

Technical Specifications



CTS - Twist & Lock® (PEI and PSEI Range) for Products Listed on Pages 68-73.

Fittings and pipe should be kept clean and undamaged before use.

Sizes

3/8" to 1" CTS.

Pipes

CTS sized fittings can be used with: PEX, Copper and CPVC Pipes conforming to ASTM Standards. CTS sized fittings cannot be used on stainless steel pipe.

Standards

CTS sized products are designed and manufactured under a fully integrated system assessed by B.S.I. to BS EN ISO9001. CTS sized PEI and PSEI Fittings and CTS sized PEX Pipe are also NSF-14, IAPMO and ICC listed.

Do not use for gas, fuel oil or compressed air applications.

Working pressures and temperatures:

Application	Max. Pressure	Max. Temperature
Water	160 psi	73° F
Water	100 psi	180° F
Water	80 psi	200° F

Burst Pressure (fittings)

CTS sized fittings used with copper or CTS sized PEX Pipe will withstand pressures well in excess of normal service conditions.

Insulation

Comply with code requirements.

Minimum bend radius (PEX)

Pipe Diameter	3/8" CTS	1/2" CTS	3/4" CTS	1" CTS
Min radius	4"	5"	7"	10"

Clip spacing (in inches): For surface mounted pipes.

Clip Spacing		
Pipe Diameter	Horizontal Run	Vertical Run
1/2" CTS	16"	20"
3/4" CTS	20"	30"
1" CTS	30"	36"

Expansion (PEX Pipe)

1% on length between 68°F and 180°F. •

Flow rates

Comparable with metal systems.

Cleaners, inhibitors and descalents

For advice on the use of additives such as corrosion inhibitors, the additive manufacturers should be consulted.

Paint and Chemicals: Only use water or oil based paint. **DO NOT ALLOW CONTACT WITH** jointing compounds, cellulose-based paints, paint thinners, paint strippers, solder flux, acid-based descalents or aggressive cleaning products.

Solder Flux

No fluxes of any type should come into contact with CTS sized products. Extreme care should be taken to ensure that no such contact takes place.

Chlorine

CTS sized fittings are suitable for use with water supplies containing up to 4ppm of chlorine.

Exposure to light

CTS sized products, when used indoors, are not affected by sunlight. When used outdoors, protect from ultraviolet light by lagging or painting.

Pipe clips

Pipe clips should not be fitted any closer than 2.5 inches from the end of the fitting. Pipe should be adequately supported by pipe clips to prevent undue stress (side load) on fittings.

Pipe inserts: Plumbing

John Guest recommends the use of pipe inserts for PEX pipe connections with John Guest CTS sized products in Standard Residential Plumbing (hot and cold water) installations.

Pipe inserts: Heating

John Guest requires the use of pipe inserts for PEX pipe connections with John Guest CTS sized products in all Heating installations.

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Metal joists

When 'cabling' plastic pipe through metal joists, ensure rubber grommets are in place to prevent damage to the pipe.

Connection to boilers

A minimum 36 inches run of copper pipe must be installed between the boiler and the CTS sized system.

Connection to Hot Water Heater

A minimum 18 inches run of copper pipe must be installed between the hot water heater and the CTS sized System.

Connection to copper pipe

18 inches is the minimum distance to make a solder connection on copper pipe inserted into a CTS sized Fitting. Ensure that no solder flux comes into contact with the fitting.

Concrete and masonry

CTS sized pipe and fittings can be laid in concrete and masonry providing they are installed in conduit pipe with access boxes for the fittings. This is to enable the pipe to expand and provide accessibility for both pipe and fittings. Fittings and pipe should be removable for possible replacement. Insulation is also recommended to protect against heat loss and the effects of frost. Fittings not to be used underground.

Electrical continuity

If CTS sized fittings are used in an existing metal system, electrical continuity must be reinstated.

System testing

To ensure the pipework and fittings have been installed correctly, whether it be on a new or extended system, it is essential that the system be checked and hydraulically wet tested. Testing should be at 30 psi for 10 minutes and 150 psi for 10 minutes. This testing, combined with other relevant checks, should reveal installation problems and is regarded as good plumbing practice. However, system testing should not be regarded as a substitute for correct installation (see also "How to make a Twist & Lock connection").

