GENERAL GUIDE TO GOOD PRACTICE IN THE USE OF STEEL ROOFING AND WALLING PRODUCTS

TECHNICAL BULLETIN TB-13

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This issue supersedes all previous issues

The key to obtaining the full benefits of the corrosion resistant coatings applied to steel used in roofing, walling and rainwater items lies in correct material selection, good handling and installation practice, and sensible maintenance.

It is true to say that very few roofing or walling products are replaced because of overall breakdown or general corrosion. Rather, replacement is generally due to isolated component failure, which could have been avoided by following a few simple rules.

This Technical Bulletin sets out the general principles of good installation practice. More detailed information on most of these points can be obtained from other Technical Bulletins, which will be given as references in the text.

Attention to the following factors should ensure satisfactory performance and good service life. Manufacturers' specific recommendations about their particular products should be followed.

1. Correct material selection for the environment and any special corrosive influences *(refer TB-1a & TB-1b)*.
2. Design: Minimum roof pitch, support spacings, metal thickness *(refer CTB-8 & TB-14)*.
3. Site storage before erection *(refer TB-7)*.
4. Handling steel sheet on site
5. Laying procedure *(refer roll-formers recommendations)*.
6. Placement, size and type of fasteners, including life expectancy and compatibility *(refer TB-16)*.
7. Cutting and avoidance of swarf damage *(refer TB-5)*.
8. Compatibility of accessories including flashings and sealants *(TB-8, TB-9 & CTB-12)*.
9. Maintenance procedures to contribute to long life *(TB-4)*.

1. CORRECT SELECTION OF MATERIAL

The correct selection of roofing and walling materials is the first stage in achieving the maximum service life of a building. The range of products manufactured by BlueScope Steel Limited is designed to give optimum performance under normal environments. These environments range from benign rural areas to more corrosive industrial or salt-laden coastal atmospheres. It is a matter of choosing the right product for its intended location.

Selection of the appropriate material for a given environment is thoroughly covered in Technical Bulletins TB-1a & 1b which are guides to the selection of steel roofing and walling products. These bulletins not only cover atmospheric influences but also the special requirements for industrial activities and animal housing. If there is any doubt, it is essential to consult a BlueScope Steel Sales Office for advice on the appropriate product for a given location.

2. DESIGN

There are a number of aspects to be considered with regard to design that will influence the service life of the product. Three important factors are listed below.

- **MINIMUM PITCH**

  Minimum pitch has an important influence on the life expectancy of the product. Specified minimum pitch varies according to the depth of the roof deck profile and the means of fixing, such as "secret fixed" or, pierced and screwed.

  Profiles designed for roofs with low pitches have deeper pans which allows the roof to drain water effectively without flooding the laps. Secret fixed decks further enhance the capability of the roof to effectively drain water by not breaching the roof sheet with fastener holes.

- **CORRECT SUPPORT SPACINGS**

  The correct spacing of supports is a critical component of the structural integrity of the building. Support spacing near the eaves and the ridge is usually less than the intermediate spacings to handle the increased lift and forces created by wind turbulence at these positions.

  Information regarding the correct spacing for specific profiles can be obtained from the relevant rollformer.

  Supports must be carefully aligned to avoid creating low spots in the roof where ponding will occur leading ultimately to reduced service life.

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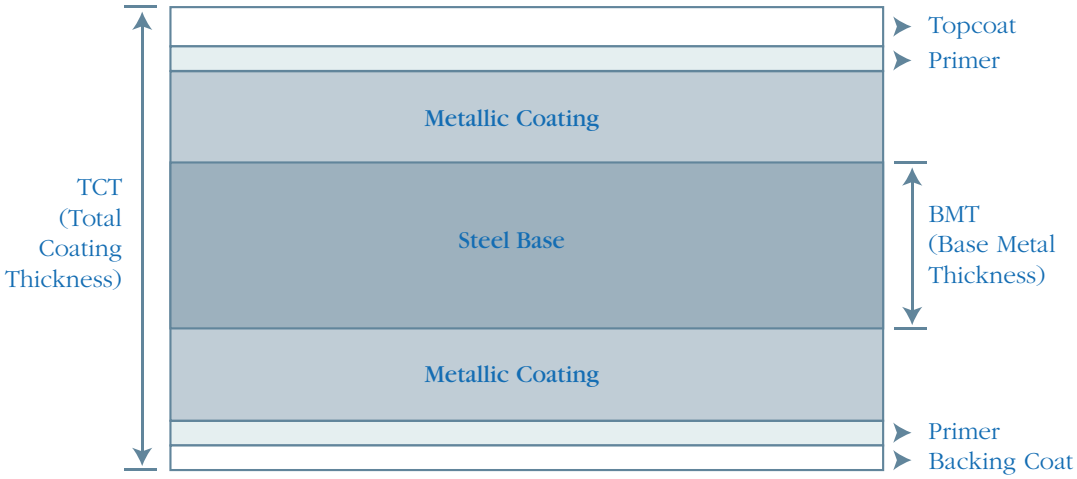
- **STEEL THICKNESS – BASE METAL THICKNESS**
  The thickness of BlueScope Steel products is specified as base metal thickness *(BMT)* not total coated thickness *(TCT)*. See Figure 1 below.

Figure 1: Schematic of BMT vs TCT.



It is important to note that structural capability is a function of base metal thickness and steel grade whereas corrosion performance is afforded by metallic coating thickness and type. Always ensure that the base metal thickness specified is as per recommendations.

Further guidance is contained in Technical Bulletin TB-14 *"Builders guide to Australian steel sheet and strip standards"*.

