

# Increase job site efficiency and minimize material handling

## Pre-assembled strut fittings

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### Challenge:

Contractors are under pressure to provide quality while maintaining budget and schedule, making it increasingly important to choose the right method and materials for construction. A continued push toward pre-construction and Building Information Management (BIM) as a means of project delivery has resulted in the contractor's ever-increasing role in design; therefore, liability has become a greater concern. Simply put, the contractor must do the job right, on-budget and on-time.

### Solution:

Eaton offers high quality products, services and resources that allow customers to save time, reduce complexity and maximize their profit. One example of this is the B-Line series pre-assembled strut fittings. This white paper provides the advantages of using this solution over traditional strut fittings.

## The advantage of using B-Line series pre-assembled strut fittings

Eaton has taken the most commonly used strut fittings and adapted them with the proper hardware. The result is the pre-assembled strut fittings that are faster and easier to install than traditional strut fittings.

Pre-assembled strut fittings help minimize material handling, increase construction assembly efficiency and deliver a quality solution that results in an overall positive return on the investment.

## Addressing quality and safety concerns

### B-Line series strut and pre-assembled fittings stands apart

Eaton provides safety factor information in the B-Line series strut system catalog\* which helps ensure the safety and operational capability of the product over time.

Load data is based on 12-gauge B-Line series strut channel, using ½ inch diameter hardware and B-Line series strut fittings. When these correct products are utilized the 2.5 safety factor is achieved.

- The hole size of the B-Line series strut assembled fittings are 9/16-inch, which provides a 1/16-inch annular space around the shank of the fastener.
- The ½ inch cap screws typically used to install fittings also have 360-degree coverage to provide even load distribution under the head of the cap screw and does not require a flat washer.
- The strut nut or grip nut is designed to bite into the folded edge of the strut channel to help prevent slipping. Loads are based on the dimensionality and tensile strength of the base material.

### Strut and fittings are designed as assemblies

- Hardware that is 3/8-inch diameter would create a 3/16-inch annular space around the shank of the fastener which would require the use of a flat washer.
- The torque is different for ½ inch hardware from 3/8 hardware. The clamping power of a bolt is achieved through slight stretching of the bolt through even tension. The 3/8 bolt will likely cave the washer prior to reaching the right tension.
- The use of undersized strut nuts can negatively affect the load rating of the assembly.
- Our published working loads are inclusive of the safety factor to assist the end user in safe design practice.

\*Learn more, reference technical data section of the strut system catalog: <https://www.eaton.com/content/dam/eaton/products/support-systems/strut-systems-&-accessories/strut-system-catalog-2018.pdf>



## How field assembly impacts efficiency

The assembly of spring nuts, cone nuts or top spring nuts into the channel is labor intensive.

- When inserting and aligning the nuts into the channel, the spring on the spring nut can cause the nut to turn over, become dislodged or misaligned before the bolt is introduced. This results in the need to disassemble and reassemble.
- The spring also tends to get caught in the slotted holes and falls over. Often the cone on the cone nut pulls off the strut nut body, while other strut nut options can become dislodged during the dry fit operation.

The alignment of the fitting to the strut nuts adds additional installation time.

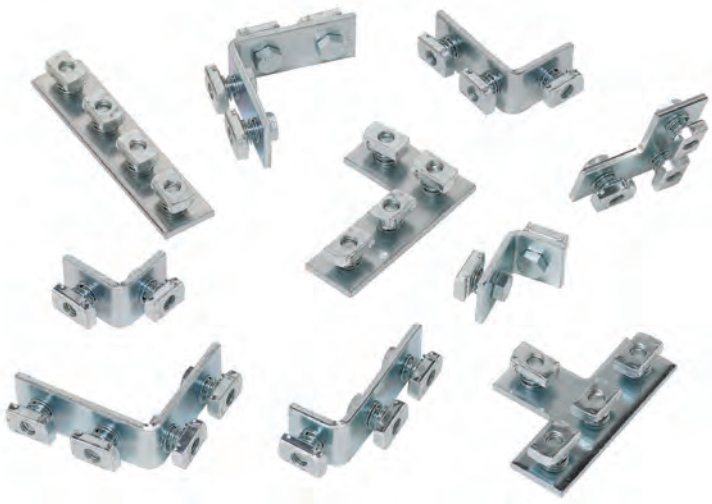
- Once the strut nuts are installed, alignment is required. This involves dry fitting, placing the fitting to check alignment with the strut nuts, then removing and adjusting the nut locations as is necessary. This may require multiple attempts.

The vibration of the impact gun can cause misalignment or loosening.

- Currently common method of tightening, whether in the pre-fab shop or in the field, is generally performed using an impact gun.
- The vibration of the impact gun can cause the parts and pieces of the standard assemblies to jar loose or become misaligned requiring constant re-alignment or adjustment.

The cost of inventory, purchasing and material handling can be impacted.

- A typical four (4) bolt type strut fitting would require ordering and managing 13 items to make a single assembly. This includes the standard fitting, bolts, washers and spring nuts.
- Compared to B-Line series pre-assembled fitting the piece count is just one.
- MRO and plant facilities purchasing becomes stream lined and accurate by reducing overall piece count to be managed.



## B-Line series pre-assembled fittings versus traditional strut fitting install method

### Up to 75% faster to install

Multiple time tests were completed for standard typical strut fitting installation versus the B-Line series pre-assembled fittings. The tests were done on both 2-hole and 4-hole strut fitting assemblies in multiple configurations from angles to flat fittings using the same installers and tools. The pre-assembled fittings installed up to 75% faster than the typical strut fitting assemblies. Interestingly, as the test quantities went up the time savings also increased. The greater the production quantities the greater the delta between typical and pre-assembled fittings installation.

### Significant reduction in material management

This is an example of the impact of managing just 12 connections.

#### 4-hole fitting

- B-Line series pre-assembled fittings = 12 components (B104PAZN)
- Typical method for the same application = 156 components (12 fittings, 48 cap screws, 48 fender washers and 48 strut nuts)

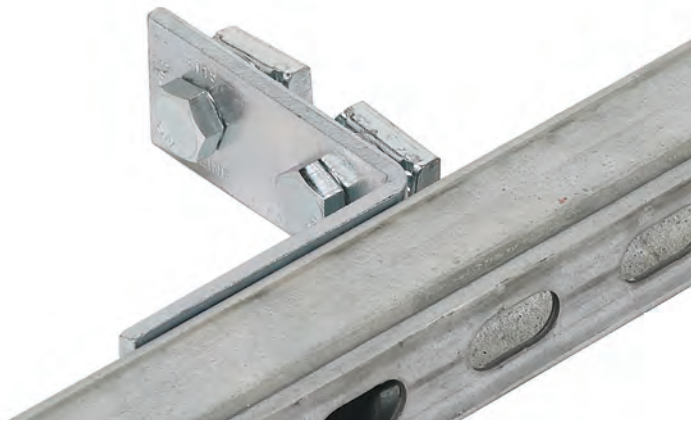
#### 2-hole fitting

- B-Line series pre-assembled fittings = 12 components (B101PAZN)
- Typical method for the same application = 84 components (12 fittings, 24 cap screws, 24 fender washers and 24 strut nuts)

## Conclusion

Eaton's B-Line series pre-assembled fittings increases job-site efficiency, minimizes material handling and maximizes return on investment.

The result is a high quality consistent, predictable installation with an economical and profitable outcome for contractors, engineers and facility owners.



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