Disinfection of Hot and Cold Water Systems

CTS sized fittings can be disinfected after installation or as part of a routine maintenance program. The disinfection procedure must comply with code requirements. Only disinfection solutions specifically recommended as suitable for contact with plastic plumbing systems, where necessary, employing specialist contractors maybe used with CTS sized product. Disinfection solutions must only come into contact with the internal (wet) surfaces of the system. If any normal dry surfaces of a CTS sized product come into contact with disinfection solution, the whole fitting must be replaced immediately. The disinfection solution must be immediately flushed out at all draw out points with fresh, clean water at the end of the disinfection period. The solution must not be left in the system.

System flushing

As is usual practice for any plumbing installation, flushing of the system prior to the use of CTS sized fittings is recommended to remove any contaminants/chemical residue from elsewhere in the system.

Vermin

CTS sized products will need special protection in vermin infested areas.

Tube insertion depths

	3/8" CTS	1/2" CTS	3/4" CTS	1" CTS
PEI	N/A	1 1/4"	1 5/8"	1 5/8"
PSEI/MWI	1 1/16"	1 1/8"	1 1/2"	1 1/2"

Side Loads

Fittings should not be subject to excessive side loads and they should not be used as support brackets. Tubing should be adequately supported to prevent excessive side loading.

Maximum torque values of threads: in Ft lbs

	1/2" NPT	3/4" NPT	1" NPT
Plastic NPT	2	3	3
Metal NPT	3	4	4

It is recommended that all installations are checked prior to use to determine that a seal has been made.

John Guest USA, Inc. is not responsible for misprints or typographical errors.

Terms and Conditions

The products described in this document are hereby offered for sale to be established by John Guest (USA) Inc. its subsidiaries and its authorized distributors. This offer and its acceptance by any customer (the "Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in this document, when communicated to John Guest (USA) Inc., its subsidiaries or an authorized distributor (the "Seller") verbally or in writing, shall constitute acceptance of this offer.

1. **Terms and Conditions of Sale.** All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of the Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein (the "Agreement"). The Buyer's acceptance of any offer to sell is limited to the terms and conditions in the Agreement. Any terms or conditions in addition to, or inconsistent with those stated in the Agreement, proposed by the Buyer in any acceptance of an offer by the Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the agreement between the Buyer and the Seller unless expressly accepted in writing by the Seller. The Seller's acceptance of any offer to purchase by the Buyer is expressly conditioned upon the Buyer's assent to all the terms and conditions in this Agreement, irrespective of any terms in addition to, or inconsistent with those contained in the Buyer's offer. Acceptance of the Seller's products shall in all events constitute such assent.

2. **Documents.** Unless provided otherwise in the Agreement, all catalog descriptions, illustrations, drawings and literature or independently submitted estimates of performance, weights and measurements or other specifications provided by the Seller are mere approximations and the Seller reserves the right to alter or amend the same at any time. The Seller reserves the right to correct clerical or technical errors in the contract documents. The Buyer shall furnish with his order all necessary specifications and information. The Seller takes no responsibility for goods manufactured, priced or delivered not in accordance with the order or the specifications unless the Buyer's order and specifications are clear and correct.

3. **Prices.** Unless otherwise provided, all prices contained in our quotations and written acceptances are ex works and do not include the cost of packing. All orders are accepted on the condition that all such prices are subject to revision by the Seller at any time before the goods are dispatched to take account of any price change. In the event that the Buyer does not place the entire order quoted by the Seller for the Buyer, the Seller reserves the right to revise its prices. The Seller also reserves the right to revise its prices if the Buyer modifies the specification or quantity of the goods, or the delivery requirements after the order has been accepted by the Seller.

4. **Advice.** All advice given in connection with the Seller's goods is provided without charge to the Buyer. Any advice and assistance given by the Seller to the Buyer is given at the Buyer's risk and the Seller shall not be liable for any loss, damage or claim arising therefrom.

5. **Payment.** (a) Unless otherwise provided in the Agreement, or explicitly agreed upon in writing by the Seller, payment is due in full 30 days from date of shipment of the items purchased herein under. (b) In the case of an installment contract, deliveries or parts, payment for each installment delivery or part shall be made under sub-clause (a) as if the same constituted a separate agreement. (c) Amounts not timely paid shall bear interest at the rate of 2-1/2% above the Seller's bank's prime rate from time to time in force. (d) A bank fee shall apply to all payments received via wire transfer. (e) Payments made with a credit card shall incur a 2% bank fee. (f) In the event that the Buyer fails within one calendar month of the date for payment to effect any payment which may be due under the Agreement or any agreement with the Seller, or if the Buyer commits any breach of the Agreement, or if the Buyer becomes insolvent or commits any act of bankruptcy or contemplation of liquidation, the Seller will be entitled, without prejudice to the Seller's other rights, to terminate the Agreement or any unfulfilled part thereof, or at the Seller's option to make partial deliveries.

