

**stream33<sup>®</sup>**



# F1960 | PRODUCT GUIDE

Product instructions for F1960 fittings and rings for use in PEX-A plumbing applications

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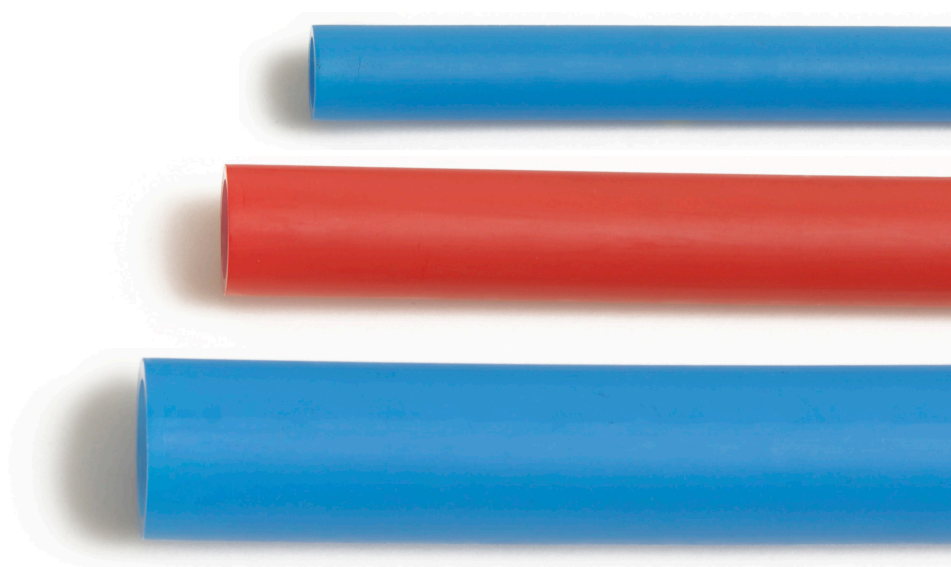
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# PEX-A Tubing & Fittings

## Safety and Warnings

Thank you for your purchase. These instructions contain information about the assembly and use of the Stream33 F1960 cold expansion fitting system with Stream33 PEX-A pipe, intended for use in hot and cold water potable systems.

For professional use only. Persons using this guide must be experienced and appropriately licensed professional contractors who understand the principles and practices associated with the proper installation of hot and cold water potable and hydronic systems.

The information presented in this product instruction manual is intended to demonstrate the proper assembly method and installation recommendation for the Stream33 F1960 fitting system. Allow only persons who fully understand this manual to participate in the assembly and use of the Stream33 F1960 fitting system with Stream33 PEX-A pipe.




It is the responsibility of the licensed contractor to check the prevailing local codes and to verify that the technical information presented in this guide is appropriate for a particular installation.

Nothing in this manual supersedes national or local code requirements or the recommendations of other manufacturers regarding their components. Observe all applicable national, state and local laws, regulations, standards, codes and ordinances. If you believe Stream33 product information conflicts with applicable code requirements, industry standards, or the recommendations of other manufacturers regarding their components, contact the Stream33 distributor in your area and consult with the building authority having jurisdiction before installing the F1960 fitting system.

Before starting the installation process, read the Stream33 PEX-A warranty, available at [stream33.com](http://stream33.com). It can also be obtained from your authorized Stream33 distributor or by writing to Stream33 Products LLC, 350 Courtney Road, Sebring, OH 44672 USA.

Proper installation is the responsibility of the installing contractor.

This manual contains safety-related information that requires your special attention. It is indicated with the safety alert symbol and the signal words described below:

 <b>DANGER</b>	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	Indicates a risk of property damage, including damage to the individual components.

Only trained personnel should be engaged in the installation process. Follow the instructions in this manual and use common sense to reduce the risk of injury or property damage.

