

## TECHNICAL BULLETIN

### EXPANSION OF LONG LENGTH SHEETS

Any piece of metal, free to move, will increase in size with an increase in temperature, and will decrease in size with a decrease in temperature. The magnitude of this thermal expansion and contraction varies between different types of metal, but for each metal, the change in length is proportional to the change in temperature and the sheet length. The change in sheet length can be calculated as:

$$\Delta L = 12(\Delta T)(L)(E)$$

where:  $\Delta L$  = change in sheet length, inches

$\Delta T$  = change in temperature, degrees F

$L$  = total sheet length, feet

$E$  = coefficient of linear expansion,

= 0.0000065 for Galvanized or Galvalume Steel

= 0.0000128 for Aluminum

= 0.0000099 for Stainless Steel

= 0.0000093 for Copper

When designing a structure, the expansion of the sheeting must be considered, especially when aluminum panels (which expand twice as much as galvanized steel) are used. Standing seam roof systems like Rollfab's 1 3/4" SL-175 are designed to allow for thermal movement of the sheets. Careful attention must be paid to the ridge and gable details and any roof penetrations. All of these transitions must allow for expansion and contraction. If they do not, fastener holes will elongate and leaks will occur.

Rollfab's installation manuals provide recommended details. In exposed fastener systems, the expansion/contraction of long length sheets may cause fastener hole elongations and eventually leaks.

Therefore, the overall sheet lengths must be limited. Rollfab recommends limiting exposed fastened aluminum panels to 16' long and steel panels to 40' or 45' maximum length. For run lengths longer than these, end laps with butyl sealant should be used.