

Installation Instructions

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NIBCO® Press System — Installation Instructions

NIBCO Press System

The NIBCO Press System, when used with tested and authorized pressing tools and jaws, is designed to mechanically crimp fittings and valves onto copper tubing to create a watertight, permanent seal. When the switch on the pressing tool is depressed a small hydraulic pump generates thousands of pounds of crimping force to install the specially designed fittings and valves.

System Components

Fittings and Valves

NIBCO Press System copper or bronze fittings and valves

Tubing

ASTM B 88 seamless Hard Drawn Copper Water Tube: Types K, L and M as well as 1/2", 3/4" and 1" annealed copper tubing.

Pressing Tools, Chains and Jaws

The pressing tool, chain and jaw are important parts of ensuring a reliable, permanent connection between NIBCO Press System fittings and valves and the copper water tube.

CAUTION — Use only pressing tools and jaw sets that have been tested and authorized for use with NIBCO Press System fittings and valves ⁽¹⁾. Use of unauthorized pressing tools and/or jaws may result in an improper seal that could cause extensive property damage.

(1) See approved tool and jaw compatibility matrix in this catalog.

Chemical Compatibility

Please consult the most current edition of the NIBCO Chem-Guide for recommendations regarding chemical compatibility of material exposure to specific media and media-treatment additives. The NIBCO Chem-Guide is a general guide on the topic of chemical compatibility and is by no means an exhaustive resource on the subject. Ultimately, proper material selection is the responsibility of the installer and/or end-user, taking into account all aspects of a system's design and intended use.

Galvanic Potential in Piping Systems

Galvanic corrosion or dissimilar metal corrosion is an electrochemical process that is created through the electrical interaction of two different metals under the influence of a conductive media (i.e. an electrolyte). An electrolytic cell, much like a battery, is generated by these dissimilar metals using water as the electrolyte. The electrical charge, developed within the electrolytic cell, drives a preferential attack on the more electrically active metal with the water acting as the recipient of the discarded metal ions. Such galvanic attack is often encountered in service where iron or steel components are installed, and later corrode, in a largely copper piping system. Please consult NIBCO Technical Bulletin NTB-0714-01 Dielectric Products Relative to Electrolysis and Galvanic Corrosion.

Pressing Tool Safety

- Only use authorized pressing tools and jaws with NIBCO Press System fittings and valves. Other uses or modification of the jaws for other applications may damage the press tool, damage the jaws and/or cause personal injury.
- Keep fingers and hands away from jaws during pressing cycle. Your fingers or hands can be crushed, fractured or amputated if they become caught between the jaw tips or between the jaw and any other object.
- Always wear safety glasses while using pressing tools and jaws.
- Never attempt to repair a damaged jaw set. A jaw that has been modified in any manner can fail during crimping resulting in serious injury. Discard the entire damaged jaw set. Replace with a new jaw set.

WARNING: Please read these installation instructions and the manufacturer's pressing tool and jaw operators manual(s) carefully prior to installation of the NIBCO Press System. Failure to understand and follow the contents of this manual may result in extensive property damage, severe personal injury or death.

Please contact NIBCO Technical Services at 888.446.4226 if you have installation questions.

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NIBCO® Press System — Installation Instructions

Installation Instructions for 1/2" - 2" Press Fittings and Valves

WARNING: To prevent serious injury, inspect the pressing tool, battery charger (if applicable) and jaw sets according to the procedure outlined in the pressing tool instruction manual prior to beginning installation.

Failure to clean jaws can result in an improper connection that can lead to extensive property damage.

Preparing the Copper Tube

1. Select clean, undamaged copper tube and cut to desired length. Cut tube end square using a tube cutter or fine-toothed saw. Do not crimp over damaged, scratched, gouged, or otherwise damaged tubing ends. Do not crimp over etch print streams on tubing. (Figure 1).



Figure 1 — Cut tube to desired length

2. Deburr the tube inside and outside diameter using a half-round file or a deburring tool.
3. Clean the tube end of all dirt, oil and grease. (Emery cloth or sandpaper to clean the tube or remove oxidation should not be used.)

