

## SEALANT BUBBLING

Bubble formation in sealant beads is an industrywide phenomenon that has occurred for many years. While normally not a performance concern, cured bubbles leave an unsightly cosmetic imperfection in an otherwise clean finished look. Sealant bubbling is normally a result of trapped gaseous pressure, typically water vapor, escaping from substrates or structural voids that push into uncured sealant. Although uncommon in many regions, sealant bubbles may form anytime the right combination of factors are present.

Bubbles usually form during the sealant “skin over” period, typically between five minutes and up to five hours after application. The probability for bubbling decreases as sealant curing progresses. While all sealant technologies and brands may experience bubbling, slower curing formulas (i.e., latex and solvent-based) have a higher propensity to bubble. Faster curing sealants (i.e., hybrid and silicone) experience far less occurrences. It’s important to note that bubbling is a system related phenomenon, and not a sealant defect.

Studies have identified several key variables, or leading factors that allow escaping pressure to form sealant bubbles. It’s usually the combination of two or more factors that produce the phenomenon. While there are other variables that can play a part, these five are the most frequent and important ones. Avoid future sealant bubbling by following the prevention recommendation for each factor.

- **Trapped moisture.** Moisture found within building material joint substrates can convert to vapor, creating pressure within the sealed joint. This pressure seeks to escape through pathways of least resistance. The sealant, in an uncured state, provides a medium in which the moisture vapor can begin a diffusion process which can result in bubbling. To limit trapped moisture, follow manufacturer instructions for handling and storing building materials. If moisture is unavoidable, allow materials to dry before applying sealant.
- **Rapid temperature rise.** The sun can cause rapid heat gain of exterior walls – upwards of a 70°F increase within an hour of direct sun exposure. Field observations confirm bubbling occurs most often on southern and westerly exposures. Allow exterior cladding installed on a cool, wet morning to sit a few hours before applying sealant.
- **Porous substrates.** Wood, cellular PVC, and other porous materials may trap moisture, increasing the likelihood of bubbling. Follow recommended procedures for priming and sealing cut ends of cladding materials to prevent moisture absorption.
- **Voids, channels, or capillaries** between cavities and substrate surfaces provide areas to trap moisture, similar to porous substrates, which may increase bubbling occurrences. Always follow cladding manufacturer storage, handling, and installation instructions, and provide for and maintain a proper drainage plain allowing for moisture and pressure outlets.
- **Structural movement** can displace gas contained in large voids forcing it through capillary channels leading to bubbling. Limit structural movement by allowing for proper acclimation of building materials prior to construction.

To repair bubbled sealant, fully remove the bubbled bead and reapply following the above bubbling avoidance recommendations. If circumstances prevent full bead removal, cut the surface off the individual bubbles. Apply the sealant to fill the cut open bubbles. Ensure direct and continuous contact with substrate(s) per manufacturer recommended installation instructions. Do not apply in very thin applications.

The best bubbling phenomenon solution is both prevention and the correct sealant selection. If bubbling is common in your region, take note of each recommended step above and choose a sealant that fits not only the job specifications but one that is considered bubble resistant. Henkel offers sealant technologies within its brand portfolios that are considered bubble resistant (i.e., OSI® QUAD® Max). Go to [ositough.com](http://ositough.com), [loctiteproducts.com](http://loctiteproducts.com), [gesealants.com](http://gesealants.com), or [lepage.ca](http://lepage.ca) to learn more about these solutions.

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