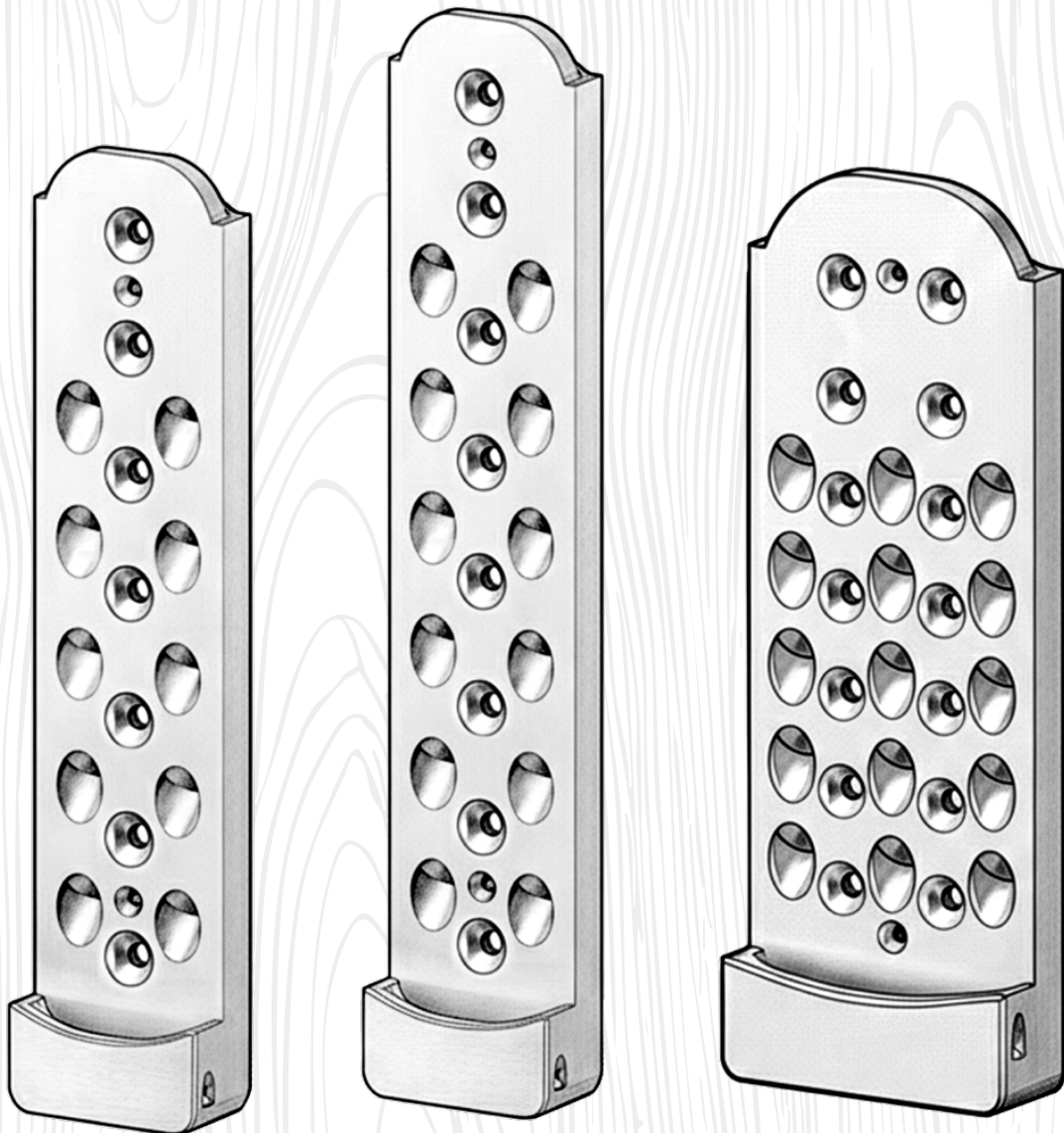
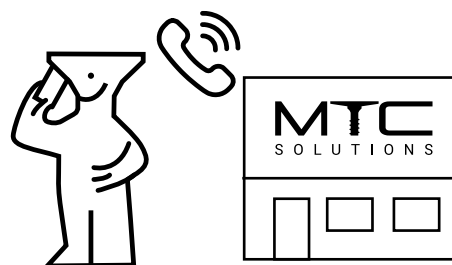
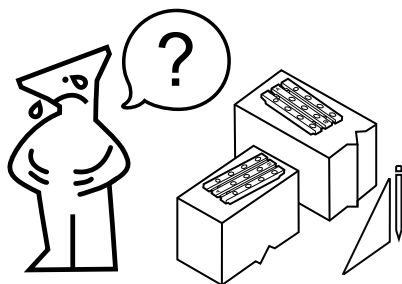