3. SITE STORAGE BEFORE BUILDING

Steel roofing and walling products being transported or stored on site prior to installation must be kept dry at all times. Failure to do so can result in moisture being drawn by capillary action into closely packed bundles that can cause irreparable damage and a significantly reduced service life.

This of course is not just confined to steel sheet but applies to other metal building products. Dry site storage must always be a consideration with most building materials.

For more complete details, see Technical Bulletin TB-7 *"Care and storage of exterior products prior to installation"*.

4. HANDLING STEEL ROOFING AND WALLING PRODUCTS ON SITE

Appropriate safety precautions must always be taken when handling steel roofing and walling products on site.

Given the outdoor nature of roofing and walling erection it is recommended that suitable precautions be taken to prevent personal sun damage. It has been found that sunscreens containing semi-conducting metal oxides such as titanium dioxide (TiO_2) and zinc oxide (ZnO) can accelerate the degradation of organic materials, including paint systems.

For personal safety, and to protect the surface of COLORBOND® steel prepainted steel, it is recommended to:

- wear clean, dry, cut-resistant gloves that are suitable for the task,
- take suitable protection against personal sun damage, and
- prevent contact of the painted surface with titanium dioxide (TiO_2) and zinc oxide (ZnO) containing sunscreens.

5. LAYING PROCEDURE

Follow manufacturer's recommended instructions.

The proven practice of laying pierced sheets with overlaps away from the weather is the most effective method and is a requirement of Australian Standard AS 1562, "Design and Installation of Metal Roofing". This standard states "Work shall start at the leeward end of a building so that side laps are protected from the prevailing weather".

In some unlined COLORBOND® steel roofing applications such as patios it is often desired that the colour of the finish coat be visible on the underside. This results in the sheeting being installed so that the backing coat is exposed to direct sunlight on the top surface of the roof. This practice is not recommended since such instances will result in the rapid chalking and degradation of the backing coat.

For applications where it is desired that the bottom surface has a colour other than

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the backing coat it is recommended that enquiries be made regarding availability of double sided products that have a finish coat on both surfaces. In cases where the desired colour combination is not available then it is recommended that COLORBOND® steel sheeting be installed with finish coat exposed to sunlight and backing coat (underside) be post-painted to the desired colour as per Technical Bulletin TB-2 "Overpainting and Restoration of COLORBOND® Prepainted Steel Sheet".

6. FASTENERS – PLACEMENT, SIZE, TYPE, LIFE EXPECTANCY AND COMPATIBILITY

The expected service life of the fasteners should be equivalent to that of the roofing material. BlueScope Steel recommendations are contained in TB-16 *"Fasteners for roofing and walling product - selection guide"* and are based on Australian Standard AS 3566.

Special washers have been designed for fixing roofs in areas prone to cyclones and are available from reputable suppliers.

There are some screws on the market with only minimal corrosion protection. These will quickly rust and may affect the integrity of the roof sheeting.

Screws made of some alloy materials are highly corrosion resistant in their own right *(eg stainless steel)*, but form a galvanic couple when in contact with steel. This causes increased corrosion of the steel sheeting around the screws.

Screw manufacturers/suppliers should be consulted to ensure correct usage in accordance with Technical Bulletin TB-16 and Australian Standard AS 3566.

7. CUTTING AND AVOIDANCE OF SWARF DAMAGE

The process of cutting roof sheeting to size, or drilling to fix with fasteners, can create debris, or "swarf". If left on the roof, swarf is not only unsightly but can create localised corrosion and shorten the service life.

Any debris of this type should be carefully removed from the job at the end of each working day.

BlueScope Steel do not recommend the use of abrasive discs when cutting steel roofing and walling products. Such cutting methods can damage the edges of the material and may result in accelerated corrosion of the edge.

Technical Bulletin TB-5 "*Swarf staining of steel roofing and walling profiles*" covers this in more detail.

8. COMPATIBILITY OF ACCESSORIES INCLUDING FLASHING AND SEALANTS

There are certain materials that are incompatible with BlueScope Steel's products. These materials can lead to premature failure of the steel product. For a comprehensive guide to compatible materials, refer to Technical Bulletin TB-8 *"Flashing materials for ZINCALUME® and COLORBOND® steel sheet"* and Corrosion Technical Bulletin CTB-12 "*Dissimilar metals*".

BlueScope Steel recommends the use of neutral cure silicon sealants. Sealants with adverse reactions, such as acid release, should never be used. Recommendations on sealant usage are covered in Technical Bulletin TB-9 *"Sealants for exterior finishes"*.

9. MAINTENANCE PROCEDURES TO CONTRIBUTE TO LONG LIFE

Areas not subject to the natural washing action of rainfall are known as "unwashed areas". In these regions, dust, dirt and pollutants that would otherwise be removed by rain, tend to build up. Regular cleaning and removal of these contaminants by hosing with fresh water (in accordance with local regulations), will help prevent the formation of localised areas where accelerated corrosion might occur. Accumulations of windborne salty deposits in seaside localities can have a particularly aggressive effect on steel products.

Complete recommendations on maintenance procedures are given in Technical Bulletin TB-4 *"Maintenance of COLORBOND® prepainted steel roofing"*.

SUMMARY

This technical bulletin cannot cover all the techniques and trade practices that are very well established. This Technical Bulletin is therefore intended as a guide only and further information should be obtained on these topics in other publications.

It is the responsibility of the relevant contractor to comply with good building practices. It is not sufficient for the contractor to plead ignorance on these points. It is essential that all contractors maintain good standards and keep abreast of new developments.

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