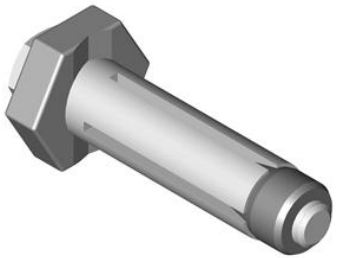


Installation instructions – (BoxBolt® ICC ES Submitted)

Manufacturer:

LNA Solutions (A Kee Safety Company)

3924A Varsity Drive
Ann Arbor
MI 48108

Tel: (888) 724 2323

Website : **www.lnasolutions.com**

Specific applications

BoxBolt® is a blind fastener designed for tube steel where access is difficult. BoxBolt® is suitable for use with rectangular, square or circular hollow sections.

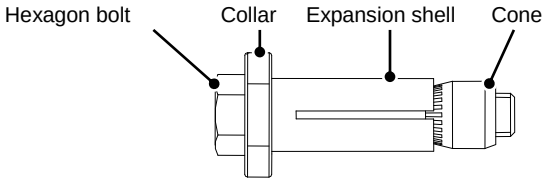
BoxBolt® is designed with a sleeve that expands on the inside of the connection to create a mass that then acts similar to a standard nut and bolted connection, however, specific installation and inspection guidelines need to be followed. Please read these instructions carefully before using this product.

BoxBolt® may be used only once and must be replaced with a new BoxBolt if ever removed.

BoxBolt® may be used in aggressive environments, provided that the GEOMET coating on the BoxBolt® fastener is intact. At the first signs of corrosion, inspect the steel structure and replace it, wholly or partially, if necessary.

Safety instructions!

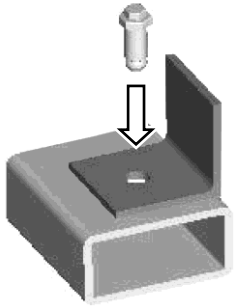
- Never exceed the maximum permissible loads. Before using the BoxBolt® system it is essential to check the steel framework can support the imposed loads.
- Use BoxBolt® fasteners only as described in these installation instructions.
- When choosing BoxBolt® fasteners, take the following parameters into account (as detailed in the technical table overleaf)
  - The total thickness of the steel to be connected (Dim X)
  - Diameter and spacing of holes (Dim A & B)
  - Tightening torque (Always use recommended torque stated in column "Torque" in the technical table overleaf)
  - Load (e.g. Static Tension or Static Shear)
  - Resistance of the materials being connected
- If in any doubt about your connection it is essential to contact LNA Solutions to obtain the appropriate BoxBolt® fastener and advice.
- Check that your BoxBolt® fastener includes all the elements shown below:
- Ensure that the vee of the expansion shell is located hard up against the vee groove in the collar with the cone tight against the opposite side to stop the expansion shell from rotating freely.



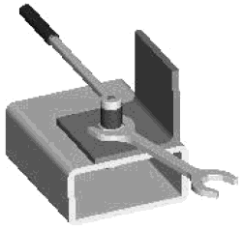
Installation instructions

BoxBolt® fasteners are installed as follows:

1. Drill the sections to be fixed, ensuring that the holes required have the correct diameter and spacing. (See Dim C overleaf)
2. De-burr the holes.
3. Position the sections flush against each other, ensuring:
   - the two sections are lined up and are flush without any gap. If necessary, use a clamp to hold the two sections and prevent a gap forming
   - the holes are aligned, using a mandrel if necessary.
4. Position the Bolts in the holes. Check the collar is resting flat on the section with no gap.



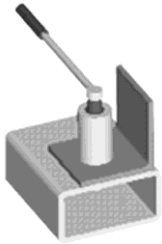
5. **Advice:** Use of the special BoxSok™ tool is recommended for installation. If you are using this tool, go to step 7.
6. Hold the collar in position using a suitable open-ended wrench, then tighten the bolt to the torque specified.



Go to step 9.

7. Fit the BoxSok™ onto the BoxBolt®, so that the BoxSok™ is resting on the section. If necessary, adjust the BoxSok™ so that it fits properly on the BoxBolt®.

8. Hold the BoxSok™ straight and tighten the bolt using the BoxSok™.



9. Remove the tool and check the tightening torque on the bolt. If necessary, correct the tightening torque. (Always use the manufacturers recommended torque on the reverse of this page, column headed "Torque" in the technical table.)

