

Application of bushings in unusual service conditions

Mounting angles greater than 20 degrees

When a bushing is mounted at an angle that exceeds the 20-degrees from the vertical recommended in C57.19.00 under Usual Service Conditions, it may be subjected to excessive bending moment. If the bushing is not designed for such an application, it may be subjected to excessive force that may result in leaks or damage to the bushing.

The following guidelines can be used to ensure proper application.

1. The manufacturer should be made aware of the requirement so that the bushing can be designed and tested according to the special application.
2. When a bushing has been designed for usual service conditions as per C57.19.00 and needs to be applied at an angle greater than 20 degree from the vertical, it should be tested for cantilever requirements as per Note 2 of Table 4, C57.19.01 – 2000. The note basically specifies the following:

For angles greater than 20 degrees, an equivalent force appearing at the top terminals due to the weight of the bushing should be added to the design test values of Table 4 when testing the bushing in the vertical position.

The equivalent force due to the weight of the bushing can be calculated by using the following simplified formula:

$$\text{Equivalent force} = [W \times A \times \text{Sine } (T)] / [B \times \text{Sine } (T)]$$

Where

W - Bushing weight

T - Angle of mounting from the vertical, degrees

A - Distance of bushing center of gravity from the flange-mounting surface

B - Distance of mid point of top terminal from the flange-mounting surface

The actual cantilever test force when tested in the vertical position would be:

$$\text{Cantilever test force} = \text{Cantilever test value as per Table 4} + \text{Equivalent force}$$

The bushing should be tested in the vertical position using the above cantilever test force.

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