

#117 Clamp and Strap Installation for Insulated No-Hub Cast Iron Pipe

Installation Note: For all 117 configurations involving insulated No-Hub Cast Iron pipe, clamps and straps should be installed directly against the pipe, beneath the added insulation. This installation method conforms to the tested configurations and ensures proper support, alignment, and system performance.

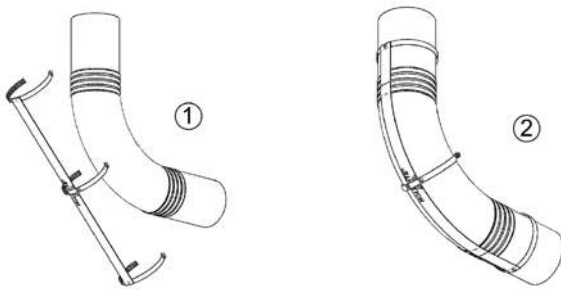
- Do not place clamps or straps over insulation.
- Ensure insulation is neatly cut and fitted around the installed clamps and straps to maintain thermal integrity.
- This method is consistent with all configurations validated through testing.

#117 Series No Hub Fitting Restraints

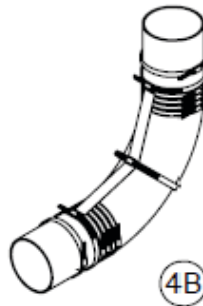
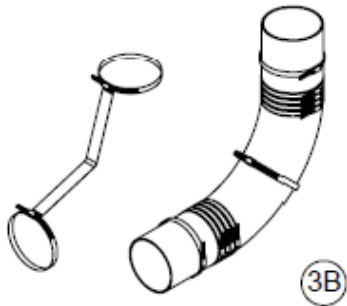
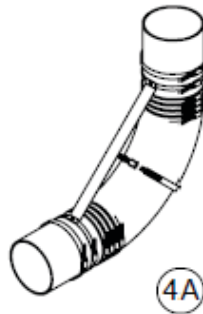
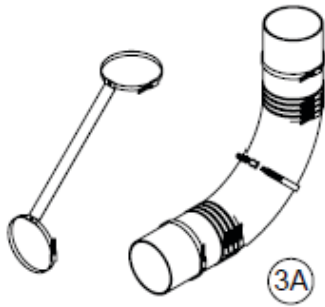
#117-K-Series (sizes 2 in. – 8 in.) 90° Short Sweep and the #117-LS Series (Sizes 2 in.– 6 in.) Long Sweep Support

Installation Instructions

1. Install outside radius strap first; position strap by installing middle slider clamp around the cast iron 90. Do not tighten clamp, leave it loose enough to reposition as needed.



2. Install end clamps around pipe, do not tighten. Position strap so end clamps are spaced equally from No-Hub couplings.
3. Once outside radius strap is positioned, tighten middle slider clamp to 60 in/lbs using 5/16 in. No-Hub coupling torque wrench.
4. Before tightening end clamps make sure there is no slack in the strap. Tighten clamps to 60 in/lbs.
5. If installing the inner radius strap at a 45 degree diagonal position (normal mode Drawings 5A and 6A), prepare diagonal strap for installation by slightly bending the ends with the clamps to approximately 45°.

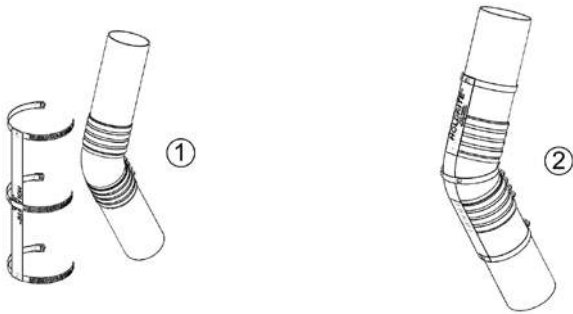


6. Position & install clamps so they are spaced between the clamps of the outside radius support and the No-Hub couplings. Do not tighten.
7. Once the diagonal strap is positioned, tighten the clamp at one end first. Before tightening the second clamp, make sure there is no slack in the strap. Tighten both clamps to 60 in/lbs using 5/16 in. No-Hub torque wrench.
8. Installation is complete. [Installation is rated to 50 ft. water head thrust pressure]
9. Alternate inner strap installation:
 - a. If installing the inner strap so that it follows the inner radius of the 90 degree bend (Drawings 3B and 4B) loosen the inner band clamp of the outside strap and insert the inner strap under the band clamp, and then re-tighten the band clamp just enough to allow the inner strap to remain about 1/2 in. from the fitting's surface.
 - b. Position and install the end band clamps so they are equally spaced from the clamps on the first support strap.
 - c. Tighten the band clamp on one end of the strap to 60 in/lbs.
 - d. Pull the slack out of the strap and tighten the second band clamp to 60 in/lbs.
 - e. Tighten the inner band clamp, of the outer strap, to 60 in/lbs.
 - f. Installation is complete [Installation is rated to 50 ft. water head thrust pressure]

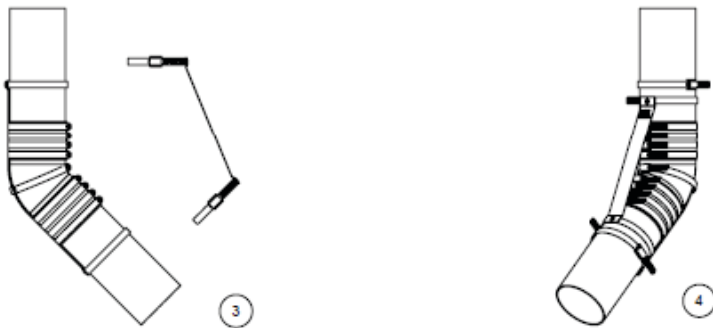
#117-L-Series (sizes 2 in.– 8 in.) 22-1/2° (1/16 Bend), 45° (1/8 Bend) and 60° (1/6 Bend)

Support

1. Install outside radius strap first; position strap by installing middle slider clamp around the cast iron 22, 45 or 60 Bend. Do not tighten clamp, leave it loose enough to reposition as needed.



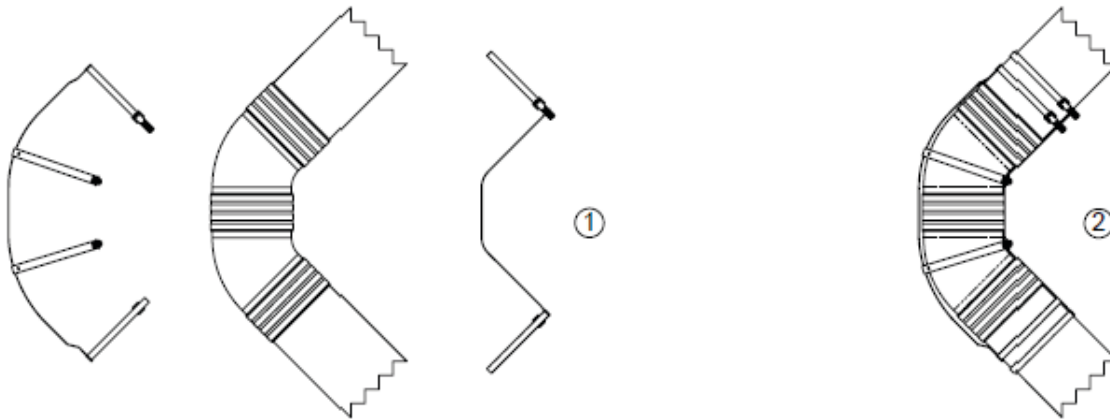
2. Install end clamps around pipe, do not tighten. Position strap so end clamps are spaced equally from No-Hub couplings.
3. Once outside radius strap is positioned, tighten middle slider clamp to 60 in/lbs using 5/16 in. No-Hub coupling torque wrench.
4. Before tightening end clamps make sure there is no slack in the strap. Tighten clamps to 60 in/lbs.
5. Prepare diagonal strap for installation by slightly bending the ends with the clamps to (approximately 22° when used on a 45° 1/8 Bend).



