

## YOW 225 H WINDOW SYSTEM



### YOW 225 H SYSTEM DESCRIPTION

- 2-1/4" Overall Depth
- Variations: Casement, Projected Vents, & Fixed Windows
- 9/16" & Optional 1-1/6" Insulating Glass
- Optional Screens

### YOW 225 H PERFORMANCE FEATURES

- ANSI/AAMA 101-97
- AW-65 Rating (Operable & Fixed)
- Factory Assembled & Sealed

## Installation Manual



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## **INSTALLATION NOTES**

1. Do not drop, roll or drag boxes of aluminum framing. Move and stack boxes with proper support to prevent distortion. If fork lifts are used, be especially careful about striking the boxes when lifting or moving.
  2. Store in a dry, out of the way area. If rain exposure, condensation or any water contact is likely, then all packaging material should be removed. Wet packaging materials will discolor and may stain aluminum finishes and paints.
  3. All materials should be checked for quantity and quality upon receipt, YKK AP must be notified immediately of any discrepancies in shipment. Check to make sure that you have the required shims, sealants, supplies, and tools necessary for the installation.
  4. Carefully check the openings and surrounding conditions that will receive your material. Remember, if the construction is not per the construction documents, it is your responsibility to notify the general contractor in writing. Any discrepancies must be brought to the general contractor's attention before you proceed with the installation.
  5. Collect your shop drawings, materials, packing list, and this installation manual. Carefully review parts location, the sequence of installation, when you glaze it, and how you seal it. Installation instructions are of a general nature and may not cover every condition you will encounter. The shop drawings and/or installation manuals were prepared specifically for the product.
  6. Any material substitutions must be of equal or greater quality.
  7. Make certain that material samples have been sent for compatibility testing for all manufacturer's sealants involved. Make certain that sealants have been installed in strict accordance with the manufacturer's recommendations and specifications.
  8. Consult sealant manufacturer for proper sealant and backer rod selection.
    - A. Small Missile: Dry Glaze interior, YKK AP approved structural silicone for exterior cap bead.
    - B. Large Missile: Use only YKK AP approved structural silicone.
- For projects in Florida, refer to Florida Product Approvals for approved sealants. For all other projects, refer to approved shop drawings and engineer of record.
9. Remember to isolate, in a approved manner, all aluminum from uncured masonry or other incompatible materials.
  10. System-to-structure fasteners are not supplied by YKK AP. Fasteners called out on shop drawings are to indicate minimum sizes for design loading.
  11. If any questions arise concerning YKK AP products or their installation, contact YKK AP for clarification before proceeding.

## INSTALLATION NOTES

12. YKK AP window installation is typically completed before drywall, flooring and other products which may still be in process. Take the extra time to wrap and protect the work produced.
13. Cutting tolerances are plus or minus one thirty second unless otherwise specified.
14. YKK AP Model YOW 225 H windows are prefinished, prefabricated, and preassembled products, and must be protected against damage.
15. Concrete, mortar, plaster, muriatic acid and other alkaline and acid based construction and cleaning materials may be very harmful to window finishes and should be removed with water and mild soap immediately or permanent damage or staining of the finishes will occur. A spot test is recommended before any cleaning agent is used, and abrasive type cleaners must never be used.
16. Windows are never to be used as ladders, step stools, scaffolds or scaffold supports.
17. All work must start from, and be referenced to benchmarks, offset lines and/or column centerlines established by the architectural drawings and the general contractor.
18. All windows must be installed plumb, square, level and true, and in accordance with approved shop drawings and these installation instructions.
19. Glass and glazing building codes governing the design and use of products vary widely. YKK AP America Inc. does not control the selection of products, product configurations, operating hardware and function, or glazing materials, and YKK AP assumes no responsibility for these design considerations. It is the responsibility of the design professional, owner, architect, specifier, general contractor, and the installer to make these selections in strict accordance with all applicable codes.
20. Do not fasten ceiling support angles, blind pockets, drapery tracks, convactor covers or stools to the windows or the receptors. The window system is not designed to support the additional load and must be free to expand and contract under normal thermal cycling conditions.
21. For projects that require an Official Dade County NOA (Notice of Acceptance) please contact your local Service Center for Approved Product Applications. (Keep or delete?)
22. Check our website, [www.ykkap.com](http://www.ykkap.com), for the latest installation manual update prior to commencing work.



## INSTALLATION

### STEP 1 DETERMINE WINDOW REFERENCE POINT

Establish the window reference lines or the exterior/interior plane of the windows to be installed using either bench marks, offset lines, or column centerlines provided by the general contractor and referenced on the shop drawings. Use the established reference points to determine the installation points for each window opening at the head, jambs, and sill.

