

MAXIMUM THERMAL MOVEMENT

Thermal movement must always be considered when detailing structures. Attention should be paid to the temperature differences that may occur during the service life of the structure relative to the temperature at the time of installation. As a result, materials may experience both expansion and contraction. The detailing should therefore accommodate the actual dimensional changes expected from the installation temperature and the anticipated temperature range in service.

Thermal expansion is often expressed as the maximum total movement that can occur over the full temperature range. However, the actual expansion or contraction relative to the installed condition depends on the temperature at the time of installation.

If installation takes place at approximately the midpoint of the expected temperature range, around 50% of the total movement will occur as contraction and 50% as expansion. If installation occurs near the minimum or maximum service temperature, most of the movement will occur in a single direction.

For example:

- The product reaches its **minimum length at 0°C**.
- The product reaches its **maximum length at 40°C**.
- The total dimensional change between 0°C and 40°C is **10 mm**.

If the product is installed at **20°C**, which is the midpoint of the temperature range, then:

- The product can still **expand by 5 mm** when the temperature rises to 40°C.
- The product can still **contract by 5 mm** when the temperature drops to 0°C.

Although the total thermal movement is 10 mm, relative to the installation condition the movement is:

- **50% expansion**
- **50% contraction**

Simplified schematic illustration

0°C	20°C	40°C
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Min. length	Installation	Max. length

← 50% contraction → ← 50% expansion →

The structure must therefore be designed to accommodate the actual dimensional changes of the material, considering the installation temperature and the temperature variations expected during service.