

## Use of Bumpers

Cardinal IG Company has done extensive testing on the use of soft urethane plastic bumpers with a PSA adhesive. These bumpers are used on internal grilles to maintain separation between the bars and glass. When grilles contact the glass surfaces, they can create a noise. The bumpers help reduce this noise, but do not guarantee the grilles will not squeak or rattle. The use or nonuse of bumpers does not have an effect on the IG unit warranty, since this phenomenon is not covered under standard warranty circumstances.

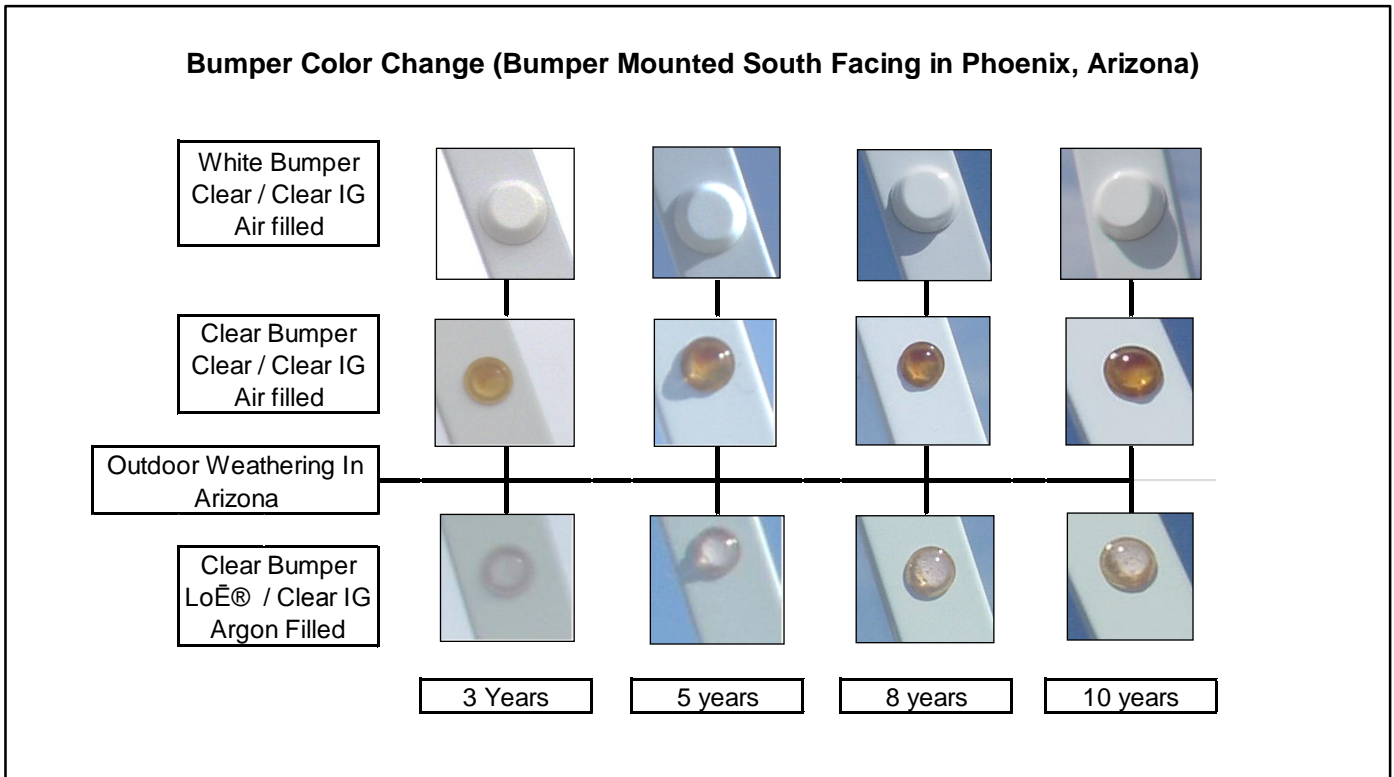
Bumpers were initially intended for use on simulated divided lite (SDL) grilles. These grilles are covered, on the outside of the glass, with an additional wood or metal grid. This external grid limited the exposure of the bumpers to sunlight. Many window and door manufacturers now require bumpers be used in situations where the bumpers will be visible and exposed to direct sunlight.

Cardinal IG Company's testing has shown there is a potential for discoloration with all bumpers currently available on the market. For this reason, Cardinal cannot offer a warranty for discoloration on these products. Cardinal's current position is to use, only when requested, white bumpers on all white grilles, colored bumpers when available and clear bumpers on grilles of all other colors. Testing has shown white and colored bumpers have significantly less potential for color change when compared to clear bumpers.

Testing has been conducted in QUV and Xenon Arc accelerated weathering devices and outdoors. This testing has shown a potential for discoloration prior to the 20-year seal failure warranty of a current IG unit. LoE® glass will reduce the potential for color change, though the use of these coatings will not eliminate the entire potential. The picture below illustrates the potential color change of a clear bumper compared to a white bumper with outdoor exposure in Phoenix, Arizona.

Testing indicates the potential for change in all weathering conditions. This testing does not indicate that in every situation the bumpers will change color, but again does indicate the potential. Factors found to affect this discoloration are temperature, intensity of light (window orientation), use of LoE® glass and argon filling. Location and design of the home and window will play a major factor in the rate of color change. Naturally, bumpers used next to the indoor glass lite in the airspace will not see the same temperature and UV light exposure as those directly facing the outdoors. Because of this, bumpers as viewed from the inside of the home will have significantly less opportunity for color change compared to ones that are viewed from the outside of the home.

Cardinal IG Company continues to research bumpers and other solutions that will provide the best performance for both noise reduction and aesthetics.



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