BEARING INSTALLATION

Expansion and slide bearing assemblies generally consist of upper and lower components. The upper component contains a support element such as a steel plate and a contact element such as a sheet of stainless steel or layer of PTFE. The lower component usually consists of a steel support element, an ROF elastomeric or preformed fabric pad and a contact assembly. The contact assembly can be a bonded layer of PTFE, bonded laminations of polymer and PTFE or a bonded steel plate recessed to contain a layer of PTFE. These assemblies can be installed in concrete to concrete, steel to steel and concrete to steel construction.

Fig. 34, 35 and 36 illustrate some typical methods of bearing assembly attachment. Fig. 35 shows methods of attaching bearings in concrete to concrete construction while Fig. 34 shows methods used for steel to steel attachment. Some installations require bearings which limit movement to one direction. Examples of two such designs are shown in Fig. 36. Combinations of these methods and others can be used for steel to concrete applications.

Upper Bearing Assembly

Upper bearing pad support elements are usually fabricated from ASTM Type A36 steel. Stainless steel contact surfaces when used, are made from ASTM A240 or Type 304 stainless steel and shall be at least 14 gage (0.064 in.) with a surface finish less than 16.5 microinches R_a (20 microinches, root-mean-square.) In addition to the surface roughness requirement, other PTFE contact surfaces shall have minimum Brinell Hardness of 125 (~70 Rockwell B).

Stainless steel contact surfaces should be continuously welded to the support element to prevent infiltration of moisture between the sheet and plate. The bearing area of the contact surface should be sufficiently larger than the contact area of the lower element to allow for relative movement between the elements. Contact areas of both upper and lower elements should be protected from dirt, abrasion etc. during installation. Wherever possible, the contact surfaces shall be oriented so that sliding movements will cause dirt and dust accumulation to fall from the mating surface.

Lower Bearing Assembly

The lower bearing assembly usually rests on a steel plate cast in concrete or is attached to a steel structural element. Support elements of the bearing are usually ASTM Type A36 steel, welded or bolted to the steel plate or structural element. The bearing pad/contact surface element can be either unrestrained free standing, restrained free standing, or bonded to the support element, if used.

If welding is used to attach elements with bonded PTFE surfaces, provisions must be made to ensure that the temperature in the bond area does not exceed 300°F (150°C).

When designing retainers for the lower assembly, consideration must be given to bulge and long-term creep shortening characteristics of the bearing pad. Retainers must be positioned so that there is sufficient vertical and horizontal clearances between the pad and the retainer to allow for pad lateral expansion and long-term creep shortening.

All exposed carbon steel should be painted to retard corrosion.

Lateral Cold Flow of PTFE With Laminated Expansion Bearing Pads

As elastomeric pads compress from applied vertical loads, the pads expand laterally. When the elastomeric material is laminated to a low-friction PTFE system, the PTFE material also expands laterally unless a special polymeric material separates the elastomeric pad from the PTFE material. This cold flow within the PTFE can create long-term durability problems, particularly when the PTFE does not recover its lateral cold flow strain. During the test program, the lateral cold flow characteristics of PTFE bonded to plain SORBTEX, to SORBTEX with a polymer, to FIBERLAST and to FIBERLAST with a polymer were measured. The results of these uniform compression tests are shown in Fig. A4 (on Pag 22). The test data indicate that the polymer layer dramatically reduces the lateral cold flow behavior of the PTFE when bonded to SORBTEX or FIBERLAST.

The design engineer should consider the expected lateral strain in the design bearing when considering the use of a polymer substrate. If the edge strain of a FIBERLAST / Polymer / PTFE pad under rotation exceeds about 15 percent, a piece of 10 gage stainless steel should be used in place of the polymer.

