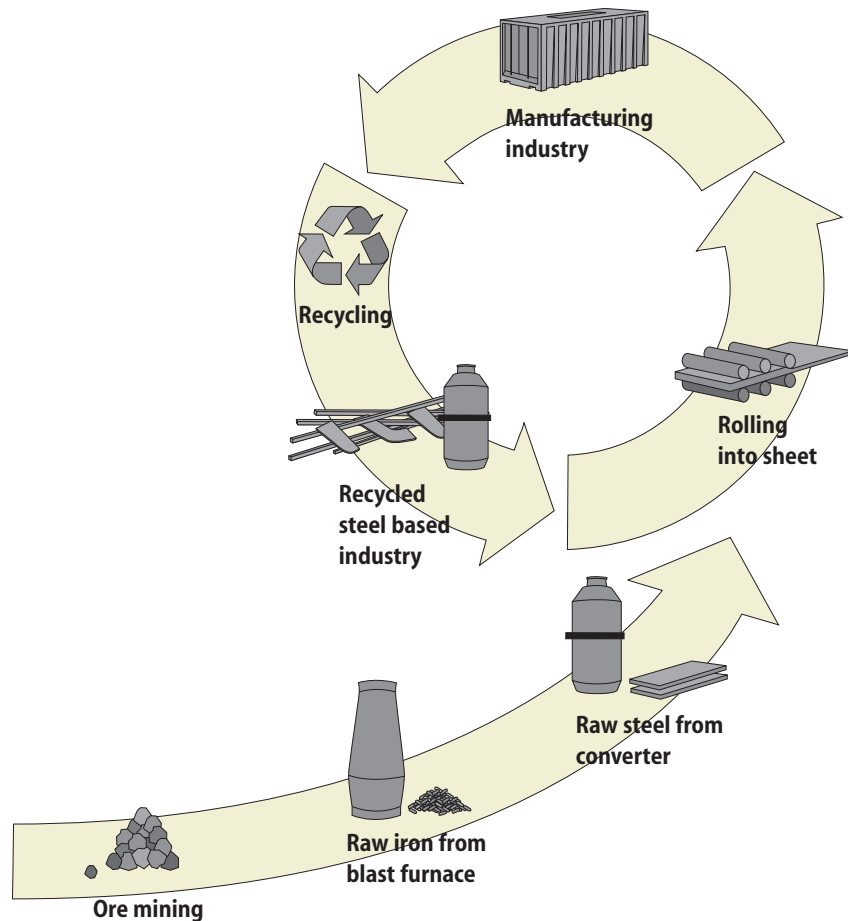
Our quality inspection during production mean that we comply with national and international standards and approvals.



SSAB Tunnsplåt has gained certification to show that the company works to a quality system that follows the ISO 9002 standard.

Our sheet steel is marked so that it can be identified. Several of our products have been certified in countries such as the UK, Germany and Russia.

Environmental properties



Recycling of steel

Steel plays an important role in the development of society and is an indispensable material in many applications. Iron and steel have always been recycled and thus comprise a natural element in modern environmentally aware societies. Iron is a metal that is essential to humanity, i.e. it is important in enabling human activities to be maintained. Iron and steel emit no substances that could be harmful to the environment or to human health.

Hot dipped galvanized sheet steel from the environmental aspect

Zinc and iron distinguish themselves from other metals by being exceptionally important to our existence.

The life of human beings, animals and plants is dependent on zinc.

One of the best ways of protecting steel against corrosion is to coat it with a thin layer of zinc. The durability of this anti-corrosion treatment may be anything from a few years to more than 100 years,

depending on the thickness of the zinc coating.

In the galvanized steel sheet substrate the zinc is used to provide an anti-corrosion resistant metal coating. Galvanized sheet steel is 100% remeltable and recyclable. The zinc is contained in the flue gas dust formed in the melting process. This dust is collected and the zinc is recovered from it.

Prepainted sheet steel from the environmental aspect

More than 99% of the solvents used in painting coil

coated steel strip are retained in the process. The solvents are burned, and the combustion energy is recovered and is returned to the process for drying the paint. The processes we use for coating the steel are generally superior from the environmental aspect to the methods employed in the engineering industry.

Prepainted sheet steel is very light in relation to its load bearing and covering capabilities. This makes the material easy to use in construction and to transport,

which thereby saves energy. Correct choice of product and good maintenance ensure a long useful life, which is beneficial from the environmental aspect.

If the sheet steel cannot be reused, it can easily be recycled by remelting.

