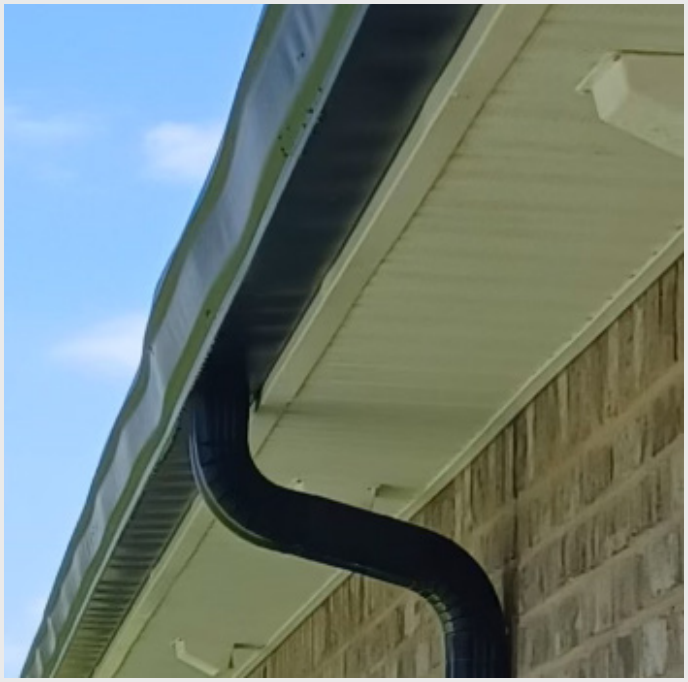
Thermal Expansion

What is it?

Thermal expansion, in the context of gutters, refers to the tendency of metal to expand when exposed to heat and contract when exposed to cold. This behavior is due to the increased kinetic energy of the material's molecules at higher temperatures, causing them to occupy more space.

Thermal expansion can have several implications:

1. Material Stress: As temperatures fluctuate, metal gutters can expand and contract and even experience changes in length. These repeated expansions and contractions can place stress on the gutters and their fastenings, potentially leading to warping, bending, or breaking over time.
   - Aluminum- A 50 foot run of rain gutter will expand .369 of an inch with a 50 degree change in temperature. (Just a little less than 3/8 of an inch.)
   - Copper- a 50 foot run of rain gutter will expand .279 of an inch with a 50 degree change in temperature. (Just a little more than ¼ of an inch.)
   - Steel- a 50 foot run of rain gutter will expand .219 of an inch with a 50 degree change in temperature. (Just a little less than a ¼ of an inch.)
2. Connection Points: The joints and seams where sections of the gutter system connect are particularly vulnerable to the effects of thermal expansion. If these connections are not designed to accommodate movement, they can become loose or develop gaps, leading to leaks.
3. Mounting and Support: The brackets and hangers that hold the gutters in place must also account for thermal expansion. If they are too rigid, they can restrict the natural movement of the gutters, causing deformation or even detachment.



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What Can be Done?

While thermal expansion cannot be controlled, it can be effectively managed. Below are several strategies to minimize its impact:

1. **Avoid Over-Tightening Hanger Screws**: Ensure that hanger screws are not excessively tightened. If you are unable to move the hanger by hand, it indicates that it is too tight, which can impede the necessary movement due to thermal expansion.
2. **Correct Hanger Installation**: Install the hanger at the top of the back of the gutter to allow for proper movement and expansion.
3. **Proper Placement of Run-Out Stands**: Position the first run-out stand 8 to 10 feet from the exit end of the gutter machine, with additional stands placed every 15 feet thereafter. This spacing supports the gutter and accommodates expansion.
4. **Ensure Proper Operation of the Gutter Machine**: Regularly check that the gutter machine is functioning correctly, as a properly running machine helps in maintaining the integrity of the gutters and accounts for thermal expansion. Also, make sure the run out stands are adjusted to the same height as the material coming out of the machine; if it is too high the gutter will have a wavy back as it is forced uphill.
5. **Adequate Staffing for Long Gutter Runs**: Ensure that there are enough personnel available to handle longer gutter runs, which helps in managing the gutters effectively and reduces stress on any single section.

For More on Thermal Expansion Watch the Video at:
https://youtu.be/RAb9VtSwDzQ