Inserting the Tube into the Fitting or Valve

1. Check the fitting to make sure the EPDM seal is in place, clean and free of dirt and debris (Figure 2).



Figure 2 — Check for EPDM Seal

WARNING: Never lubricate the EPDM seal in the NIBCO Press System fitting or valve with anything other than water. Oil-based lubricant, dirt or debris may damage the seal. An improper seal can lead to extensive property damage.



Figure 3 — Marking for Insertion Depth

2. Mark the tube with a permanent marker to indicate the proper tube insertion depth (Figure 3).
3. Refer to the minimum insertion depth table for correct depths
4. Insert the tube into the fitting or valve using a twisting motion. Make sure that the tube is fully inserted into the fitting stop or shoulder.

Tube Size	Insertion Depth (min.)	
	Inches	mm
1/2	11/16	18
3/4	7/8	22
1	7/8	22
1 1/4	1	25
1 1/2	1 3/8	35
2	1 1/2	38

CAUTION: Tubing that is difficult to insert may have burrs or could be out-of-round. Burrs must be removed and tubing end must be undamaged. Make sure tube is inserted to the proper depth. Failure to do so may result in an improper seal.

Attaching Pressing Jaws

1. Make sure the battery is removed or the cord is unplugged on the pressing tool prior to attaching or changing the crimp jaws.
2. Push and twist to open the jaw set mounting pin. (Figure 4).



Figure 4 — Pushing and twisting to open the jaw set mounting pin

3. If press tool contains a jaw set, slide it out of the crimping tool.

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4. Select the jaw set that corresponds to the size of the joint to be crimped and insert the jaw set into the pressing tool (*Figure 5*).

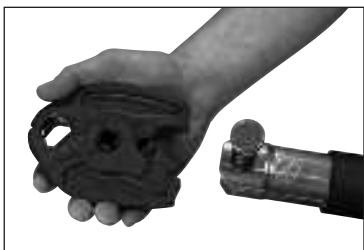


Figure 5 — Inserting the NIBCO Press System jaw

5. Push the jaw set mounting pin until it clicks into position.

NOTE: The tool will not properly press unless the pin is fully engaged.

Crimping a NIBCO Press System Fitting or Valve

1. Make sure the tubing is inserted to the proper depth in the fitting. (*Figure 6*).

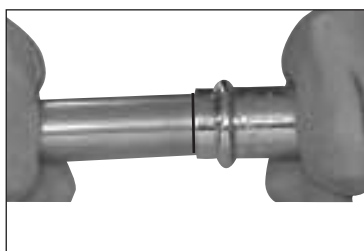


Figure 6 — Inserting the tube to proper depth

2. Squeeze jaw arms to open the jaw set.
3. Place the open jaws around the fitting and ensure that the contour of the jaw is properly aligned with the contour of the fitting (*Figure 7*).



Figure 7 — Open the jaw set and place around the fitting

4. Make sure the tool is perpendicular to the tubing and depress the switch (*Figure 8*). Keep the trigger depressed from the time the cycle begins and the rollers contact the jaw arms until the end of the entire crimp cycle.

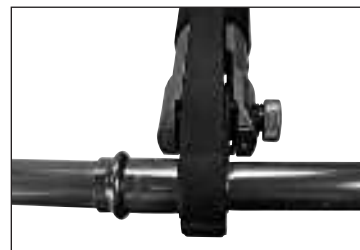


Figure 8 — Jaw set should be square to tubing

5. Once the crimp is complete, press the jaw arms to open the jaw and remove from the fitting.

If the tool displays an LED flash or emits an audible alarm, please refer to the tool instruction manual for troubleshooting suggestions.

CAUTION Avoid handling sharp edges that may have formed on the fitting during the crimping operation.

Inspecting the Crimp

1. Inspect the crimped fitting to ensure proper crimp.

NOTE: The use of the NIBCO Press System jaw will produce a unique witness mark "N" on the crimped fitting.

2. Inspect the crimped fitting checking the connection for the following problems:

- Not fully inserted tube, double check depth marks
- Incorrect jaw alignment with the fitting contour

If any problems are found, a new section of tubing and a new fitting will need to be prepared, installed and crimped.

3. Test the NIBCO Press System in accordance with crimp integrity testing instructions for fittings and valves in this catalog.

