BUILDING TRUST

TECHNICAL BULLETIN
Expansion Joint Recommendations

The Need for Expansion Joints

In order to maintain alignment of grouted equipment, epoxy machinery grouts are designed to be rigid and have high resistance to creep. As a result, stresses developed during cure and subsequent temperature changes may result in cracks. Grout cracks do not directly affect the ability of the grout to support the equipment, but they do provide an entrance point for oils and other contaminants that can eventually lead to problems in the foundation. Expansion joints should be used when the span of the grout exceeds 5 ft (1.5 m) in any direction.

Location and Design of Expansion Joints

It is normally recommended that expansion joints be located at 3–6 ft (0.9–1.8 m) intervals. More expansion joints may be needed if the grout will experience a temperature drop of more than 40° F (4° C) below the installation temperature. Joints should be placed so as not to interfere with sole plates, chocks or anchor bolts. For best results, they should be spaced evenly between anchor bolts or sole plates. There are a variety of techniques for preparing expansion joints in epoxy grout. Different joint designs are appropriate for different types of installations. Two basic types of joints are discussed below.

Standard Single Seal Expansion Joint

Grooves must be placed in the grout for this design. It is preferable to create the groove with the formwork. Dividers are placed in the form where the joints are to be located. The dividers consist of an interior portion of 3/4" (19 mm) wood or fiberboard expansion joint material and an outer removable portion consisting of 3/4" (19 mm) lumber covered with polyethylene or duct tape to prevent bonding. The outer removable portion should extend above the finished grout to facilitate removal. The removable portion of the divider should be sized to provide a finished groove in the grout that is approximately 3/4" (19 mm) wide and 1-1/2" (38 mm) deep. When the grout is sufficiently hardened, the exterior portions of the dividers are removed. A standard 1" (25 mm) foam polyethylene backer rod is forced into the bottom of the groove and the rest of the groove is filled with a good quality joint sealant. The surface of the expansion joint material can be tooled to a neat concave or flat surface as shown in Figure 1.

FIGURE 1

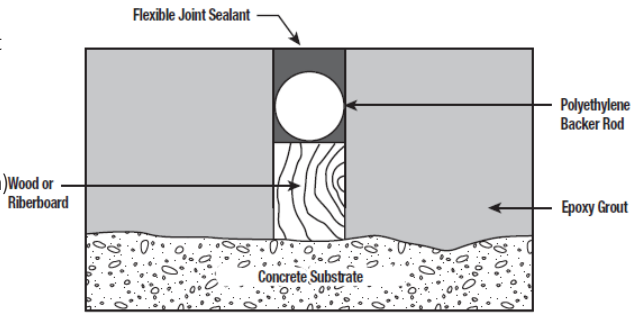
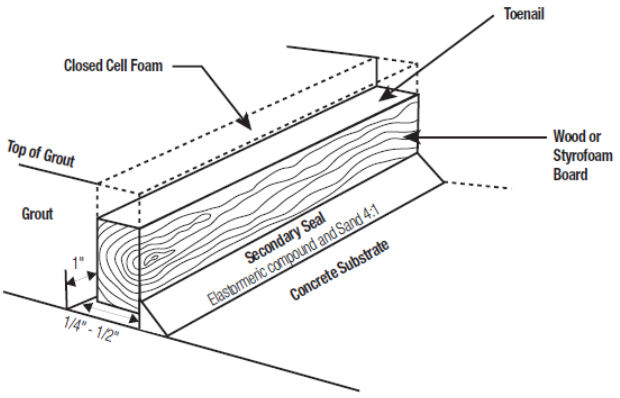


FIGURE 2



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Composite Joints Containing Both a Primary and a Secondary Seal

A composite joint that contains an interior wood portion and an exterior portion of closed cell foam (See Figures 2, 2A) provides double protection against oil intrusion. The wooden interior is set in place using an epoxy mortar that acts as a secondary seal to prevent oil and other fluids from penetrating the concrete. The grout bonds to the closed cell foam forming a tight primary seal against oil penetration.

