

Corner Fabrication

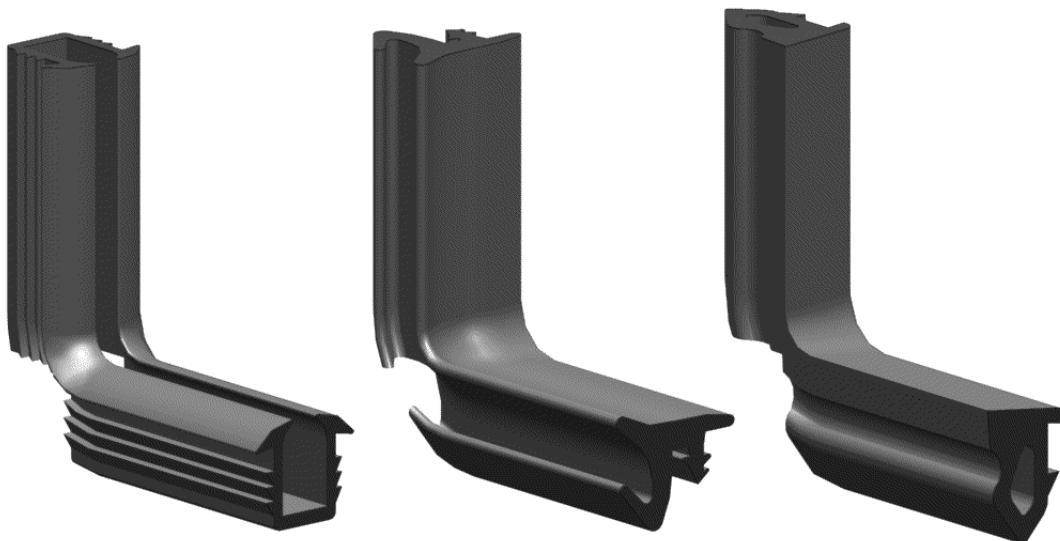
The most leak susceptible area in any gasket system is at the corners. It is a standard practice to provide some type of corner treatment to attain an acceptable level of weather tightness.

When a glazing system includes extruded gaskets, the corners on the exterior side of the lite are treated to effectively create a continuous gasket around the entire perimeter of the lite. Treating the corners on the interior side of the lite is often desirable.