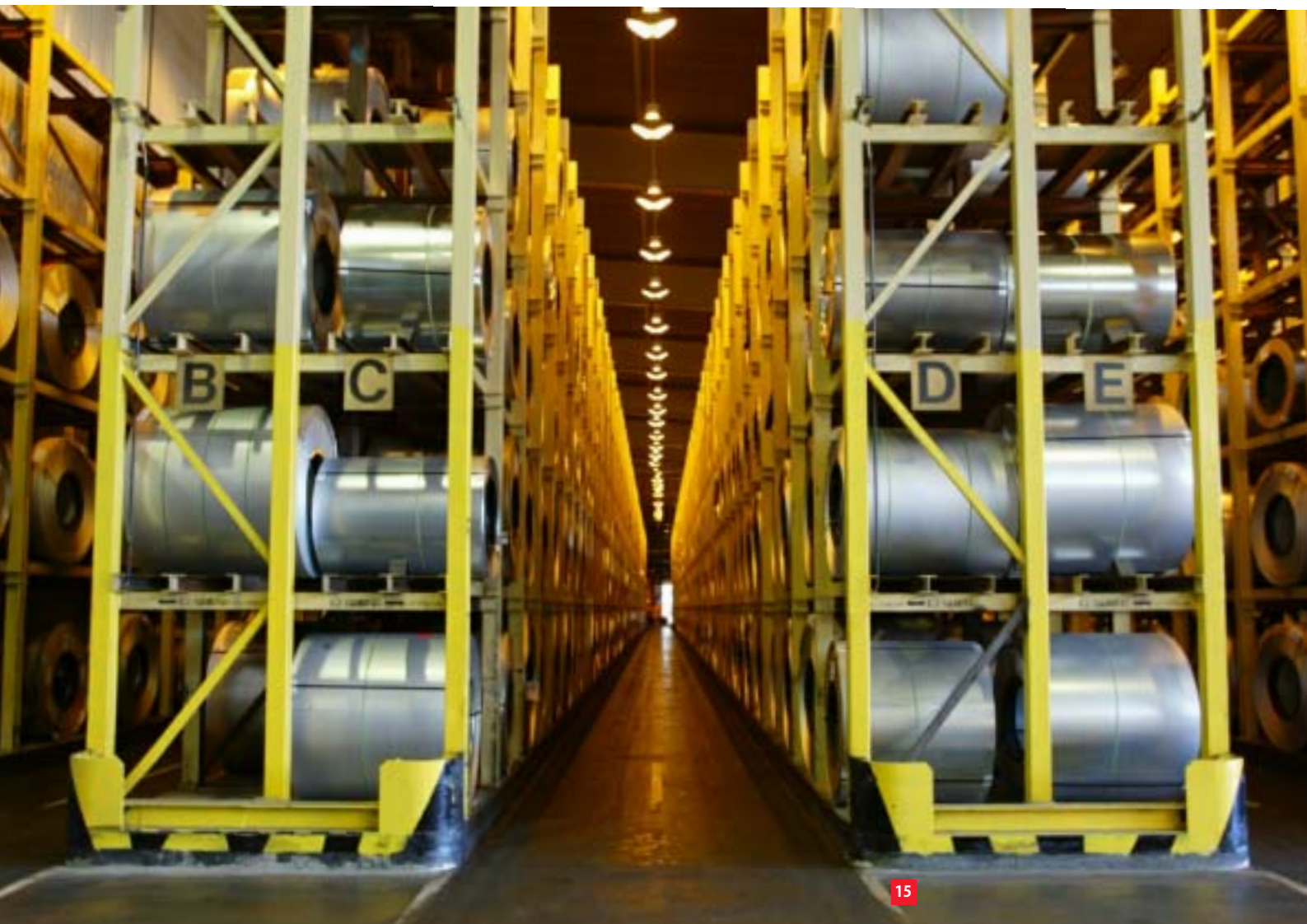
Environmental impact of sheet steel production

SSAB Tunnplåt has been pursuing active environmental work for many years. This includes work on raw materials, residual products, chemicals, risk analyses and measures

aimed at restricting emissions to the atmosphere and to watercourses, conservation of energy, etc. Processes and products are developed from the environmental and life cycle perspectives.

Environmental specifications

The properties of Prelaq from the environmental aspect are described in our environmental specification sheets.



Selecting the right material



For every application, there is an optimal combination of steel, zinc coating and paint coating.

The factors that must be taken into account when selecting the paint coating and substrate material are:

- Type of application
- Expectations on appearance and long term colour fastness
- Degree of working (forming)
- Degree of exposure to mechanical wear
- Corrosiveness of the environment
- Sun and heat
- Future maintenance
- Static strength of the product

Table 6 gives our general recommendations for some typical applications.

Table 6

Applications and material recommendations			
Application	Paint coating	Zinc coating	Steel grade ²
Profiled sheet steel for roofing	Prelaq Nova Prelaq Polyester	Z 275	SUB 250 – SUB 350 420 YP
Steel roof tiles	Prelaq Nova Prelaq Polyester Prelaq Matt Polyester	Z 275	SUB 250 – SUB 350
Profiled sheet steel for walls	Prelaq Nova Prelaq Polyester Prelaq PVDF	Z 275	SUB 250 – SUB 350
Sandwich panels	Prelaq Nova Prelaq PVDF	Z 275	SUB 250 – SUB 350
Long strip roofing	Prelaq Nova	Z 350	PLX
External panels	Prelaq Nova Prelaq PVDF	Z 275	FA
Roof drainage products	Prelaq Nova DS ¹	Z 275	FAX, PLX
Fittings	Same as connected materials.	Z 275	FA, SUB 250 – SUB 350

1. Sheet coated on both sides

2. See also Table 2 on page 8

Colour and gloss

Colour, surface gloss and durability of the paint coating are the factors that are most important for the appearance of a building. In addition to being suitable for the building itself, the colour scheme must also make the building blend neatly into the surroundings.

The following four simple pieces of advice will make it easy to choose the colour scheme:

- A discreet colour is preferable to a bright colour.
- Preferably use a few colours rather than many.
- Bear in mind the surroundings and the overall impression.

- Obtain the advice of experienced professionals.

Colour deviations between the different deliveries are measured in Cielab units. One Cielab unit is normally the highest permissible colour deviation from our reference.