The wooden portion of the joint should be made from standard finished lumber that has a nominal thickness of 1" (25 mm). Actual thickness will be about 3/4" (19 mm). Cedar is an excellent choice. It is resistant to water and oil, and is easily compressible. The wood is installed after the concrete surface has been chipped and the forms have been built. A mixture of one part expansion joint compound and four parts dry blasting sand is used to prepare a flexible mortar for the secondary seal. This material is applied to the concrete in strips about 2–3" (51–76 mm) wide by 1" (25 mm) deep, running the entire length of the joint. The lumber should be immediately embedded to a depth of about 1/2–3/4" (13–19 mm). The lumber should be smaller than the completed joint by 1" (25 mm) to allow for attachment of a primary seal consisting of 1 by 1" (25 by 25 mm) chemical resistant closed cell foam (see Figure 2). The closed cell foam may be attached to the wooden portion of the expansion joint in one of several ways.

1. Gluing the foam to the wood using epoxy adhesive.
2. Gluing the foam to the wood using silicone sealant (RTV).
3. Nailing the foam to the wood by toenailing from the side (Figure 2).

CAUTION: Do not drive nails through the top of the foam as this destroys the foam's sealing ability.

If the foam has a tough skin on one side, this portion of the foam should be faced outward. The vertical face of the expansion joint should be sealed also. This can be done by extending the foam down the vertical face as shown in Figure 3. If a notch is cut into the foam as shown in Figure 4, it aids in the foam's conforming to the bend in the expansion joint. For shallow pours of 1–2" (25–51 mm), the wooden portion of the joint can be eliminated. The foam should be bonded directly to the concrete with or without a secondary seal.

Closed cell foam with notches to conform to vertical sides (see Figure 3).

A variation of the above design is to use an epoxy joint sealant as the external joint. Using this method the wood joint is initially brought up to the surface of the finished grout. After the grout is then placed and cured, the wood is removed to a depth of 1/4–1/2" (6–13 mm) below the grout surface. The typical width of the joint is twice the depth (see Figure 5).

FIGURE 2A

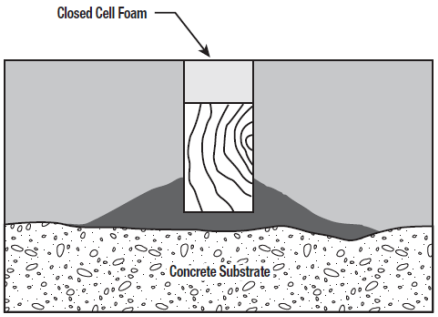


FIGURE 3

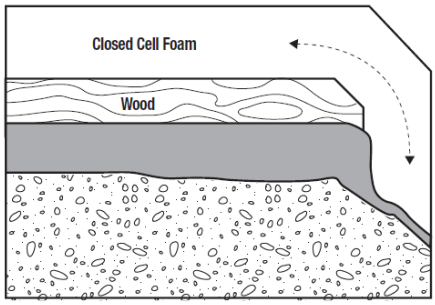
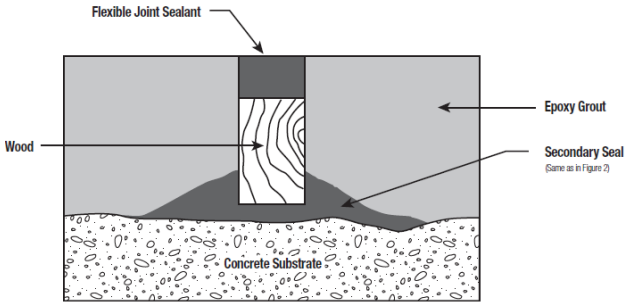


FIGURE 4

FIGURE 5



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Rev April 2025