There are six common corner treatments by which individual lengths of extruded gaskets are made into a continuous “picture frame” gasket:

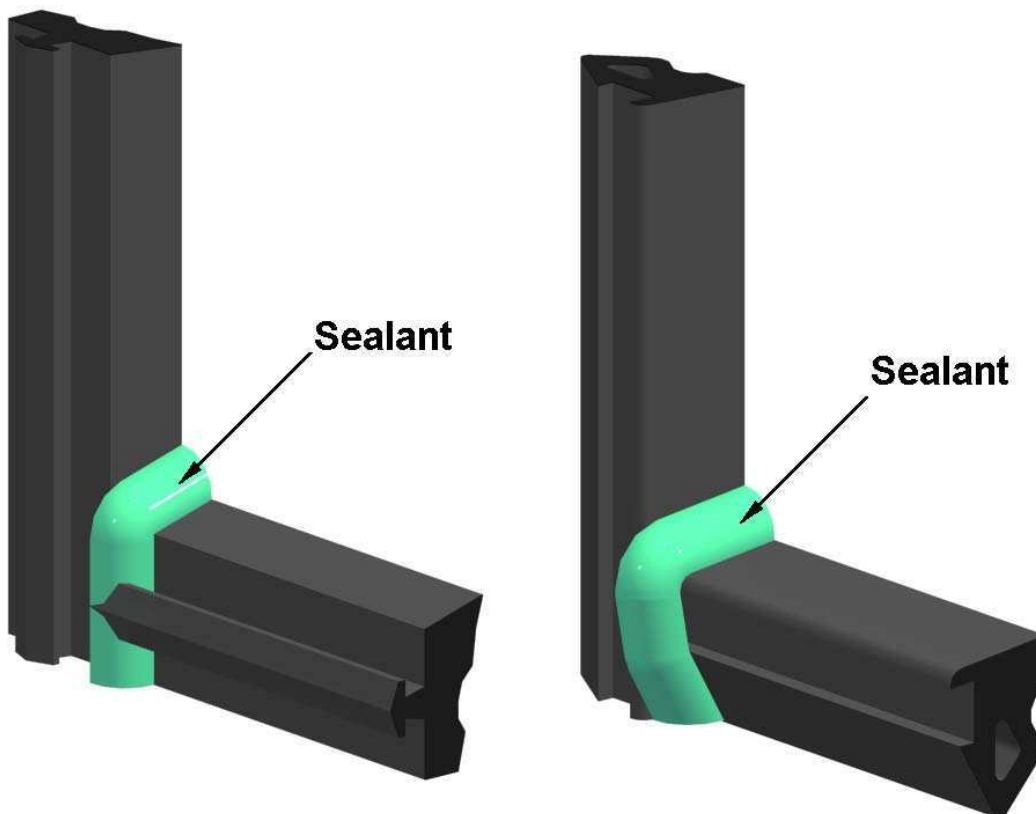
1. **Notch Cutting** is a procedure in which the underside of an extruded gasket is notched at the corners without cutting the exposed portion. This gasket is installed in one length and is butt joined in the middle of the jamb or head condition. This joint, then, is sealed with a wet sealant in many cases.