# PPSU Fittings - Special Considerations

## Handling and Use

Petroleum based products, solvents, PVC glues and primers, gels, lubricants, pipe dopes, ethylene glycol, thread oils and paste or other volatile compounds should not come in contact with PPSU fittings. Store fittings away from harmful chemicals and direct sunlight (UV exposure). The maximum short-term working temperature (30 days) of fittings: 210 °F (99 °C) @ 150 PSI. Constant Working Temperature: 180 °F (82 °C) @ 100 PSI. PPSU should not be used in any installation within mechanical systems that may have oil or solvent residue. Do not impact PPSU polymer fittings. Do not subject fittings to torque limits exceeding 100 lbs. of force. Fittings should be kept free of mechanical stress. Each joint should be properly supported. Limit torque on connections which puts undue stress on molded fittings. Try to support the tubing within 4" of a fitting especially when tubing is changing direction directly after the connection and thereby putting the connection in a torqued application

PPSU fittings are suitable for radiant heating and cooling under the following conditions:

1. Use only propylene glycol (food grade) to maximum 60% by volume
2. DO NOT USE ETHYLENE GLYCOL WITH PPSU FITTINGS
3. Maximum temp: 194°F (90°C) at 44 PSI
4. Recommended Corrosion Inhibitors: Metal Guard™
  - H50 6% by volume
  - H60 4% by volume
  - H80 4% by volume



Glue/Primers/Chemicals: PPSU fittings should be protected from harmful chemical exposure. Do not allow any oils to contact PPSU fittings.



Do not subject PPSU material to an open flame or solder within 18" of polymer fittings. Flame or heating sources beyond material tolerances must be avoided.

## Assembly

The basic process of assembling an F1960 joint is as follows:

- Inspect fitting and ring.
- Make a clean, square cut of the pipe using pipe cutter.
- Slide the ring onto pipe until ring stops on end of pipe.
- Insert F1960 expansion tool expander head into pipe.
- Expand pipe with ring the necessary number of times while rotating the expander head between expansions.
- Insert fitting into expanded end of pipe so pipe with ring are touching fitting shoulder.
- Hold joint in place until pipe and ring shrink securely around fitting.
- Inspect completed joints.

**Required assembly tools include:**

- Pipe cutter
- F1960 expansion tool with expander heads provided by same manufacturer (toolkit supplied by others)

### WARNING

Read the tool manufacturer’s instruction manual for F1960 expansion tools before use and follow all safety precautions. Improper use can cause serious personal injury or property damage.

### NOTICE

For use only with Stream33 PEX-A pipe. Other materials may crack or otherwise fail which could result in leaking and property damage.

Use only expander heads that match the dimension of the pipe being installed (e.g., 1/2” expander head for 1/2” pipe and ring). Use of expander heads that are the wrong size may result in faulty joints, which can lead to leaking and property damage.

### 1. Fitting Assembly (1/2”, 3/4” & 1” Sizes)

The assembly methods for the Stream33 F1960 joint with the F1960 expansion tool is as follows:

- Inspect fitting and ring.
- Verify the marking on the fitting and ring are the proper size to be connected with the pipe.
- Carefully inspect all fittings and rings for damage prior to assembly. Do not use fittings or rings if there is any doubt about their integrity.

### 2. Squarely cut the Stream33 PEX-A Pipe

- Using a pipe cutter, cut pipe to the desired length. Prior to cutting pipe, ensure pipe cutter is in good condition with a sharp blade.
- The cut must be clean and square (i.e., forming a 90° angle with side of pipe) and must be free of burrs, nicks and jagged ends.



### NOTICE

Not having a clean, square cut of the pipe could cause leakage of the finished joint.

### 3. Slide the PEX ring onto the Stream33 PEX-A pipe.

- Using a pipe cutter, cut pipe to the desired length. Prior to cutting pipe, ensure pipe cutter is in good condition with a sharp blade.
- The cut must be clean and square (i.e., forming a 90° angle with side of pipe) and must be free of burrs, nicks and jagged ends.



## 2.1 Assembly

### Assembly

#### Continued

#### 4. Place expander head on the F1960 expansion tool.

- Select the properly sized expander head for pipe diameter (e.g., 1/2" expander head for 1/2" pipe and ring).
- Ensure the expander head is from the same manufacturer as the F1960 expansion tool.