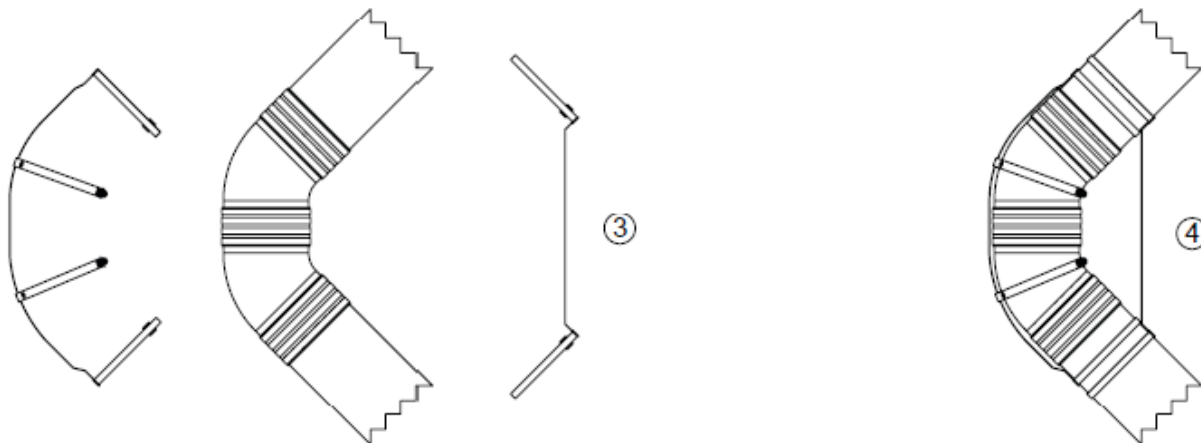
6. Position & install clamps so they are spaced between the clamps of the outside radius support and the No-Hub couplings. Do not tighten.
7. Once the diagonal strap is positioned, tighten the clamp at one end first. Before tightening the second clamp, make sure there is no slack in the strap. Tighten both clamps to 60 in/lbs using 5/16 in. No-Hub torque wrench.
8. Installation is complete. [Installation is rated to 50 ft. water head thrust pressure]

#117-LL-Series (sizes 2 in. – 8 in.) Double 45° 1/8 Bends, joined together

1. Install outside radius strap first; position strap by installing the two middle slider clamps around the cast iron 45s. Do not tighten clamps, leave them loose enough to reposition as needed.

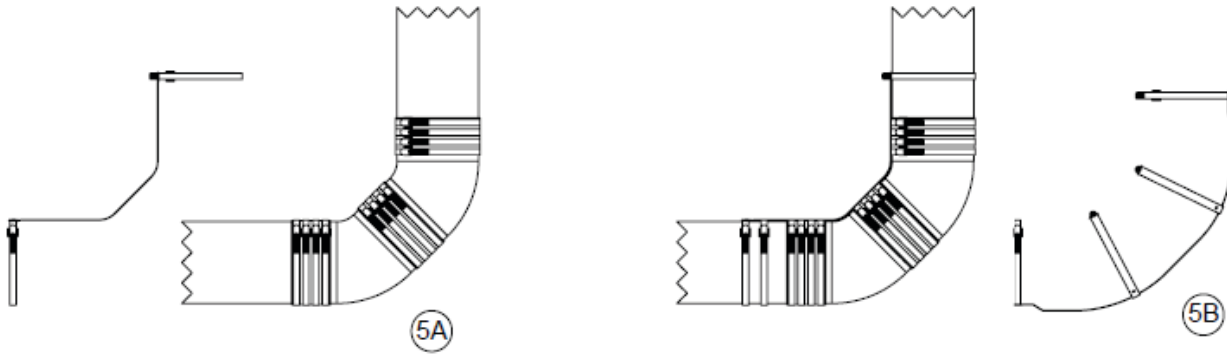


2. Install end clamps around pipe, do not tighten. Position strap so end clamps are spaced equally from No-Hub couplings.
3. Once outside radius strap is positioned, tighten the two middle slider clamps at the midpoint of each 45° Bend. Tighten to 60 in/lbs using 5/16 in. No-Hub coupling torque wrench.
4. Before tightening end clamps make sure there is no slack in the strap. Tighten clamps to 60 in/lbs.
5. Prepare diagonal strap for installation by slightly bending the ends with the clamps to (approximately 22°, when used on a 45° 1/8 Bend).
6. Position & install clamps so they are spaced between the clamps of the outside radius support and the No-Hub couplings. Do not tighten.



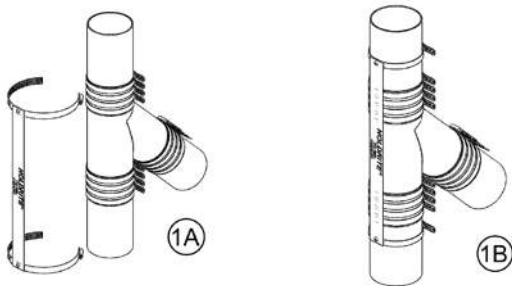
7. Once the diagonal strap is positioned, tighten the clamp at one end first. Before tightening the second clamp, make sure there is no slack in the strap. Tighten both clamps to 60 in/lbs using 5/16 in. No-Hub torque wrench.

8. Installation is complete. [Installation is rated to 50 ft. water head thrust pressure]
9. Alternate inner strap installation:
- If installing the inner strap so that it follows the inner radius of the two 45 degree bends (Drawings 5A and 5B) loosen the two inner band clamps of the outside strap and insert the inner strap under the two band clamps, and then re-tighten the band clamps just enough to allow the inner strap to remain about 1/2 in. from the fitting's surface.
 - Position and install the end band clamps so they are equally spaced from the clamps on the first support strap.
 - Tighten the band clamp on one end of the strap to 60 in/lbs.
 - Pull the slack out of the strap and tighten the second band clamp to 60 in/lbs.
 - Tighten the inner band clamps, of the outer strap, to 60 in/lbs.
 - Installation is complete [Installation is rated to 50 ft. water head thrust pressure]

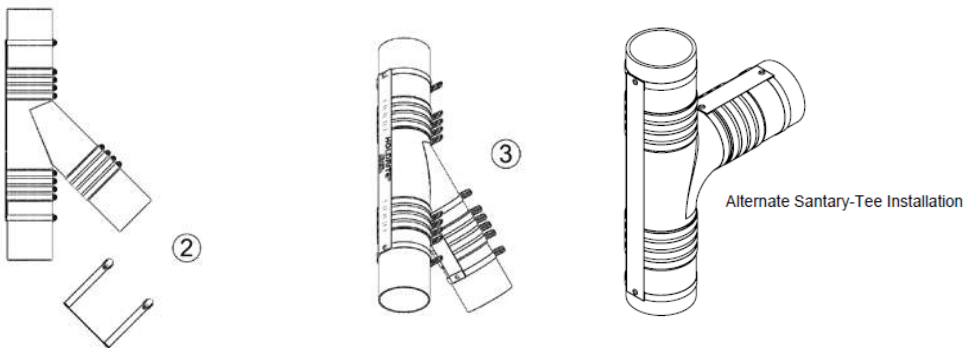


#117-W-Series (sizes 2 in. – 8 in.) Wye & Santee Support

1. Install support strap along the barrel / run of the wye or santee fitting. Position end clamps so they are spaced equally outside the No-Hub couplings. Once clamps are in position and all slack has been taken out of the support strap, tighten clamps to 60 in/lbs using a 5/16 in. No-Hub torque wrench.
 - a. For fittings 5 in.– 8 in., install the second long barrel strap in a similar fashion, 180 degrees opposed to the first long barrel strap, along the two sides of the fitting.



2. Install support strap over fitting branch. Position one end clamp as close to the fitting barrel as possible, do not tighten clamp completely. Position the opposite end clamp around branch pipe.