# APEX

Version 1.0





## General Notes to the Installer

1. Carbon steel fasteners shall only be used in dry service conditions, as exposure to wet service conditions may lead to premature failure. Connections designed for dry service conditions should be protected from wetting and excessive moisture during construction.
2. During construction, mass timber elements may experience temporary surface wetting, potentially causing the timber surface moisture content (MC) to exceed 19%. In such cases, A3K electroplated carbon steel fasteners are acceptable for use, provided that the following three conditions are met. First, the surface wetting shall not exceed the moisture limits defined for dry service conditions for more than a few weeks per year. Second, the annual average MC during construction shall remain within the range of 10–16%. Third, the design must incorporate appropriate detailing to accommodate dimensional changes in the wood due to wetting and/or drying. If any of these conditions cannot be met, fasteners with enhanced corrosion resistance are recommended, and detailing must be adjusted accordingly.
3. Use a drill equipped with a feather (variable-speed) trigger to ensure proper torque management and mitigate the risk of overtorquing. Although impact guns are not expressly prohibited, their use is discouraged due to increased risk of overtorquing. If an impact gun is utilized, limit its use to short screws and maintain a continuous drive without pausing.
4. APEX connectors must be installed with the listed MTC-FTC (ASSY) screws. Substitution of fasteners is not permitted.
5. If splitting of a wood member or fastener damage is observed prior to or during installation of the fasteners, the installation process must be stopped, and the Engineer of Record (EOR) must be contacted immediately to provide appropriate site instructions to rectify the issue.
6. A pilot hole is a short, starter hole intended to reduce installation torque and wandering of the screw. Pilot holes may be used to facilitate fastener installation with greater precision. Pilot holes shall be 1 in. [ 25 mm ] deep and their diameters shall not exceed the minor diameter,  $D_m$ , of the fastener.
7. For fasteners installed in a countersunk hole, a pilot hole using the Predrilling Jig is recommended to ensure proper installation of the fasteners.
8. A hole is considered predrilled if its length matches the entire embedment of the fastener. Predrilling is recommended for installation of fasteners into dry (<10% MC) Southern Yellow Pine (SYP) to reduce installation torque. Predrilling is required when installing connectors into Parallel Strand Lumber (PSL) and the edge of laminated veneer products to reduce the risk of splitting.
9. Screws should be fully driven in an uninterrupted process, from tip insertion to head seating. If necessary, a torque wrench may be used to complete installation immediately after initial insertion of the screw.
10. Refer to the project's approved shop drawings or details from the glulam manufacturer for the required connector position. For additional information on routing and housing requirements, refer to MTC beam hanger design guide.

Table 1.1 - APEX Hardware Package Installation Overview

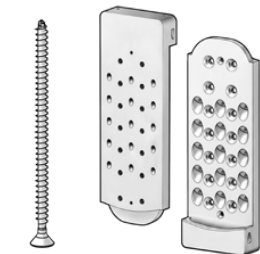
APEX		Plate Qty.	Fasteners				Installation Time min.
Series	Model		Primary Member Type	Qty.	Secondary Member Type	Qty.	
100	APEX S	2	MTC-FTC 10 x 200 mm	17	MTC-FTC 10 x 200 mm	17	13
	APEX M	2	MTC-FTC 10 x 200 mm	20	MTC-FTC 10 x 200 mm	20	15
150	APEX L	2	MTC-FTC 10 x 200 mm	29	MTC-FTC 10 x 200 mm	29	20
	APEX XL			Coming soon			

Notes:

- Subsequent tabulated capacities in this chapter assume connectors are installed with MTC-FTC (ASSY VG CSK) (see Table 1.2 on Page 3) fasteners specified in this table and in accordance with CCMC 13677-R..
- The estimated installation time is based on a time study and includes steps for layout and positioning, installation of nonstructural positioning screws, drilling a 1 in. [ 25 mm ] deep pilot hole for each fastener, and structural screw installation for both plates. Refer to Page 5 for more information.
- Each product kit includes four 1/4 x 3-1/8 in. [ 8 x 80 mm ] MTC-PTC (see Table 1.1 on Page 3) nonstructural positioning screws.