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Voss ENGINEERING

Fig. A1 **CREEP BEHAVIOR**

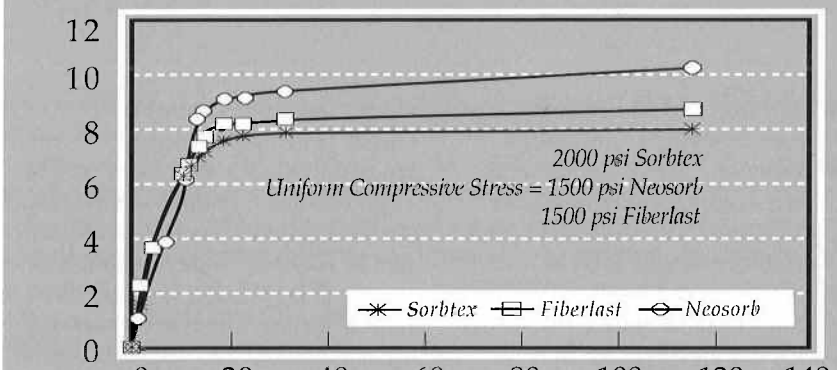


Fig. A2 **COEFFICIENT OF FRICTION TESTS**

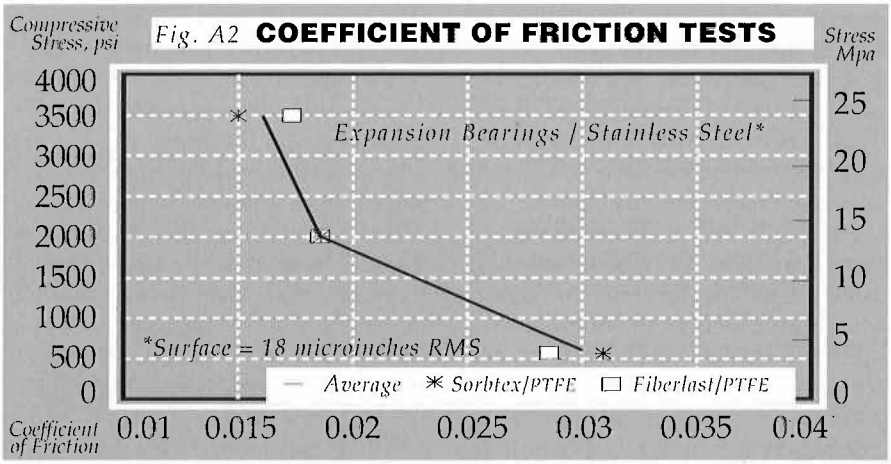


Fig. A3 **SLIDE BEARING FRICTION TESTS**

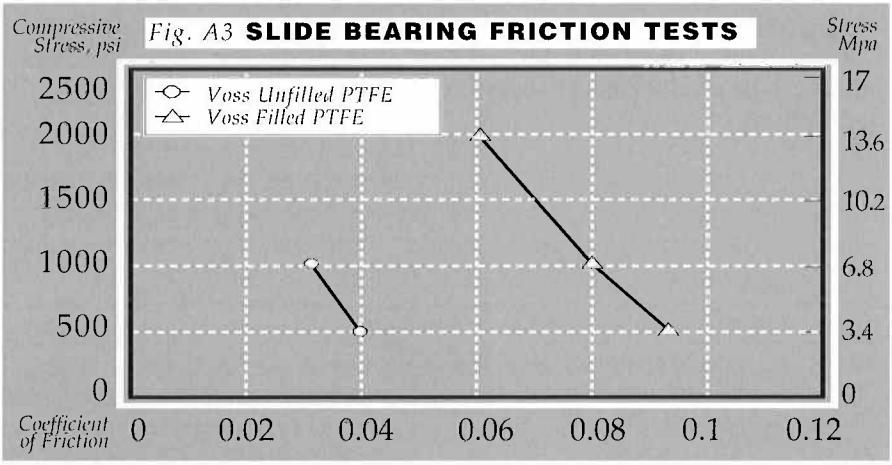
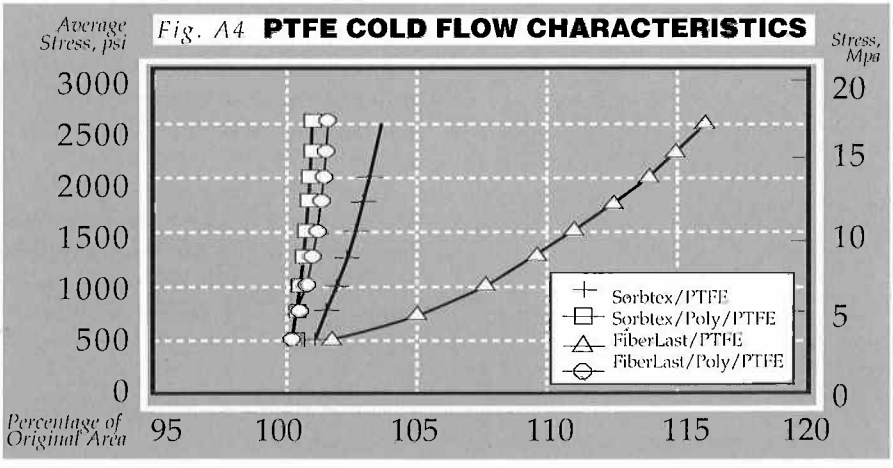