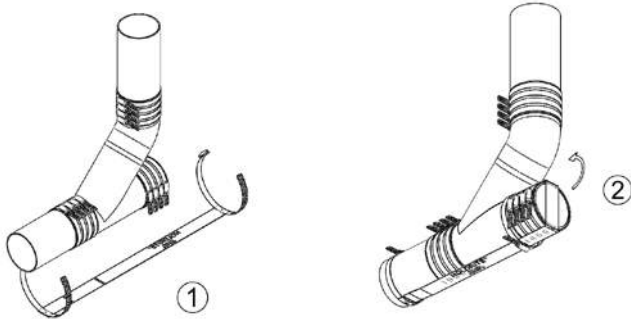


3. Once strap & clamps are positioned and slack removed from the strap, tighten clamps to 60 in/lbs using a 5/16 in. No-Hub torque wrench.
 - a. For fittings 5 in. – 8 in., install the second short strap in a similar fashion, 180 degrees opposed to the first short strap.
4. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]

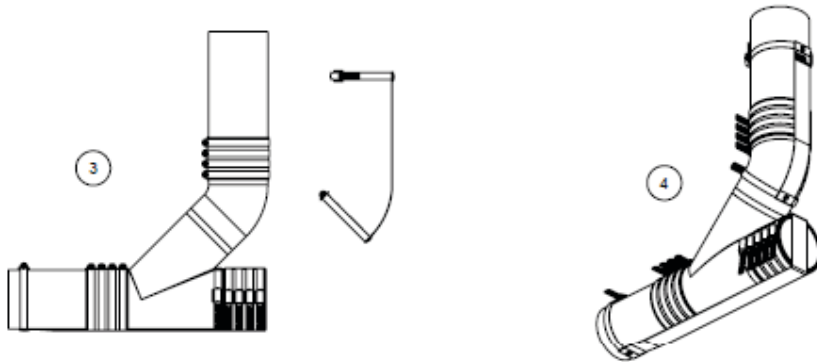
#117-CE-Series (2 in. – 4 in.) Combo or Wye @ end of line

(See the next section for slight variation for 5 in. – 8 in. sizes)

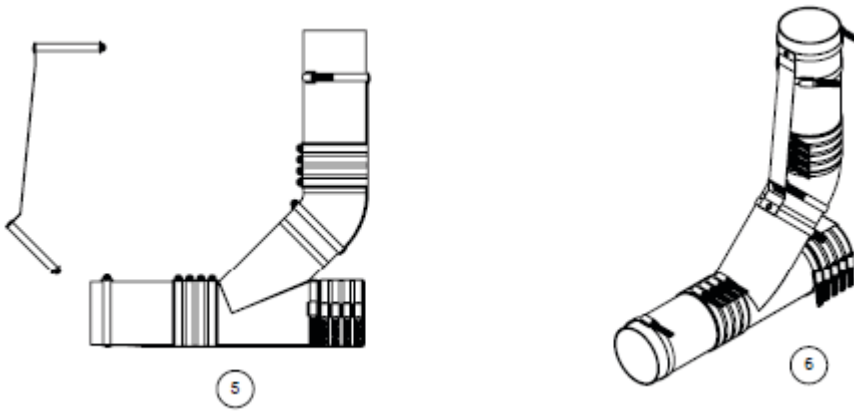
1. Position one end of long strap with clamp on the pipe, just downstream of the combo fitting. Do not tighten clamp.
2. Fold strap snugly around end cap and along fitting run. Install clamp around fitting barrel and strap, do not tighten.



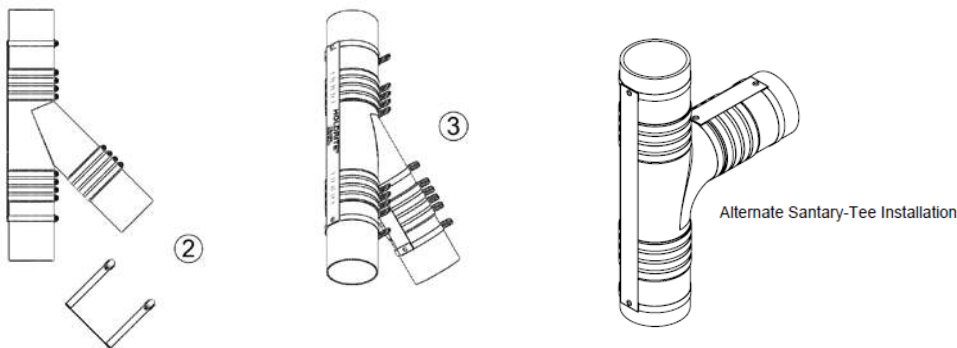
3. Make sure strap is wrapped tightly around fitting barrel and end cap; tighten to 60 in/lbs using 5/16 in. No-Hub torque wrench.
4. Tighten clamp at opposite end of strap [downstream side] after all slack is taken out of the strap. Tighten to 60 in/lbs.



5. Position the short strap with clamps on the outside radius of the fitting branch. Attach clamps but do not tighten.
6. Position clamp closest to fitting so clamp is in the middle of the 1/8th bend; tighten to 60 in/lbs. Tighten clamp at opposite end of strap to 60 in/lbs after all slack is removed from strap.



7. Position second short strap diagonally across the inside of the radius of the branch 1/8th bend. Install one end of strap & clamp between the fitting run and restraint strap clamp installed in steps 3 & 4 above.
8. Install opposite end of strap & clamp around branch pipe. Tighten to 60 in/lbs after all slack is taken out of strap.
9. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]



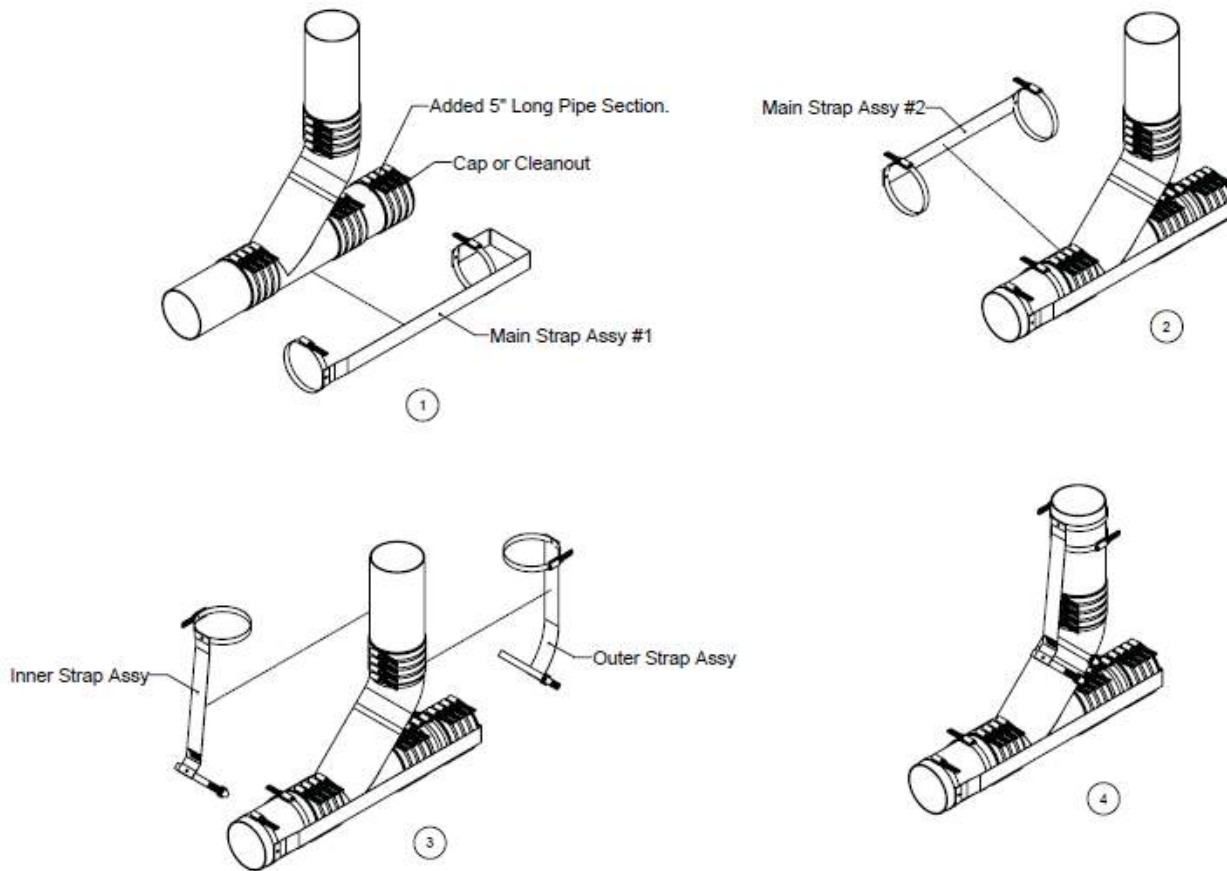
10. Install support strap over fitting branch. Position one end clamp as close to the fitting barrel as possible, do not tighten clamp completely. Position the opposite end clamp around branch pipe.
11. Once strap & clamps are positioned and slack removed from the strap, tighten clamps to 60 in/lbs using a 5/16 in. No-Hub torque wrench.
12. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]



#117-CE-Series (5 in.– 8 in.) Combo or Wye @ end of line

Note: Due to the need for two clamps beyond the fitting, add 5 in. long pipe section between fitting and cap.