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NIBCO® Press System — Installation Instructions

Installation Instructions for 2 1/2" - 4" Press Fittings and Valves

WARNING: To prevent serious injury, the pressing tool, battery charger (if applicable) and pressing chains should be inspected according to the procedure outlined in the pressing tool instruction manual prior to beginning installation.

Failure to clean pressing chains can result in an improper connection that can lead to extensive property damage.

Preparing the Copper Tube

1. Select clean, undamaged copper tube and cut to the desired length. Cut tube end square using a tube cutter or fine-toothed saw. Do not crimp over damaged, scratched, gouged, or otherwise damaged tubing. Do not crimp over etch print streams on tubing (Figure 1).



Figure 1: Cut tube to desired length using a tube cutter

2. Deburr the tube inside diameter using a half-round file or deburring tool. Remove any copper shavings or filings (Figures 2 & 3).

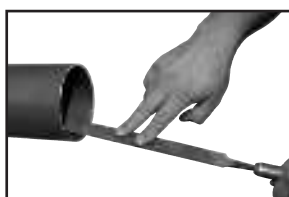


Figure 2: Deburr inside diameter using a half-round file



Figure 3: Deburr inside diameter deburring tool

3. Deburr the tube outside diameter using a half-round file to prevent damage to the EPDM seal (Figure 4).



Figure 4: Deburr outside diameter using a half-round file

4. Clean the tube end of all contamination, oils and shavings. A smooth transition chamfer is recommended to ease tube insertion past the seal. (Emery cloth or sandpaper to clean the tube or remove oxidation **should not be used**.)

Inserting the Tube into the Fitting or Valve

1. Check the fitting to make sure that the seal is in place and is free of oil or grease. Only original NIBCO® EPDM seals are to be used when making a press connection with NIBCO Press System fittings and valves. If it is necessary to lubricate the seals, use water only. **DO NOT** use any petroleum-based lubricants (Figure 5).



Figure 5: Check for EPDM seal

WARNING: Never lubricate the EPDM seal in a NIBCO Press System fitting or valve with anything other than water. Oil-based lubricants, dirt or debris may damage the seal. An improper seal can lead to extensive property damage.

2. Mark the proper insertion depth on the tube with a permanent marker prior to insertion, based on insertion depth chart. Refer to minimum insertion depth table for correct depths.

NIBCO® Press System Insertion Depth Chart			
Tube Size	2 1/2"	3"	4"
Insertion Depth (min.)	1 1/2"	1 5/8"	2 1/8"

3. Insert the tube into the fitting or valve using a twisting motion. Make sure that the tube is fully inserted into the fitting or valve.

WARNING: If tube is not inserted to the proper depth, an inadequate seal may result.

CAUTION: Tubing that is difficult to insert may have burrs or could be out-of-round. Burrs must be removed and tubing end should be undamaged. Make sure tube is inserted to the proper depth. Failure to do so may result in an improper seal.

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NIBCO® Press System — Installation Instructions

Crimping a NIBCO Press System Fitting or Valve

CAUTION:

NIBCO press fittings and valves (2½", 3", 4" ends) to be installed **ONLY** with:

- NIBCO PC-100 and PC-280 pressing tools
- NIBCO PC-5 adapter jaw
- NIBCO pressing chain - 2½" (PC-2), 3" (PC-3), 4" (PC-4)

1. Make sure that the battery is removed or that the cord is unplugged on the pressing tool prior to attaching or changing the adapter jaw.
2. Select the correct size pressing chain. Pull the pin on the chain which allows the segments to open. Position the chain on the raised bead and wrap the chain around the fitting with the "pipe side" designation facing the tube. When the chain is fully wrapped around the fitting, reinsert the pin to secure the chain on the assembled joint. Visually inspect the mark made for insertion depth, to ensure the tube remained in position (*Figure 6*).



Figure 6: Placement of the pressing chain onto fitting or valve

3. Release the pin (push and twist) on the jaw holder of the pressing tool, and install the adapter jaw on the tool. Return the pin to its original position, securing the jaw. The red sleeve on the tool must be in the back position to allow for crimping sizes 2½", 3" and 4" (*Figure 7*).