Fig. A4 **PTFE COLD FLOW CHARACTERISTICS**



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EXPANSION BEARING CONCEPTUAL DESIGN DETAILS

Fig.34 STEEL TO STEEL

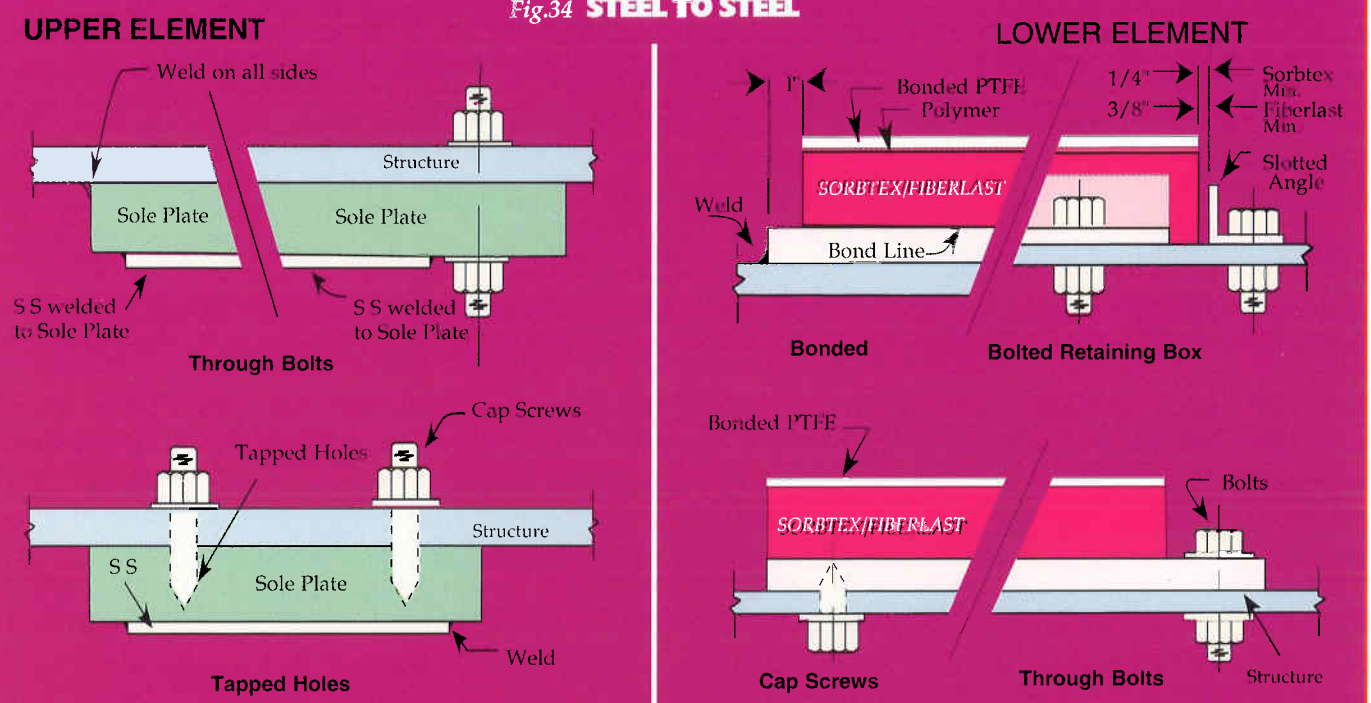

Fig.35 CONCRETE TO CONCRETE

Fig.36 LATERAL RESTRAINT