



Guidance document GD 29

January 2017

## MANUFACTURING TOLERANCES FOR PROFILED METAL ROOF AND WALL CLADDING

### 1.0 INTRODUCTION

MCRMA members profile self-supporting roof and wall cladding panels in accordance with the harmonised European Standard BS EN 14782 and BS EN 508-1 series product standards.

In general, MCRMA profiling companies will purchase pre-coated coil with appropriate quality certification as recommended by the British Standards from international metal producers.

The tolerances relate to the profiler's nominal dimensions as measured at site on profiled sheets delivered in their original packaging before handling or fixing.

Secret fix sheet systems may require smaller tolerances to form a functional roof, details of which will be provided by the profiler. Secret fix sheets may be profiled on site to avoid problems of transporting long lengths; in such cases the dimensional tolerances should be no different from those of factory production.

The following tolerances are defined with methods of measurement:

- Sheet length
- Sheet cover width, contraction or bulge
- Straightness
- Squareness
- Depth of profile
- Radius and angle of curved sheets
- Ripple of sheet side lap

**Caution:** The lifting of slings of bundles without edge protection and spreader beams across the sheet width may cause distortion of the profile and damage to the sheet side lap. Some variation in sheet cover width can be adjusted during installation.

Guidance is given on the thickness range of coated sheets to be expected on site, based on the appropriate British Standards. The metals included in the quoted British Standards are aluminium, copper, zinc, steel and stainless steel with or without decorative coatings.

Products manufactured in accordance with BS EN 14782 may be CE marked; only products subject to a harmonised European standard known as a hEN or products subject to a Common Understanding and Assessment Procedure (CUAP) and the associated European Technical Assessments (ETA), now known as European Assessment Documents (EAD) are obliged to carry a CE mark. CE marking does not confirm that a product will comply with the appropriate Building Regulations for England and Wales, Scotland or Northern Ireland. In particular, the national Building Regulations may require additional fire performance certification – MCRMA members will provide advice on request.

Detailed advice on CE marking can be found on the MCRMA web site at <http://mcrma.co.uk/ce-marking> and in the two MCRMA guidance documents listed at the end of this publication.

## **2.0 METHODS FOR MEASURING DIMENSIONAL TOLERANCES**

Any sheet to be measured shall be placed on at least three equally spaced supports which are on a rigid flat surface. Unless otherwise stated, all measurements are to be made at least 200mm from the ends of the profiled sheet.

Where necessary, the measurement shall be corrected to 20°C for example, the length of long aluminium sheets using the thermal expansion data given in BS EN 14782. The stated tolerances apply to profile depths less than 65mm; deeper profiles which are normally designed for decking are generally more flexible and therefore have larger tolerances.

## 2.1 Sheet length

The length of a sheet (L) shall be measured along the central axis of the sheet:

$L \leq 3000\text{mm} - 5\text{mm}$

+ 10mm

$L > 3000\text{mm} - 5\text{mm}$

+ 20mm

Where sheets are to be fitted between other building components for example, horizontal cladding between columns, smaller tolerances may be agreed upon by the profiler and purchaser at the time of ordering.

## 2.2 Sheet cover width, contraction or bulge

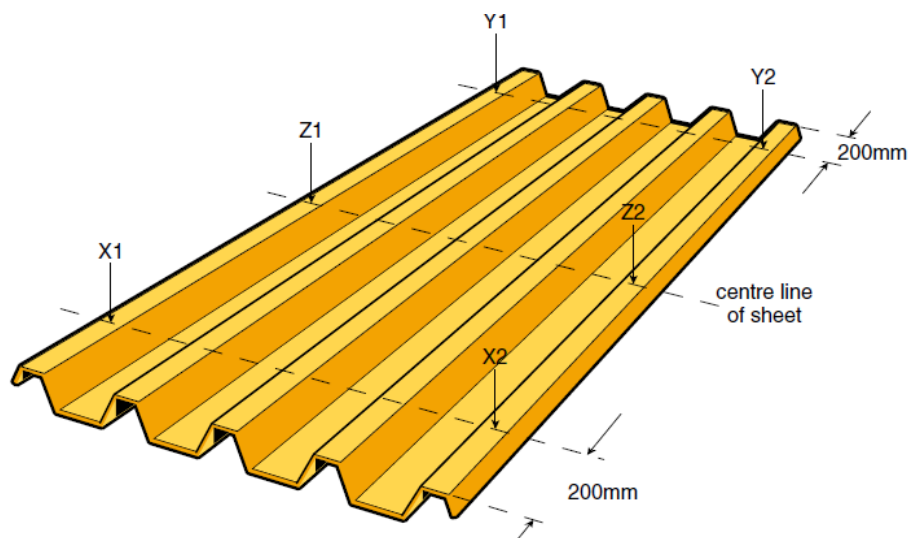


Fig 1: Cover width

Cover width  $b1 = X1 \text{ to } X2$

$b2 = Y1 \text{ to } Y2$

$b3 = Z1 \text{ to } Z2$

The cover width  $b_1$  and  $b_2$  shall be measured at a distance from the sheet ends as shown in figure 1 overleaf. Both measurements shall be within the stated tolerance.

