

Capillary Tubes In Insulating Glass Units

DEFINITIONS:

Capillary tubes are 12" or longer with an internal diameter of 0.032 inch or less. They are inserted into the edge spacer of an IG unit to allow pressure equalization during shipping and / or during in-service use. The most commonly used materials are stainless steel and aluminum alloy.

Breather tubes generally have an internal diameter of 0.125". They are inserted into the edge spacer of an IG unit to allow pressure equalization during shipping of the IG unit and must be closed and sealed at the job site or IGU failure will result. Materials of construction include but are not limited to aluminum, copper, and polyethylene.

Because breather tubes are large diameter than capillary tubes, they significantly increase the risk of excess moisture entering the unit and Vitro does not recommend their use. Therefore, the use of breather tubes is not addressed in this document.

The use of capillary tubes in IG units has always been a controversial issue. They have been used successfully for many years to relieve pressure differentials within IG units. The controversy centers on whether they are effective in keeping moisture out of the IG and whether manufacturers are capable of inserting and sealing them properly.

Historically, Vitro has avoided use of capillary tubes. However, occasionally severe shipping, handling, and glazing conditions have dictated that they be installed. In those cases, no IG warranty was given. Today Vitro still holds the belief that

their use will reduce the life expectancy of an IG unit. The degree of reduction depends upon the following:

1. Quantity and initial dryness of desiccant in the IG.
2. How well the capillary tube is sealed at the point of insertion through the spacer.
3. Whether the exposed end of the capillary tube is sealed or left open.
4. The internal diameter of the capillary tube.
5. The length of the capillary tube, if left open.
6. The exposure of the unit before sealing the capillary tube.
7. The in-service exposures of the unit (dry or wet climate).

In the manufacture of Intercept® IG units, Vitro has no control over any of the above items. So, we leave the decision to use or not use capillary tubes to the manufacturer of the units. If you do decide to use capillary tubes, here are several factors to keep in mind.

1. If you want the IG to stay flat in all conditions and choose to use "leave-open" capillary tubes, expect shorter IG life.
2. If you want to increase unit life while using capillary tubes, leave capillary tubes open until they reach their final destination, allow them to equilibrate, then crimp and seal the capillary tubes - the units will be flat initially, but after the capillary tubes are

sealed, flatness will vary with changes in temperature, atmospheric pressure, and wind load. If the capillary tubes are sealed thoroughly and properly, unit life will be longer than with "leave open" capillary tubes but will depend on the conditions to which the unit was exposed before sealing the tubes.

3. Don't skimp on desiccant and use extra care in sealing around the capillary tube where it enters the IG unit.

4. Do not use capillary tubes in gas filled units - the gas will leak out.

5. Check with your coated glass supplier to verify whether a particular coated glass can be used in IG units with capillary tubes. Hard-coat products can usually be used with open capillary tubes, even though IG longevity is reduced. With soft-coat products, in general the capillary tubes must be crimped and sealed after the IG units reach equilibrium at their destination. This will help protect the coating as well as improve IG longevity.

Vitro MSVD Soft Coat Products: Closed capillary tubes for high altitude applications may be utilized in insulating glass units incorporating Vitro MSVD Low-E coated glass, providing the capillary tubes are open at the installation altitude, allowed to stabilize for four to six hours, and then crimped closed and completely sealed with butyl to insure airtight integrity. This procedure will help to protect the coating as well as improve IGU longevity and may be performed at the time of receipt at the installation altitude, or at the job site. Permanently opened capillary tubes should not be used and are never recommended.

Again, if you can avoid the use of capillary tubes, do so.

HISTORY TABLE		
ITEM	DATE	DESCRIPTION
Original Publication	12/11/2001	TD-103
Revision #1	10/04/2016	Updated to Vitro Logo and format
Revision #2	1/22/2019	Updated the Vitro Logo and format
Revision #3	8/23/2023	Updated for policy change and to emphasize differences between capillary and breather tubes.

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