### STEP 2 DETERMINE TYPE OF ANCHOR FASTENER TO BE USED

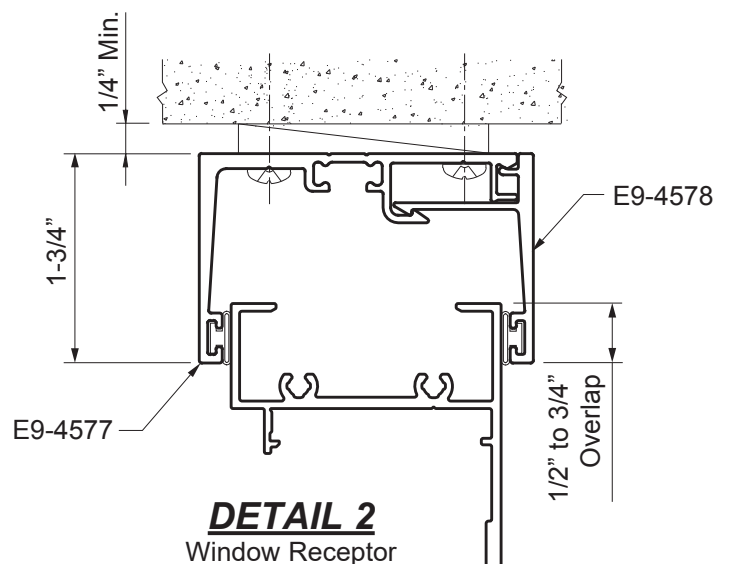
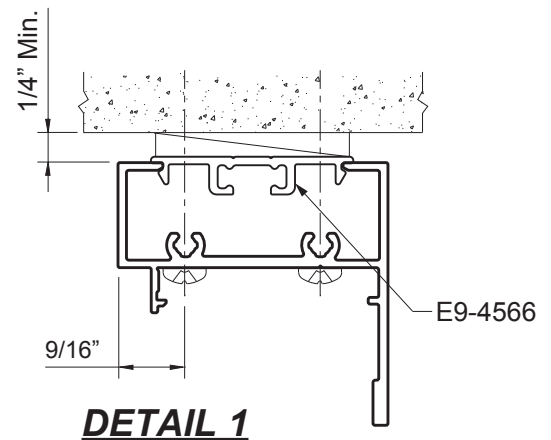
-Anchoring must follow the details as shown on the Florida Product Approvals or as provided by a state registered P.E.

See **Details 1 & 2**.

Location of fasteners:

- A maximum of 3" from the corner of all frames and receptors.
- At 15" on center staggered from the front to the back.
- A maximum of 3" on each side from the centerline of ventilator locking points.
- Shim solidly between the window and building substrate and do not "open" window joinery when anchoring.
- Add anchorage at hinges, especially butt hinges.

**Note:** For fabrication and installation of head receptors, sill flashings, strap anchors, steel twist anchors, edge clip anchors, and trim & clip anchors, refer to the **Window Accessories Installation Manual**.

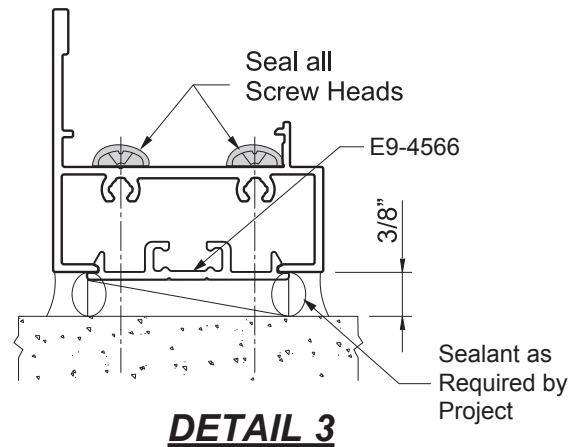


## INSTALLATION

### STEP 2 (Continued)

#### DETERMINE THE TYPE OF WINDOW ANCHORS TO BE USED

Refer to the specific fastener manufacturer's recommendations for proper edge distance, embedment, and spacing for masonry applications. Seal all screw heads that penetrate the framing and make water tight. See **Detail 3**.



### STEP 3

#### VENTILATOR INSTALLATION AND ADJUSTMENT

- All operating hardware and components must be checked for proper alignment, margins, and operation.
  - If necessary adjust the hinges, keepers, friction arms and pivots to ensure the proper operation of locking devices and the compression of the weather seal.
  - Push hinges as close to the hinge jamb as possible and as tight towards the interior as possible.
  - Check gasket compression between frame and vent. Insert a piece of paper between the frame and vent. Close the vent. Moderate resistance to pulling the paper should be felt. Check all four sides of the vent.
  - All hardware must be cleaned to provide smooth operation.
- See **Page 11** for multi-point lock adjustment.

**Note:** To re-install 4-bar hinges after loosening or removal, tighten the fasteners by hand using a screwdriver or allen wrench, depending on fastener type. Aggressive over-tightening may strip the fasteners.



**CALCULATING GLASS SIZES**

<b>ELEVATION FIXED WINDOW</b>					
		<b>FIXED GLASS SIZE</b>	<b>GLASS W</b>	$FW - 3 \frac{3}{8}'' [85.7\text{mm}]$	$FW - 3 \frac{3}{8}'' [85.7\text{mm}]$
		<b>GLASS H</b>	$FH - 3 \frac{3}{8}'' [85.7\text{mm}]$	$h1, h2 - 2 \frac{15}{16} [74.6\text{mm}]$	$FH - 3 \frac{3}{8}'' [85.7\text{mm}]$

<b>ELEVATION CASEMENT OUTSWING</b>		<b>Outswing</b> 	<b>Outswing</b> 	
		<b>VENT GLASS SIZE</b>	<b>GLASS W</b>	$FW - 5 \frac{7}{8}'' [149.2\text{mm}]$
		<b>GLASS H</b>	$FH - 5 \frac{7}{8}'' [149.2\text{mm}]$	$h1 - 5 \frac{7}{16}'' [138.1\text{mm}]$
<b>FIXED GLASS SIZE</b>		<b>GLASS W</b>	N/A	$FW - 3 \frac{3}{8}'' [85.7\text{mm}]$
		<b>GLASS H</b>	N/A	$h2 - 2 \frac{3}{8}'' [60.3\text{mm}]$

**NOTE:** GLASS BITE = 1/2"

<b>ELEVATION PROJECT OUTSWING</b>		<b>Outswing</b> 	<b>Outswing</b> 	
		<b>VENT GLASS SIZE</b>	<b>GLASS W</b>	$FW - 5 \frac{7}{8}'' [149.2\text{mm}]$
		<b>GLASS H</b>	$FH - 5 \frac{7}{8}'' [149.2\text{mm}]$	$h1 - 5 \frac{7}{16}'' [138.1\text{mm}]$
<b>FIXED GLASS SIZE</b>		<b>GLASS W</b>	N/A	$FW - 3 \frac{3}{8}'' [85.7\text{mm}]$
		<b>GLASS H</b>	N/A	$h2 - 2 \frac{3}{8}'' [60.3\text{mm}]$