While this method gives the appearance of being continuous at the corners, it is not. This method does not afford good weather tightness and is generally considered unacceptable for commercial glazing. This treatment is often associated with PVC gaskets and lower performing or residential glazing systems.



2. **Sealed Corner Method** is simply a method by which the gasket is installed in four “cut lengths” and the corners are sealed with wet sealant.

While this method provides a weather tight corner, it is subject to workmanship error, e.g., short-cutting the gasket length. Butyl caulks have shown an acceptable level of adhesion to various rubber compounds, but such corners are subject to a relatively short life expectancy due to the performance limitations of butyl caulks. Using a silicone sealant for this application will extend the life of the corner seal, however, long term adhesion to typical rubber compounds is not assured. Silicone sealants will generally adhere to silicone rubber extrusions and some will adhere to Tremco’s SCR-900 and Peroxide EPDM cured compounds.



3. **Glued Corners** are formed by bonding carefully miter cut gaskets by means of a cold applied bonding cement. While this method can be performed on the job site, adequate quality can only be achieved in a factory environment.

Due to the nature of a cold curing “glue” line, performance of such corners should not be expected to match performance of “hot” procedures, yet to be discussed. This is one way, however, to provide corners with odd angles when volume does not warrant production of tooling needed for other fabrication methods



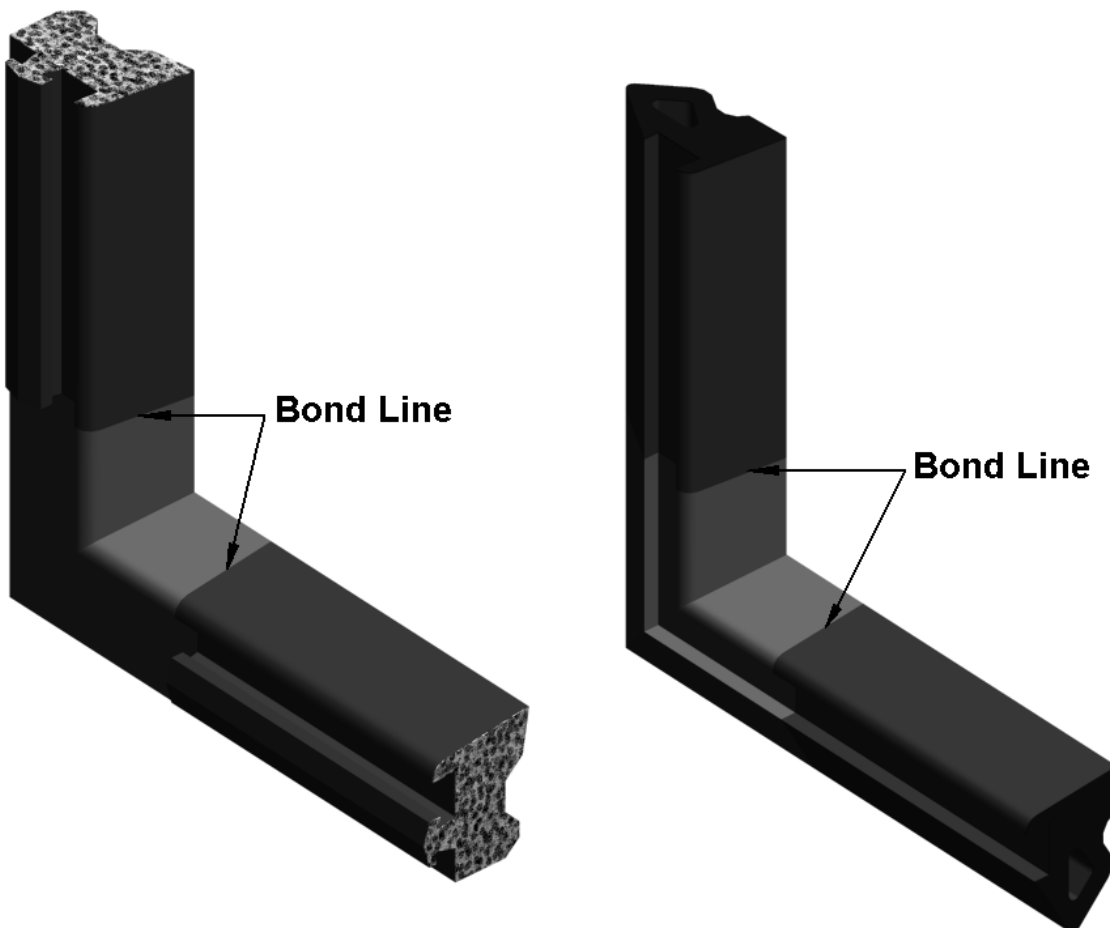
4. **Welded Corners** are formed by miter cutting gaskets by means of a hot knife then pressing the molten surfaces together as they come off the knife.

This method works only with thermoplastic materials (such as PVC) and is not applicable with Neoprene, EPDM or silicone thermoset rubbers. Thermoplastic extrusions are not typically used in high performance architectural applications requiring corners. Thermoplastic materials have higher compression set values than thermoset rubbers, which precludes their use in compression glazing applications.

5. **Vulcanized Corners** are similar to glued corners. The difference is in the “glue” that is used. Vulcanized corners use a “high temperature curing” bonding cement instead of an “ambient temperature curing” cement. This results in a much more durable “glue line” in the corners.