Figure 7: Placement of adapter jaw into the tool

4. Squeeze adapter jaw arms to open the jaw. Rollers must be fully retracted to open the adapter jaw. Place the open adapter jaw into the grooves in the pressing chain and let go of the jaw arms (*Figure 8*).



Figure 8: Placement of adapter jaw into pressing chain

5. Make sure the tubing is inserted to the proper depth in the fitting or valve, and that the tube and fitting or valve are aligned properly.
6. With the pressing tool perpendicular to the tube, begin the pressing cycle by pulling the trigger of the pressing tool.
7. Keep the trigger depressed from the time the cycle begins and the rollers contact the jaw arms until the end of the entire cycle. Remove the pressing tool and adapter jaw from the pressing chain. Remove the pressing chain from the fitting.

If the tool displays an LED flash or emits an audible alarm, please refer to the tool instruction manual for troubleshooting suggestions.

CAUTION: Avoid sharp edges that may have formed on the fitting during the crimping operation.

Inspecting the Crimp

1. Inspect the crimped fitting or valve to ensure proper crimp. The final crimp should appear pressed uniformly around the fitting or valve (*Figure 9*).



Figure 9: Inspection of final crimp

NOTE: The use of the NIBCO Press System chain will produce a unique witness mark "N".

2. Inspect the crimped fitting checking the connection for the following problems:
 - Not fully inserted tube, double check depth marks
 - Incorrect chain alignment with the fitting contour
 If any problems are found, a new section of tubing and a new fitting will need to be prepared, installed, and crimped.
3. Test the NIBCO Press System in accordance with crimp integrity testing instructions for fittings and valves in this catalog.

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NIBCO® Press System — Crimp Integrity Testing

Instructions for Fittings & Valves

PRESSURE TESTING:

NIBCO recommends the following leak testing procedures when installing NIBCO Press System with the leak detection feature. These test procedures allow the installer to find un-pressed connections while the system is being tested under pressure. The uniquely designed EPDM o-ring allows fluids or gases to flow past the seal and leak when the fitting has not yet been pressed. When the fitting has been pressed, the o-ring will create a water tight seal around the tube.

AIR LEAK TESTING:

1. Pressure system slowly increasing to a maximum of 15 psi maximum using dry, oil free compressed air, carbon dioxide, or nitrogen.
2. Allow system pressure to stabilize for a minimum of 2 hours.
3. If system pressure has dropped, add more air to bring entire system up to 15 psi maximum. If system pressure increases above 15 psi, bleed off excess pressure to ensure system is at a maximum pressure of 15 psi.
4. If the system pressure continues to drop, inspect all joints for un-pressed fittings. The NIBCO Press System press fittings with the leak detection feature are designed to leak in an un-pressed condition.
5. Check all press joints for air leaks using a commercially available leak test solution or a soap and water mixture. Do not use a soap that contains Mineral Spirits or a Hydrocarbon/ petroleum that might attack the EPDM O-rings.
6. Once the system has been confirmed to be leak free, pressure can be increased to the recommended working pressure to verify system integrity.

WATER LEAK TESTING:

1. Pressurize system up to 50 psi maximum using potable water.
2. Allow system pressure to stabilize for a minimum of 2 hours.
3. If system pressure has dropped, add more water to bring entire system up to 50 psi maximum. If system pressure increases above 50 psi, bleed off excess pressure to ensure system is at a maximum pressure of 50 psi.
4. If the system pressure continues to drop, inspect all joints for un-pressed fittings. The NIBCO Press System press fittings with the leak detection feature are designed to leak in an un-pressed condition.
5. Check all press joints for leaking water.
6. Once the system has been confirmed to be leak free, water pressure can be increased to the recommended working pressure to verify system integrity.

SYSTEM INTEGRITY TESTING*:

Once a system has been confirmed to be properly installed and no press connections have been left uncrimped, the system is recommended for testing up to the maximum non-shock working pressure as indicated in the Press Fittings Applications Chart reported in this catalog.

NOTE: While NIBCO Press System products are tested to pressures as high as 600 psi, the product system rating limitation of 200 psi is in place to ensure a safety factor of three-times proof-testing according to ASME B16.51 Copper and Copper Alloy Press-Connect Pressure Fittings.