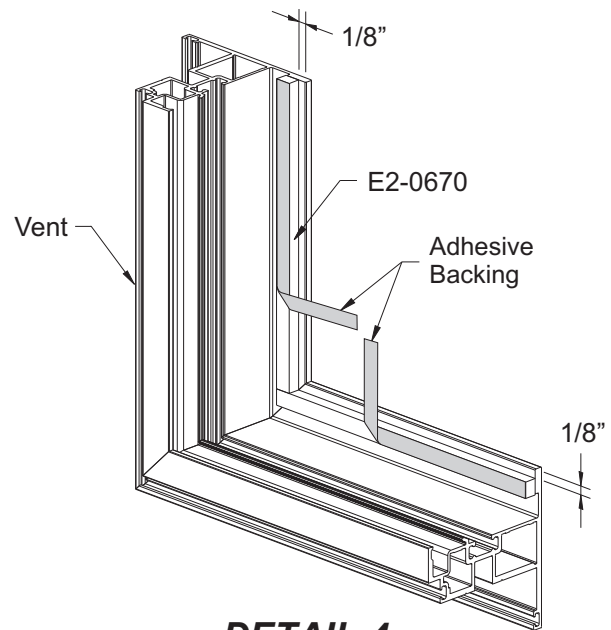
**NOTE:** GLASS BITE = 1/2"

## GLAZING

### STEP 4A PREP CASEMENT WINDOWS

Casement windows require “Corner Blocking” for proper operation.

1. Verify that the frame and vent are properly aligned with a 1/8” margin around the entire perimeter of the vent.
2. Remove the glazing beads and clean the exterior glazing leg with an approved cleaning agent using the “two cloth” cleaning method. Also clean the interior corners of the frame glazing pocket.
3. Install exterior glazing tape, E2-0670, on all four sides:
  - Leave a 1/8” gap between the edge of the tape and the edge of the ventilator.
  - Make certain that the corners of the tape do not overlap as this will prevent full contact around the perimeter of the glass.
4. Peel back the tape adhesive backing 3” to 4” at each corner and fold them towards the inside of the vent.



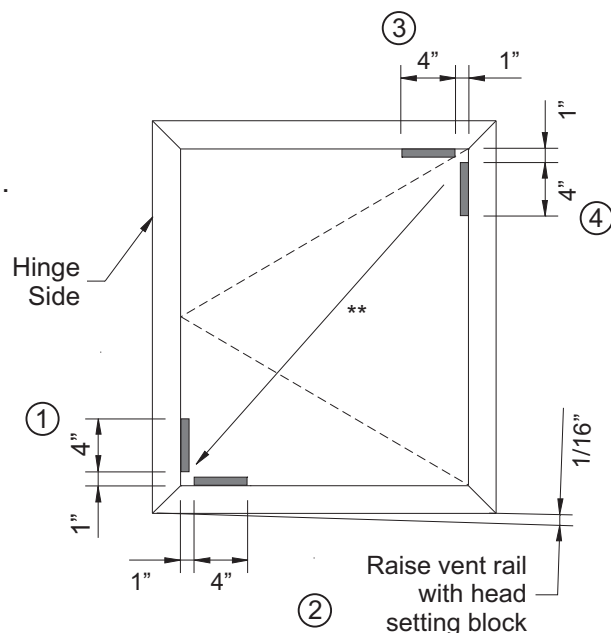
**DETAIL 4**

See **Detail 4**.

5. Install setting blocks at locations 1, 2, and 4.
6. If bench glazing, make sure that the casement is fully supported from underneath before proceeding.
7. Unlock ventilator lock and install a setting block at location 3.
8. Change setting blocks as required to square up the vent
9. Raise up the vent’s locking rail 1/16” and shim so that as the setting blocks compress the locks will align properly.

See **Detail 5**.

Finish Glazing in accordance with glazing instructions in **Steps 5 thru 6**.



**DETAIL 5**

\*\* Glass weight is transferred to bottom corner and hinge.

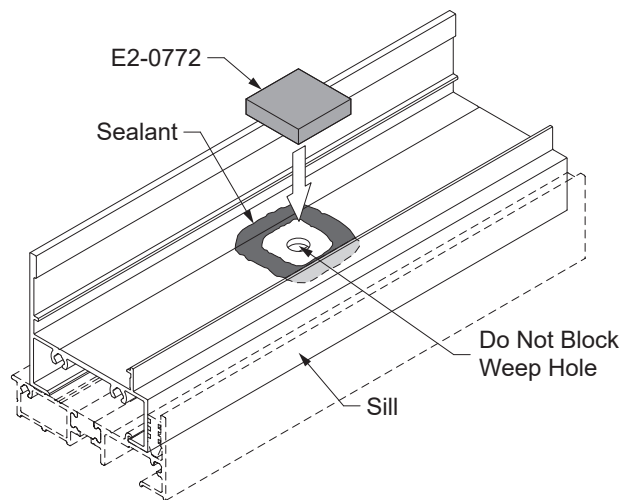
## GLAZING

### STEP 4B PREP FIXED WINDOWS

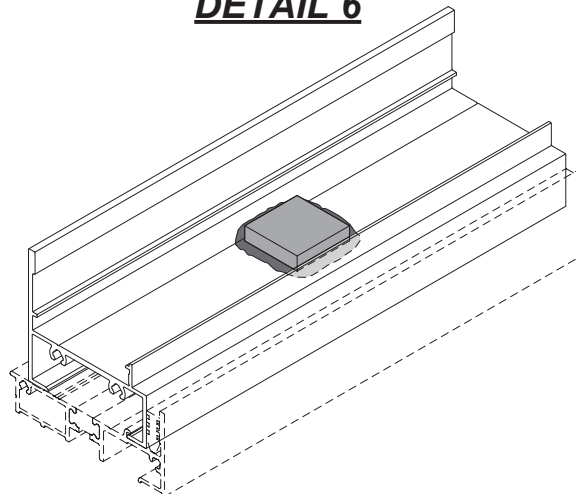
#### Optional Weep Hole Baffles when using Sill Flashing:

- Prior to field glazing fixed lites, adhere a weep baffle (E2-0772) with sealant, over the weep hole in the sill, centered on the weep hole.
- Tool the excess sealant after application.

