WHITE PAPER

Preformed Metal Wall Fabrication/Installation Tolerances

Overview

The truth is that there are any number of combinations for installation and fabrication tolerances for preformed metal used in roofing and wall construction. The basic rule of thumb is:

> *"Everything should look straight when viewed from a distance of 25'. Particular products or applications might require more stringent tolerances to assure performance."*

This document will discuss procedures that have been used by a number of MCA members for many years. This information is primarily derived from the *Preformed Metal Wall Specification Guidelines* that was developed in the 1990's to address a series of topics important to the preformed metal wall industry.

Background

As part of the regular review of MCA Technical Documentation, it was recognized that one well used document *Preformed Metal Wall Specification Guidelines* contained information on a number of topics that might be of more value if focused on individually. While there is a great amount of variability in the metal fabrication community, it was felt that communication of standards that have been successful for many years might be a benefit to the quality of the work done in this industry.

Discussion – Fabrication Tolerances

The initial concern is the fabrication of factory formed metal panels. Fabrication tolerances are listed below:

Table of Allowable Fabrication Tolerances*

Description	Tolerance
Panel Length	+/- 3/8 inch
Panel End Squareness	
Viewed from Panel Front* ***Measured across sheet***	0.5% of width & no more than 1/8 inch at one end
Viewed from Panel Side ***Measured across sheet***	2% of panel depth & no more than 1/16 inch
*Camber*** ***(Lateral bow of panel viewed from panel front)***	3/16 inch per 10 feet of length Accumulation allowed (e.g., 40-foot panel) *Length maximum camber = 3/4 inch*

*Squareness should be measured using the panel "diagonal difference" method. Generally, both ends will be parallel so 1/8 inch out of square at an end can correspond to 1/4 inch diagonal difference. Squareness thus determined is a function of panel length and width.

**If the tabulated level of camber renders a particular product unserviceable for reasons other than aesthetics, it shall not be acceptable.

Figure 1 is provided to visualize the limitations more clearly.

