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Foreword

The ever-increasing number of workplace and environmental regulations are leading more and more manufacturers in the metal industry to decommission their own surface treatment facilities in favour of pre-coated sheet steel.

Working practices of the past, such as cleaning in-house paint finishing facilities as well as the use of painting booths with employees in space suits, are simply being replaced by modern high-tech and environmentally friendly pre-coating facilities.

One of the benefits of this includes considerable energy savings, fewer working procedures in the manufacturing process and greater freedom when it comes to choosing surfaces according to the product’s specific field of application, even before the product is manufactured.

All in all, pre-coating and a reduction in manufacturing processes results in a significant reduction in CO₂ emissions.

The environment and targets for a clean environment

To Metalcolour, these are not simply empty words. The more efficiently a company operates, the better equipped it is to keep abreast with environmental considerations.

At Metalcolour, we are intensely focused on environmentally friendly production and using chrome-free substrates. Both for producing the film and for coating the steel sheets, enclosed processes are used. More than 99% of the solvent from the exhaust gases is removed and burned. The combustion energy is recovered and recycled for the process. The cooling water, taken from the local stream, has its own enclosed system to avoid any negative environmental effects. Steel is the world’s most recycled material with aluminium and plastic as close followers. Not only will the recovery of these materials contribute to decreased CO₂ emissions, it also dramatically decreases the energy used in production of new raw material.

Our environmental consciousness starts with a good working environment for our employees, the personal commitment of the individual, and last – but not least – close cooperation with our customers and suppliers.

Quality

"Quality is when the customer returns – not the product."

At Metalcolour, we constantly strive towards developing our quality to live up to the ever-increasing demands of our customers.

As a EN ISO 9001: 2000 certified company, we are able to document quality right from the sub-supplier to delivery of the finished product. Through an uncompromising approach to the management of quality and delivery times, Metalcolour contributes to ensuring an optimal production flow for our customers.

Mirtha Ortega
Product Manager
Metalcolour 2009

1) Ref. www.recycling.se
SUBSTRATE

Metalcolour takes an uncompromising approach to delivery of the specified quality. As an example, we inspect every single delivery to ensure it maintains the high quality, correct colour and the required properties before it leaves our factory.

Surfacing requirements can vary greatly from sector to sector. These may relate to technical specifications, the quality of the substrate itself, mechanical characteristics, type of coating, its properties and/or special colour requirements. All of these are adjusted after close cooperation with the customer following meticulous analyses.

The products can be manufactured with hot-galvanised steel as well as aluminium, in thicknesses ranging from 0.40 mm to 1.50 mm. The maximum width is 1280 mm.

Production is carried out in a continual process whereby the chosen substrate pre-treated with backing coat and top adhesive undergo an activation of the adhesive by heat prior to final lamination. Throughout the process, automatic checks are carried out, for instance of colour and adhesion using ISO standard methods.

Depending on the specified requirements, one of the following processes will be used: coil lamination or cut-to-sheet lamination.

COATERLINE

1. Uncoiling
2. Accumulation
3. Cleaning
4. Brushing
5. Cleaning
6. Rinsing
7. Pasivation
8. Drying
9. Primer coating
10. Drying
11. Air cooling
12. Water cooling
13. Finish coating
14. Drying
15. Foil
16. Laminating
17. Water cooling
18. Air cooling
19. Accumulation
20. Protective foil
21. Recoiling
LAMINATION LINES

Coil lamination line

1. lifting table  
2. uncoiling  
3. roller straightener  
4. truss  
5. induction furnace  
6. laminator  
7. foil reservoir  
8. cooling basin  
9. rolls for water removal  
10. drying  
11. truss  
12. cutter  
13. recoiling  
14. coil slider

Sheet lamination line

1. lifting table  
2. feeder  
3. roller table  
4. infra-red furnace  
5. laminator  
6. foil reservoir  
7. cooling basin, rolls for water removal, drying  
8. inspection table  
9. packing table  
10. roller table
Metalcolour Laminated is the world's leading product of laminated sheet steel in the marine sector. We offer a wide range of colours and designs in a variety of surface coatings. The products can be manufactured with hot-galvanised steel as well as aluminium and cold-rolled steel in any dimensions of a maximum width of 1280 mm and thicknesses between 0.40mm and 1.50mm.