See **Detail 6**.



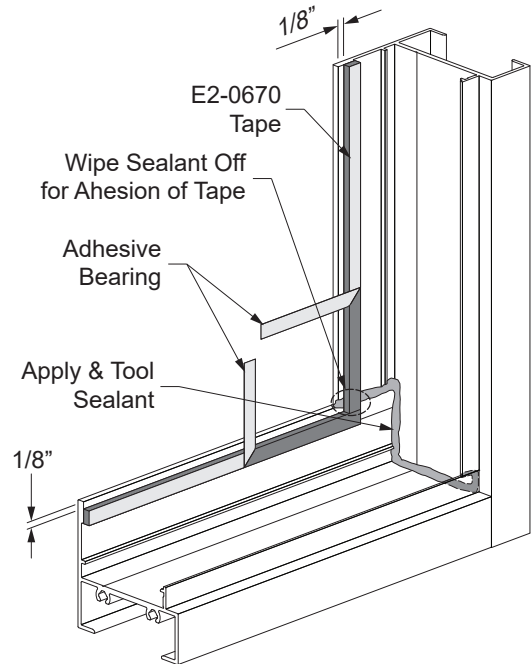
### **DETAIL 6**



**GLAZING**

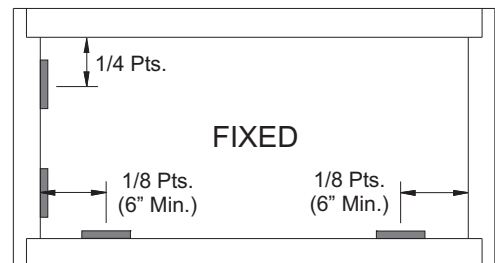
**STEP 4B (Continued)  
PREP FIXED WINDOWS**

1. Verify that the frame is square.
2. Remove the glazing beads and clean the exterior glazing leg with an approved cleaning agent using the “two cloth” cleaning method. Also clean the interior corners of the frame glazing pocket.
3. Apply and tool sealant to the interior corners of the frame glazing pocket as shown in **Detail 7**.
4. Prior to installing exterior glazing tape, E2-0670, wipe the sealant off where the tape is to be adhered.
5. Install exterior glazing tape on all four sides:
  - Leave a 1/8” gap between the edge of the tape and the edge of the ventilator/frame.
  - Make certain that the corners of the tape do not overlap as this will prevent full contact around the perimeter of the glass.
6. Peel back the tape adhesive backing 3” to 4” at each corner and fold them towards the inside of the vent/window.
7. Install setting blocks at 1/8 points (at least 6” from jambs) for fixed frames and intermediate horizontal mullions.
8. Install (2) side blocks at 1/4 points for fixed frames as shown.



**DETAIL 7**

See **Detail 8**.



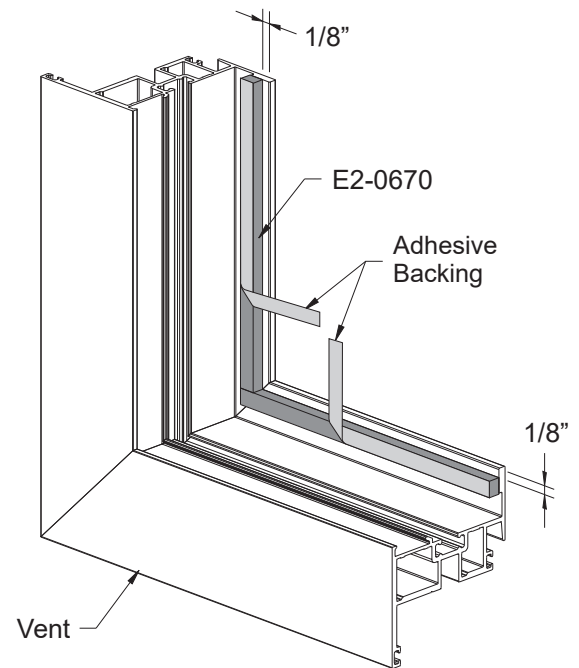
**DETAIL 8**

## GLAZING

### STEP 4C PREP PROJECTED WINDOWS

1. Verify that the frame and vent are properly aligned with a 1/8" margin around the entire perimeter of the vent.
2. Clean the glazing leg that is to receive the glazing tape using the "two cloth" cleaning method and an approved cleaner.
3. Install exterior glazing tape, E2-0670, on all four sides:
  - Leave a 1/8" gap between the edge of the tape and the edge of the ventilator/frame.
  - Make certain that the corners of the tape do not overlap as this will prevent full contact around the perimeter of the glass.
4. Peel back the tape adhesive backing 3" to 4" at each corner and fold them towards the inside of the vent/window.

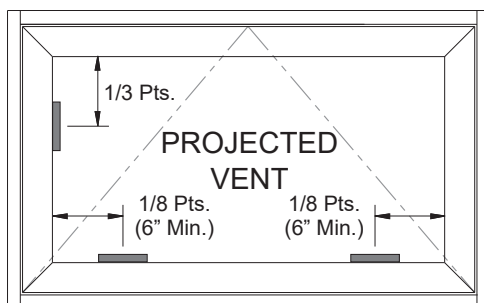
See **Detail 9**.



**DETAIL 9**

5. Install setting/side blocks for projected windows as shown in **Detail 10**.

Finish Glazing in accordance with glazing instructions in **Steps 5 thru 6**.