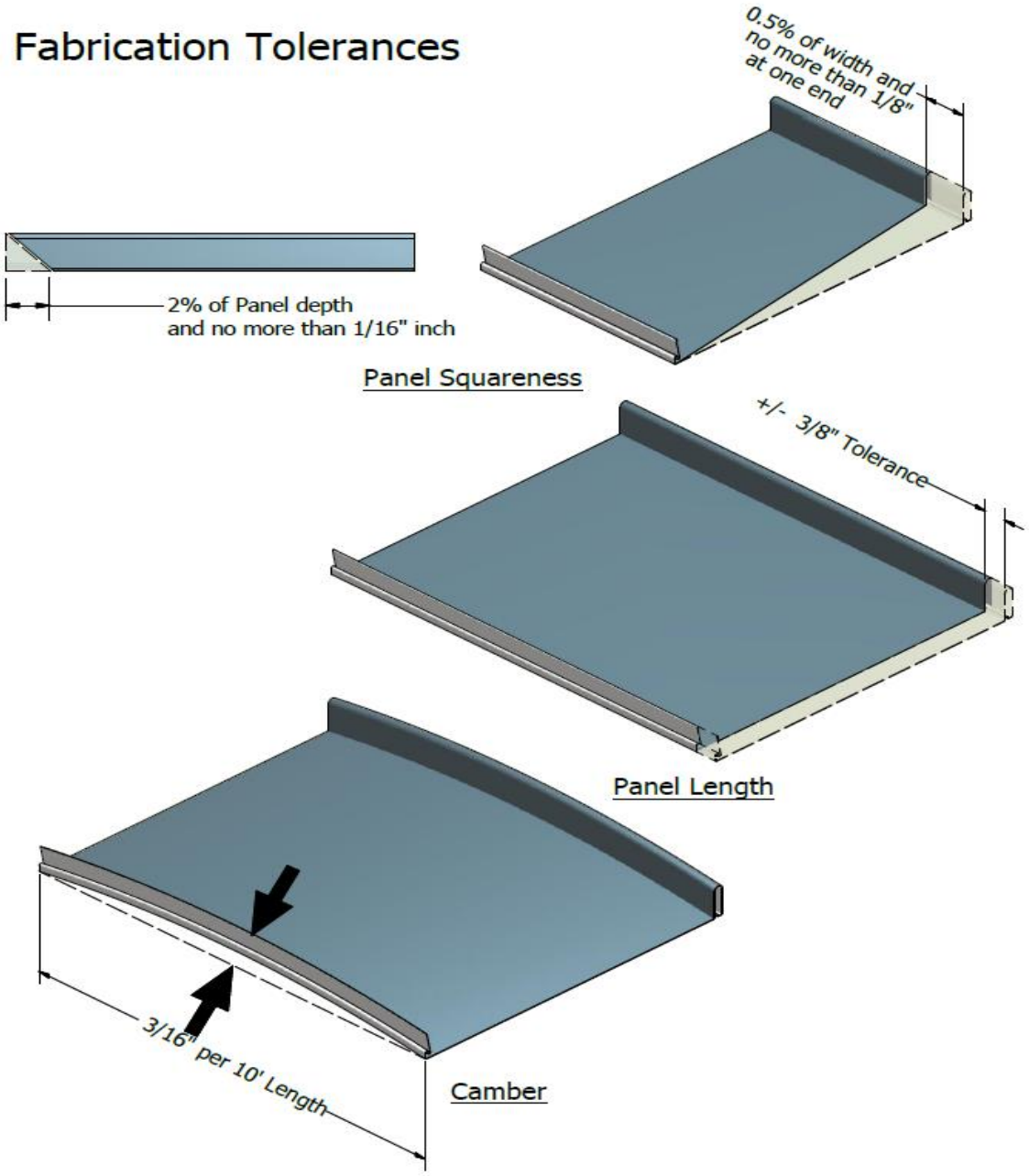

Figure 1

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Other “as fabricated” profile dimensional tolerances (e.g. cover width and sub-element lengths, radii and angular tolerances) can be somewhat meaningless. These dimensions are difficult to consistently measure and the profiles are difficult to sustain during transit and installation. Sometimes profile must be field adjusted for in place aesthetics. The final “in place” condition is the essential factor. Reasonable dimensional variations in “roll formed” products are in the table located in the Installation Tolerances area.

Installation Tolerances

It has been stated many times that the best fabrication will not satisfy the customer if the installation does not match that same level of quality. The following items provide a reasonable set of installation tolerances to establish acceptable visual quality for preformed metal installations:

1. Panels and trim shall be installed true to line and level (if horizontal) or plumb (if vertical). Exposed fasteners shall be installed in straight lines and at the locations shown on the approved drawings.
2. Field measurements to check tolerances shall be by means of commercially available squares, tape measures or levels which are in good working condition. Measurements shall be made with panels positioned without restraint (if checking fabrication tolerances) and with sufficient support to prevent significant distortion or deflection.
3. Panels should be progressively installed so that overall misalignment or tolerance issues are not focused in a single panel on the wall.

Table of Allowable Installation Tolerances

Description	***Tolerance***
Panel Plumbness (in plane of wall)	• 3/4 inch in 20 feet
Trim Plumbness (Unless controlled by structure and must align with adjacent steel or masonry for aesthetics or service.)	• 1/2 inch in 20 feet
➢ Fanning of Panels (Restores line or creates module) ➢ Fluted Panels (Fanning uniformly distributed across the panel) ➢ Flat panels with butt seams	Measured per sheet and the larger of: • 1% panel width • 1/4 inch total • 1/8 inch per seam
Differential panel coverage	• 1/4 inch per panel
Panel alignment at Ends or Endlaps (End offset and/or saw tooth. Accumulation of fabrication and installation tolerances shall not exceed 1/4 inch at base.)	• 3/16 inch (at panel base) • 1/4 inch (lap below 40 feet) • 1/2 inch (lap 40 feet & above)
Base Flashing Alignment (Measured at brake point and not at free end; on-accumulative)	• 1/2 inch in 12 feet
Exposed Fastener Alignment variance across panels. Spacing along panel or trim.	• 1/2 inch in a bay • ± 1 inch

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Figure 2 is provided to visualize the *installation* limitations more clearly.