6. **Modifications and Cancellations.** This Agreement is not subject to oral modification or cancellation. A Buyer's request for modification or cancellation will not be incorporated into the Agreement unless the request is accepted by the Seller in a writing that amends the Agreement. Acceptance of any such requested modification or cancellation shall be at the Seller's discretion and shall be upon such terms and conditions as the Seller may require.

7. **Handling Charge.** Goods supplied in accordance with the Buyer's order may later be returned to the Seller at the Seller's discretion provided the return is pre-authorized, in writing and the merchandise is unused, in original packages, unaltered, clean and no older than 60 days from the date of shipment by the Seller. The Buyer shall pay to the Seller a handling charge of 25% of the purchase price of the returned goods. A copy of the original invoice for the merchandise must accompany all returns.

8. **Delivery.** (a) Any delivery dates quoted are approximate only and the Seller shall have no liability for any delays in delivery. (b) Unless provided otherwise, delivery of the goods shall be made when the Seller has notified the Buyer that the goods are ready for dispatch. Regardless of the method of delivery, delivery shall be made F.O.B. Seller's plant, where the risk of loss shall thereupon pass to the Buyer upon the Seller's delivery to a carrier. Notwithstanding that the Seller's prices are ex-works, the Seller is prepared by special contract to procure carriage or freight and insurance on behalf of the Buyer and at Buyer's cost in which event the Seller shall be under no liability for damage in transit or loss or damage to the goods beyond the point at which the Seller contracts to deliver the same. (c) Seller will not make drop shipments.

9. **Inspection and Rejection.** (a) The following provisions shall apply in relation to all deliveries of goods: the Seller shall not be held liable for any claims of damage in transit, shortage of delivery or loss of goods, unless in the case of shortage of delivery, a separate notice in writing is given to the carrier concerned and to the Seller within three (3) days of the receipt of the goods, followed by a complete claim in writing within five (5) days of receipt of the goods and in the case of loss of goods, a separate notice in writing is given to the carrier concerned and to the Seller and a complete claim in writing made within thirty (30) days of the date of consignment. The Buyer must inspect the goods on arrival from the carrier, however, where goods are accepted from the carrier concerned without being inspected, the delivery book of the carrier concerned must be signed "not examined". The Seller shall have the right to inspect the goods at the Buyer's premises in respect to any such claims made by the Buyer and the Buyer shall retain such goods until the Seller has inspected such goods or until the Seller has notified the Buyer that the Seller does not wish to inspect such goods. Any breach of these conditions in this provision shall serve as a waiver to any claim brought by the buyer. (b) Without prejudice to the Seller's other rights, should the Buyer fail for any reason to send the Seller forwarding instructions within ninety (90) days after the date of the Seller's notification that the goods are ready for dispatch or to accept delivery of the goods, the Seller shall be entitled at the Buyer's risk and expense to store the goods and/or to procure or effect storage of the goods elsewhere. Goods so stored shall be paid for as if they had been dispatched and/or accepted.

10. **Special Tooling.** Where it is necessary for the Seller to manufacture or to purchase special tooling, including without limitation tools, dies, jigs, mandrills, fixtures, molds, and patterns in order to execute a contract, the Buyer will be charged with a proportion of the cost of such special tools. Such special tooling shall be and remain the Seller's property notwithstanding payment of any charges made by the Buyer. In no event will the Buyer acquire any interest in apparatus belonging to the Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adopted for such manufacture and notwithstanding any charges paid by the Buyer therefore. Unless otherwise agreed, the Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. **Test and Performance.** (a) The Seller's goods are, where practicable, submitted to the Seller's standard test before delivery. If special tests are required, these shall be made at the Seller's premises unless otherwise agreed, and will be subject to an extra charge. (b) The Seller accepts no liability for failure to attain any performance figures quoted by the Seller unless the Seller specifically has guaranteed them with an agreed sum as liquidation damages and the Buyer has suffered actual loss by reason of the failure to attain the figures quoted. (c) Any particulars of weights and measurements, power and consumption, power output or performance relating to the goods and like matters furnished by the Seller to the Buyer in the Seller's catalogs, literature or otherwise, are approximate and are intended only to present a general idea of the goods to be supplied and unless previously agreed specifically in writing shall not form part of the Agreement.