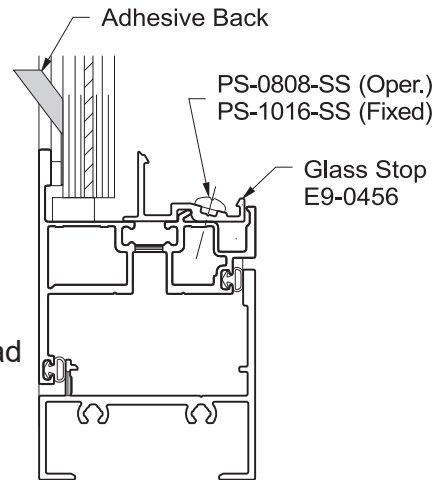
**DETAIL 10**

## GLAZING

### STEP 5 LARGE MISSILE GLAZING

1. Center the glass and carefully set the unit down onto the setting blocks.
2. From the exterior of the window gently pull the folded adhesive backing ends to remove it and adhere the glass to glazing tape.
3. Press the glass firmly against the exterior glazing tape.
4. For Casement and Projected vents, and Fixed frame at head and sill, install E2-0359 down into the small channel.
5. Install the head and sill glass stops and attach them at 3" from each end and then 10" on center using PS-0808-SS fasteners for casements and projected vents and PS-1016-SS for fixed windows.

See **Detail 11**.

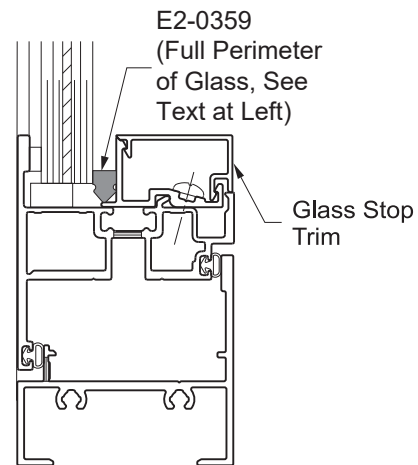


**DETAIL 11**

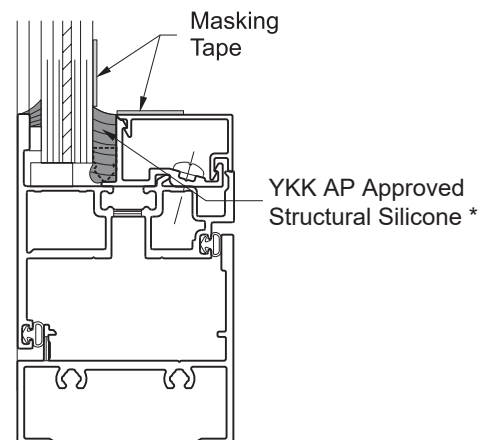
6. Snap on the interior glass stop trim members.
7. Install the glass stops for jambs and repeat **Step 4**.
8. Cut silicone spacer E2-0359 to be installed at the perimeter of the glass lites: 2 horizontal pieces at D.L.O. width plus 1-3/8", and 2 vertical pieces at D.L.O. height plus 3/4". Install the horizontal spacer first by pushing them into the cavity as shown in **Detail 12**. Then install the vertical spacers.
9. Make sure all silicone contact surfaces and joints have been cleaned with isopropyl alcohol (50%) and wiped clean using the "two cloth cleaning" method.
10. Apply masking tape to the window and glass as shown.
11. Apply structural silicone into the cavity between the window and the glass. Use positive pressure so that the silicone sealant completely fills the cavity.
12. Using a spatula or other non-scratching implement, tool the silicone sealant immediately after running the joint. Exert positive pressure while tooling to ensure that the silicone sealant makes complete contact with all surfaces. Be careful not to remove too much silicone.
13. Remove masking tape within ten minutes of tooling.

See **Detail 13**.

**Caution:** Do not permit the silicone sealant to skin over before it is tooled. Immediately remove masking tape after tooling silicone sealant.



**DETAIL 12**



**DETAIL 13**

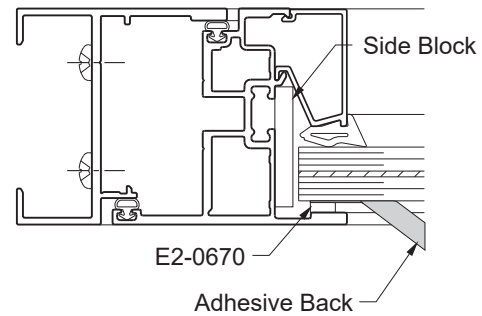
\* For impact glazing in Florida, refer to Florida Product Approvals.

## GLAZING

### STEP 5A SMALL MISSILE GLAZING

1. Center the glass and carefully set the unit down onto the setting blocks.
2. From the exterior of the window gently pull the folded adhesive backing ends to remove it and adhere the glass to glazing tape.
3. Press the glass firmly against the exterior glazing tape.

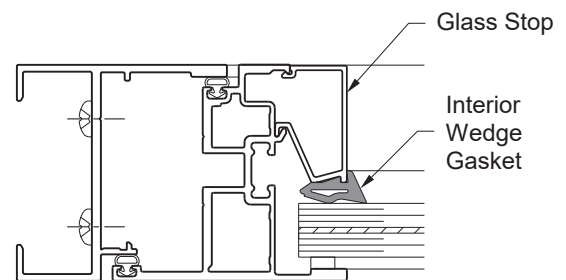
See **Detail 14**.



**DETAIL 14**

4. Install the interior glass stops.
5. Cut interior wedge gasket to the day light opening dimension plus 1/8" per foot.
6. Install the wedge gasket, first install each end and then the center of the gasket; push in the remainder of the gasket, working from the center toward each end.

See **Detail 15**.