1. Position one end of longest strap with clamp on the pipe, just downstream of the combo fitting. Do not tighten clamp.
2. Fold strap snugly around end cap and along the side of the fitting run. Install clamp around fitting barrel and strap, do not tighten.
3. Make sure strap is wrapped tightly around fitting barrel and end cap; tighten to 60 in/lbs using 5/16 in. No-Hub torque wrench.
4. Tighten clamp at opposite end of strap [downstream side] after all slack is taken out of the strap. Tighten to 60 in/lbs.
5. Install the second longest strap along the opposite side of the fitting, securing one band clamp of the pipe section between the combo/wye and the cap and the other band clamp downstream of the combo/wye.
6. Position the short strap with clamps on the outside radius of the fitting branch. Attach clamps but do not tighten.
7. Position clamp closest to fitting so clamp is in the middle of the 1/8th bend; tighten to 60 in/lbs. Tighten clamp at opposite end of strap to 60 in/lbs after all slack is removed from strap.
8. Position second short strap diagonally across the inside of the radius of the branch 1/8th bend. Install one end of strap & clamp between the fitting run and restraint strap clamp.

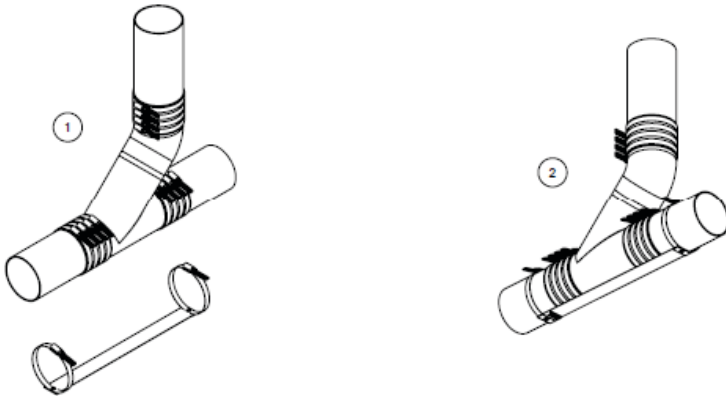


9. Install opposite end of strap & clamp around branch pipe. Tighten to 60 in/lbs after all slack is taken out of strap.

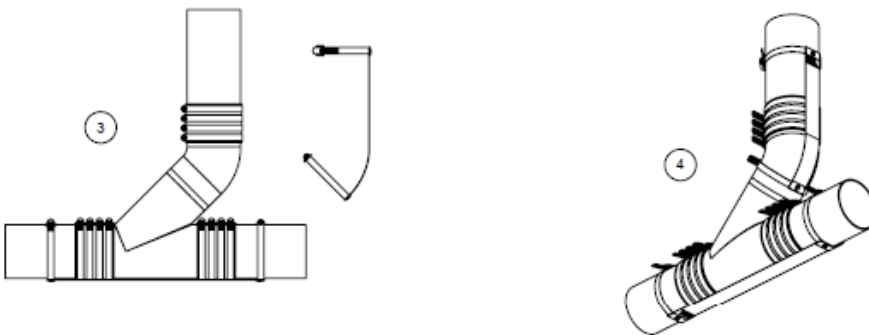
10. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]

#117-CM-Series (2 in. – 8 in.) Combo

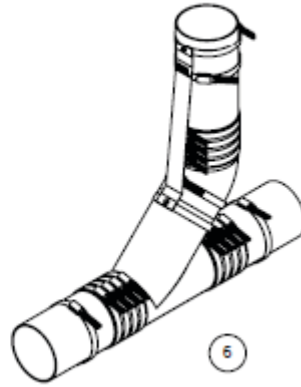
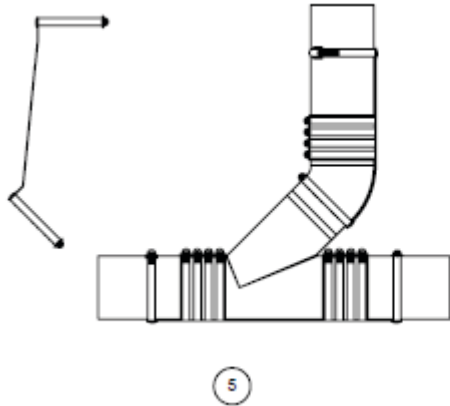
1. Position one end of longest strap with clamp on pipe attached to fitting barrel. Do not tighten.
2. Install clamp at opposite end of strap around pipe attached to fitting run, do not tighten.



3. Make sure strap positioned free of slack; tighten clamps to 60 in/lbs using 5/16 in. No-Hub torque wrench.
 - a. For fittings 5 in. – 8 in., install a second strap in a similar fashion, 180 degrees opposed to the first strap, along the two sides of the fitting.
4. Position a short strap with clamps on the outside radius of the fitting branch. Attach clamps but do not tighten.



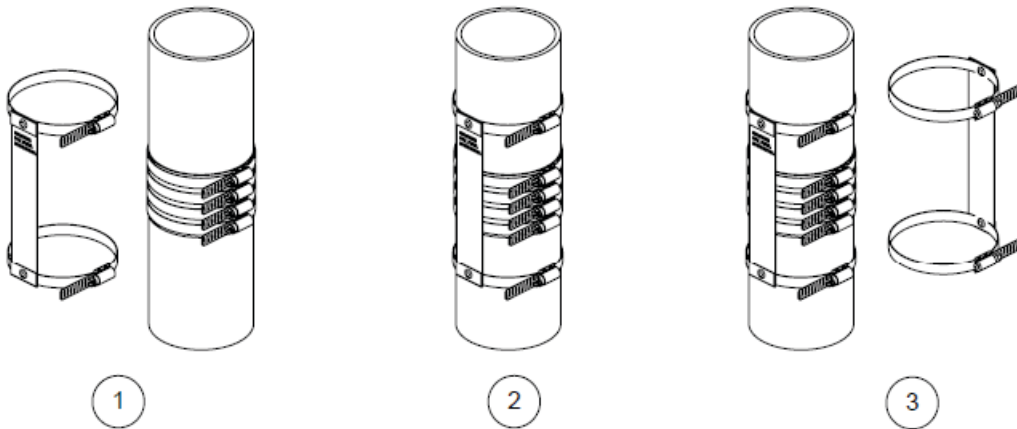
5. Position clamp closest to fitting so clamp is in the middle of the 1/8th bend; tighten to 60 in/lbs. Tighten clamp at opposite end of strap to 60 in/lbs after all slack is removed from strap.
6. Position second short strap diagonally across the inside of the radius of the branch 1/8th bend. Install one end of strap & clamp between the fitting run and restraint strap clamp installed in steps 3 & 4 above.



