

## INSTALLATION INSTRUCTIONS FOR No. 4 THROUGH 11 ZAP SCREWLOK "FX" COUPLERS UNCOATED & EPOXY ON GRADE 75, GRADE 80 AND GRADE 100 REBAR\*

Slide the **No. 4 through 11 ZAP SCREWLOK "FX"** coupler over one of the rebar ends until the rebar touches the positive center stop of the coupler, as shown in Figure 1. Do not under-insert, as shown in Figure 2. If the coupler is specially supplied **without** a center stop, or if the center stop is removed, measure and mark the rebar for one half of the coupler length ( $L/2$ ) before inserting it into the coupler per Figure 3 and Chart 1.

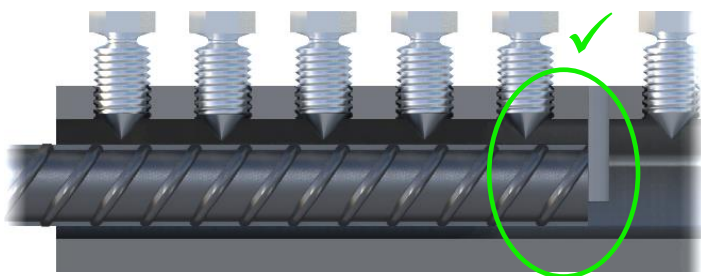


FIGURE 1: **Correct** Rebar Insertion Depth

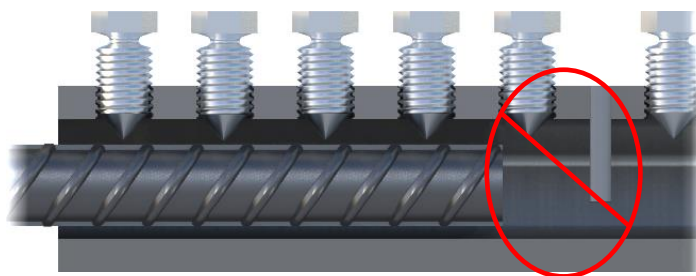


FIGURE 2: **Incorrect** Rebar Insertion Depth

Using an **impact wrench** and a **socket "S"**, per Chart 1 on page 2, tighten the twist-off screws starting **at the end** of the coupler and working your way **toward the middle** of the coupler. Tighten each screw until the head of the screw **twists off**. (See Chart 1 for approximate twist-off torque)

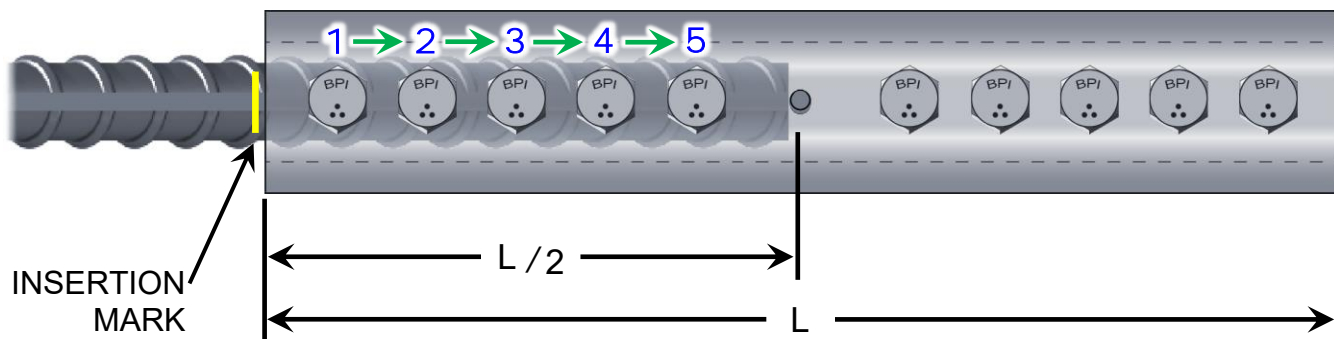


FIGURE 3: **Correct** Tightening Order, 1<sup>ST</sup> Side (#7 shown, other sizes similar)

\* ASTM A615 Grade 75 rebar, ASTM A615 or A706 Grade 80 rebar, and ASTM A1035 Low carbon chromium steel Grade 100 rebar

Once the screws for the first rebar have been tightened down and heads twisted off, **insert the other** rebar into the coupler until it butts up **against the center stop** per Figure 4. If the coupler has no center stop, insert the second rebar until it butts up **against the first rebar**. In the **same order** as the first side, tighten the screws until the heads twist off working from the end of the coupler toward the middle of the coupler.