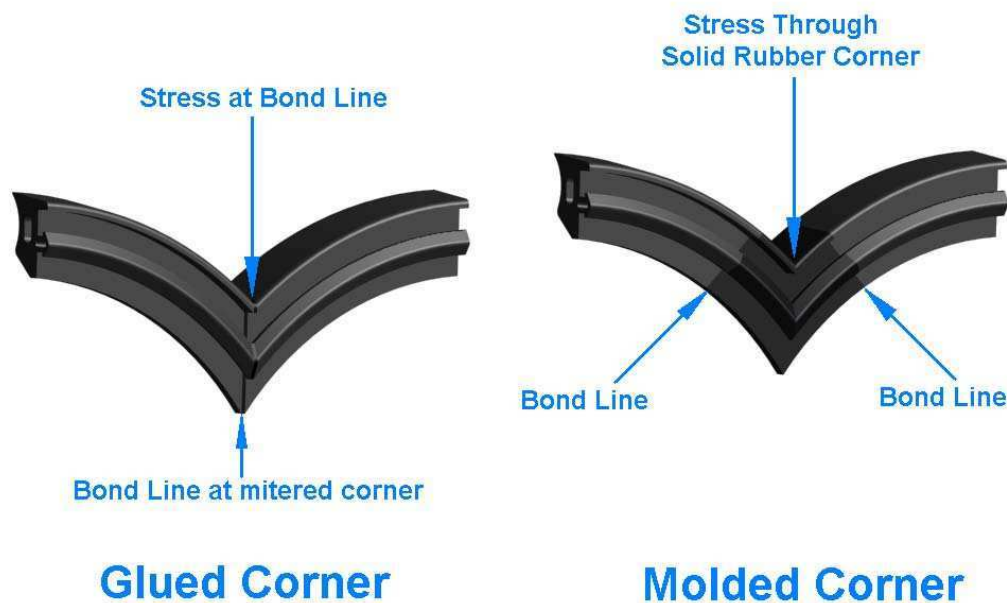
Vulcanized corners are produced by applying a bonding compound to the miter cut ends of a gasket. They are then mated in a heated mold that is custom machined for that profile. The mold is closed and the corner is cured by means of heat.

6. **Injection Molded Corners** is the common term used for corners produced by the “transfer molding process”. These corners are formed by injecting a specially formulated rubber compound between the ends of an extrusion that is “locked” into a custom machined mold. The formed corners are then cured by means of heat and pressure.



The advantages of molded corners are all in the process. An inherent weakness in vulcanized corners lies in the bonding of the two pieces of rubber at the mitered corner. Any stresses placed on the corner from thermal movement, handling, installation or any other reason, are directed right at the bond line. This gives rise to premature splitting of the corner which may result in air and water infiltration.

An injection molded corner eliminates this potential problem by eliminating the gasket to gasket bond at the corner. An entirely new section of gasket is formed in the shape of the corner and is then bonded to the gasket a short distance away from the corner. The bond of the injection molded corner to the gasket is superior to the vulcanized bond for two reasons. First, the injection molded corner bond is formed from compounds being injected into the mold by a ram driven by 1,000 psi to 1,500 psi pressure, whereas a vulcanized corner is not formed with pressure. Second, the position of the bond in an injection molded corner allows distribution of stress away from the bond line, while a vulcanized bond directs stresses at the bond line.



The use of injection molded corners, however, does have special concerns. The corners formed by this process are dense rubber. Therefore, when molding corners for cellular profile, the corners are not cellular. And when molding corners for a hollow profile, the corners may not be hollow. This creates a potential for imparting increased pressure on the glass at the corners.

Tremco has handled this through control of the hardness of the molding compounds and through design of the corner molds. Typically, the corner itself is softer than the actual extrusion. This compensates for the loss of the hollow profile in the corner. Using these criteria, Tremco has not experienced a problem related to excessive corner induced pressure. This success involves many millions of molded corners.

In the beginning, when deciding what type of corner to produce at Tremco, it was decided to go with the most secure system available, which was and still is today the “injected molded corner”.