Certain colour systems are more sensitive than others to colour deviations. These include metallic colours and Matt Polyester.

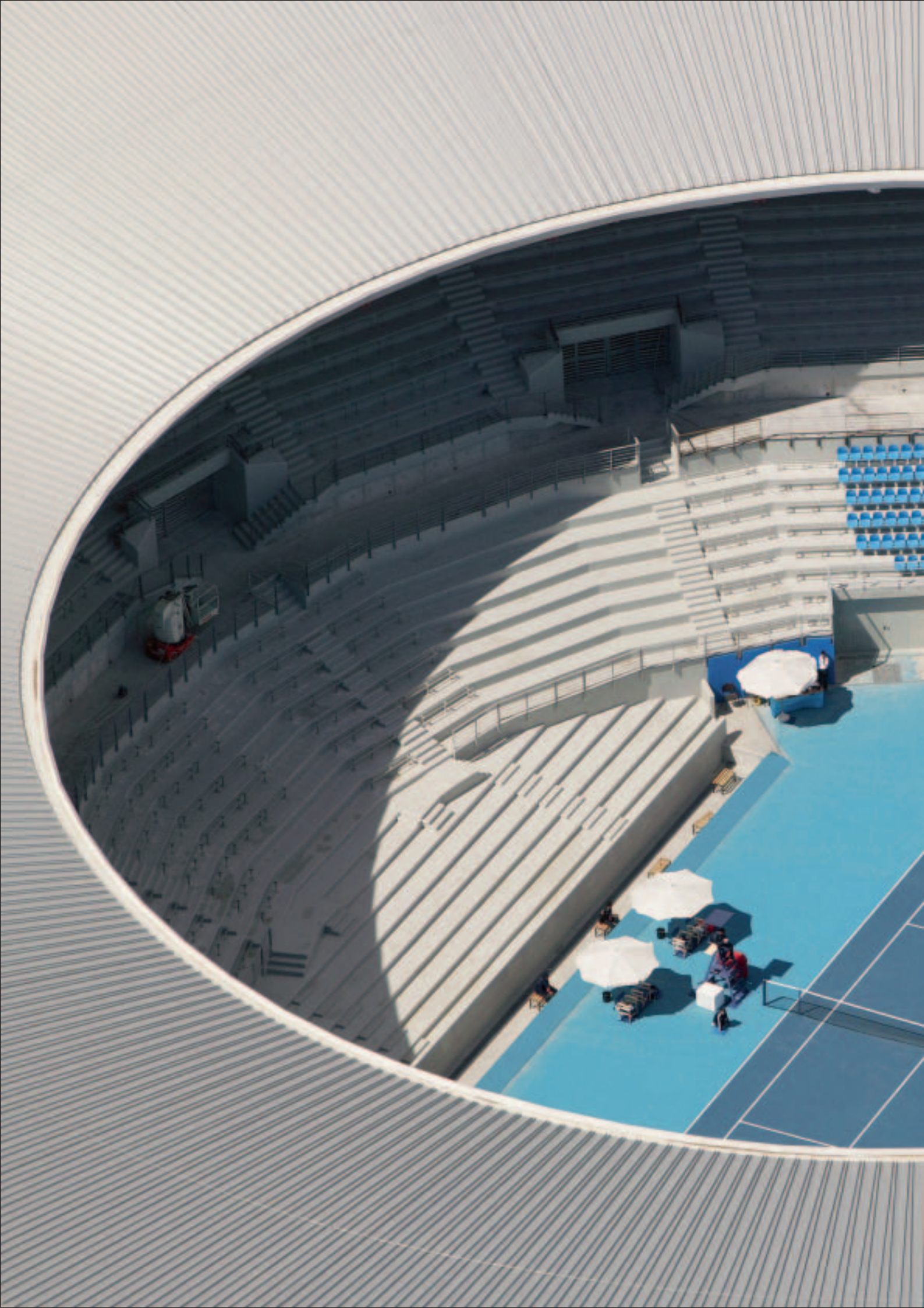
For these paint systems, efforts should be made to use the same production batch of sheet for the roof or external surface, and the sheets must be fitted so that the arrows on the reverse side of the sheet all point in the same direction.