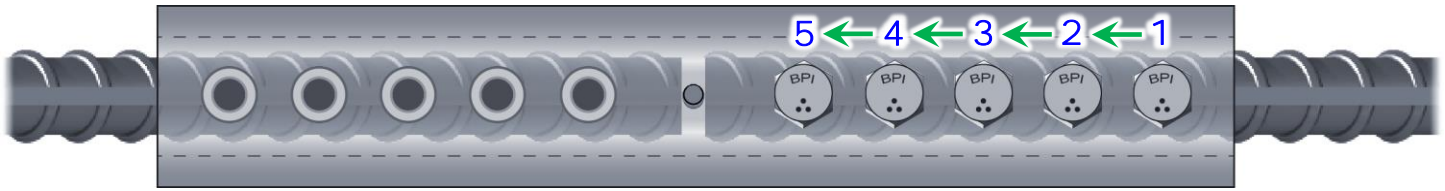


FIGURE 4: **Correct** Tightening Order, 2<sup>ND</sup> Side (#7 shown, other sizes similar)

DO NOT USE THESE COUPLERS IN CONJUNCTION WITH REBAR WHICH IS LARGER OR SMALLER THAN THE INTENDED BAR SIZE. **KEEP COUPLERS CLEAN AND KEEP THREADS RUST FREE, PER FIGURE 5. STORE COUPLERS IN A CLEAN, DRY PLACE UNTIL READY TO INSTALL. RUST IN THE THREADS PRIOR TO ASSEMBLY, PER FIGURE 6, IS UNACCEPTABLE BECAUSE IT COULD RESULT IN LOWER PERFORMANCE OF THE ASSEMBLED SPLICE.**



FIGURE 5: Clean **Acceptable** Coupler



FIGURE 6: **Unacceptable** Rust in Coupler Threads

**CHART 1**

REBAR SIZE US [metric/CAN]	APPROXIMATE COUPLER LENGTH "L" (in.)	½ COUPLER LENGTH "L / 2" (in.)	NUMBER OF SCREWS PER BAR	IMPACT SOCKET SIZE "S"	AVERAGE SCREW TWIST-OFF TORQUE "T" (ft-lb)	MINIMUM IMPACT WRENCH ▼ <b>WORKING</b> TORQUE (ft-lb)
#4 [12/10M]	7	3 ½	3	½	60	250
#5 [16/15M]	9	4 ½	4	½	60	250
#6 [20/20M]	11	5 ½	5	½	60	250
#7 [22]	13	6 ½	5	5/8	105	500
#8 [25/25M]	15 ¼	7 5/8	6	5/8	105	500
#9 [28/30M]	16 ¾	8 ¾	6	¾	215	750
#10 [32]	19	9 ½	7	¾	215	750
#11 [36]	21 ½	10 ¾	8	¾	215	750

▼ Example of suitable pneumatic impact wrench is Ingersoll Rand, IR 261

Please direct all assembly questions to BarSplice Products, Inc.