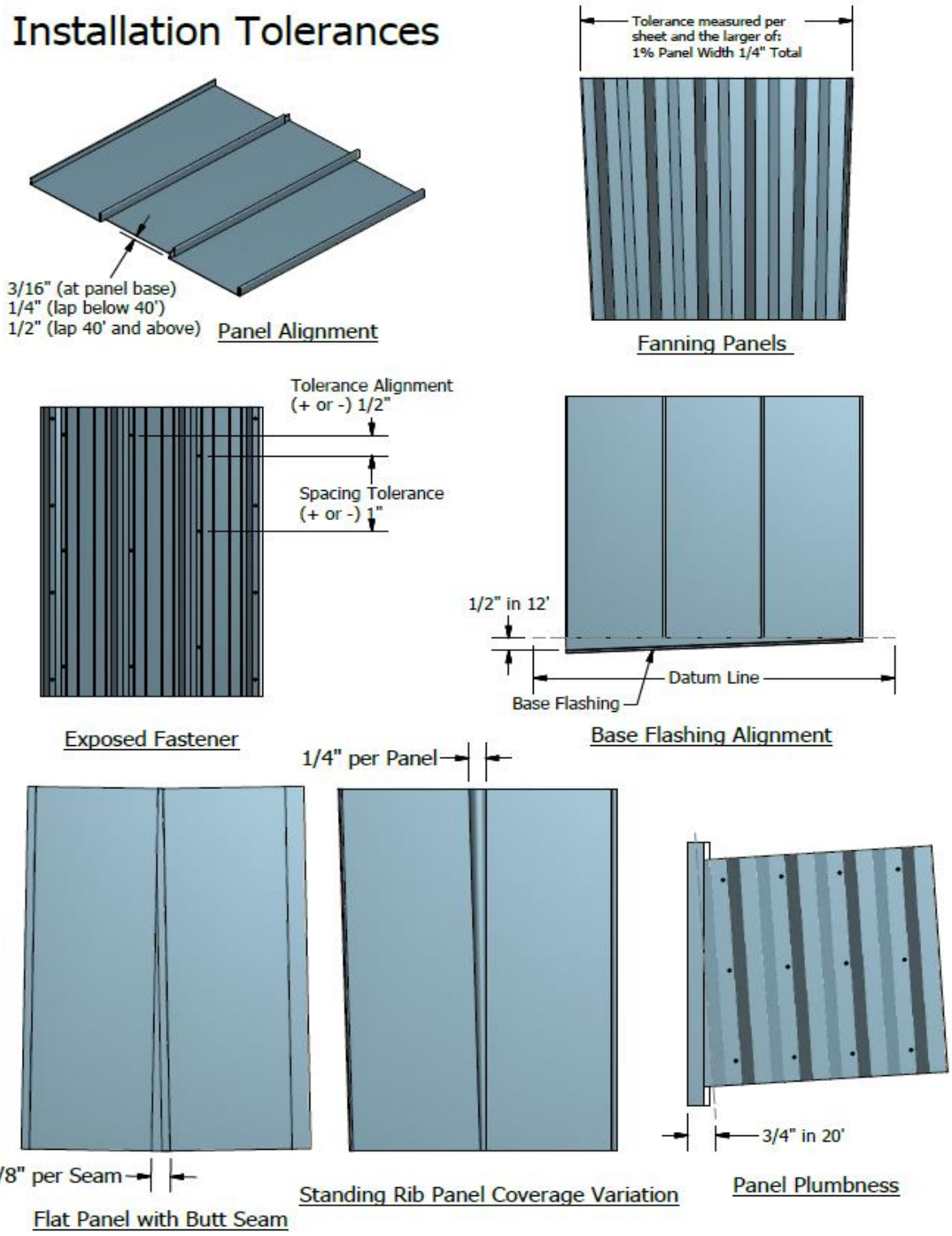

Figure 2

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Panel providers often detail panel clearance at building overhangs and terminations. This offers relief for thermal response and accommodates tolerances. Length fabrication tolerances compounded by the supporting structure construction tolerances (typically 1/4” in 20’, noncumulative) dictate that designers provide adequate girt bearing surface and allow proper flashing coverage. This requirement is additional to weather-tightness considerations, and is particularly true when no intermediate "take up" points exist along the panel length. Target flashing coverages of 3 inches vertically and horizontally normally mask problems and assure weather-tightness.

Summary

Panel fabrication and installation are critical components for a successful project. MCA member companies have found that adherence to the criteria defined within this White Paper will be helpful in providing a visually acceptable and successful project. This document is only intended as general guidance and does not supersede any documentation issued by the manufacturer. In the event that this guide conflicts in any way with the warranties, contract terms, drawings (including all notes), installation instructions, CSI guide specifications and/or similar documents, those documents shall overrule information provided here.

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- Recognition of industry-achievement awards
- Monitoring of industry issues, such as codes and standards
- Research to develop improved metal construction products
- Promotional and marketing support for the metal construction industry
- Publications to promote use of metal wall and roof products in construction

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