#### NOTICE

The use of incorrectly sized or damaged expander heads may produce faulty joints that could leak.

- Inspect each expander head to ensure no segments are broken or chipped. Do not use if the expander head is damaged.

#### 5. Insert expander head into end of Stream33 PEX-A pipe.

- Insert the expander head into the end of the pipe.
- The pipe with ring are expanded by the tool.



#### WARNING

Moving parts can pinch. To reduce the risk of personal injury during operation:

- Never touch the expander head during operation.
- Keep hands and other parts of your body away from the expander head during operation.

#### NOTICE

Prevent grease from entering pipe being installed.

- Avoid over-lubricating the expansion cone.
- Do not apply grease to the expander head segments.
- Wipe away excess grease from inside tubing after expansion.

#### 6. Expand pipe with ring the necessary number of times so pipe with ring are snug to the expander head shoulder.



#### Cold expanding with auto rotating expander heads:

- The expander head should expand, retract and rotate slightly between expansions.
- Hold the pipe so it does not rotate with the expander head.
- Continue to repeat pipe expansions until the pipe with ring are snug to the expander head shoulder.
- Do not keep tool in the expanded position with pipe ring in place. This will over-expand the pipe and ring and will require additional time to shrink over the fitting.
- Ensure the expander head is rotating during expansion.
- Remove the expander head from the pipe.

#### Cold expanding without auto rotating expander heads:

- After each expansion, remove the expander head from the pipe, rotate expander tool 1/8-turn, insert expander head back into pipe and expand again.
- Continue to repeat pipe expansions until the pipe with ring are snug to the expander head shoulder, ensuring the expander head is rotated 1/8-turn between expansions.
- Do not keep tool in the expanded position with pipe and ring in place. This will over-expand the pipe and ring and will require additional time to shrink over the fitting.
- Evenly expand the pipe. Ensure the expander head is rotated 1/8-turn between expansions.
- Remove the expander head from the pipe.

#### NOTICE

Improper expansion of the pipe with ring can create deep grooves in the inside of the pipe which may result in faulty joints that could leak.

## Assembly

### Continued

#### 7. Insert F1960 fitting into expanded Stream33 PEX-A Pipe with PEX ring.

- Push the fitting into the pipe so that the end of the pipe with ring are touching the fitting shoulder when assembled.
- If the fitting does not insert far enough, immediately remove the fitting and expand again then reinsert the fitting into the expanded pipe with ring.



#### 8. Hold the joint in place until the Stream33 PEX-A pipe and PEX ring shrink securely around the fitting.

### NOTICE

Do not move on to the next fitting assembly until the fitting is secured with the pipe and ring. If not secure, the pipe could pull away from the joint which may result in faulty joints that could leak.

#### 9. Inspect the completed F1960 joint..

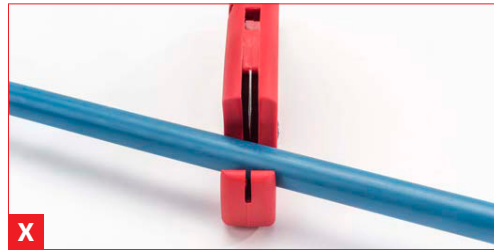
- The pipe with ring should fit closely against the fitting shoulder. A maximum gap of up to 1/16" (1.6mm), or about the thickness of two credit cards, is acceptable. This applies to all sizes of fittings.
- If the gap is more than 1/16" (1.6mm) the joint must be replaced.



## 2.2 Assembly Considerations

### Assembly Considerations

**Pipe cutting.** When cutting the pipe to length, the cut must be clean and at a right angle (90°) to the pipe wall. Ensure there are no burrs or debris inside the pipe.



**Expansion of pipe.** Expand the pipe with ring the necessary number of times while ensuring the expander head is rotating between expansions.

#### NOTICE

Improper expansion of the pipe with ring can create deep grooves inside of the pipe which may result in a faulty joint that could leak.