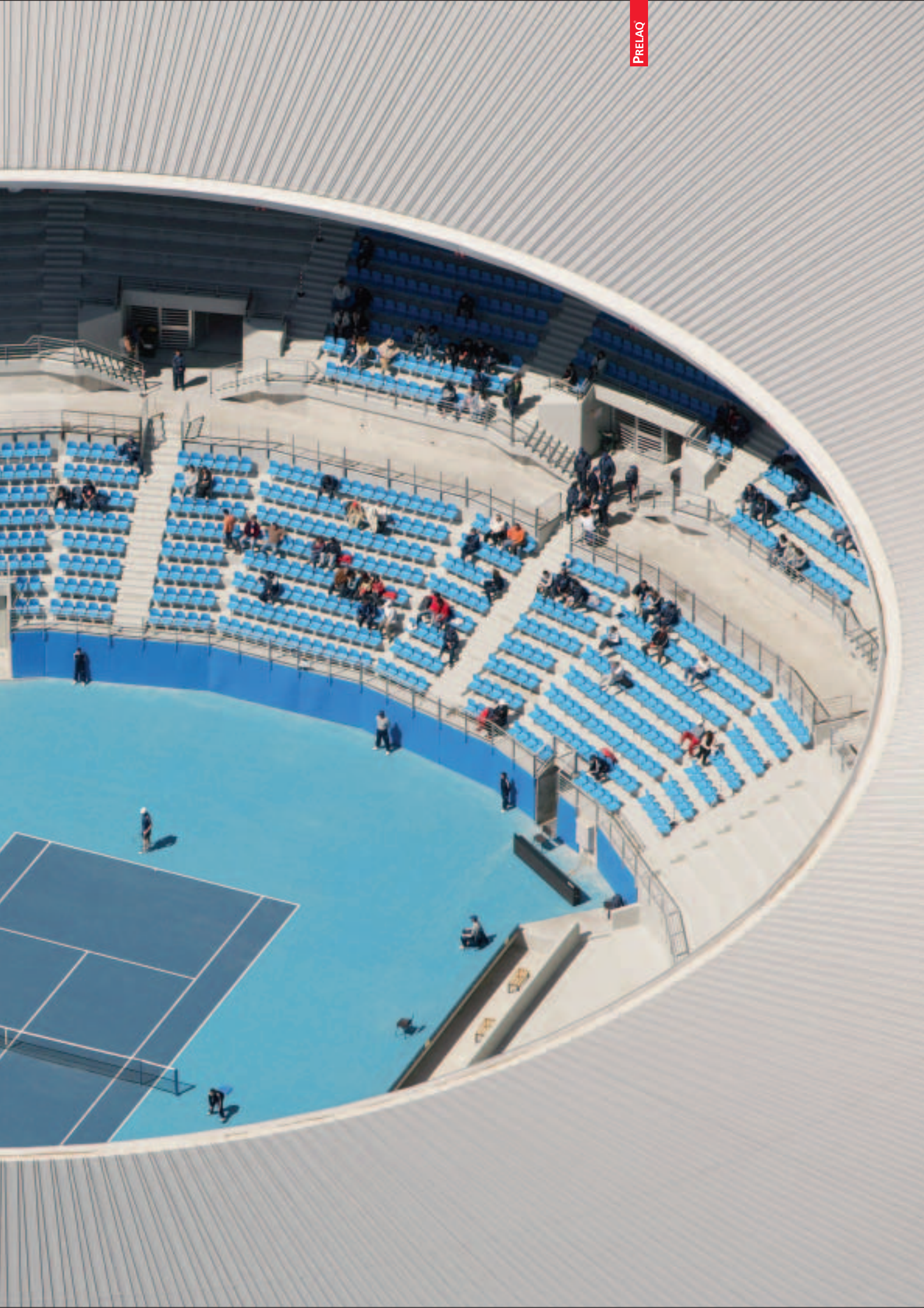


Table 7

Choice of paint coatings to suit the corrosiveness of the atmosphere			
Corrosion class	Corrosiveness of the environment	Examples of environment	Paint system that is suitable with regard to the environment
C1	Very low	Heated areas in which the air is dry and has insignificant amounts of pollutants.	All
C2	Low	Atmospheres with low contents of pollutants. Rural areas.	All
C3	Moderate	Atmospheres with a certain amount of salt or moderate contents of pollutants. Areas affected to some extent by the sea coast.	All
C4	High	Atmospheres with moderate contents of salt or significant contents of air pollutants. Industrial and coastal areas.	Prelaq Nova Prelaq P200
C5-I	Very high (industrial)	Industrial areas with high air humidity and an aggressive atmosphere	Prelaq P200 ¹ Prelaq Nova ¹
C5-M	Very high (marine)	Coastal and offshore areas with high salt contents	Prelaq Nova ¹ Prelaq P200 ¹

1. The choice of material should be discussed with SSAB Tunnpått.





Prelaq is easy to work



Forming of Prelaq into a trapezoidal profile.

Prepainted sheet steel is formed mainly by bending or rollforming. Cutting is carried out by shearing or slitting of the sheet. It is important to ensure that all tools used in working are clean and have smooth surfaces. Tools that were previously used for cold-rolled or galvanized sheet steel must be cleaned before they are used for working prepainted materials.

Radii produced by rollforming and bending must be suitable for the bending properties of the material employed, as specified in the enclosure in the pocket at the end of this brochure and in the special product leaflet. In tool design, efforts should be made to use the largest possible radii. This will ensure flexibility in the selection of materials, will allow for forming at lower temperatures without damage, and will minimize the risk of microscopic cracks in the paint coating.

It is always advisable to form the sheet at room temperature. There are special recommendations (see the enclosure) for long strip roofing material (PLX).

Rollforming

Rollforming consists of a flat strip being fed into a rollforming machine, in which the sheet is formed in a number of stages by successive rolls into the required profile.

Rollforming is particularly effective for forming long profiles. The operation is fast and ensures good dimensional accuracy. Moreover, the method does not damage the paint coating.

Every rollforming tool set is designed for material of a certain thickness and with definite elastoplastic properties. The setting of the tools should therefore be matched to the grade of steel being used, in order to avoid problems with the

tolerances of the profile being formed.

The rollforming tools should be designed so that the finished inside bend radius of the sheet is not smaller than the value specified in Tables 1 and 5 in the enclosure.

Water soluble lubricants can be used in rollforming, but not lubricants that contain solvents or substances that may be harmful to the paint coating.