The production methods used by Metalcolour result in products of a higher quality than would be obtained using traditional surface treatment methods. Metalcolour's sheet steel has great plasticity, excellent durability and low weight, and is therefore able to withstand any subsequent profiling, bending, edge modification, punching and scoring.

Thanks to our know-how and flexibility, we are able to accommodate the individual requirements of each individual customer. These may relate to technical specifications, the quality of the substrate itself, mechanical characteristics, type of foil, its properties and/or special colour requirements. All of these are adjusted following close consultation with the customer via meticulous analyses. From that point on, and by virtue of our ISO 9001 certification, we can always guarantee the customer the right delivery at the right time.

Metalcolour Laminated can be supplied with a wide variety of surface coatings, colours and designs. In our standard range we have about 100 different designs that guarantees high flexibility, short delivery times and only requires a minimum quantity order of 10m². This includes all our different laminated products:

• Dobel – our most famous laminated product, fire-classified and MED certified, especially developed for marine environments.
• Foodsafe – recommended where hygiene is of highest priority.
• Indoor – a more extravagant product, suitable in all industrial applications where fire-classification is not required.
• Outdoor – a product developed for demanding exterior environments.

As a step in our environmental development work, we can also offer a halogen-free product as an option to the regular PVC foil, Dobel 2005 – an HMP*)-foil. As a member of the Dobel family, it is fire-classified and MED certified and, of course, also well suited for marine environments.

Additional to our standard range of colours and designs, the choice and possibilities are endless. In stock we have hundreds of other colours and designs. We also co-operate closely with our suppliers to be able to meet our customers' specified requirements and demands and hence, are happy to undertake special "one-off" assignments.

*) HMP - Highly Modified Polyester
**SURFACE/FOIL**

<table>
<thead>
<tr>
<th>FOIL</th>
<th>ISO4591 THICKNESS µm</th>
<th>ISO1520 ADHESION</th>
<th>AST: D4145-83 MIN BENDING RADIUS T**</th>
<th>ISO6272 IMPACT RESISTANCE J</th>
<th>RECOMMENDED MAX APPLICATION TEMPERATURE ***</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOBEL</td>
<td>150</td>
<td>no remark</td>
<td>0</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>DOBEL 2005</td>
<td>120</td>
<td>no remark</td>
<td>0</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>FOODSAFE</td>
<td>100-150</td>
<td>no remark</td>
<td>1</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>INDOOR</td>
<td>150-300</td>
<td>no remark</td>
<td>0</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>OUTDOOR</td>
<td>200</td>
<td>no remark</td>
<td>0</td>
<td>18</td>
<td>60</td>
</tr>
</tbody>
</table>

**) T is the steel sheet thickness

***) Temperatures exceeding recommendation may cause discolouration with time

Naturally, all our deliveries are supplied with heat adhesive applied protective film (with no glue) on the foil.

This makes the surface easier to handle and minimises the risk of damage to the coated surface.

Most foils are produced with the protective film pre-applied, but can be ordered without as well.

Some special films are produced without protective film, but it may well be ordered with. During production, in many cases, it can be advantageous to use a self-adhesive protective film for these special foils.

Protective film is available in a variety of qualities, depending on needs.

We are happy to help our customers choose what is most suited to their needs.
COILS/SLITTING

The coated coil can either go directly to the customer or be slit to other widths. The table below shows dimensions and tolerances.

The figures shown are standard; please contact Metalcolour other requests.