IMPORTANT! BoxBolt® is an expansion Blind Bolt for structural steel connections and requires installation and inspection procedures that take its design into consideration. It is absolutely essential that the expansion sleeve expands fully by applying the recommended tightening torque (see column headed Torque below) for all types of connections including Static Tension and Static Shear. The SNUG TIGHT METHOD is NOT ACCEPTABLE for ANY type of connection when using BoxBolt®. It is also essential that the minimum and maximum fixing ranges are followed to ensure the expansion sleeve can expand correctly on the blind side of the connection. A calibrated torque wrench should always be used for every connection. Due to the BoxBolt® being a blind connection it is also essential that the inspection is carried out using a calibrated wrench to check the torque. Refer to document (BoxBolt Blind Fastener Inspection and Observation Program) for further inspection and observation requirements.

Technical Table

The below table contains all the information necessary for selecting the correct BoxBolt® blind fastener. The load carrying capacity of the assembly depends on the type of section used and its cross-section. The permissible load is limited by the permissible load of the weakest component in the assembly, namely the section itself in the case of thin wall sections, or the BoxBolt® in the case of thick wall sections (or combination of the two). If there is any doubt, it is essential to consult LNA Solutions and/or have the application checked by a qualified Structural Engineer.

The table displays the values for static tensile and static shear loads were achieved by physical testing and an IAS accredited test facility. The resistance factor for the LRFD method and the factor of safety for the ASD method have been determined by section 3.7 and 3.9 respectively of AC437.

Part Number & description			Dimensional information							Technical		Loading			
BoxBolt (Part Code)	BoxBolt (Core bolt dia)	Description	Setscrew length	Fixing range (dim x)		Across Flats of collar	Shoulder thickness	Dim A	Dim B	Dim C Drill dia	Torque (ft lb)	LRFD Method		ASD Method	
				Min	Max							Tensile (lbs)	Shear (lbs)	Tensile (lbs)	Shear (lbs)
BQ1GEO12C	1/2"	1/2" BoxBolt Size 1	2-3/16"	3/8"	15/16"	1"	5/16"	2"	1"	13/16"	60	5600	8900	3500	5500
BQ2GEO12C	1/2"	1/2" BoxBolt Size 2	3-1/8"	11/16"	1 7/8"	1"	5/16"	2"	1"	13/16"	60	5600	8900	3500	5500
BQ3GEO12C	1/2"	1/2" BoxBolt Size 3	4"	1 1/2"	2 11/16"	1"	5/16"	2"	1"	13/16"	60	5600	8900	3500	5500
BQ1GEO16C	5/8"	5/8" BoxBolt Size 1	3"	3/8"	1 3/8"	1-7/16"	3/8"	2-3/16"	1-1/16"	1-1/16"	140	9200	16100	5700	10100
BQ2GEO16C	5/8"	5/8" BoxBolt Size 2	4"	1"	2 5/16"	1-7/16"	3/8"	2-3/16"	1-1/16"	1-1/16"	140	9200	16100	5700	10100
BQ3GEO16C	5/8"	5/8" BoxBolt Size 3	4-3/4"	2"	3 1/16"	1-7/16"	3/8"	2-3/16"	1-1/16"	1-1/16"	140	9200	16100	5700	10100
BQ1GEO20C	3/4"	3/4" BoxBolt Size 1	4"	1/2"	1 13/16"	1-13/16"	7/16"	2-3/4"	1-3/8"	1-3/8"	220	17000	26300	10800	16400
BQ2GEO20C	3/4"	3/4" BoxBolt Size 2	4-3/4"	1 3/16"	3"	1-13/16"	7/16"	2-3/4"	1-3/8"	1-3/8"	220	17000	26300	10800	16400
BQ3GEO20C	3/4"	3/4" BoxBolt Size 3	6"	2 9/16"	4"	1-13/16"	7/16"	2-3/4"	1-3/8"	1-3/8"	220	17000	26300	10800	16400

Information:

Tensile loading – The tensile loads are based on failure of the BoxBolt® and as stated above the structure should be checked for structural capacity.

Shear loading – The shear loads are based on physical testing using the minimum thickness of steel we anticipate each diameter of BoxBolt® being used with. These thicknesses are 1/2" BoxBolt® diameter = 1/4", 5/8 BoxBolt® diameter = 5/16" and 3/4" BoxBolt® diameter = 3/8". Should it be required to use the BoxBolt® in materials that are thinner, then the structural capacity of the connected steel will need to be checked by a licensed structural engineer to ensure it can withstand the loads.

Note 1: Only use the drill sizes stated as dim C

Note 2: Always ensure the correct torque is applied to the core bolt using a calibrated torque wrench

Note 3: Always check that the total fixing range is within the ranges stated for dimension X

Note 4: The BoxBolt® will operate within a wide temperature range of between -30 ° C to + 60 ° C, please consult the supplier if you intend to use it outside of this range for advice.