Pressing

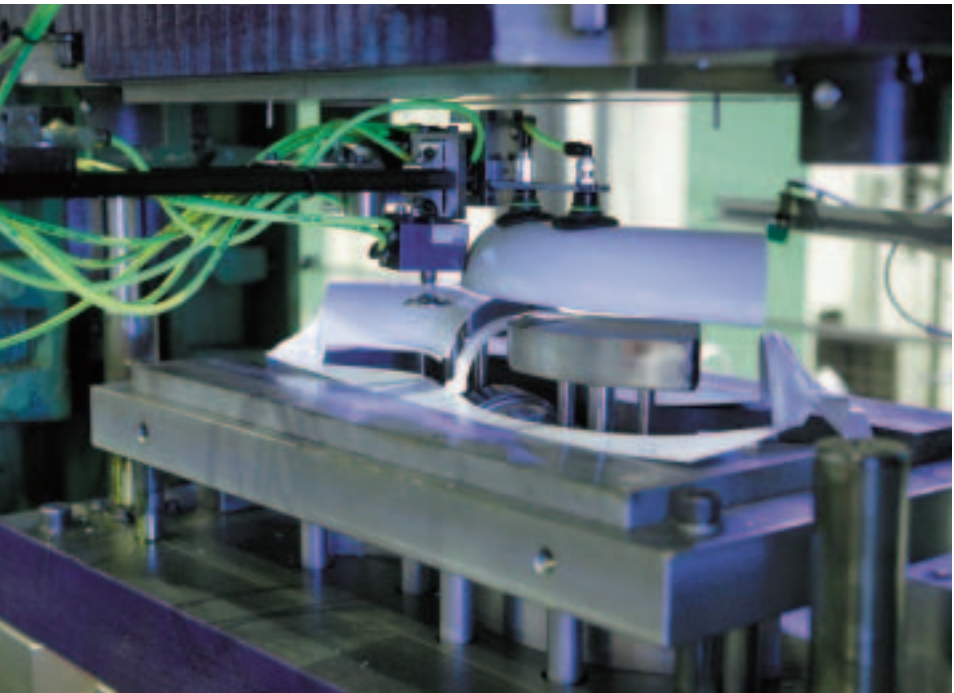
Prelaq is commonly used for producing pressed components. The benefit of the paint coating is that separate lubrication is often unnecessary, particularly for shallow parts. The material can be deep drawn, which in practice represents a combination of drawing and stretch forming. The formability improves with decreasing strength of the steel, and mild steels such as PLX are therefore often used.

Bending

Bending can be carried out in an edge pressing or machine. In the bending process, the outside of the sheet is stretched while the inside is compressed. The amount of stretching increases as the bending radius is reduced. The bendability of Prelaq is specified in the enclosure, where the minimum permissible bending radius is specified for bending the various steel grades and the paint coatings. The maximum value for each combination of sheet steel and paint applies (see the enclosure, Tables 1 and 5).

The fundamental conditions for successful bending of prepainted sheet steel in edge pressing are as follows:

- The tools must be clean, in good condition and without sharp burrs and sharp edges. The latter is particularly important in the upper part of the V in a V die.
- Protective tape or plastic film should be used in the tools when bending Prelaq PVDF, Prelaq Nova and Prelaq Polyester.
- V-shaped dies should be used in order to avoid damage to the paint coating.
- The blade should be set so that it does not bottom in the die.
- When the sheet is bent through 180°, care must be taken to avoid damage to the coating during the



Pressing of a part for roof drainage products.

final compression. The sheet bending radius should be 1-3 mm, so that the selected paint system and steel will be able to withstand the bending operation without cracking.

A soft material between the sheet steel and the tool will reduce the risk of damage.

Shearing

When shearing Prelaq with a thick paint coating, it is advisable to begin the cut on the reverse side of the sheet. The burrs occurring will then be concealed and protected by the paint coating. Carefully remove any swarf, so that it will not be trapped in the paint coating. All shearing should be carried out at right angles to the sheet surface. A suitable clearance between the shearing blade, punch and die may vary between 6% and 12%

of the sheet thickness, depending on factors such as the strength of the steel. Make sure that the blades are always sharp.

Using blunt tools for shearing increases the risk of edge corrosion.

Slitting

Edge trimming and slitting into narrow strip are carried out by a pair of rolls made of tool steel. The necessary number of rolls is mounted on parallel shafts. The grade of tool steel and the clearance between the rolls depends on the material being slit. The following guideline values can be used for the horizontal clearance:

- For workpiece material with a tensile strength $R_m < 450 \text{ N/mm}^2$, the clearance should be around 6% of the thickness.
- For workpiece material with a tensile strength

$R_m > 450 \text{ N/mm}^2$, the clearance should be around 8% of the thickness.

Cutting

Do not use a grinding wheel to cut prepainted sheet steel, since this would increase the risk of edge corrosion on the cut surface. Grinding grit also causes damage to the coating and rusting of the grinding swarf. On the other hand, a nibbling machine can be used for cutting.

Detail design and installation

The environment is not the only factor that affects the useful life of Prelaq. The detail design and the way in which the sheet is worked and handled are also of major importance to the resistance of the sheet steel to external conditions.

Fittings and sheet edges

Avoid bare sheet edges in places on which water droplets could accumulate. If possible, bare sheet edges should be folded over. Seamed fittings should be either folded over or folded together. Make sure that the lower end of the pro-filed sheet has good air circulation.