Product Kit Details



MTC-FTC      APEX Plates

Fastener Designation Update

To reflect improvements in our quality-control program, some screw designations used in this guide have been updated. While the fasteners themselves remain unchanged, MTC Solutions now applies an enhanced quality-verification process—specifically additional screening related to hydrogen-embrittlement resistance. The updated naming convention identifies fasteners that have undergone this added level of verification, ensuring clarity and consistency across all MTC technical documents.

All factored resistances remain valid for both the legacy and the current designations.

Table 1.2 - Fastener Designation Updates

Legacy Designation	Current Designation	Description
ASSY VG CSK	MTC-FTC	Fully Threaded (FT), Countersunk (C) head
ASSY VG CYL	MTC-FTCY	Fully Threaded (FT), Cylinder (CY) head
ASSY ECOFAST	MTC-PTC	Partially Threaded (PT), Countersunk (C) head

Example: MTC-FTC-10x200 (metric) or MTC-FTC-3/8x7-7/8" (imperial)

# Installation - APEX General Requirements

## Tool Requirements

### Tools - Use the Correct Bit

MTC Solutions fasteners should only be driven using RW bits, or appropriately sized star bits. This ensures good centering and positioning with optimal torque transmission. For the APEX, use an RW 50 bit for the 3/8 in. [ 10 mm ] screws.

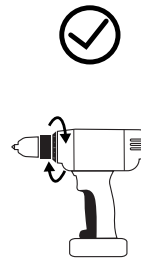


### Tools - Use the Correct Drill

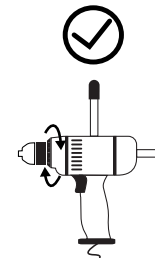
Use low-RPM, high-torque drills equipped with a feather (variable speed) trigger to install fasteners. Avoid excessive acceleration and deceleration during the drive-in process. Do not overtorque fasteners. Although impact guns are not expressly prohibited, their use is discouraged - particularly for beam hanger systems - due to an increased risk of overtorquing. Use the appropriate drill chuck size according to the fastener.

Table 1.3 - Recommended Torque, Drill Bits, and Power Drill

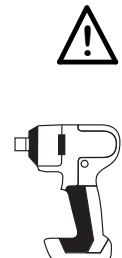
Nominal Fastener Diameter [ D ]		HSS Drill Bit Size		Power Drill Voltage	Allowable Insertion Torque
in.	[ mm ]	in.	[ mm ]	V	lb. -ft. [ N·m ]
3/8	[ 10 ]	1/4	[ 6.4 ]	60	22.13 [ 30.0 ]



Cordless Clutched Drill



Double Handle Drill



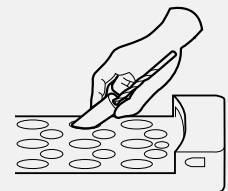
Impact Drill

### Tools - APEX Predrilling Jig

The Predrilling Jig ensures precise alignment of the APEX inclined fasteners. It guides the drill bit to create an accurate pilot hole, and ensures proper fastener seating. The hole in the jig accommodates standard imperial and metric drill bit diameters. For the 3/8 in. [ 10 mm ] inclined fasteners, pilot holes 1/4 in. [ 6.4 mm ] in diameter and 1 in. [ 25 mm ] long are recommended.



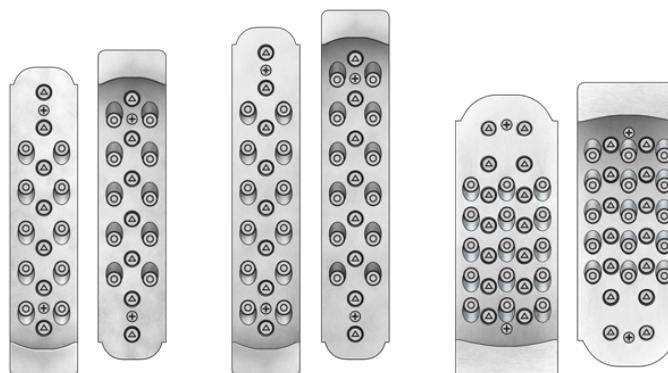
APEX Predrilling Jig



## Fastener Layout

### Fastener Orientation

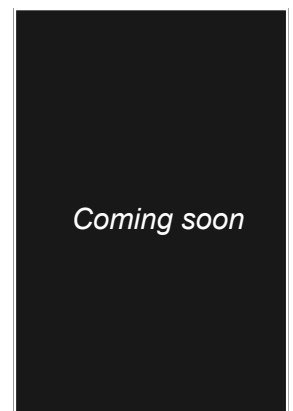
- ⊕ Nonstructural Positioning Screws
- ⊕ Horizontal Screws
- ⊙ Inclined Screws