SYSTEM INTEGRITY TESTING AT HIGHER PRESSURES*:

NIBCO Press System products can be tested at hydrostatic pressures higher than 200 CWP, not exceeding a maximum pressure of 300 psi hydrostatic for a maximum test duration of 24 hours, when assembled and tested according to the methods prescribed above.

CAUTION: These testing parameters and protocols apply only to NIBCO products as detailed above: NIBCO accepts no responsibility or liability for any other manufacturer's products that may be damaged as a result of such testing.

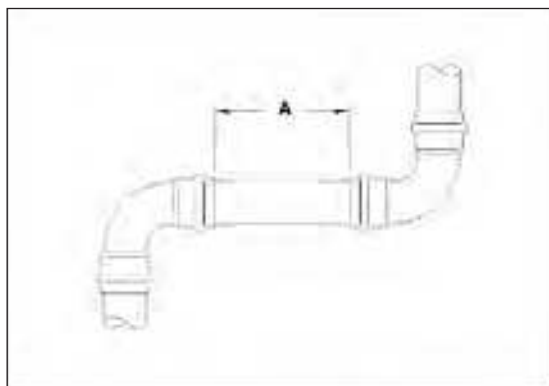
*System integrity testing applies to leak detect and non-leak detect fittings and valves.

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NIBCO® Press System — Installation Instructions

Minimum Distance Between Joints

To prevent distortion of the tubing, certain fitting sizes require a minimum distance between crimp joints (refer to *Chart 1* below). Failure to provide this minimum distance may result in an improper seal.



Tube Dia.	A (min.)	
	Inches	mm
1/2"	0	0
3/4"	0	0
1"	0	0
1 1/4"	0	0
1 1/2"	0	0
2"	0	0
2 1/2"	3/8"	10
3"	3/8"	10
4"	3/4"	10

*No minimum distance required.

System Support

CAUTION — In any installation, the system should be supported to ensure the minimum stress is imposed on the tube and joints. The NIBCO Press System should be supported in accordance with normal practice and to local jurisdiction piping code.

Softening of Copper Tubing

A NIBCO Press System installation should not be conducted within 12" of a **brazed** joint. The high temperature required for capillary joinery may cause the copper tube to become annealed and render it too soft for proper crimping. However, a NIBCO Press System product may be crimped adjacent to a **soldered** joint, as normal temperatures created by silver soldering are not hot enough to cause the copper tube to become annealed.

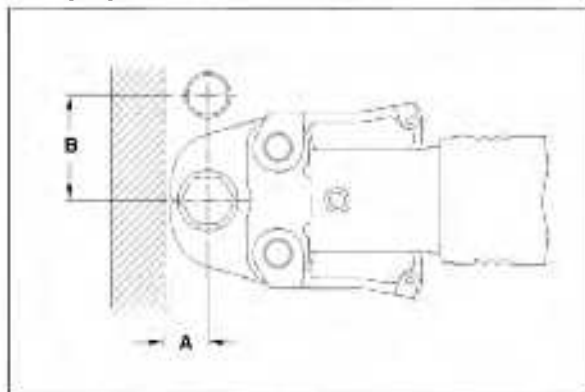
CAUTION — Brazing or soldering should not be conducted within 12" of an existing NIBCO Press System connection as this may damage the HNBR seal. If there is any concern about heat damage to the O-ring, a cold, wet cloth should be wrapped around the crimped connection prior to soldering or brazing.

Spacing

1. Sufficient clearance must be left around each joint to allow room for the pressing tool and jaw to be attached without interference.

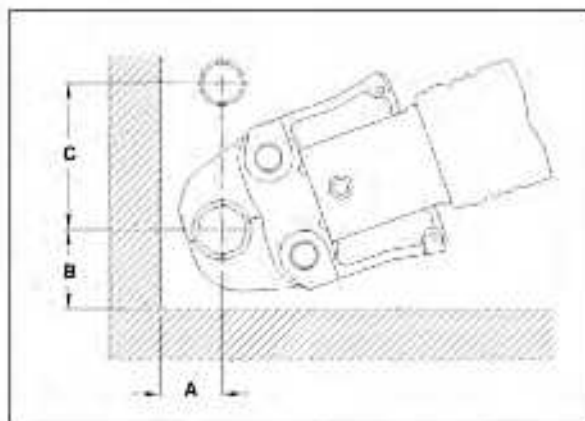
Clearance Requirement — NIBCO Standard Sets