Conceal cut edges produced by nibbling.

Extra protection for cut edges in a corrosive environment

Profiled sheet steel on a roof with a shallow pitch (<6 degrees) in an aggressive environment faces

increased risk of edge corrosion at the transverse joints of the sheet. The protection against corrosion of the cut edges on a roof with a shallow pitch can be substantially improved if the cut edges are painted after installation.

The risk of edge corrosion in an aggressive environment will be reduced if the lower bare end of the sheet is bent down to form a drip lip.

Recommendations for the paint to be used for painting can be obtained from SSAB Tunnpålt.

Roof surfaces and roof pitch

The pitch of the roofing sheet should be such that rainwater will be able to run off freely from all surfaces. Stagnant water gradually accumulates increasing amounts of impurities that may damage the paint coat in the longer term.

The support surface for long strip roofing should be sufficiently stable to ensure that no depressions will occur that could cause water accumulations when loads are applied to relatively small areas of the sheet. The roof pitch should preferably be at least 6 degrees.

Battens

Roofing sheet must not be laid directly on impregnated wood battens. Place strips of roofing felt between the battens and the sheet steel. Consult SSAB Tunnpålt if Prelaq is to be mounted on impregnated wood battens.

Securing the sheet

Profiled sheet used on the outside of the building should be secured with screws. The useful life of the fasteners should be at least the same as that of the sheet, and the fasteners should generally be made of austenitic stainless steel.



Smedmarks in Täby.

The surface to which the sheet steel is secured must not be such that it gives rise to depressions around the fastener in which water could accumulate.

Fastener manufacturers supply detailed instructions for using their products.

Agressive atmosphere

Sheet steel should not be stored or mounted in the vicinity of damp and corrosive materials. Obtain the advice of SSAB Tunnpått if Prelaq is to be used, for example, in a constantly humid environment, in areas in which the material is exposed to strong cleaning agents, or in animal housing.

If metals that are more noble than zinc come into contact with the zinc coating, the sheet may sustain corrosion damage. Design the various parts so that water containing copper will not run over the pre-painted sheet steel. Water

containing copper may come, for example, from gutters, from window edge flashing made of copper, or from copper pipes.

Take care not to damage the paint

It is important not to cause unnecessary damage to the sheet steel during the installation work. The useful life of the sheet steel will be extended if the paint coating is intact. Note that certain coatings can be supplied with a removable protective film.

Clean the sheet steel surface

Remove any drilling swarf, nibbling swarf and pop rivet stems from the sheet surface. In the longer term, any metal residues remaining on the surface will lead to discoloration and corrosion attack.



Factors that affect the useful life of sheet steel

The environment

The environment around the building will affect the paint coating. Several factors determine the time it will take before the paint is degraded. The four most important factors are:

- Ultraviolet light from the sun, its intensity and duration.
- Heat
- The amount of rainfall and the total time during which the surface layer is exposed to moisture.
- The amount of pollutants in the atmosphere. Sheet steel surfaces in "rain shadow" that rain cannot access to rinse away the impurities are more liable to corrode than other surfaces.
- Marine atmosphere. Salt laden air is a further factor in seaside areas. This affects all surfaces of a building. We define a marine environment as the area up to one kilometre from the coast.

The geographical location is of major importance as regards the sunlight and heat to which the paint coating is subjected.

Certain limitations apply to the choice of products for buildings in Central Europe and further south.

Solar radiation causes heating of the sheet steel, which contributes to the degradation of the paint coating. Sheetting on insulated surfaces will be warmer than on uninsulated surfaces, since the insulating surface reduces the capacity available for conducting away the heat.

Roofs and walls – detailed design

Roof surfaces are subjected to the highest environmental impact, particularly if the roof has a shallow pitch. The roof is then exposed to strong sunlight, moisture and dirt, and must often also withstand people walking on it and other mechanical wear. A roof on which people frequently walk should be provided with walkways.

Shortcomings in detailed design may intensify the above environmental impact effects.

Maintenance

To ensure that time and the environment will not have unnecessary opportunities to damage the sheet steel, it is important to avoid damage to the coating, both during the construction work and at a later stage. If a tool or fitting is dropped onto the sheet, the paint coating will sustain minor damage. Such damage should be repaired with touch up paint.

Choice of material

If an unsuitable material is selected, its useful life will be shortened and increased maintenance work will be required on the building.

UV light and heat are the most important factors that affect the useful life of the plastisol coating on Prelaq P200. The location of the sheet in relation to solar radiation is therefore of major importance. Water surfaces in the vicinity of the building intensify solar radiation by reflection from the water surface.



Maintenance for longer useful life of Prelaq

Provided it receives regular maintenance, a sheet steel roof may last 30-40 years or more. The sheet steel roofs of some buildings in Sweden date back to 1832, and the sheet steel is still in good condition because of the regular inspection and maintenance it has received.

A distinction is made between the aesthetic useful life and the functional useful life of the coating on prepainted sheet steel.

The aesthetic useful life is the time up to the point when the appearance of the paint coat has changed to such an extent that it no longer meets the requirements. The colour change

of roofing material that is considered acceptable depends on who assesses the change and on the type of building involved. In certain cases, the limit of the aesthetic useful life is the point in time when the paint begins to flake off.

The colour of the paint coating affects the aesthetic useful life. Light colours and dark colours, for example, have different properties. If the proven Prelaq standard colours are selected, this will ensure that the paint will meet all of the specified requirements.