- Ensure the expander head is rotating between expansions.
- Do not rotate the pipe during the expansion process.
- Expanding in temperatures below 55°F (13°C) can result in inconsistent expansion of the ring. Ensure rings are kept warm prior to expansion.



**Fitting insertion.** Insert the fitting into the expanded end of the pipe so the pipe with the ring are touching the fitting shoulder. If the fitting does not insert far enough, immediately remove the fitting and expand the pipe with ring again. Then reinsert the fitting.



**Finished joint.** A finished joint can be visually inspected. There are no calibration tools or go/no-go gauges required to inspect a finished joint.

- A properly completed F1960 joint requires the pipe with ring to be flush with the fitting shoulder. A small gap of 1/16" (1.6mm) is acceptable.
- To avoid putting unnecessary stress on the pipe, fitting or ring, ensure that the transition of the pipe into the fitting is not at an angle.





## Assembly Considerations

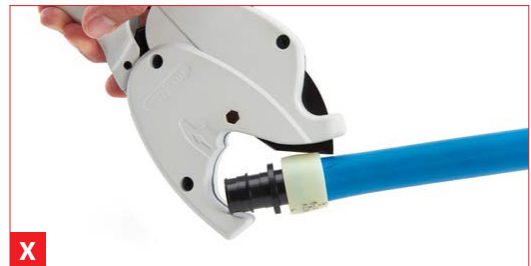
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**Fitting removal.** If it is required to remove the fitting or disassemble the joint, some precautions and additional considerations should be taken:

- F1960 polymer fittings cannot be reused and should be discarded immediately.
- F1960 PEX rings cannot be reused and should be discarded immediately.
- F1960 LF brass fittings can be reused, as long as the fitting was not damaged during removal.

If it is required to remove a LF brass fitting or disassemble the joint, ensure the system is depressurized and use the following procedure:

- 1) Cut off the ring. Avoid damaging the fitting. Discard ring.
- 2) Heat the joint with a heat gun, rotating the joint several times while heating.
- 3) Remove heat and use pliers to remove the pipe from the fitting.
- 4) Inspect the fitting for damage. If any part of the fitting has been cut or damaged during removal, discard the fitting.



### NOTICE

Support the pipe while keeping hands and other body parts away from the heat. Be careful not to damage the fitting with the tool.

### WARNING

- Do not use open flames to disassemble the joint. Open flames can cause injury or property damage.
- Never use a torch, open flame or heat gun on a pressurized system.
- Never rework a connection that is under pressure. Depressurize the system, cut out connection and replace.

For reassembly of a new joint, the following should be considered:

- The end of the pipe where the previous fitting had been installed must be completely cut off prior to making a new joint. Cutting of a minimum of 3" (approximately 75mm) is recommended.

### Installation Considerations

#### Protecting Joints

Stream33 permits F1960 joints (polymer and LF brass) to be buried or concealed. Stream33 recommends that threaded connections never be buried or concealed as they must be accessible for periodic inspection, per building codes.

The requirement to wrap an F1960 joint can depend on many factors including location and the presence of other materials that contact or can come in contact with the joint. In general, Stream33 recommends the following:

**Concealed in inaccessible locations (e.g., behind drywall).** When F1960 joints are concealed but are still in open air space, it is not necessary to wrap the joint. However, the installer should ensure that the fitting does not come in contact with chemicals (e.g., PVC glues, solvents, cements) that could damage the fitting material. Use only Linerless Rubber Tape, Black (Art. 241002) also available at most distributors and retailers (Scotch™ 2242).

**Buried directly in a concrete slab.** When burying an F1960 joint directly into a concrete slab, it is not necessary to wrap the joint. However, there are some additives in concrete that could potentially damage the fitting material and, in this case, wrapping is recommended. Use only Linerless Rubber Tape, Black (Art. 241002) also available at most distributors and retailers (Scotch™ 2242).

**Buried in a sub-base or underground in soil.** In these instances, the joint must be wrapped. Use only Linerless Rubber Tape, Black (Art. 241002) also available at most distributors and retailers (Scotch™ 2242).

