CONCRETE EXPANSION & CONTRACTION IMPACT ON PREFORMED EXPANSION JOINT FILLERS

It is commonly known that concrete slabs and structures will expand or contract when subjected to changes in temperature. By placing contraction and expansion joints in the concrete at specified distances or locations, the contractor can control the occurrence and location of undesired cracks caused by this movement.

An engineer will usually calculate the expected movement and specify the exact number of joints, gap size, and desired spacing for the application.

a. Joint spacing varies throughout the country due to considerations such as initial costs, type of slab (reinforced or plain), type of load transfer, and local environmental conditions.

b. The amount of longitudinal slab movement that a joint must accommodate is primarily a function of joint spacing and temperature changes relevant to the material type.

Approximate joint movement can be estimated by the following equation: $\Delta L = CL (\alpha \Delta T)$

Where:

- ΔL = the expected change in slab length, in inches.
- C = the base/slab frictional restraint factor (0. 65 for stabilized bases, 0. 8 for granular bases).
- L = the slab length, in inches.
- α = the PCC coefficient of thermal expansion (.0000055 for standard concrete).
- ΔT = the maximum temperature range (generally the temperature of the concrete at the time of placement minus the average daily minimum temperature in January, in °F).

c. Nomaco's preformed joint fillers such as SOF® Rod, HBR® Backer Rod, HBR® XL Backer Rod, Fastflex™, and Nomaflex® are widely used to fill both contraction and expansion joints in concrete slabs and structures prior to the application of the joint sealant.

Due to movement of the concrete caused by changing weather patterns; joint filler materials must have excellent compression strength and recovery properties to

allow for the movement. Nomoco's polyethylene and polypropylene joint filler products easily withstand more than 50% compression along with the ability to recover to nearly 100% of original size. These physical properties of our products allow for repeated compression and recovery cycles, and keep our products in place with these changes in temperature.

As an example, a 6 in. thick concrete slab, 50 feet long, will likely have 3-4 contraction joints (filled with backer rod / sealant) and periodic expansion joints (filled with Nomaflex or Fastflex / sealant) isolating other concrete structures. The expansion or isolation joints in this slab could see ***worst case*** movement up to ¼" from season to season **(based on extreme 100 degree variation)**. In addition to properly sized joints, it is extremely important to have a material that is resilient enough to handle these changes and will stay in place. Nomaco's Construction Foam Products meet this requirement.

Calculation: ¼" (estimated seasonal movement) = 0.65 x 600" x (.0000055 x 100 deg. F.)