

## TECH NOTE #15

### Minimize Hardware Damage During Shipping and Handling of Casement Windows

This tech note is meant to assist window manufacturers in developing proper handling and packaging methods that help prevent damage to the window hardware.

Shipping and handling is one of the major contributors to field service issues. If proper precautions are not taken, severe damage to the window unit can occur. In rare cases, damage can happen during shipping and handling which can result in a window sash falling out of the opening after installation. Risk of serious personal injury or property damage may result.

Hardware is designed to handle the loads seen after installation. It is possible that the loads inadvertently applied during shipping and handling could greatly exceed loads expected after installation. All casement windows are designed with a reveal between the sash and frame. This reveal, combined with bouncing, jarring, or other unintended movements during transit, may result in high impact loads which could damage the fasteners or window hardware.

A potentially more severe issue than shipping is dropping a casement window onto its side. Without correctly placed shipping blocks, even a small drop of a large window onto a hard surface can result in high impact loads and damage to the hardware.

Below are a few of the factors that will affect the degree of damage a window could suffer if window is inadvertently dropped:

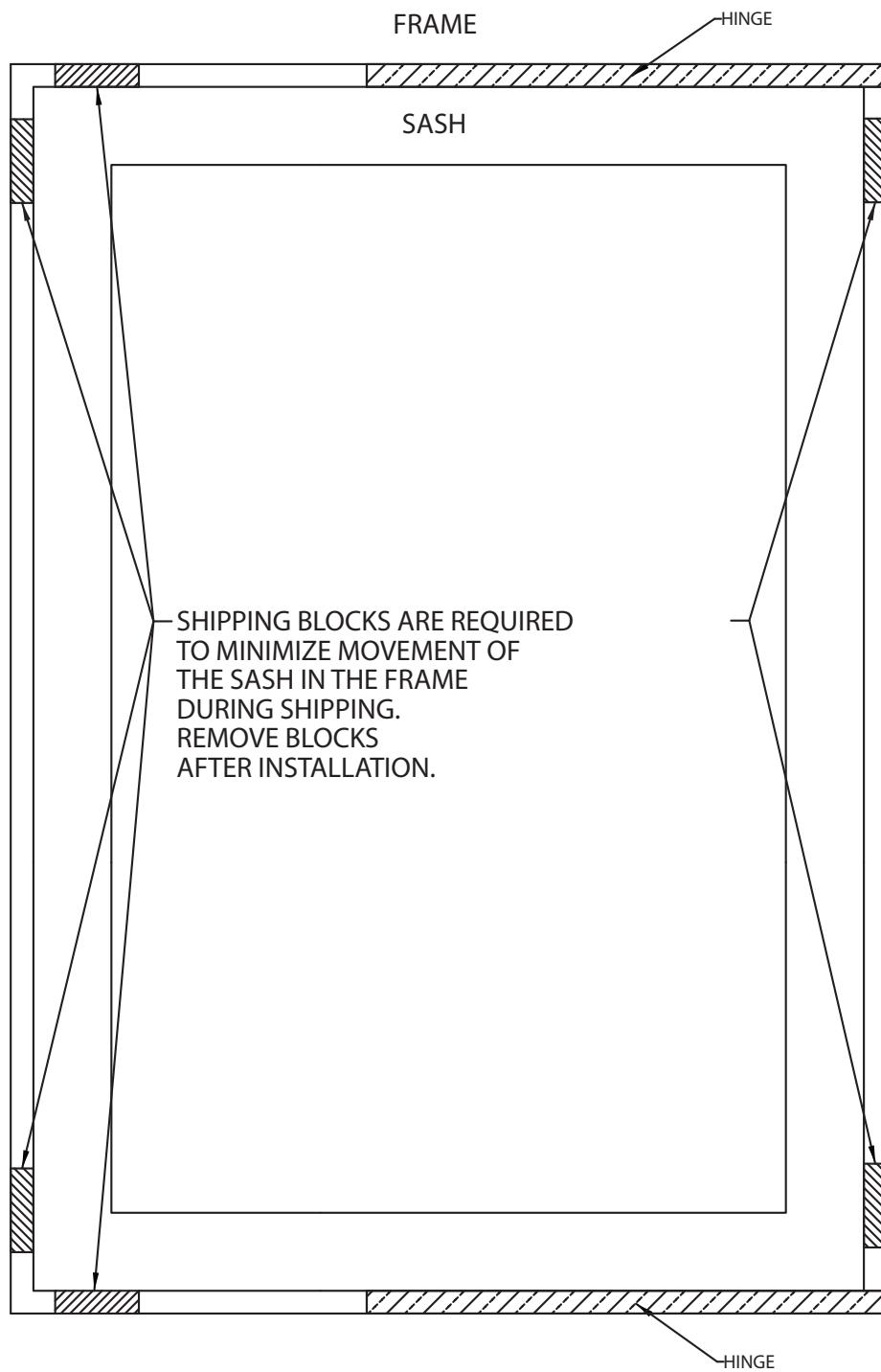
- The weight of the sash.
- The height of the drop.
- The type and location of shipping blocks.
- The ability of the sash and frame to cushion the impact.
- The portion of impact energy absorbed by the weatherstrip.
- The amount of impact energy absorbed by the lock system.
- The cushioning effect of external packaging.