APEX S

APEX M

APEX L



APEX XL

Coming soon



# Installation - APEX Guidelines

## General Installation Steps

### Estimated Installation Time

The estimated time for a single person to install a complete APEX product is shown in Table 1.3

This process includes the following steps:

1. Layout (~10%)
2. Positioning (~10%–15%)
3. Pilot Holes (~20%–25%)
4. Screw Installation (~50%–60%)
5. Optional Measures (not included in the time installation % breakdown)

The estimated installation time can be improved upon with efficient fabrication and site practices such as:

1. Drilling pilot holes for the nonstructural positioning screws at the time of fabrication
2. Utilizing templates to drill pilot holes for structural screws
3. Optimizing beam positioning to reduce worker fatigue

Table 1.4 - APEX Estimated Installation Time

APEX Model	Average Installation Time [ min. ]
S	13
M	15
L	20
XL	

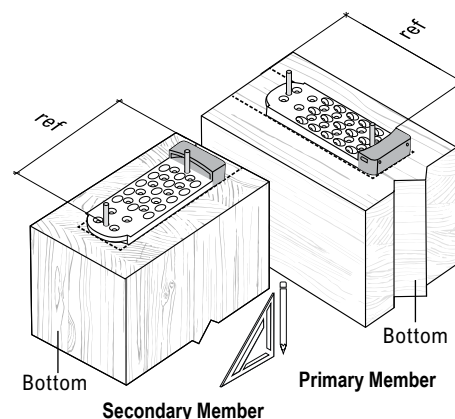
## Step-by-Step Installation Guidelines

### 1.1 Layout - Reference Points

Begin by laying out the installation locations in the primary and secondary members using a pencil and square.

The connector's point of reference is the top of the member. The **lower nonstructural positioning screw** should be measured from that point of reference.

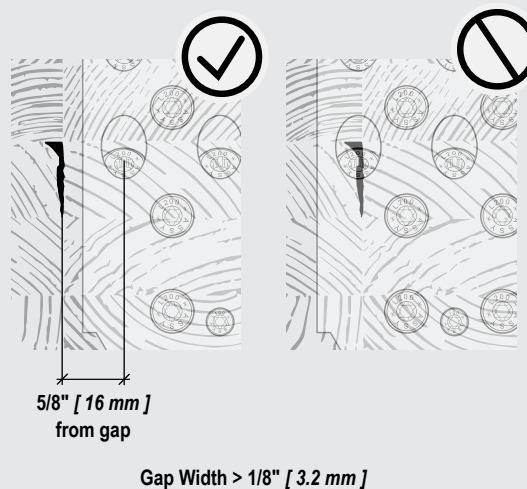
The **pocket** should be at the **bottom** on the primary member and on the **top** on the secondary member.



### 1.2 Layout - Split Lamination Considerations

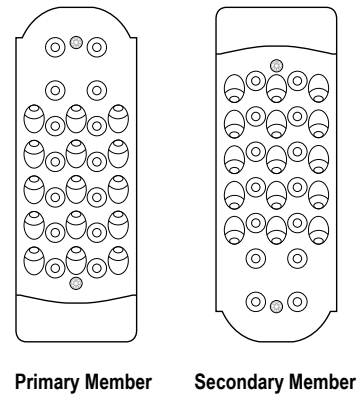
It is recommended that vertical joints in split lamination glulam beams be tight at the time of manufacturing. Gaps between adjacent plies may occur due to wood shrinkage. APEX installation requires glued bond between plies due to its high capacity; gaps and voids are not permitted. Split-laminated members shall be edge-glued or block-laminated and fabricated with pressure from all sides to ensure full contact between plies and no voids.

If gaps exist in the end grain, the APEX must be positioned so that fasteners can be installed at least 5/8 in. [ 16 mm ] away from these gaps.



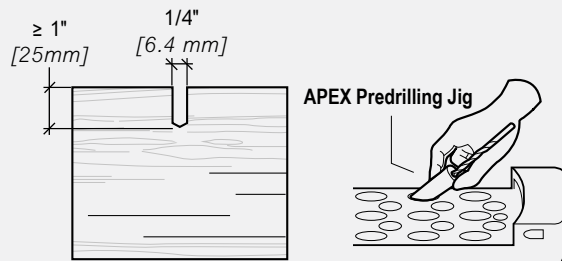
## 2.1 Positioning - Nonstructural Positioning Screw Installation

Positioning screws ensure accurate placement of the APEX connector. To improve accuracy and reduce time, it is recommended to predrill the nonstructural positioning screw locations during member fabrication. Install one nonstructural positioning screw into the hole highlighted at the top of the plate. Check to ensure alignment is maintained and then install the second nonstructural positioning screw into the hole highlighted at the bottom of the plate.