<table>
<thead>
<tr>
<th></th>
<th>LAMINATED COILS</th>
<th>SLITED COIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COIL WEIGHT</td>
<td>MAX 5.0</td>
<td>-</td>
</tr>
<tr>
<td>Tonnes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COIL WIDTH</td>
<td>MIN 640</td>
<td>MIN 25</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 1280</td>
<td></td>
</tr>
<tr>
<td>INTERNAL COIL DIAMETER</td>
<td>508/610</td>
<td>508/610</td>
</tr>
<tr>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THICKNESS STEEL</td>
<td>MIN 0.40</td>
<td>MIN 0.40</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 1.00/1.25*</td>
<td>MAX 1.00/1.25*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 Input width up to 850 mm

FORMAT CUTTING

<table>
<thead>
<tr>
<th></th>
<th>STEEL</th>
<th>ALUMINIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIDTH</td>
<td>MAX 1280</td>
<td>MAX 1250</td>
</tr>
<tr>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LENGTH</td>
<td>MAX 3700</td>
<td>MAX 3700</td>
</tr>
<tr>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THICKNESS</td>
<td>MIN 0.40</td>
<td>MIN 0.70</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 1.50</td>
<td>MAX 2.00</td>
</tr>
<tr>
<td>Max bundle weight</td>
<td>3.0 tonnes</td>
<td></td>
</tr>
</tbody>
</table>

SHEARS CUTTING

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WIDTH</td>
<td>MIN 50</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 1280</td>
</tr>
<tr>
<td>LENGTH</td>
<td>MIN 50</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 3000</td>
</tr>
<tr>
<td>THICKNESS</td>
<td>MIN 0.40</td>
</tr>
<tr>
<td>mm</td>
<td>MAX 1.50</td>
</tr>
</tbody>
</table>

It is possible to cut plates measuring more than 3.7 metres by special order - contact us for more information.
PACKAGING

Metalcolour offers various types of packaging. Standard examples are shown in the sketches below.

Naturally, we offer other packaging methods, should they be required. Contact Metalcolour’s Sales Department.

Sheets – side view: Packed with corrugating paper, covering plate, steel casing, 1 longitudinal plastic band around the casing and 3 transversal plastic bands around the pallet.

Sheets – front view: For overseas deliveries additional edge coverings made of wood are used.

Eye to side – front view: Coil packed with corrugating paper, cardboard edge covering, steel eye support, steel casing, 3 plastic bands through the eye and 2 plastic bands around the coil.

Eye to side – side view: Pallet is used upon customer request, with additional 2 plastic bands around.

Eye to sky: Coils are packed as eye to side coils with 2 plastic bands around the pallet.

The examples shown are standard. There can be varying needs for the way in which the battens are applied, their height etc.

Metalcolour’s Sales Department will go over all the details during preparation of the requirement specification.
QUALITY CONTROL

Metalcolour takes an uncompromising approach to delivery of the specified quality. As an example, we inspect every single delivery to ensure it maintains the high quality, correct colour and the required properties before it leaves our factory.

Surfacing requirements can vary greatly from sector to sector. These may relate to technical specifications, the quality of the substrate itself, mechanical characteristics, type of coating, its properties and/or special colour requirements. All of these are adjusted after close cooperation with the customer following meticulous analyses.

From that point on, and by virtue of our ISO 9001 certification, we can always guarantee the customer the right delivery at the right time.

Our certification is based on self-checking. This means that a supplier–customer relationship exists between all employees involved in the production process. Each individual employee is thus responsible for ensuring that the product he/she hands over to the next link in the chain has been thoroughly checked and is in order.

In addition to our ISO 9001 certification, Metalcolour has also been brand-certified in accordance with IMO resolutions. Moreover, we are aware of and comply with all sector-related directives and are happy to work out special requirement specifications in cooperation with our customers.

Prior to production, the incoming materials undergo thorough inspection before it is released in to the production. During production several tests are made, e.g. adhesion to steel, adhesion of protective film, gloss, bending etc. All to ensure the customer of a product of the highest quality and traceability for every order.
CHECKLIST

Before you place an order, it is a good idea to have some thoughts of the material wanted.

The table below gives an indication of which information is necessary before production.

Metalcolour’s sales department will, together with the costumer, fill in a specification of demands, where all issues will be examined.