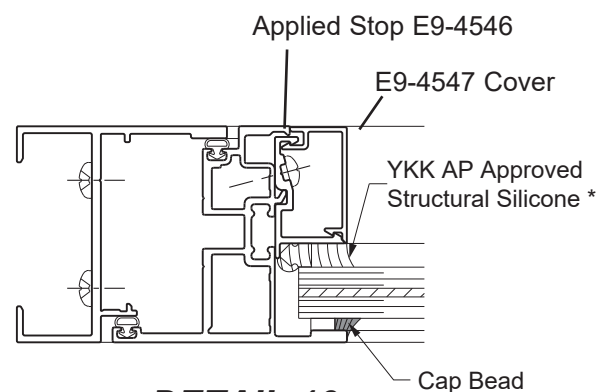
**DETAIL 15**

### STEP 6 APPLY CAP BEAD (For Fixed or Vent Glazing)

1. Apply Tremco Tremsil® 600 sealant or equal to the joint between the glass and glazing leg. When applying sealant vertically, start at the bottom and work your way up. Make sure the sealant completely fills the joint. Cover the aluminum glazing leg with sealant.
2. Using a non-scratching implement, tool the sealant immediately after running the bead. Exert positive pressure to ensure that the sealant makes complete contact with all surfaces. Cap bead should cover at least 50% of the external glazing leg.

Be careful not to remove too much sealant.

See **Detail 16**.



**DETAIL 16**

\* For impact glazing in Florida, refer to Florida Product Approvals.

**INSTALLATION OPTIONS****STEP 7 (Optional)****INSTALL OPTIONAL STACKING MULLIONS / I-MULLION**

Refer to the **Window Accessories Installation Manual** for installation of optional stacking mullions or I-mullions.



## HARDWARE

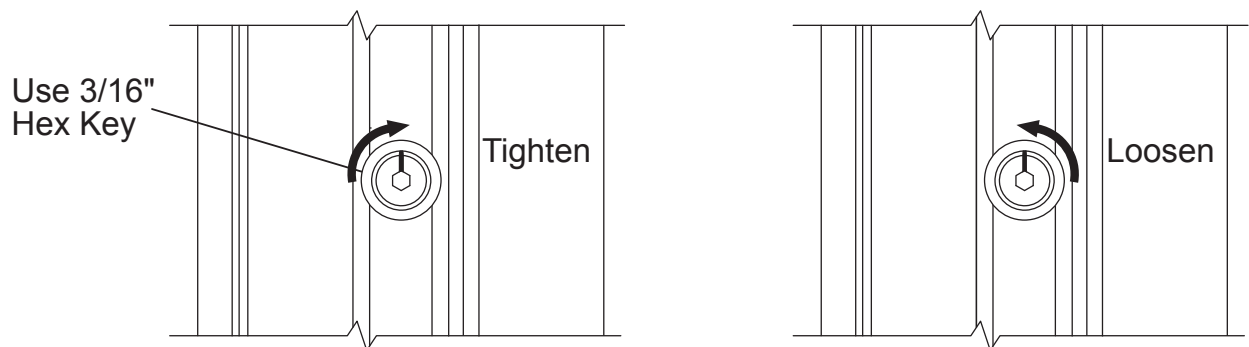
### STEP 8A MULTI-POINT LOCK ADJUSTMENT (FOR OUTSWING WINDOWS ONLY)

Adjust flushness of window keepers as necessary.

1. Neutral as factory installed.

See **Detail 17**.

2. Use 3/16" hex key to rotate lock point.
  - A. Turn clockwise to tighten seal.
  - B. Turn counter-clockwise to loosen seal.



**DETAIL 17 – In/Out**

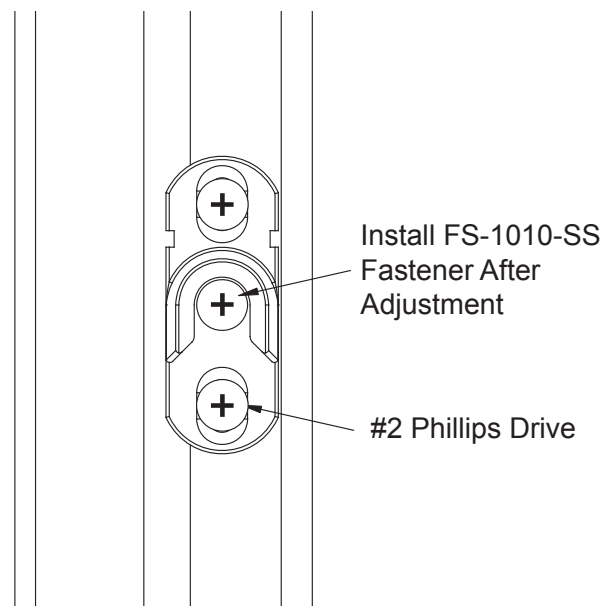
### STEP 8B KEEPER ADJUSTMENT

Adjust left/right free swing clearance of window keepers as necessary.

1. Neutral as factory installed.

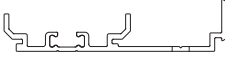



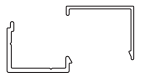
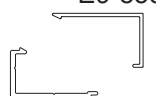

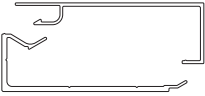
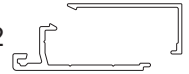
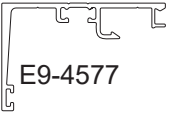

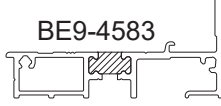
See **Detail 18**.

2. Use #2 Phillips drive to lightly loosen fastener.
  - A. Slide keeper to allow 1/8" clearance from locking point.
  - B. Using #2 Phillips drive, tighten fastener.
  - C. After final adjustment install FS-1010-SS to lock keeper in place.