The useful life also depends on whether the material is used for wall cladding or roofing, the

roof pitch, the orientation of the surface (such as north or south), and whether the sheet is exposed to an inland or coastal environment. When estimating the useful life of the paint coating, it is also important to take into account the environmental impact of local factory emissions and traffic.

An undamaged coating of Prelaq Nova and Prelaq PVDF in a normal environment can be expected to have an aesthetic useful life of at least 20 years, while the useful life of Prelaq Polyester and Prelaq P200 can be expected to be at least 15 years.



The functional useful life is the time up to the point 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 zinc coating and, most importantly, the environment to which the sheet steel is exposed.

Inspection and maintenance

Regular inspection and maintenance will ensure that prepainted sheet steel has a long useful life. The sheet surface should be inspected at least once a year.

In most cases, maintenance is confined to washing the sheet steel a few times during its useful life, especially in a polluted atmosphere. But rain is often sufficient to keep the surface of the sheet steel clean.

Sheet steel mounted in "rain shadow", i.e. in areas that rain cannot reach to rinse away the dirt, should be inspected particularly carefully.

Do not hesitate to consult SSAB Tunnplåt for practical advice. Advice is also compiled in the brochure entitled "Inspection and maintenance of prepainted steel sheet".

Repainting

Depending on the demands made on a building clad in sheet steel, it may be advisable in time to restore the surface coating. This may be done by replacing the sheet or by overpainting it.

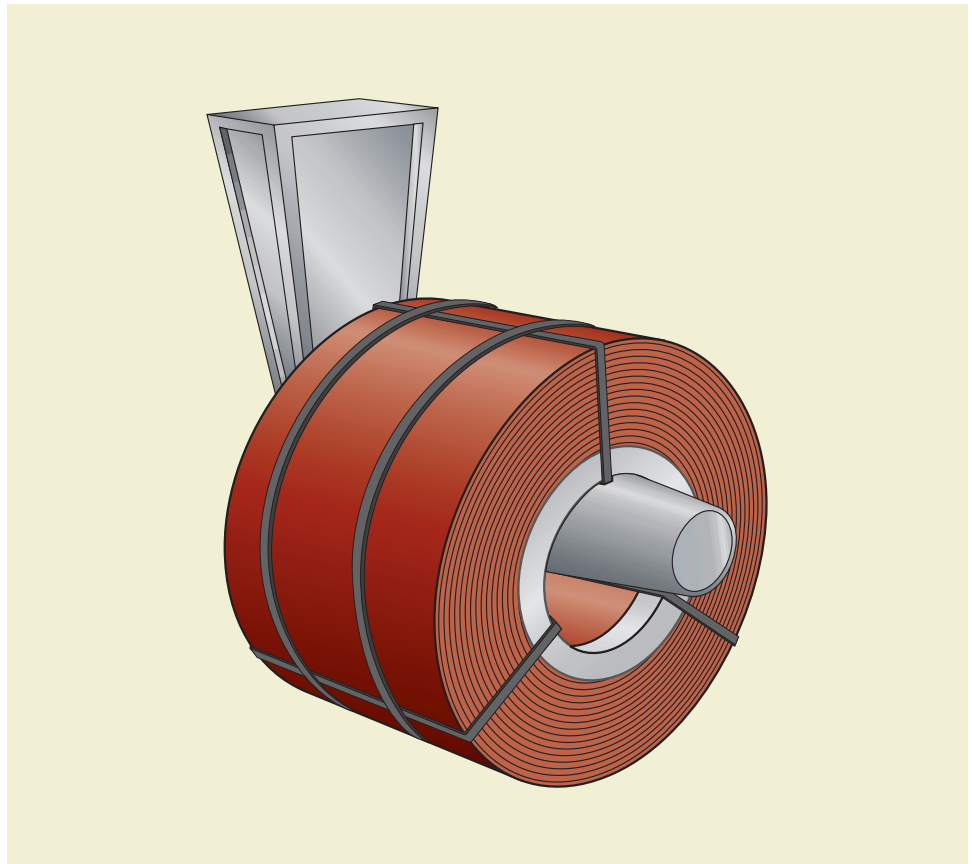
A suitable time for overpainting can be determined by regular inspection of the paint coat. The sheet should be overpainted before the existing paint coat has lost its adhesion to the sheet steel. A suitable time for repainting should preferably be assessed by an expert. The normal time before repainting varies with the environmental conditions and the paint system selected.

Particular care should be taken when overpainting a plastisol coating. In this case, the conditions for repainting should be assessed by an experienced person.

Several different makes and systems of paints for repainting are available on the market.



Handling, storage and transport



Prepainted sheet steel is a quality product and must be correctly handled. Moisture, mechanical damage or other abuse may destroy the entire coil or sheet stack or some part of it. The following simple rules will enable you to avoid damage to the sheet:

Dry conditions

Prepainted and metal-coated sheet should be protected against moisture while in storage. Indoor storage in dry premises at a uniform temperature is best. Rapid temperature fluctuations may cause condensation. Sheet steel should therefore be stored far from doors that are

frequently opened and closed.

If moisture has collected between the sheets, the sheets should be separated and left to dry in air. Profiled sheet stored outdoors must be covered but must be assured of good air circulation.