Cover width  $b - 5\text{mm} + 5\text{mm}$

A third measurement, of cover width  $b_3$ , shall be made across the centre of the sheet to determine contraction or bulging of the profile. This  $b_3$  measurement shall be within the stated tolerance of the average  $b$  where  $b = 0.5 \times (b_1 + b_2)$ .

Measurements of  $b$  are made between the centre of the outermost crowns.

### 2.3 Straightness

The sheet straightness is measured as the deviation of the edge crown from a straight line between the two points X and Y shown in figure 1.

Maximum deviation 2.0mm per metre of sheet length not exceeding 10mm.

### 2.4 Squareness

The sheet squareness is defined as  $S$  in figure 2, where  $b$  is the nominal cover width.

$S \leq 0.5\%$  of  $b$  mm for example, 1000mm cover width sheet tolerance 'S' less than or equal to 5mm.

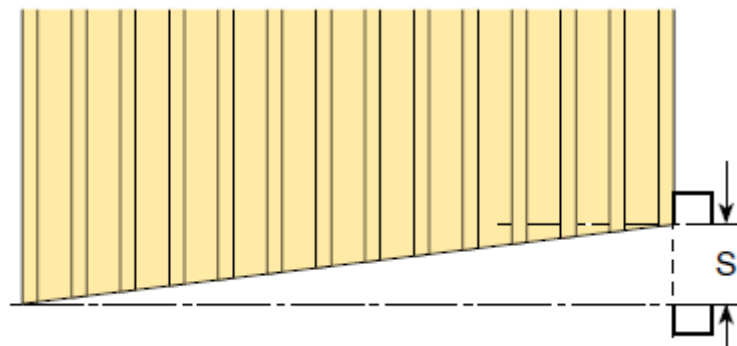


Fig 2: Method of measurement of squareness

## 2.5 Depth of profile

The depth of profile  $h$  is defined in figure 3, where the average depth of the profile is measured.

$$H = 0.5 \times (h_1 + h_2)$$

Tolerance for profile depth  $h$  -2mm  
+2mm

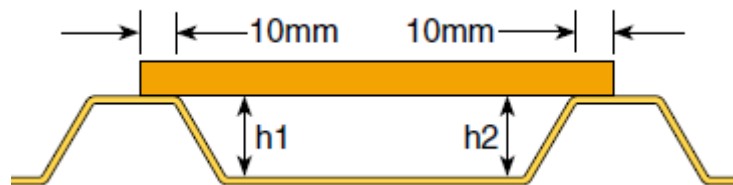


Fig 3: Method for measurement of profile depth

## 2.6 Radius and angle of curved sheets

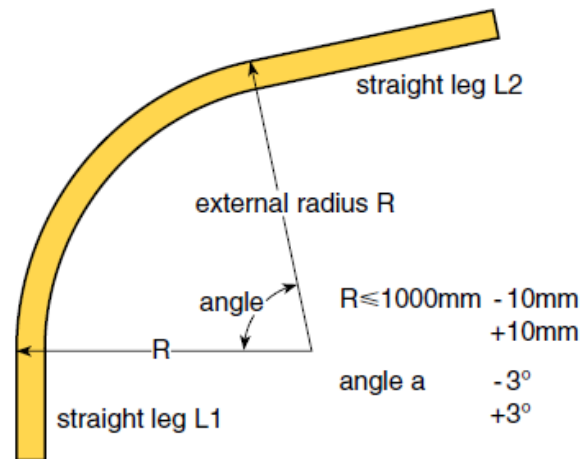


Fig 4: Curve dimensions

Curved profiled sheets with nominal radius  $R$ .

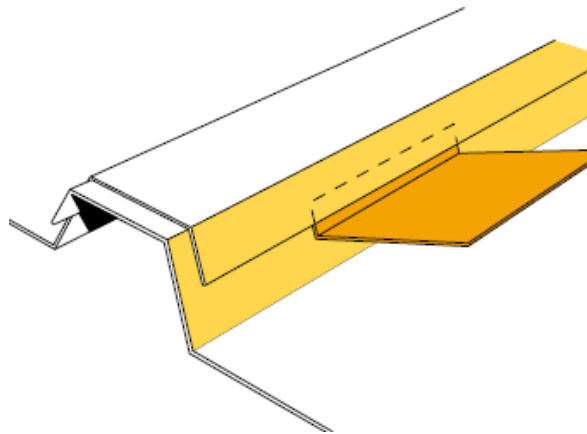
Curves with radii larger than 1000mm tend to be more flexible and therefore both the radius and angle are too variable to be the subject of universal tolerances. The profiler will provide tolerances for a particular profile section and curve on request.