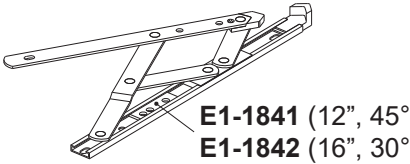
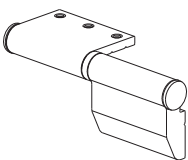
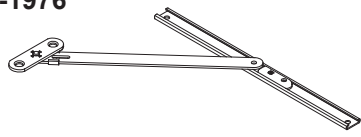
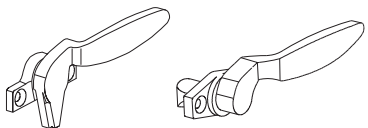

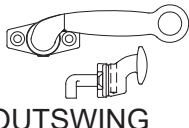


**DETAIL 18 – Left/Right**



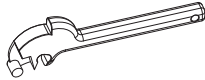
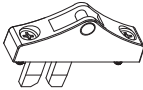
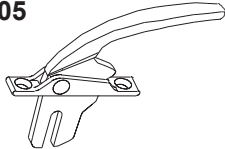


## ANCHORING PARTS LIST

PART	DETAIL	DESCRIPTION	MATERIAL
STRAP ANCHOR	E1-1779 	4-1/2" length of E9-4529, used at indicated locations to add strength at anchor points.	ALUMINUM
TWIST ANCHOR	E1-1970 	Twist in anchor located as required. (Approved for up to Wind Zone 3 only)	GALVANIZED STEEL
ANCHOR FILLER	E9-4566 x 2 1/2" LG. 	Anchor filler for head, jamb, & sill at through anchors.	ALUMINUM
FRAME FILLER	E3-0038 x S.L. 	Frame filler for backer rod support at head, jamb, & sill	PVC
1" x 1-1/4" TRIM & CLIP	E9-4556 E9-4557 	Trim & clip anchor for head, jamb, & sill.	ALUMINUM
1" x 1-11/16" TRIM & CLIP	E9-8538 E9-8537 	Trim & clip anchor for head, jamb, & sill.	ALUMINUM
1" x 2" TRIM & CLIP	E9-4032 E9-4031 	Trim & clip anchor for head, jamb, & sill.	ALUMINUM
1-1/8" x 3-1/2" TRIM & CLIP	E9-8563 E9-8562 	Trim & clip anchor for head, jamb, & sill.	ALUMINUM
ANCHOR CLIP	E9-4035 E1-1922 	2" long edge clip with trim cover for head, jamb, & sill.	ALUMINUM
HEAD/JAMB RECEPTOR	E9-4577  E9-4578 	Head or Jamb Receptor. Used with E2-0051 bulb gasket.	ALUMINUM
SILL FLASHING	BE9-4583 	Sill flashing used with E2-0367 spacer. Optional sill extensions also available.	ALUMINUM


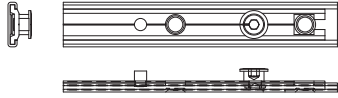
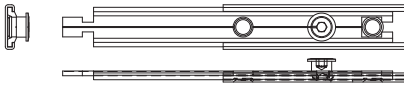
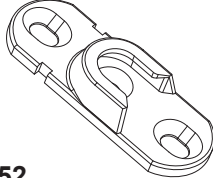
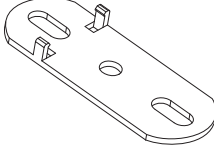
## HARDWARE

PART	DETAIL	DESCRIPTION	MATERIAL
<b>4-BAR HINGES &amp; LIMIT STOPS</b>	<p> <b>4K-14207</b> (12")  <b>4K-14208</b> (16", Casement Only)  <b>5K-15284</b> (16", Project Out Only)  <b>E1-1957</b> (12" Egress, Casement Out Only)                 </p>  <p> <b>E1-1841</b> (12", 45°)  <b>E1-1842</b> (16", 30°)                 </p>	<p>4-Bar Hinges allow for efficient and durable operation of projected and casement vents.</p> <p>Limit Stops allow vents to be opened to a preset maximum opening.</p>	STAINLESS STEEL
<b>BUTT HINGES</b>	<p> <b>E1-1714</b> (LH)  <b>E1-1715</b> (RH)                 </p> 	Butt Hinges are optional on casement outswing and inswing vents.	ALUMINUM
<b>FRICTION ADJUSTER (STANDARD)</b>	<p><b>E1-1976</b></p> 	Friction adjusters are standard on all butt hinge casement windows.	STAINLESS STEEL
<b>CAM HANDLES</b>	<p> <b>E1-1541</b> (RH)      <b>E1-1503</b> (RH)  <b>E1-1542</b> (LH)      <b>E1-1504</b> (LH)                 </p> 	White Bronze Cam Handles for manual operation of vents. E1-1541 / E1-1542 are standard on outswings; E1-1503 / E1-1504 are standard on inswings.	WHITE BRONZE
<b>CUSTODIAL CAM LOCKS (OPTIONAL)</b>	<p> <b>E1-1596</b>      <b>E1-1517</b> </p> 	Custodial locks are offered for maintenance operation. These type of locks are used in place of cam handles.	WHITE BRONZE
<b>POLE RING CAM HANDLE (OPTIONAL)</b>	<p> <b>E1-1853</b> (LH) — INSWING  <b>E1-1854</b> (RH) — INSWING  <b>E1-1882</b> (LH) — OUTSWING  <b>E1-1881</b> (RH) — OUTSWING                 </p> 	Pole Ring Handles are offered for windows inaccessible through normal means.	WHITE BRONZE