Lifting

Never use chains or steel ropes for lifting prepainted sheet steel. If a forklift truck is used, fit protective sleeves to the forks to prevent denting the sheet. A lifting device must not have sharp edges and its diameter should be the same as the inside diameter of the coil. If straps are

used for lifting, edge protection should be arranged.

Sheets should be lifted carefully from a sheet stack and should not be allowed to slide on top of one another. This will avoid unnecessary scratch marks. Preferably use pneumatic or magnetic lifting devices.

If steel sheet is stored so that the pressure between painted surfaces is high, the phenomenon of gloss transmission will occur. This will disappear if the sheet is heated to 50-60°C. Roofs and walls often attain this temperature in the summer.

Storage

Cut-to-length sheet should be stored on timber spacers that are arranged in line vertically. Sideways misalignment of the spacers may cause distortion of the sheet.

Coils should be stored horizontally on rubber mats in a steel cradle.

Transport

While in transit, prepainted sheet steel should be covered and carefully protected against moisture. If sheet steel is transported

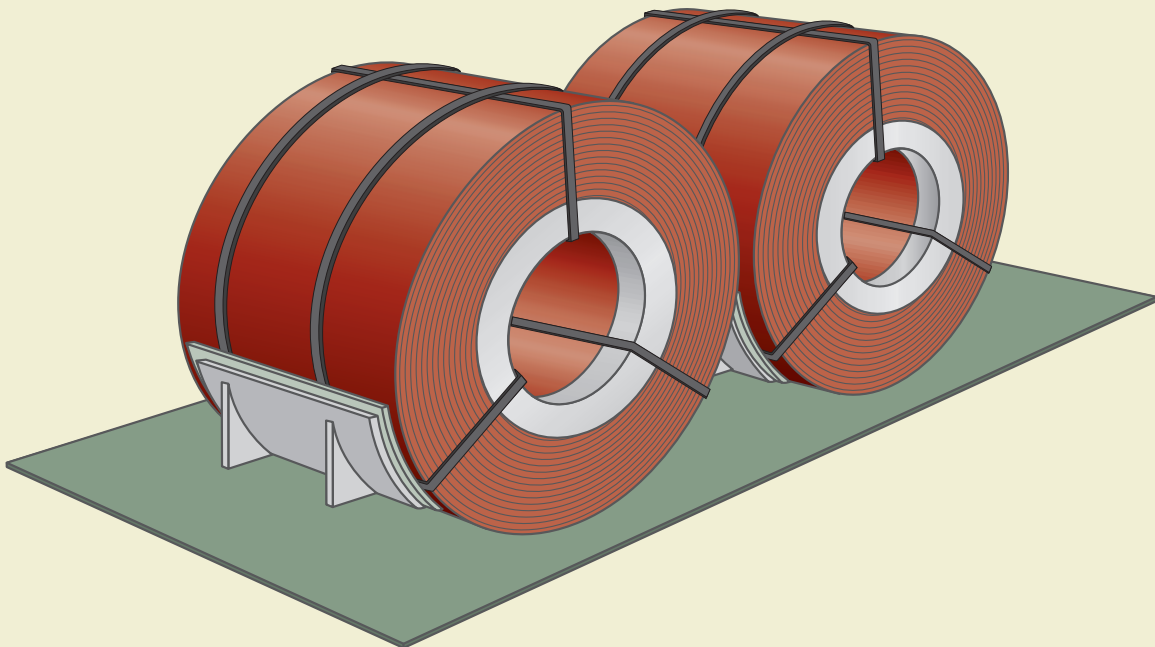
through different climatic zones, the packages will be subjected to different temperatures and weather conditions during the shipment. This involves serious risk of condensation forming inside the sheet packages, which may give rise to corrosion. Corrosion may also occur if profiled sheet is stacked without spacers between the individual sheets. It is advisable for the sheets to be stacked with a gap between each sheet, e.g. by placing some form of cord

or strip between them. As an alternative, the sheets can be provided with protective film and special reverse side coating.

When the sheets arrive on site, they should immediately be unpacked and separated.

Packaging

Prelaq can be delivered with different forms of packaging, in accordance with various specifications.



Technical support



Tech Service Prelaq is an important part of our assistance to customers. Our experts in various fields are at the disposal

of our customers for the selection of materials and in other technical matters.

Further information on Prelaq

The Organic Coated Products Marketing Department will be pleased to assist with additional information. Further particulars of Prelaq are available on our website at www.prelaq.com. Other publications dealing with Prelaq can be ordered from SSAB Tunnpålt.

Our activities also include courses and seminars for customers and other interested parties who wish to gain the benefit of our experience and broaden their knowledge of sheet steel.

prelaq.com



Enclosure: Material specification for Prelaq

The latest issue of the specification will be found at www.prelaq.com

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

SSAB Tunnpååt is a member of the SSAB Swedish Steel Group, has a turnover of SEK 10 billion, and employs more than 4000 people in Sweden. We produce around 2.8 million tonnes of sheet steel every year.

Our environmental policy involves continual improvements to the efficiency of our production processes and environmental care plants, and development of the environmental properties of our products from the life cycle perspective.

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

DOMEX®

Hot-rolled steel strip

DOCOL®

Cold-rolled sheet steel

DOGAL®

Hot-dip galvanized sheet steel

PRELAQ®

Prepainted sheet steel

We assist our customers in selecting the steels that are best able to improve their competitiveness. Our strength lies in the quality of our products, the reliability of our supplies, and our flexible customer service.

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