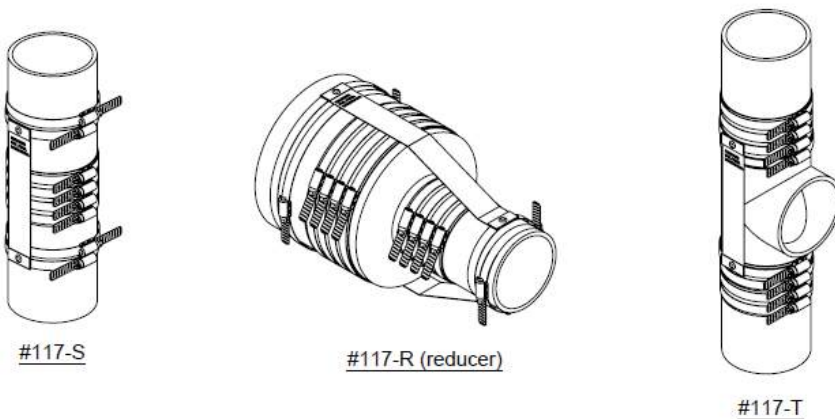
7. Install opposite end of strap & clamp around branch pipe. Tighten to 60 in/lbs after all slack is taken out of strap.
8. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]

#117-S-Series (2 in. – 8 in. Straight coupling joint), #117-R (Reducer) & #117-T (Test/Cleanout Tee or Sanitary Tee) End-to-end pipe support

1. Position one strap with clamps alongside pipe & No-Hub coupling so clamps are spaced equally from No-Hub coupling.
2. Install clamps around pipe & tighten after all slack is taken out of strap.



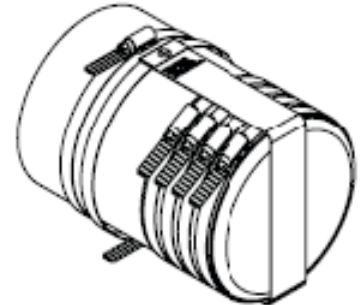
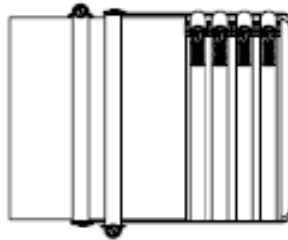
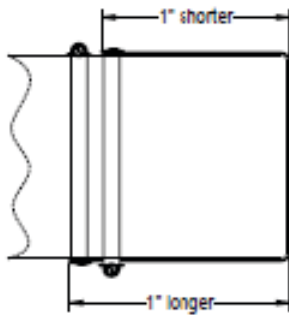
3. Install second strap with clamps following step #1 above, except that the clamps of the second strap will offset slightly to the clamps of the first strap.
4. Install clamps around pipe & tighten after all slack is taken out of strap.



5. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]

#117-BP Series (2 in.– 8 in. Blind Plug/Cap)

1. Position one strap over the end of the blind plug/cap and bend the two ends of the strap around the end of the fitting with one side being approximately 1 in. longer than the other.
2. Tighten one band clamp to 60 in/lbs.
3. Pulling the strap tight, to remove any slack; tighten the second band clamp to 60 in/lbs.



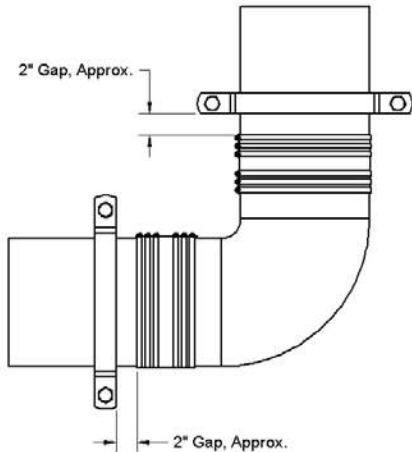
4. Installation complete. [Installation is rated to 50 ft. water head thrust pressure]



No-Hub Fitting Restraints #117-10K, #117-12K, #117-15K (For 10 in., 12 in. and 15 in. 90 Degree Short Sweeps. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

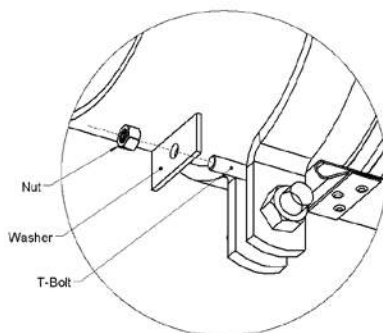
1. Assemble pipe clamps around pipe, approximately 2 in. (two inches) away from no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



2. Position “ears” of pipe clamps perpendicular to the pipe’s 90° change of direction.

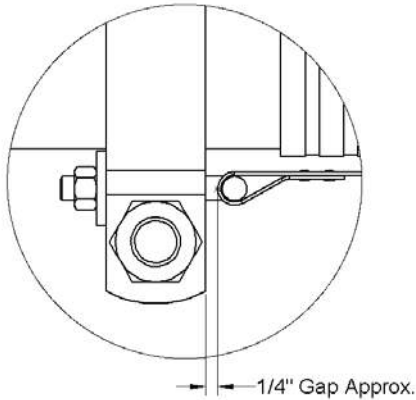
See Image Above

3. Install the two restraint straps by inserting threaded end of each T-bolt in the gap between pipe surface and pipe clamp bolt. Install washers & nuts.

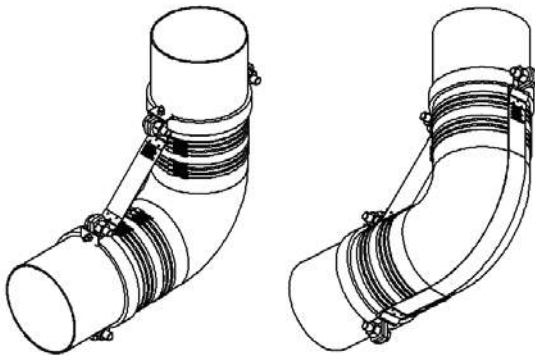


This information is proprietary to rwc and is subject to change without notice. It may not be reproduced in part or whole without written authorization. Cette information est exclusive à rwc et peut être modifiée sans préavis. Reproduction en tout ou en partie interdite sans autorisation par écrit. Esta información es propiedad de rwc y está sujeta a cambios sin previo aviso. No podrá reproducirse en parte o en su totalidad sin autorización escrita.

(Note) There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.

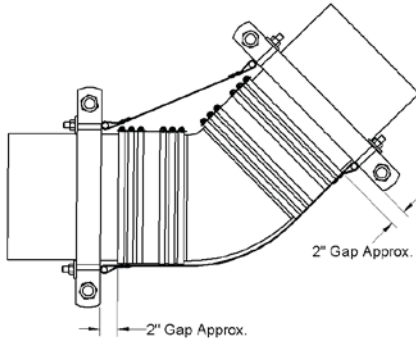


4. Tighten pipe clamp nuts & bolts completely, using a socket and torque wrench (At least 60 foot-pounds of torque).
5. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears.
6. Installation is complete.



#117-10L, #117-12L, #117-15L (For 1/8 in. Bends. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

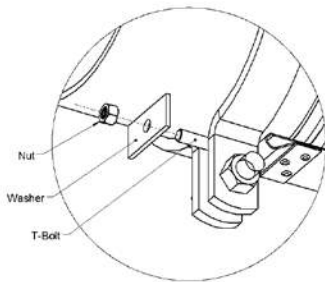
1. Assemble pipe clamps around pipe, approximately 2 in. (two inches) away from no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



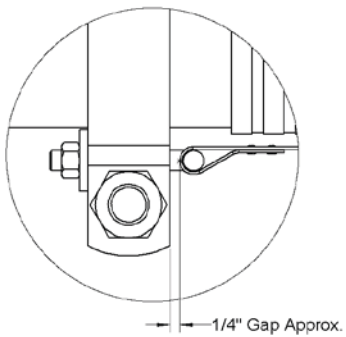
2. Position “ears” of pipe clamps perpendicular to the pipe’s 45° change of direction.

