

About Capillary Tubes & Breather Tubes

Capillary tubes and breather tubes are used in insulating glass units to equalize the pressure between the sealed panes. The primary reason for the use of capillary or breather tubes is for installation of windows at high altitudes.

When a sealed IG unit is constructed at low altitudes and then installed at higher altitudes the resulting increase in altitude causes the glass panes to bow out and have a pillow shaped appearance. The glass bows because the sealed pressure at the time of assembly is greater than the pressure encountered at higher elevation. If the pressure change is large enough, the glass panes can fracture and/or the sealant holding the glass can rupture causing premature seal failure.

Breather Tubes

Breather tubes are defined as aluminum tubes with an inside diameter of approximately 0.125 inches and a typical length of 3 to 6 inches. They are intended to be sealed after pressure equalization at the installed altitude. Breather tubes are only intended to be open during shipment to the job site. All Weather does not recommend the use of breather tubes in their IG units.

Capillary Tubes

Capillary tubes are small stainless steel or aluminum tubes with a typical inside diameter of 0.10 to 0.020 inches, and a typical length of 12 inches. Capillary tubes are typically left open in the field, which allows the IG unit to equalize initially and maintain a generally flat appearance over time. All Weather uses only capillary tubes in high altitude applications.

Capillary Tube Function

Testing conducted by outside laboratories has shown moisture diffusion through a capillary tube is a function of the tube diameter and tube length, as well as humidity level and pressure changes. The results from testing have shown that with a small capillary tube diameter and sufficient tube length that the moisture diffusion through the tube is minimal.

In addition to diffusion, moisture is transported into the unit by the pressure changes caused by daily and seasonal temperature changes or "breathing" of the unit. In some units, primarily smaller IG units, this mode of transport can allow significant amounts of moisture into the airspace.

Capillary-tubed units are designed for the purpose of relieving pressure associated with high altitude only. Installation of a capillary-tubed unit in any other environment may significantly reduce its longevity. Because of this, All Weather recommends only installing capillary tubes in high altitude applications, and minimizing the use of capillary tubes whenever possible.

Equalization Rate

The rate of equalization is dependent upon temperature, barometric pressure, altitude, IG unit dimension, glass thickness, airspace width, and the type of insulating glass spacer. Typically, the majority of pressure equalization will occur within 48 hours. It is, however, unlikely the glass deflection will return to a perfect neutral or parallel position. Tempered or heat strengthened glass is used, additional bowing may be present due to the tempering process. Bowing of the glass from tempering can be significant, with as much as a 1/16th of an inch per foot of glass. This bow will remain regardless of whether the unit has pressure equalized.

Summary Points

- | All Weather does not use large diameter breather tubes in their IG units and will not honor the warranty of units with breather tubes.
- | Due to the possibility of unacceptably decreased longevity, All Weather does not suggest the use of capillary tubes in units not installed in high altitude areas and recommends minimizing the use of capillary tubes whenever possible.
- | All Weather does not sell high altitude argon filled units. Argon will easily diffuse through a capillary tube, and currently there are no dependable methods to seal off a capillary tube.
- | When a capillary tube is used, the majority of the glass deflection will be alleviated within 48 hours; however, complete equalization of the airspace (no glass deflection) may not occur because of constant changes in atmospheric conditions.
- | Windows constructed with tempered or safety- glazing glass can have a permanent bow due to the tempering process. There is no current solution for this problem. The homeowner should be made aware that windows with internal bars and safety glazing glass could have an objectionable gap between the bars and glass after a capillary tube has been installed.
- | IG units having capillary tubes installed by All Weather are covered by warranty, when used in high altitude applications. For this warranty, all capillary tube materials (tubes, covers, silicone, picks) must be purchased from All Weather and the All Weather installation procedure must be properly executed. Failure to utilize All Weather supplied materials or properly execute the installation procedure will void this warranty.

See [All Weather's Limited Warranty statement](#) for additional information or contact your All Weather representative for more information.