## CAUTIONS AND SUGGESTIONS

1. In all cases, consider your own **personal safety**. Before beginning, make sure the equipment is functioning and in good working order. Ensure that you are securely positioned and that you will not slip or fall during installation.
2. Follow the torque order described. Do not use any other torquing order.
3. For **best performance** and **ease of installation**, use a high quality  $\frac{3}{4}$  inch drive **pneumatic impact wrench** (▼such as Ingersoll Rand IR 261) and suitable impact socket. Make sure the impact wrench is rated to achieve at least the minimum impact wrench working torque specified in **CHART 1** to avoid stalling. The **air supply** hose and fittings should have a minimum inside diameter of  $\frac{1}{2}$  inch. The towable air compressor should be large enough to provide **100 psi** (7 bar) gauge pressure & deliver a minimum air flow at load of **45 cfm**.
4. It is **NOT** recommended to use a battery powered or electric impact wrench of any size, make or model.
5. Each screw should normally take **4 – 8 seconds** for the head to twist-off. If each screw takes more than 10 seconds to twist-off, then there is either a restriction preventing enough air flow to reach the impact wrench, or the impact wrench is worn out/undersized and needs to be serviced/replaced. Examples of restrictions are the air line is too small, underrated air compressor, gauge pressure at air compressor set too low, hose fittings too small, underrated impact wrench, outside temperature too low for air compressor or impact wrench to function properly.
6. **DO NOT** use an open-ended wrench or an adjustable wrench because of the risk of rounding-out the hexagon head prior to reaching the torque needed to twist off the head.
7. Prior to assembly, straighten excessively bent rebar ends so that proper wedge contact is made between rebar and coupler. BAR ENDS should be straight to within  $\frac{1}{8}$  inch in 18 inches. For curved rebar with a diameter that exceeds 54 feet, a bar end straightness check is not necessary. If needed, grind-off large shear lips that prevent proper insertion of rebar into coupler.
8. If removal of the center stop is necessary, use a hammer and punch or large nail to tap out the pins in the coupler body.
9. Replace missing screws immediately with BPI special screws only. **DO NOT ALLOW THREADED HOLES TO RUST.**
10. If bars are corroded, removal of rust/corrosion on the bar ends must be performed to the same degree as that required to bond with concrete prior to installing the Zap coupler. Testing of old or severely corroded bars is recommended to ensure the integrity of the adjoining bars and compliance to design requirements.
11. For Epoxy Coated ASTM A775/A775M rebar, use a pre-coated ZAP SCREWLOK "FX" epoxy coupler. Touch-up coating damage and the sheared surfaces of screws with a suitable epoxy patching kit after assembly as required.
12. **DO NOT ATTEMPT TO EPOXY COAT OR HOT-DIP GALVANIZE AN UNCOATED ZAP PRODUCT IN ANY WAY. DO NOT ALLOW ABRASIVE BLAST MATERIAL TO COME INTO CONTACT WITH UNASSEMBLED THREADS.**

## INSTALLATION INSTRUCTIONS FOR No. 14 & 18 ZAP SCREWLOK "FX" COUPLERS UNCOATED & EPOXY ON GRADE 75, GRADE 80 AND GRADE 100 REBAR\*

Slide the **No. 14 or 18 ZAP SCREWLOK "FX"** coupler over one of the rebar ends until the rebar touches the positive center stop of the coupler, as shown in Figure 1. Do not under-insert, as shown in Figure 2. If the coupler is specially supplied **without** a center stop, or if the center stop is removed, measure and mark the rebar for one half of the coupler length ( $L/2$ ) before inserting it into the coupler per Figure 3 and Chart 1.

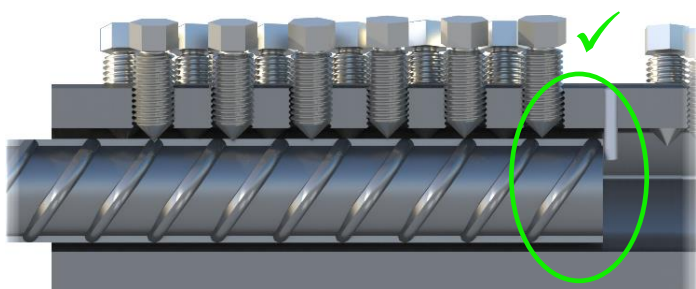


FIGURE 1: **Correct** Rebar Insertion Depth

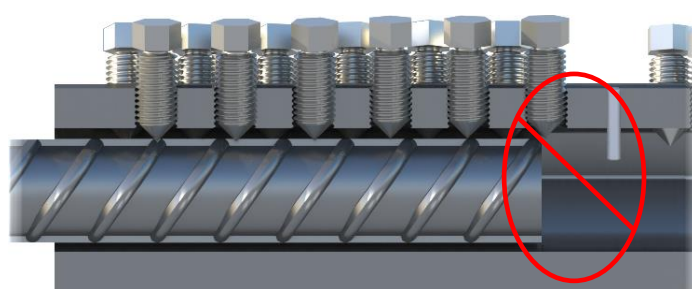


FIGURE 2: **Incorrect** Rebar Insertion Depth

Using an **impact wrench** and a **socket "S"**, per Chart 1 on page 2, tighten the twist-off screws starting **at the end** of the coupler and working your way **down one row toward the middle** of the coupler. Tighten each screw until the head of the screw **twists off**. (See Chart 1 for approximate twist-off torque) After all the heads have been twisted off on the first row, repeat the procedure down the second row, starting at the end and working your way toward the middle of the coupler.