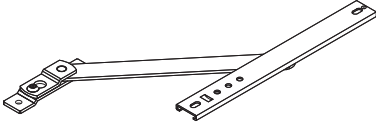



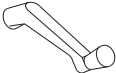
## HARDWARE

PART	DETAIL	DESCRIPTION	MATERIAL
STANDARD MULTI-LOCK	<p><b>E1-1966</b></p> 	<p>Standard Multi-Locks with 4" handles are use to secure casement inswing and outswing and project out vents. Available for all windows.</p>	<p>Die Cast / Steel / Powder Coated or Plated</p>
EXTENDED MULTI-LOCK (OPTIONAL)	<p><b>E1-1994</b></p> 	<p>Optional Multi-Locks with 8" handles are use to secure casement inswing and outswing and project out vents.</p>	<p>Die Cast / Steel / Powder Coated or Plated</p>
CUSTODIAL MULTI-LOCK	<p><b>E1-2011 Handle</b></p>  <p><b>E1-2010 Lock</b></p> 	<p>Custodial Locks are offered for maintenance operation. These types of locks are used in place of E1-1966 multi-lock handles.</p>	<p>Die Cast / Steel / Powder Coated or Plated</p>
BRONZE CRAFT MULTI-LOCK (OPTIONAL)	<p><b>E1-1505</b></p> 	<p>Optional Multi-Lock handles are use to secure casement inswing and outswing vents.</p>	<p>WHITE BRONZE</p>
CUSTODIAL MULTI-LOCK (OPTIONAL)	<p><b>E1-1655</b></p> 	<p>Custodial Locks are offered for maintenance operation. These types of locks are used in place of E1-1505 multi-lock handles.</p>	<p>WHITE BRONZE</p>
STANDARD PULL HANDLE	<p><b>E1-1981</b></p> 	<p>Amesbury-Truth Pull</p>	<p>Satin Nickel / Chrome or Powder Coated</p>

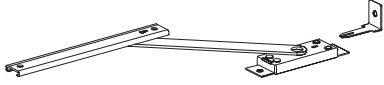
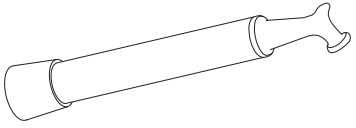
HARDWARE

PART	DETAIL	DESCRIPTION	MATERIAL
<p>PULL HANDLE (OPTIONAL)</p>	<p>E1-1508</p> 	<p>Bronze Craft Pull</p>	<p>WHITE BRONZE</p>
<p>LOCK BAR BASE</p>	<p>E1-1954-xxxx</p> 	<p>5-1/4" to 48" 1 to 3 Points</p>	<p>ALUMINUM / STAINLESS STEEL</p>
<p>LOCK BAR EXTENSION</p>	<p>E1-1955-xxxx</p> 	<p>6" to 22" 1 Point</p>	<p>ALUMINUM / STAINLESS STEEL</p>
<p>INTERLOCK KEEPER</p>	<p>E1-1952</p> 		<p>DIE CAST / STAINLESS STEEL</p>
<p>KEEPER SHIM</p>	<p>E1-1953</p> 	<p>1/8" Thickness</p>	<p>PLASTIC</p>





## HARDWARE

PART	DETAIL	DESCRIPTION	MATERIAL
<b>4" LIMIT DEVICE (OPTIONAL, APPROVED FOR NEW YORK CITY)</b>	<b>E1-1904</b> 	Keyed Limit Device meeting the fall revention requirements and approved for New York City.  (Note: this hardware may be used in locations outside New York City.)	<b>STAINLESS STEEL</b>
<b>STANDARD SINGLE ARM ROTO- OPERATORS</b>	<b>E1-1987 LH 8" E1-1988 RH 8" E1-1989 LH 14" E1-1990 RH 14"</b> 	Single Arm Roto Operators are available as an option for Casement Outswing windows and include the E1-9932 handle.  Available on all outswing windows.	Die Cast / Steel / Powder Coated or Plated
<b>OPTIONAL SINGLE ARM ROTO- OPERATORS</b>	<b>E1-1590 RHR E1-1591 LHR</b> 	Optional Bronze Craft Single Arm Operator	Composite, White Bronze, Stainless Steel
<b>DUAL ARM ROTO- OPERATORS</b>	<b>E1-1991 5.5" E1-2012 7" E1-2013 9" E1-1992 11"</b> 	Dual Arm Roto Operators are available as an option for Project Out windows and include the E1-9932 handle.  Available on all outswing windows.	Die Cast / Steel / Powder Coated or Plated
<b>STANDARD CRANK HANDLE</b>	<b>E1-9932</b> 	For Use with Roto Operators	Die Cast / Steel / Powder Coated or Plated

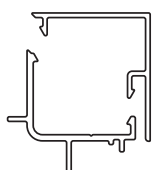
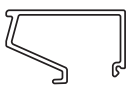
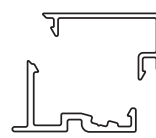
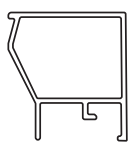
**HARDWARE**

PART	DETAIL	DESCRIPTION	MATERIAL
<p><b>KEYED LIMIT DEVICE (OPTIONAL)</b></p>	<p><b>E1-1572</b></p> 	<p>Permits the window to be opened a maximum of 6” and return to the closed position without the use of a tool or key. For maintenance or washing, key releases the window from the limit arm for reversal. When reversed, the window can be washed from the interior. Reclosing of window and re-engagement of limit arm is accomplished without key.</p>	<p>STAINLESS STEEL</p>
<p><b>PULL RING POLE ASSEMBLY (OPTIONAL)</b></p>	<p><b>E1-9930</b></p> 	<p>White bronze pull ring pole operates the pole ring cam handle. Available in lengths of 4’, 6’, and 8’.</p>	<p>WHITE BRONZE</p>

## GLAZING CHART

GLASS/PANEL DEPTH	EXTERIOR		INTERIOR	
	F.C.	BACKER TAPE	F.C.	WEDGE GASKET
9/16" Large Missile	1/8"	E2-0670 	1/8"	E2-0359 
9/16" Small Missile	1/8"	E2-0670 	1/8"	E2-0672 

## GLASS STOPS

9/16" LARGE MISSILE GLAZING		9/16" SMALL MISSILE GLAZING	
PART NUMBER	DETAIL	PART NUMBER	DETAIL
E9-4544 Fixed Glass Stop E9-4545 Snap Cover		E9-4521	
E9-4546 Vent Glass Stop E9-4547 Snap Cover		E9-4522	







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