**With foaming agents.** Foaming agents and solvents in closed-cell foam insulation kits can damage the PPSU fitting material. Therefore, it is necessary to wrap polymer fittings in a protective tape from polyurethane foams. Use only Linerless Rubber Tape, Black (Art. 241002) also available at most distributors and retailers (Scotch™ 2242).



When wrapping an F1960 joint, the following is required:

- Wrap the joint and ensure a minimum of 50% overlap of the tape.
- Avoid wrinkles or kinks in the tape and ensure the joint is completely covered, extending onto the pipe as necessary.
- Indicate the location of each joint as required on the “as-built” drawings.

#### NOTICE

Use only Stream33 recommended protective tapes for wrapping F1960 joints. Do not use other types of tapes (e.g., duct tape, standard electrical tape) to wrap the joint, as chemicals in the adhesive may not be compatible with the PPSU fitting material or the PEX pipe.

#### NOTICE

Never use heat shrink tubing to wrap the joint, as the high temperatures produced from a heat gun will soften the pipe and may cause it to pull away from the fitting.

#### Distance Between Fittings

A minimum distance between F1960 fittings is required to ensure the fittings are not damaged during the expansion process by the installation tools. A minimum pipe length is required. See table below.

Nominal Fitting Size (in.)	Length of Pipe (in.)
1/2	2
3/4	3
1	3-1/2

#### Supporting F1960 Fittings

Supports and clamps shall not be placed directly on the F1960 fitting, multi-port tee or PEX ring. Always comply with prevailing local codes.

## Installation Considerations

### Continued

#### Excessive Pressure and Temperature

Avoid installing pipe or fittings in areas where they may be exposed to temperatures above the maximum temperature rating of the system. In addition, pipe and fittings must avoid contact with surfaces or substances that may exceed the maximum temperature ratings of the system (e.g., recessed can lights, boiler vents, chimneys or chemicals that may have an exothermic reaction such as spray foam insulations).

Temperature and pressure (T&P) relief valves are safety mechanisms in case they system overheats (mandatory in hot water distribution systems). These valves act quickly to relieve excess temperature or pressure if either one of these conditions is reached. ASTM F877 and CSA B137.5 require the system to be able to accommodate short-term exposure conditions of 210°F (99°C) at 150 psi (10 bar) for 48 hours, in the event of a water heating system failure or T&P relief valve failure.

#### Water Quality

Stream33 PEX-A pipe are third-party tested and certified for use where drinking water qualities meet the requirements of the EPA National Primary Drinking Water Regulations and the Guidelines for Canadian Drinking Water Quality by Health Canada.

#### Disinfection

Disinfection of the system should always follow prevailing local codes and requirements. If required by code and no conditions are specified, disinfect using chlorination according to AWWA or ICC procedures outlined below.

Chlorine Concentration	Disinfection Period	Authority
50 to 100 ppm	3 hours	AWWA
50 ppm	6 hours	ICC

Pre-mix solution before injecting into the system. Do not allow disinfection solution to sit in the system beyond the disinfection period. Thoroughly flush the entire system with potable water after disinfection.

#### Chlorine Resistance

F1960 joints have the same chlorine resistance ratings as the Stream33 PEX-A Pipe.

#### Stress Corrosion Resistance

Fittings should not be exposed to harmful chemicals or aggressive water conditions that could result in operational failures..

#### Freeze Break Resistance

The flexibility of the Stream33 PEX-A pipe allows it to expand as water freezes in the pipe as long as the pipe has room to expand. However, this does not ensure the integrity of the joint. Therefore, installers must take precautions to ensure that pipes and fittings do not freeze. This may result in leaks and operational failures.

#### Water Hammer

Water hammer, also called “hydraulic shock”, occurs when a valve closes abruptly at the end of a pipeline system and a pressure wave builds in the pipe, creating noise and vibration. This all may be true for metallic piping systems, however the ability of PEX pipe to absorb shock eliminates the need for water hammer arrestors, if allowed by present local codes.