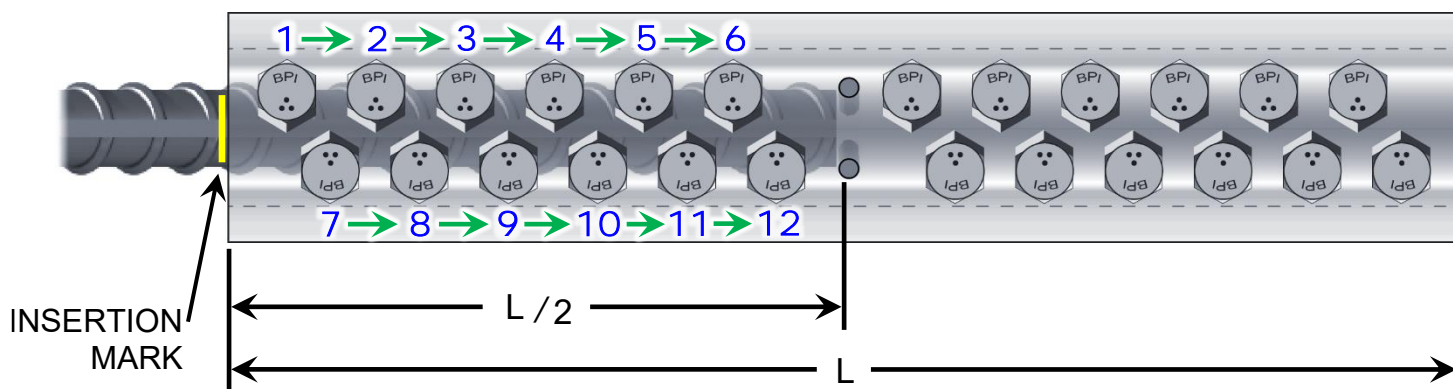


FIGURE 3: **Correct** Tightening Order, 1<sup>ST</sup> Side (#14 shown, #18 similar)

\* ASTM A615 Grade 75 rebar, ASTM A615 or A706 Grade 80 rebar, and ASTM A1035 Low carbon chromium steel Grade 100 rebar

Please direct all assembly questions to BarSplice Products, Inc.



Once the screws for the first rebar have been tightened down and heads twisted off, **insert the other** rebar into the coupler until it butts up **against the center stop** per Figure 4. If the coupler has no center stop, insert the second rebar until it butts up **against the first rebar**. In the **same order** as the first side, tighten the screws **down one row** until the heads twist off working from the end of the coupler toward the middle of the coupler. Then repeat the procedure down the second row, working from the end of the coupler toward the middle.

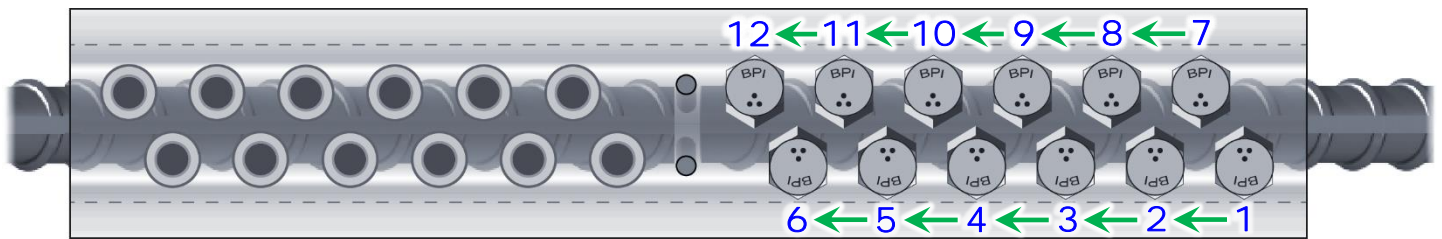


FIGURE 4: **Correct** Tightening Order, 2<sup>nd</sup> Side (#14 shown, #18 similar)

DO NOT USE THESE COUPLERS IN CONJUNCTION WITH REBAR WHICH IS LARGER OR SMALLER THAN THE INTENDED BAR SIZE. **KEEP COUPLERS CLEAN AND KEEP THREADS RUST FREE, PER FIGURE 5. STORE COUPLERS IN A CLEAN, DRY PLACE UNTIL READY TO INSTALL. RUST IN THE THREADS PRIOR TO ASSEMBLY, PER FIGURE 6, IS UNACCEPTABLE BECAUSE IT COULD RESULT IN LOWER PERFORMANCE OF THE ASSEMBLED SPLICE.**