See Image Above

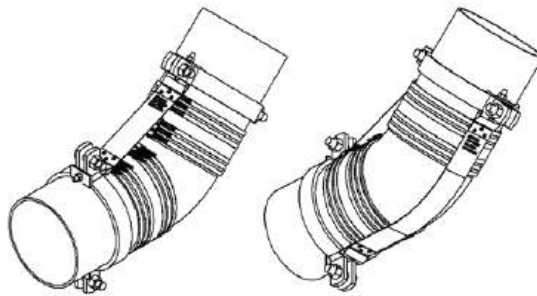
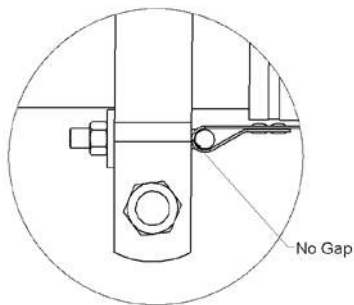
3. Install both restraint straps by inserting the threaded end of each T-bolt in the gap between the pipe surface and the pipe clamp bolt. Install washers & nuts.



There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket on a torque wrench.
5. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a 3/4 in. socket or wrench.



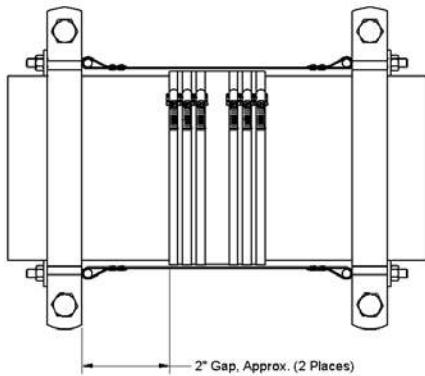
6. Installation is complete.



#117-10S, #117-12S, #117-15S (For Straight Coupling Joints. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

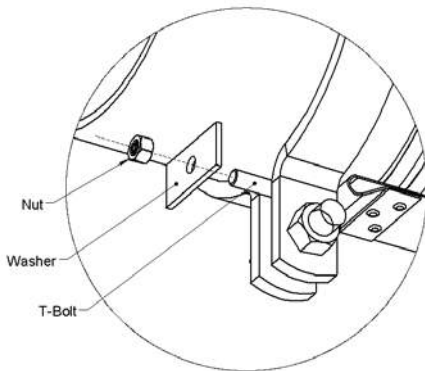
1. Assemble pipe clamps around pipe, approximately 2 in. (two inches) away from no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



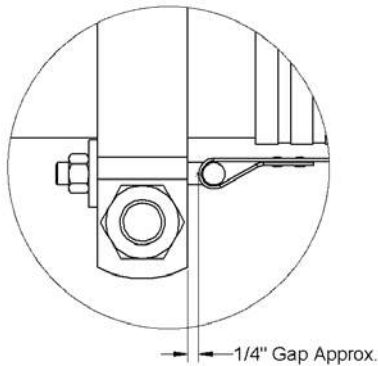
2. Position “ears” of pipe clamps parallel to another.

See Image Above

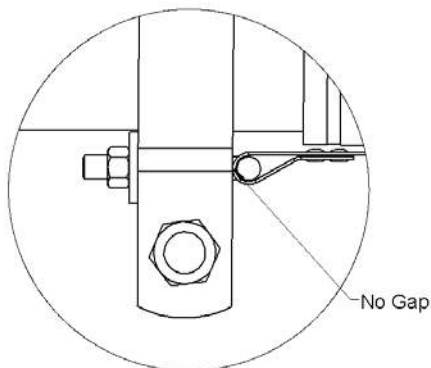
3. Install both restraint straps by inserting the threaded end of each T-bolt into the gap between the pipe surface and pipe clamp bolt. Install washers & nuts.



There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.
5. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a 3/4 in. socket or wrench.

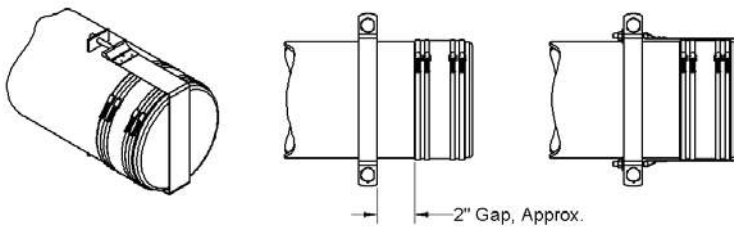


6. Installation is complete.

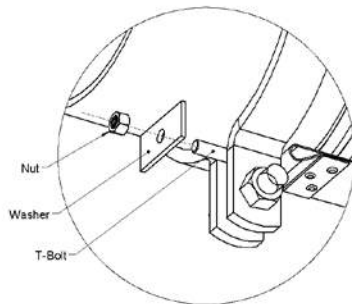
#117-10BP, #117-12BP, #117-15BP (For Bling Plugs/Caps. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

1. Set the restraint strap centered over the cap and bend the two ends at 90 degree angles, to match the O D of the blind plug/cap.
2. Assemble the single pipe clamp around the pipe, approximately 2 in. (two inches) away from the no-hub coupling. Pipe clamp should be loose enough to allow positioning by tapping into place with a hammer.

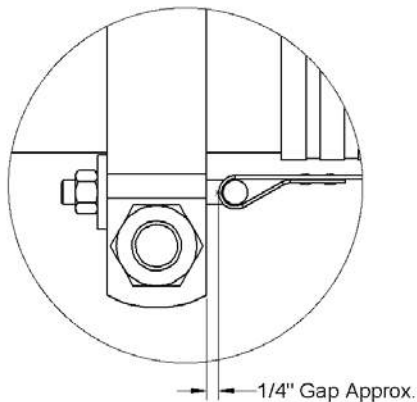


3. Install the restraint strap by inserting the threaded end of each T-bolt into the gap between the pipe surface and pipe clamp bolt. Install washers & nuts.

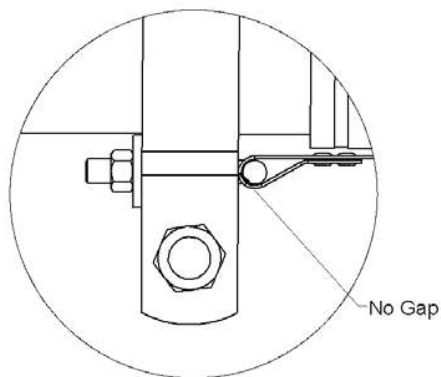




There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.
5. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a 3/4 in. socket or wrench.



6. Installation is complete.

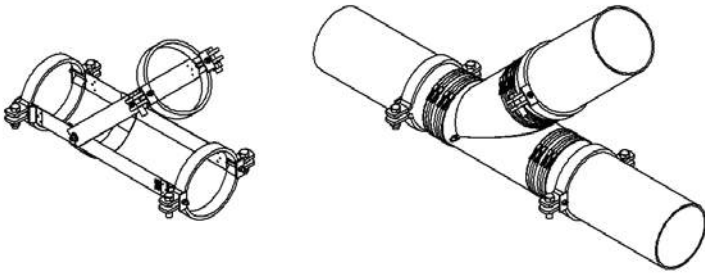
This information is proprietary to rwc and is subject to change without notice. It may not be reproduced in part or whole without written authorization.
Cette information est exclusive à rwc et peut être modifiée sans préavis. Reproduction en tout ou en partie interdite sans autorisation par écrit.
Esta información es propiedad de rwc y está sujeta a cambios sin previo aviso. No podrá reproducirse en parte o en su totalidad sin autorización escrita.



#117-10W Thru #117-15W (For Wye fittings with 10 in., 12 in. and 15 in. size combinations. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

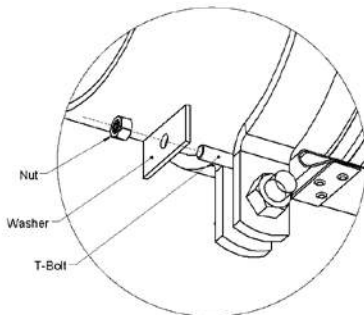
1. Assemble pipe clamps around pipe, approximately 2 in. (two inches) away from no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



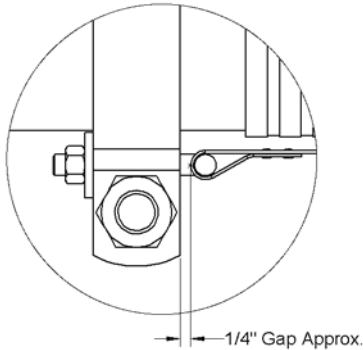
2. Position the “ears” of the three pipe clamps 90 degrees from the fitting’s seam/midline.