Radius includes depth of profile for ridge and eaves curves. For large radius curves for example, barrel vault roofs, consult manufacturer before ordering.

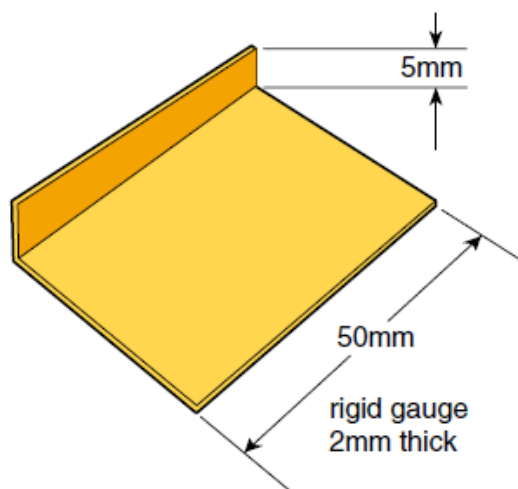
Tolerance on length of any exposed straight leg for example, down wall on curved eave should be agreed with the manufacturer before ordering.

## 2.7 Ripple of sheet side lap

The 2mm thick gauge should not penetrate the side lap to its full 5mm depth at any point more than 500mm from each end of the sheets.



*Fig 5: Method of checking edge ripple*



*Fig 6: Gauge for checking edge ripple*

### 3.0 THICKNESS OF METAL

Mill finish sheets for example, aluminium should have a thickness tolerance in accordance with the relevant British Standard for the metal coil. Coated metals, including steel, may have a protective coating and decorative finish to both sides, each with coating tolerances.

Unless otherwise agreed, the coil used for profiling shall be Class 1: full minus nominal tolerance according to BS EN 508 series and BS EN 10143.

#### 3.1 Nominal coating thickness for common types of finish

Coating	Application	Tolerances on coating nominal thickness
200 µm	external embossed finish	minus 25 µm
25 µm PVDF	external smooth finish	minus 7 µm
25 µm polyester	external smooth finish	minus 7 µm
White liner finish	internal finish	minus 5 µm
100 micron plastisol	internal finish	minus 20 µm
Reverse side coating		minus 5 µm

#### 3.2 Nominal sheet thickness for common types of finish

Coating	Typical application	Total nominal thickness and minimum thickness
<b>Hot dip zinc coated steel with backing coat</b>		
0.7mm + 200 µm plastisol	Roofing and flashings	Nominal 0.92mm thicker than 0.785mm
0.5mm + 200 µm plastisol	Wall cladding	Nominal 0.75mm thicker than 0.645mm
0.55mm + 25 µm PVDF	Wall cladding	Nominal 0.57mm thicker than 0.488mm
0.4mm white liner sheet	Internal ceilings, soffits and walls	Nominal 0.42mm thicker than 0.348mm
<b>Aluminium</b>		
0.9mm mill finish	Roofing and flashings	

## REFERENCES

BS EN 14782: Self-supporting metal sheet for roofing, external cladding and internal lining – product specification and requirements.

*This document contains the requirements for CE marking of products manufactured to the following four standards:*

BS EN 508: Roofing products from metal sheet – Specification for self-supporting products of steel, aluminium or stainless steel sheet:-

Part 1: Steel

Part 2: Aluminium

Part 3: Stainless steel and

BS EN 506: Copper or zinc sheet.

BS 5427: Code of practice for the use of profiled sheet for roof and wall cladding on buildings – Part 1. Design.

*This code of practice gives recommendations for use and expected durability of profiled sheeting in the UK environment.*

BS EN 10169 -1: Continuously organic coated (coil coated) steel flat products – Part 1: General information (definitions, materials, tolerances, test methods).

DD ENV 10169 -2 Continuously organic coated (coil coated) steel flat products – Part 2: Products for building exterior applications.

BS EN 10169 -3 Continuously organic coated (coil coated) steel flat products – Part 3: Products for building interior applications

*Currently there are no equivalent standards for coatings on metals other than steel.*

Steel standards for grades of material:

BS EN 10326: 2004 has replaced BS EN 10147 and together with BS EN 10327 supersedes BS EN 10214 and BS EN 10215.

BS EN 10327: 2004 has replaced BS EN 10146 and together with BS EN 10326 supersedes BS EN 10214 and BS EN 10215.

CE marking guidance:

MCRMA guidance document GD05 *CE marking – answers to common questions*

MCRMA guidance document GD06 *MCRMA position statement on CE marking of construction products*

### Note:

This document was originally published as a technical paper in May 2006 and has been re-formatted as a Guidance Document



## **DISCLAIMER**

Whilst the information contained in this guidance document is believed to be correct at the time of publication, the Metal Cladding and Roofing Manufacturers Association Limited and its member companies cannot be held responsible for any errors or inaccuracies and, in particular, the specification for any application must be checked with the individual manufacturer concerned for a given installation.

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