<table>
<thead>
<tr>
<th>REQUIRED INFORMATION</th>
<th>LAMINATED COILS</th>
<th>LAMINATED SHEETS</th>
<th>PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour/Design</td>
<td>Colour/Design</td>
<td>Labelling</td>
<td></td>
</tr>
<tr>
<td>Dimension (Th x W)</td>
<td>Dimension (Th x W x L)</td>
<td>Requirements for packaging</td>
<td></td>
</tr>
<tr>
<td>Substrate quality</td>
<td>Substrate quality</td>
<td>Preferred transport arrangement</td>
<td></td>
</tr>
<tr>
<td>Tolerances</td>
<td>Tolerances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width and length</td>
<td>Width and length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flatness</td>
<td>Flatness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagonal divergence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal and external diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. kilo per package</td>
<td>Max. kilo per package/Max. pieces per package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface requirements</td>
<td>Surface requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End use</td>
<td>End use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classification</td>
<td>Classification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TOLERANCES

The tolerances indicated below are for guidance only. If other tolerances are required, it will depend on the material and has to be agreed on a case-by-case basis. Contact us for more info.

Length and diagonal differences are dependent on the camber effect in the material, over which we have no influence. However, we can halt production if the measured value exceeds what has been agreed.

<table>
<thead>
<tr>
<th>SHEETS - tolerances in mm (standard)</th>
<th>width &gt; 850 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>-0/+6</td>
</tr>
<tr>
<td>Length (&lt;3m)</td>
<td>-0/+2</td>
</tr>
<tr>
<td>Length (&gt;3m)</td>
<td>-0/+4</td>
</tr>
<tr>
<td>Rising height</td>
<td>max 6</td>
</tr>
<tr>
<td>Waves per meter</td>
<td>max 2 pcs</td>
</tr>
</tbody>
</table>

CHARACTERISTICS

The following pages deal with squareness, camber and flatness. It is important to take all of these parameters into consideration before the basic material is purchased from the steelworks.

Metalcolour's Sales and Quality Assurance Departments are always happy to offer advice and guidance in order to ensure the customer is completely satisfied.
SQUARENESS

In the standard EN 10143 (galvanised), the permissible deviation from squareness is stated as 1% of the sheet/plate width.

Most of the times this does not by far meet the high demands of our customers. As a result in the process of development we can offer more narrow tolerances.

See the sketch and table below.

<table>
<thead>
<tr>
<th>SQUARENESS</th>
<th>Tolerance = U mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheets</td>
<td></td>
</tr>
<tr>
<td>Length (&lt; 3000mm)</td>
<td>3</td>
</tr>
<tr>
<td>Length (&gt; 3000mm)</td>
<td>5</td>
</tr>
<tr>
<td>Shear cutting</td>
<td>1</td>
</tr>
</tbody>
</table>

Read about the camber effect on the next page.
Camber occurs as a result of the rolling process at the steelworks. The camber effect cannot be eliminated by slitting or coil cutting the material. Camber is present when a coil that has been rolled out on completely flat surface is curved in the plane.

Often, this effect is not significant but there may be problems when it comes to welding. If the camber effect gives rise to problems, shearing the sides is one option for eliminating this.

EN 10143 stipulates a maximum tolerance of 5 mm, measured on a length of 2 metres. For plates shorter than 2 metres, the camber must not exceed 0.25% of the actual length.

The sketch below shows how the tolerance is measured.

NB
Be aware that deviations are different depending on the substrate.

Flatness for flatness are measured as rising heights and waviness.

The rising height is the maximum distance between the plate and a completely flat base. The maximum rising height permitted is 5 mm according to EN 10143.

Waviness is measured from wave top to wave top. The maximum number of waves permitted is 2 per metre.
BASIS OF THE AGREEMENT

Metalcolour’s Sales Department is happy to assist with advice and guidance to ensure that the customer obtains the most optimal solution.

It is a pre-requisite for every order that a requirement specification is drawn up that contains all the necessary information regarding the desired delivery.

The specification deals with all the information required, right from the choice of basic material, surface, tolerances, testing methods, slitting/cutting to the way in which the order is to be packaged and labelled.

We would like to point out that the tolerances stipulated are standard values that can be deviated from if required.

Contact the Sales Department if you have other requirements.