## 3.1 System Testing and Maintenance

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### System Testing and Maintenance

A pressure test must be performed on the system to ensure the Stream33 PEX-A pipe and F1960 joints are leak-free. In addition, a visual inspection of all joints is recommended to ensure all connections have been properly assembled.

#### Pressure Testing

The following detailed pressure test procedure applies to both compressed air and hydrostatic (water) testing.

#### WARNING

- Failure to follow proper safety precautions for an air pressure test could result in dangerous separation of the material, leading to serious injury or death.
- Use personal protective equipment. To reduce the risk of eye injury, always wear close-fitting protective eye wear with side protection. Eye wear must be impact-rated and marked as complying with ANSI Z87.1.
- Never use a torch, open flame or heat gun on a pressurized system. Exceeding the temperature pressure ratings will result in dangerous separation of materials leading to serious injury or death.
- Never rework a connection that is under pressure. Depressurize the system, cut out connection and replace.
- To reduce the risk of personal injury, only qualified persons conducting and/or inspecting the pressure test should be present.

#### General Recommendations

- A pressure test must always be performed prior to closing in the system (e.g., behind drywall).
- Perform test using water or air at ambient temperature. Do not exceed 150 psi (1030 kPa) for the piping system. Verify maximum pressure limits are not exceeded for all system components prior to performing the pressure test.
- When air pressure testing with polymer fittings do not exceed 120 psi (825 kPa).
- A pressure test must always be performed on the system prior to and during the installation of the thermal mass to ensure that Stream33 PEX-A pipe and connections are leak-free.
- Tests shall comply with local codes where applicable and, where required, shall be witnessed by the building official.

## System Testing and Maintenance

### Continued

#### Pressure Testing with Air

Air can store a high amount of energy as compared to water during a pressure test. Due to this higher energy, different failure modes of system materials must be understood by persons conducting the pressure test.

- If a thermoset polymer (e.g., PEX-A pipe) is over-pressurized and fails (bursts), it does so in a ductile mode. The pipe will swell and then split with no separation of fragments.
- If a rigid thermoplastic polymer material (e.g., PPSU) is over-pressurized and fails (bursts), it does so in a brittle mode and can result in separation of the material.

#### Stream33 Pressure Test Procedure

- Use an air test if conditions do not permit a water test (e.g., freezing conditions, insufficient water supply/pressure).
- Air temperature will affect the gauge pressure. Perform all pressure tests at a constant temperature. Verify maximum pressure requirements for other systems prior to performing the test.
- Conduct a visual inspection of the piping system to ensure all connections have been properly made and all piping has been properly secured prior to pressurization.
- Perform a preliminary pressure test pressurizing the system to 1.5 times the maximum operating pressure not to exceed the maximum pressures defined above for 30 minutes.
- As the piping expands, restore pressure, first at 10 minutes into the test and again at 20 minutes.
- At the end of the 30-minute preliminary test, pressure must not fall by more than 5 psi from the maximum, and there shall be no leakage.
- After performing the preliminary test, perform the main pressure test immediately. The main pressure test shall last at least 2 hours. The test pressure should be restored and must not fall more than 3 psi after 2 hours. No leakage should be detected.
- It is recommended to maintain pressure on the system during further construction, where practical, to immediately identify damage. If a water (hydrostatic) test is used, protect the water from freezing or drain water from pipes.
- If any repairs or corrections are necessary, depressurize the system before proceeding.

### NOTICE

- When other thermoplastic piping materials (e.g., CPVC, PP-R) are present in the piping system, these sections of piping must be isolated from the Stream33 PEX-A piping system during the pressure test. The installer must consult the other component manufacturer's installation instructions for pressure testing those sections of the system.
- Always refer to the local codes for pressure testing requirements and use air testing only if approved by the local Authority Having Jurisdiction (AHJ).
- Stream33 only provides the general guidelines for performing a pressure test, which by no means supersedes or are intended to contradict safety requirements. It is the responsibility of the installing contractor to ensure a proper and safe pressure test is performed on site.
- All other trades must be notified that the pressure test will be conducted on the piping system.