Truth has developed the following guidelines to minimize shipping and handling damage to the window hardware.

#### Shipping Blocks Between the Sash and Frame

Shipping blocks between the sash and frame near the corners are required to help minimize damage. These shipping blocks will transfer the impact load directly from the sash to the frame instead of transmitting it through the hinges and other hardware. In order for the shipping blocks to work correctly, they must be both rigid enough and large enough to prevent the sash from shifting more than .060 inches within the frame when the window is dropped, bounced, or experiences other unintended movements during transit. Truth offers consultation with customers to assist in preparing specifications for appropriate shipping block designs.

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### **Shipping Orientation**

Truth recommends that casement windows are shipped in their upright position (sill down). In this orientation, the hinges have their highest resistance to impact loads.

### **Drop Testing**

Truth highly recommends that window manufacturers test their casement windows for resistance to shipping and handling damage. Truth understands that manufacturers may already have their own testing procedures in place to anticipate this damage; however, the following guidelines may help manufacturers who currently do not have their own test protocols. Select the largest and heaviest window size offered. Pick a unit with dimensions giving the largest hinge cavity (tallest frame & shortest sash) that tolerances will allow.

- Insert shipping blocks in appropriate locations.
- Position the closed and locked window with the lock side down on a rigid floor (preferably concrete).
- Raise the head of the window to the test height and drop it to the floor. The test height specification should be established by the window manufacturer to meet their needs. Truth recommends a window manufacturer should consider a test height of at least 6 inches to prevent damage from drops that are quite likely to occur in the field.
- Raise the window to its upright position on the floor (with the sill on the floor, the sash will not be able to fall far if damage has occurred).
- Open it carefully and inspect for damage to the hardware. Look for:
  - A broken, bent, or loose hinge stud.
  - A hinge arm disconnected or partially unsnapped from the stud.
  - Loose screws.
  - A bent hinge track.

Do not install a window exhibiting any of the foregoing conditions.

- Open and close the window completely and lock it to verify that the operator and locks function correctly.
- Due to variability of results, several samples should be tested and inspected for damage. Manufacturers should consider a variety of tests from forces being applied at various angles to minimize the damage that could be caused by other inadvertent loadings.

### **In Transit Testing**

Truth recommends that manufacturers consider in transit testing or vibratory platforms testing of windows using their available equipment or their normal shipping methods. One testing method is to send the units round-trip to the farthest location that your product is sold to test real shipping and handling effects. Inspect for damage upon the return of the shipment. Appropriate precautions should always be taken to ensure the product is properly secured during transit.

This Tech Note is for general guidance only. Window manufacturers, distributors and any other 3rd party must exercise due care in connection with establishing measures that will help prevent damage to the product in individual circumstances.