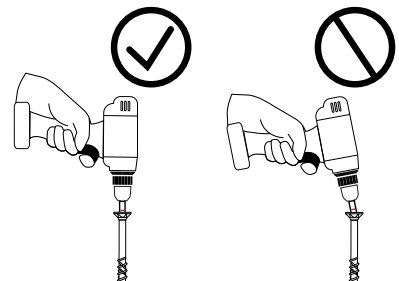
## 3.1 Pilot Holes - Recommendations

Pilot holes are optional; however, they facilitate screw thread engagement, help reduce splitting risks, ensure a proper penetration path which reduces screw wandering, and reduce insertion torque. For the structural fasteners used with the APEX series, pilot holes 1/4 in. [ 6.4 mm ] in diameter and 1 in. [ 25 mm ] in length are recommended. The use of the APEX Predrilling Jig for the inclined screws of the APEX is recommended to ensure proper hole placement.



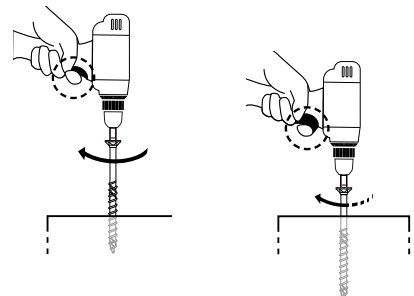
## 4.1 Screw Installation - Align Drill Bit Axis

Align the driver bit axis parallel to the fastener axis during installation to allow proper torque transmission and to avoid stripping.



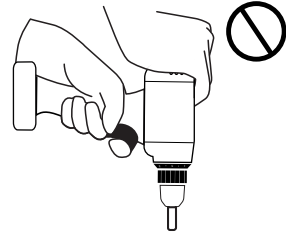
## 4.2 Screw Installation - Decrease RPM

To avoid overtightening the screw, decrease the rotation speed about 1/2 in. [ 13 mm ] away from the final installed position. This is crucial to prevent wood crushing due to overtightening, which can impact beam hanger tolerances, potentially impeding overall connection assembly. This is especially important when using an impact drill.



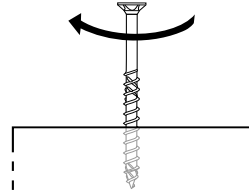
#### 4.3 Screw Installation - Drill Pressure

Do not apply excessive pressure on the drill while driving the fastener to prevent fastener buckling or deviation during installation. Only apply the required force or use the recommended holder case to eliminate cam-out effects.



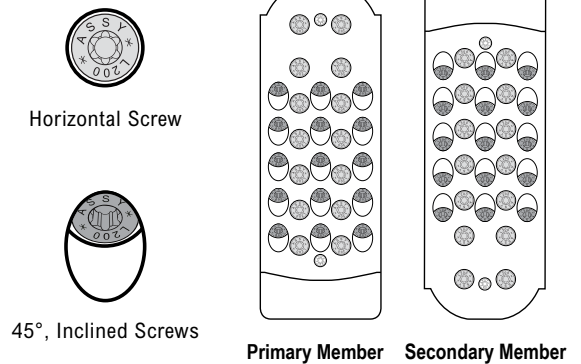
#### 4.4 Screw Installation - One-Step Process

To avoid increased torque peaks caused by stopping and restarting the drive-in process, install the screw in one run until the head is lightly seated against the side member. If necessary, a torque wrench may be used to complete installation immediately after the screw has been driven.



#### 4.5 Screw Installation - Structural Screws

Install the  $\frac{3}{8} \times 7\text{-}7/8$  in. [  $10 \times 200$  mm ] MTC-FTC (ASSY) screws in all horizontal holes first. Once all horizontal screws are installed, install the  $\frac{3}{8} \times 7\text{-}7/8$  in. [  $10 \times 200$  mm ] MTC-FTC (ASSY) screws in all inclined holes.



## 5.1 Optional Measures - Pre-Installed Wood Plug

Where connectors are housed in the secondary beam, it is recommended to seal the void in the routing below the connector for aesthetics and fire protection. The APEX system is equipped with diagonal holes so that a wood plug may be pre-installed on the non-routed member in the shop or on site before the secondary beam is lifted into place.