See Images Above

3. Install both long restraint straps along the barrel of the wye fitting by inserting the threaded end of each T-bolt in the gap between the pipe surface and the pipe clamp bolt. Install washers & nuts, as shown in the drawing below.

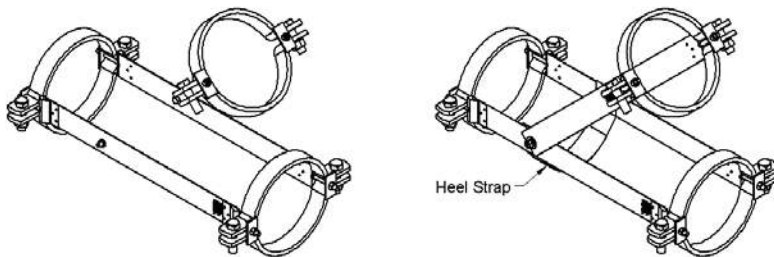


There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Prior to tightening any of the straps, place the short (1 in. long bolt) through the hole in each strap, located at the Wye branch centerline location, with the bolt threads pointing away from the fitting.

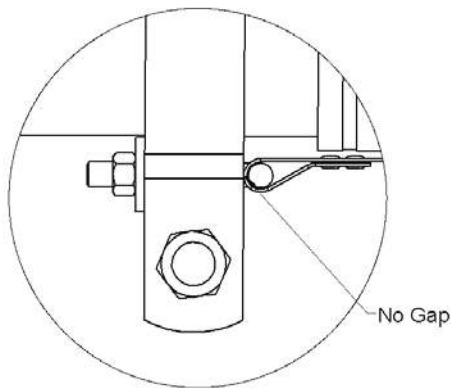
(See image below)



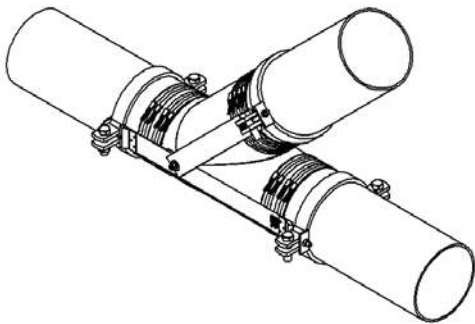
5. Tighten the two pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket on a torque wrench.
6. Install the two shorter galvanized straps along the 45 degree branch of the wye fitting. One end of each strap (with the T-bolt) goes through the large pipe clamp ears (as shown in step 3 above) and the other end (with the hole it in) goes over the 1 in. long bolt at the fitting's intersection. See figure above and Fig. #7 below.



7. Install the short in heel strap in. around the back side of the fitting by placing each end of the strap over the 1 in. bolts, through the holes at each end of the strap. See figure above.
8. Install the lock washer and nut on each of the 1 in. bolts and tighten.
9. Tighten the bolts on the pipe clamp that is on the fitting branch to 60 foot pounds, with a socket and torque wrench.
10. Tighten nuts on the two T-bolts on these shorter restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears.



11. Installation is complete.



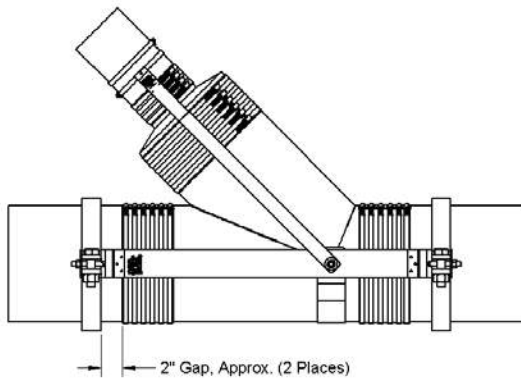
This information is proprietary to rwc and is subject to change without notice. It may not be reproduced in part or whole without written authorization.
Cette information est exclusive à rwc et peut être modifiée sans préavis. Reproduction en tout ou en partie interdite sans autorisation par écrit.
Esta información es propiedad de rwc y está sujeta a cambios sin previo aviso. No podrá reproducirse en parte o en su totalidad sin autorización escrita.



#117-10x4 W Thru #117-15x8 W (For Wye fittings with 10 in., 12 in. and 15 in. barrels and 4 in. – 8 in. branches. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

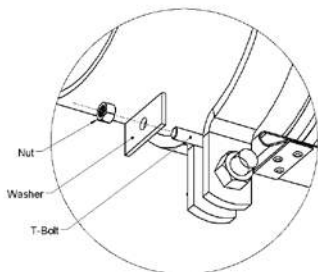
1. Assemble two large pipe clamps around pipe, along the long barrel of the fitting, approximately 2 in. (two inches) away from the no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



2. Position the “ears” of the two pipe clamps 90 degrees from the fitting’s seam/midline.

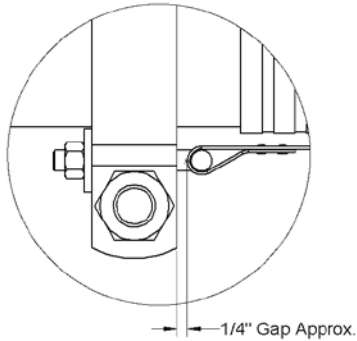
(See Image Above)

3. Install both long restraint straps along the barrel of the wye fitting by inserting the threaded end of each T-bolt in the gap between the pipe surface and the pipe clamp bolt. Install washers & nuts, as shown in the drawing below. There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



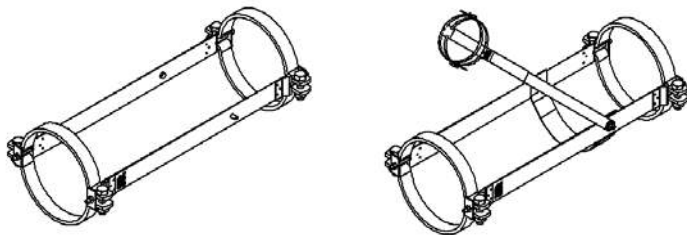
This information is proprietary to rwc and is subject to change without notice. It may not be reproduced in part or whole without written authorization. Cette information est exclusive à rwc et peut être modifiée sans préavis. Reproduction en tout ou en partie interdite sans autorisation par écrit. Esta información es propiedad de rwc y está sujeta a cambios sin previo aviso. No podrá reproducirse en parte o en su totalidad sin autorización escrita.

There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Prior to tightening any of the straps, place the short (1 in. long bolt through the hole in each strap, located at the Wye branch centerline location with the bolt threads pointing away from the fitting.

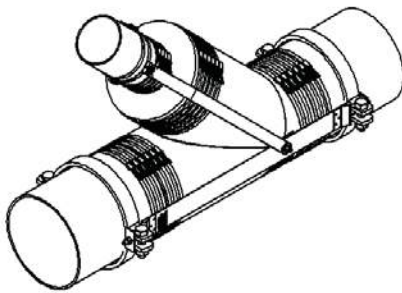
(See image below)



5. Tighten the two pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.
6. Install the two shorter galvanized straps along the 45 degree branch of the wye fitting. One end of each strap (with the stainless steel bands) goes around the pipe beyond the branch of the Wye and the other end (with the hole in it) goes over the 1 in. long bolt at the fitting's intersection.



7. Install the short “heel strap” around the back side of the fitting by placing each end of the strap over the 1 in. bolts, through the holes at each end of the strap.
8. Install the flat washer, split lock washer and nut on each of the 1 in. bolts and tighten.
9. After pulling the slack out of the two galvanized straps, tighten the stainless steel bands to 60 in/lbs. with a 5/16 torque wrench.
10. The installation is complete.