GASKET INSTALLATION INFORMATION

1. Picture frame gaskets can become slightly deformed, due to shipment and/or storage in cartons. These should be unpacked and placed flat or draped over temporary racks to allow recovery to original shape. Gaskets shipped on reels can become “slightly stretched or deformed” from factory reeling. These, therefore, should be unrolled and allowed to relax before cutting to final length. In temperatures colder than 40°F (4°C), arrangements should be made to warm gaskets before installation. Care should be taken not to apply direct and excessive heat to the gasket. This will minimize the potential for excessive glazing pressure on the glass edge due too cold, stiff rubber gaskets.
2. Factory fabricated gaskets, sponge or dense, are sized to be about 1/2% to 1% longer than the day light opening (D.L.O.). This is referred to as “crowd”. Crowd is the addition of material to the gasket’s extruded length to ensure the fabricated corner will not be pulled out, caused by relaxation in the gasket’s length. Relaxation may occur in the rubber extrusion because of the manufacturing process and the handling of the material. Lineal gaskets, which are supplied on reels or coils and are cut on the job should also have this same amount of crowd added. ***However, cutting gaskets on site may require an additional 1/2% be added to account for stretching of the gasket which generally occurs during field measuring.*** Factory cut lineal gaskets can be supplied upon special request, to ensure the proper crowd is added. This may reduce the installation time by eliminating cutting errors and minimize scrap.
3. Insertion of sponge picture frame gaskets into the framing system should be performed by first pushing the gasket’s dart at the two upper corners (1 embedding in sealant if required). Then finding the center of the gasket’s length at the head, push the gasket’s dart into the metal race at the center of the opening. The balance of the head member should be inserted, working from the center towards the corners. The two lower corners should be installed next (1 embedding in sealant if required), followed by the balance of the jamb members, again working from the center towards the corners. Finally the sill member should be inserted, following the same procedure.
4. When setting glass, care must be taken not to displace the exterior gasket. Visual inspection should take place after glass is set to ensure the exterior gasket has not been displaced (rolled out of position). Be sure that the glass is centered in the opening so the correct gasket coverage on the glass (bite) is achieved. (Setting blocks should already be in proper position)

5. The dense drive-in wedge can be supplied in a molded picture frame gasket like the pre-set gasket and can be cut to length, as described in #2, approximately 1/2% longer than the nominal day light opening to prevent the possibility of gaps developing at the corners. ***However, cutting gaskets on site may require an additional 1/2% be added to account for stretching of the gasket which generally occurs during field measuring.*** The wedge should be installed at the sill first, by inserting the corners or cut ends first (1 embedding in sealant if required). Then install the wedge at the setting block locations and the center of the gasket's length. Complete installation by installing the "loops", working from the center towards the corners. The upper two corners would be installed next, followed by the jambs. Always halving the gasket's length and working from the center out. Where a lubricant is desired, plain water, an IPA solution or mineral spirits can be used. (The use of lubricants may interfere with the proper adhesion of sealant used to seal gasket corner conditions. Lubricants should be removed from the gasket and adjacent substrates prior to the application of sealants.) When using temporary wedges, they should be a minimum of 4" long and placed directly over setting blocks at the sill and quarter points at the head and jambs.

6. Gaskets should not be installed into framing until the opening is ready to be glazed so as not to expose the gaskets to debris or construction damage.

1 Some glazing systems may require a sealant in the corners to provide a better air and water seal. Sealants can be used which are recommended to be compatible with the gaskets, sealants used in and around the metal-to-metal joinery, and incidental contact with insulating glass seal if applicable.

Tremco's Butyl Sealant is approved for contact with all Tremco sponge and dense EPDM, Peroxide EPDM, SCR-900 and Neoprene extrusions. However, the butyl sealant will not adhere to cured silicone sealants if used to seal the metal-to-metal joinery.

Tremco non-acid curing silicone sealants are approved to be applied against Tremco sponge and dense EPDM, Peroxide EPDM, Neoprene, SCR-900 and silicone rubber extrusions. Adhesion may only occur with Tremco's SCR-900, Peroxide EPDM and silicone compounds. Please note: silicone sealants will cure resulting in a firm rubber product. Allowing the sealant to cure prior to setting glass, may result in excessive pressure, if a volume of sealant is allowed to cure at the corner.

GASKET SIZING INFORMATION

1. For all gaskets with factory molded corners the dimension of the day light opening (D.L.O.) will be supplied by the customer. Tremco will allow for any flaps and proper amount of crowd in the picture frame fabrication.
2. Tag marks should be assigned to the D.L.O. dimensions since the unit size cannot be written on each tag.
3. See the sketch for determining the dimensions for the day light opening (D.L.O.).