Tool perpendicular to wall



Tube Dia.	A (min.)		B (min.)	
	Inches	mm	Inches	mm
1/2	15/16	24	1 5/8	41
3/4	7/8	22	2 1/8	54
1	1 1/4	31	2 1/2	64
1 1/4	1 1/8	29	2 7/8	73
1 1/2	2	51	4 3/8	111
2	2	51	4 3/8	111

Tool angled to wall



Tube Dia.	A (min.)		B (min.)		C (min.)	
	Inches	mm	Inches	mm	Inches	mm
1/2	1 1/8	28	1 3/8	35	2 1/2	64
3/4	1	26	1 1/2	38	2 1/2	64
1	1 5/16	34	1 3/4	45	3	76
1 1/4	1 1/4	32	2 1/4	57	3 1/8	80
1 1/2	2 1/8	54	3 1/8	80	5	127
2	2 1/8	54	3 1/8	80	5	127
2 1/2	4 1/2	114	4 11/16	119	6 1/8	156
3	4 3/4	121	5	128	6 7/8	175
4	5 1/4	134	5 11/16	145	7 7/8	200

NOTE: Clearance dimensions for 2 1/2", 3" & 4" are for wrapping pressing chains around fittings.

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NIBCO® Press System — Frequently Asked Questions

What is the NIBCO product offering?

NIBCO Press System features a full range of copper and copper alloy fittings, commercial valves, accessories and pressing tools, jaws and chains for use with K, L and M copper water tube as well as 1/2", 3/4" and 1" annealed copper tubing.

What is the system temperature rating?

NIBCO Press System is rated at 200 psiG over a temperature range of -20°F to 250°F.

What are the approved system applications?

Approved applications include residential and commercial potable, hot, chilled and process water for plumbing and HVAC systems. NIBCO Press System is designed for use with water glycol mixtures of ethylene or propylene glycol up to 50% at 200°F.

What was the testing protocol for NIBCO Press System fittings and valves?

NIBCO Press System fittings and valves were subjected to a wide range of performance tests including dimensional verification, thread end specification, hydrostatic burst strength, unrestrained pressure, static torque, bending, vacuum pressure, cyclic pressure, vibration, thermo-cycling and dynamic torque. The testing protocol included testing to a 3X safety factor above the 200 psiG system rating.

NIBCO testing was witnessed and validated by the internationally recognized NSF.

Can other available pressing tools and jaws be used on the NIBCO Press System?

See our Approved Tool and Jaw Compatibility Matrix for a complete listing of approved tools and jaws.

Can a NIBCO Press System connection be re-crimped?

If for any reason the press cycle is interrupted, it is possible to re-crimp a NIBCO Press System connection. However, when re-crimping the connection, the jaws must be properly aligned so that the crimp is performed in the same location as the original.

How long will the EPDM seal last?

Accelerated life tests show that the EPDM seals used with NIBCO Press System fittings and valves have a life expectancy of 50 years.

Are NIBCO Press System fittings available with solder or threaded by Press System connection?

NIBCO offers many Press System fitting combinations by soldered or threaded connection. Please note, always solder the standard wrought connection first when possible. Prior to soldering, remove the press end EPDM o-ring, solder, allow the fitting to cool, insert the EPDM O-ring, and then Press the connection.

Can a fitting be soldered close to a Press System connection?

NIBCO recommends soldering at least 12 inches away from the Press System connection. If this length is not possible, either solder the joint prior to connecting the press fitting or wrap the connection with a cold wet cloth.

Is NIBCO Press System approved for underground use?

In accordance with local plumbing codes, NIBCO Press System can be installed underground.

Is NIBCO Press System compatible with standard disinfectant cleaning agents commonly utilized in a new water system?

With regard to cleaning and/or disinfecting any copper piping system, NIBCO recommends following the general guidelines offered by the Copper Development Association (see Commissioning and Disinfecting Copper Plumbing Systems for details at www.copper.org.)

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