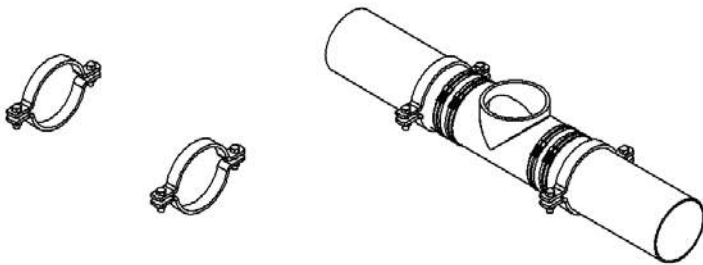




#117-10T and #117-10T-G (For 10 in. Test/Cleanout Tee. Model number with the suffix “-G” have galvanized pipe clamps and hardware)

Installation Instructions

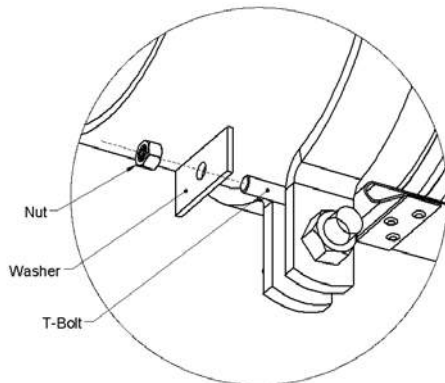
1. Assemble pipe clamps around pipe, approximately 2 in. (two inches) away from no-hub couplings. Pipe clamps should be loose enough to allow positioning by tapping into place with a hammer.



2. Position “ears” of pipe clamps parallel to another.

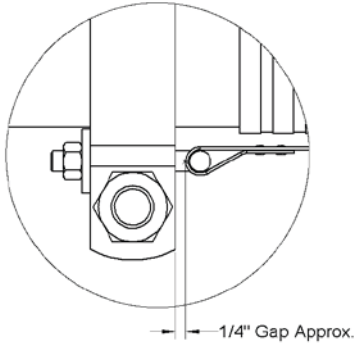
See Image Above

3. Install both restraint straps by inserting the threaded end of each T-bolt into the gap between the pipe surface and pipe clamp bolt. Install washers & nuts.

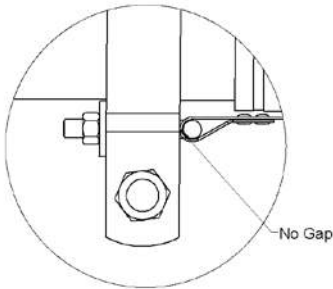




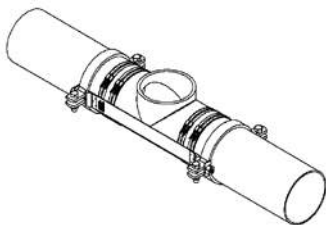
There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.
5. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a 3/4 in. socket or wrench.



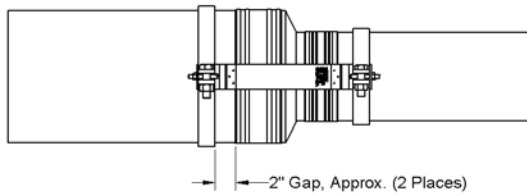
5. Installation is complete.



#117-12x10R, #117-15x10R and #117-15x12R (For Short Reducers involving 10 in.-15 in. pipe. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

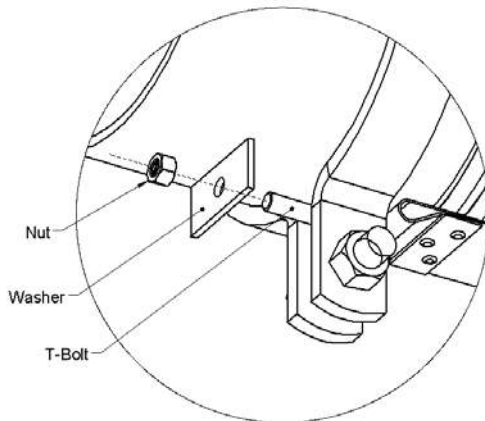
Installation Instructions

1. Assemble pipe clamp around pipe, approximately 2 in. (two inches) away from no-hub coupling. Pipe clamp should be loose enough to allow positioning by tapping into place with a hammer.



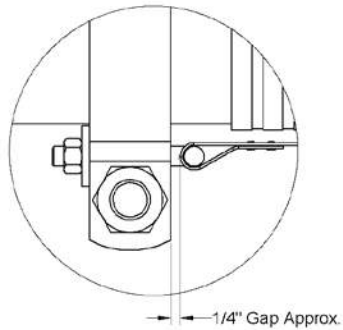
2. Position "ears" of pipe clamps parallel to another.

See Image Above

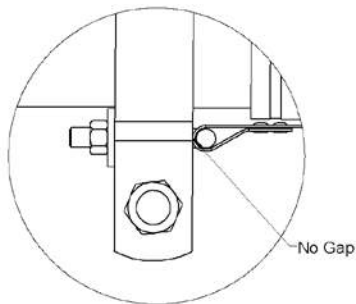


3. Install both restraint straps by inserting the threaded end of each T-bolt into the gap between the pipe surface and pipe clamp bolt. Install washers & nuts. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.

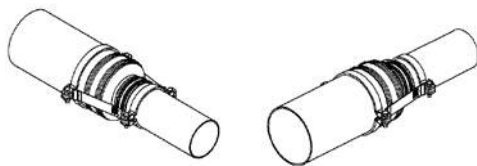
There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



4. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a $\frac{3}{4}$ in. socket or wrench.



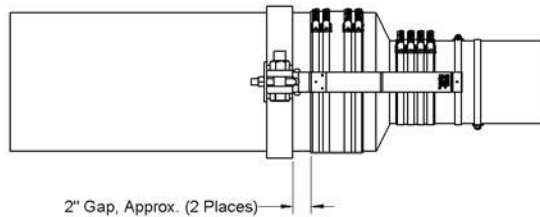
5. Installation is complete.



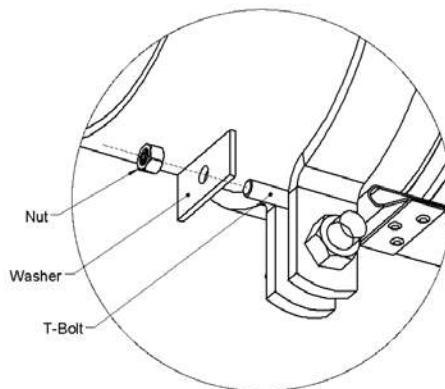


#117-10x4R thru #117-15x8R (For Short Reducers involving 10 in.–15 in. pipe by 4 in.–8 in. Pipe. Model numbers with the suffix “-G” have galvanized pipe clamps and hardware)

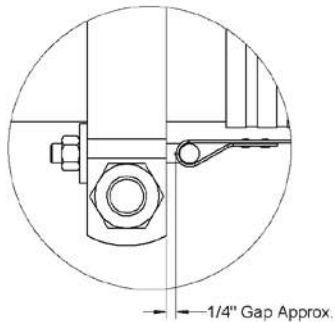
Installation Instructions



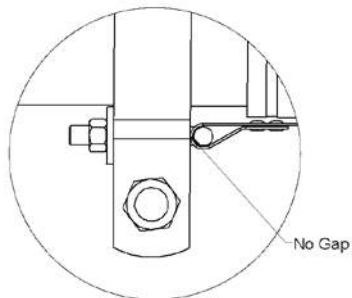
1. Install both restraint straps by inserting the threaded end of each T-bolt into the gap between the pipe surface and pipe clamp bolt on the 10 in., 12 in. or 15 in. pipe. Install washers & nuts.



There should be a slight gap (approx. 1/4 in.) between end of restraint and pipe clamp “ears”. Adjust pipe clamp positions to achieve this gap by tapping clamps into place with a hammer.



6. Tighten pipe clamp nuts & bolts completely (At least 60 foot-pounds of torque) using a 1-5/16 in. socket and torque wrench.
7. Pull the straps to eliminate any slack and tighten the stainless steel bands around the adjoining pipe. Tighten to 60 inch pounds using a 5/16 in. torque wrench.
8. Tighten nuts on restraint straps until there is little or no gap between ends of restraint straps and pipe clamp ears, using a 3/4 in. socket or wrench.



9. Installation is complete.