FIGURE 5: Clean **Acceptable** Coupler



FIGURE 6: **Unacceptable** Rust in Coupler Threads

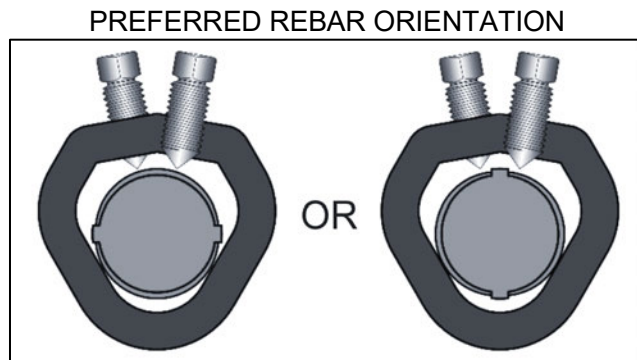
**CHART 1**

REBAR SIZE US [metric/CAN]	APPROXIMATE COUPLER LENGTH "L" (in.)	½ COUPLER LENGTH "L/2" (in.)	NUMBER OF SCREWS PER BAR	IMPACT SOCKET SIZE "S"	AVERAGE SCREW TWIST-OFF TORQUE "T" (ft-lb)	MINIMUM IMPACT WRENCH ▼ <b>WORKING</b> TORQUE (ft-lb)
#14 [43/45M]	20 1/8	10 1/16	12	3/4	350	1000
#18 [57/55M]	29 1/2	14 3/4	21	3/4	350	1000

▼ Example of suitable pneumatic impact wrench is Ingersoll Rand, IR 290

## CAUTIONS AND SUGGESTIONS

1. In all cases, consider your own **personal safety**. Before beginning, make sure the equipment is functioning and in good working order. Ensure that you are securely positioned and that you will not slip or fall during installation.
2. For best installation and performance, try to adjust the orientation of the coupler or rebar so that the rebar deformations are in full bearing contact with the wedge shape of the coupler body, opposite of the screws.



3. Follow the torque order described. Do not use any other torquing order.
4. For **best performance** and **ease of installation**, use a high quality 1-inch drive **pneumatic impact wrench** (▼ such as Ingersoll Rand IR 290) and suitable impact socket. Make sure the impact wrench is rated to achieve at least the minimum impact wrench working torque specified in **CHART 1** to avoid stalling. The **air supply** hose and fittings should have an inside diameter of **¾ inch or 1 inch**. The towable air compressor should be large enough to provide **100 psi** (7 bar) gauge pressure & deliver a minimum air flow at load of **60 cfm**.
5. It is **NOT** recommended to use a battery powered or electric impact wrench of any size, make or model.
6. Each screw should normally take **4 – 8 seconds** for the head to twist-off. If each screw takes more than 10 seconds to twist-off, then there is either a restriction preventing enough air flow to reach the impact wrench, or the impact wrench is worn out/undersized and needs to be serviced/replaced. Examples of restrictions are the air line is too small, underrated air compressor, gauge pressure at air compressor set too low, hose fittings too small, underrated impact wrench, outside temperature too low for air compressor or impact wrench to function properly.
7. **DO NOT** use an open-ended wrench or an adjustable wrench because of the risk of rounding-out the hexagon head prior to reaching the torque needed to twist off the head.
8. Prior to assembly, straighten excessively bent rebar ends so that proper wedge contact is made between rebar and coupler. **BAR ENDS** should be straight to within ⅛ inch in 18 inches. For curved rebar with a diameter that exceeds 54 feet, a bar end straightness check is not necessary. If needed, grind-off large shear lips that prevent proper insertion of rebar into coupler.
9. If removal of the center stop is necessary, use a hammer and punch or large nail to tap out the pins in the coupler body.
10. Replace missing screws immediately with BPI special screws only. **DO NOT ALLOW THREADED HOLES TO RUST.**
11. If bars are corroded, removal of rust/corrosion on the bar ends must be performed to the same degree as that required to bond with concrete prior to installing the Zap coupler. Testing of old or severely corroded bars is recommended to ensure the integrity of the adjoining bars and compliance to design requirements.
12. For Epoxy Coated ASTM A775/A775M rebar, use a pre-coated ZAP SCREWLOK "FX" epoxy coupler. Touch-up coating damage and the sheared surfaces of screws with a suitable epoxy patching after assembly as required.
13. **DO NOT ATTEMPT TO EPOXY COAT OR HOT-DIP GALVANIZE AN UNCOATED ZAP PRODUCT IN ANY WAY. DO NOT ALLOW ABRASIVE BLAST MATERIAL TO COME INTO CONTACT WITH UNASSEMBLED THREADS.**

Please direct all assembly questions to BarSplice Products, Inc.