12. **Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished to the Seller by the Buyer, or any other items which become the Buyer's property, may be considered obsolete and may be destroyed by the Seller after two (2) consecutive years have elapsed without the Buyer placing an order for the items which are manufactured using such property. The Seller shall not be responsible

for any loss or damage to such property while it is in the Seller's possession or control.

13. **Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by the Seller, or if the Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the item sold. The Buyer agrees to pay all such taxes or to reimburse the Seller therefore upon receipt of its invoice. If the Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, the Buyer shall promptly indemnify and hold the Seller harmless from and against any such tax, as well as any interest or penalties thereon which may be assessed if the items are held to be taxable.

14. **Warranty.** (a) The Seller warrants that the items sold hereunder shall be free from defects in material or workmanship at the time of shipment by the Seller. The Seller warrants that if within 12 months of delivery of the goods to the Buyer the Buyer returns immediately to the Seller's premises any of the said goods which the Buyer believes to be defective, carrier paid, properly packed and clearly marked with the Buyer's full name and address and any other information such as serial numbers which may be necessary to enable the goods to be identified, together with a complete description of the respects in which it is alleged that the goods are defective, they will be repaired or new goods will be supplied in exchange and the goods so repaired or such new goods will be delivered to the Buyer free of charge at the Seller's premises provided that the foregoing warranty shall only be applicable if upon demand by the Seller, the Buyer proves to the Seller's satisfaction: (i) that the defect was due solely to defective workmanship; (ii) that no alterations or repairs have been made to the goods except with the Seller's written consent; (iii) that the defect was not caused by any act of the Buyer or its agents; and (iv) that the defect was not caused by any matter beyond the reasonable control of the Seller, including, without limitation, accident or normal wear and tear. (b) For John Guest PEI, MWI and PSEI Series Plumbing products and Speedfit PEX Pipe only, the warranty period contained in sub-paragraph (a) may be extended to 300 months (25 years) from date of delivery of the goods to the Buyer provided that, in addition to all other requirements, Seller's products are: (i) used in domestic plumbing applications; (ii) Installed by a Licensed Contractor, Plumber or qualified equipment installation professional; and (iii) Installed and operated in accordance with published John Guest technical specifications. (c) All costs and expenses, including freight charges, customs duties, and insurance incurred in returning the goods to the Seller's premises in accordance with this provision shall be paid by the Buyer. The benefit of this warranty shall not be assignable by the Buyer. (d) The warranty contained in sub-paragraphs (a) and (b) above does not extend to any goods not manufactured by the Seller even though supplied by the Seller nor does it extend to any second-hand or reconditioned goods nor does it extend to components manufactured by the Seller but installed, attached or welded by the Buyer or his customer on equipment not manufactured by the Seller. Goods not manufactured by the Seller carry only the warranty (if any) of their makers and the Buyer is entitled to the benefit thereof only so far as the Seller has the power to transfer it. (e) This warranty comprises the sole and entire warranty pertaining to items provided hereunder; the Seller makes no other warranty, guarantee, or representation of any kind whatsoever. All other warranties, including but not limited to, merchantability and fitness for purpose, whether expressed or implied, or arising by operation of law, trade usage, or course of dealing are hereby disclaimed. (f) Notwithstanding the foregoing, there are no warranties whatsoever on items built or acquired wholly or partially to the Buyer's designs or specifications.

15. **Limited Remedy.** The Seller's liability arising from or in any way connected with the items sold or this Agreement shall be limited exclusively to repair or replacement of the items sold. In no event shall the Seller be liable to the Buyer or any 3rd party for any incidental, consequential or special damages of any kind or nature whatsoever, including but not limited to lost profits arising from or in any way connected with this agreement or items sold hereunder, whether alleged to arise from breach of contract, express or implied warranty, or in tort, including without limitation, negligence, failure to warn or strict liability.

16. **Indemnity for Infringement of Intellectual Property Rights.** (a) The Buyer shall defend and indemnify the Seller against all actions, claims, demands, penalties and costs by 3rd parties in tort, or for infringement, or alleged infringement, of patents, trademarks, copyrights, trade dress, trade secret or other rights of any 3rd party resulting from the goods manufactured in accordance with the Buyer's specifications or based on any information provided by the Buyer. The Buyer will defend any action against the Seller for title, patent, trademark, copyright infringement, or other claimed by a 3rd party at the Buyer's sole cost and expense. (b) The Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this provision. The Seller will defend and indemnify the Buyer against allegations of infringement of US patents, US trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). The Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against the Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a 3rd party. The Seller's obligation to defend and indemnify the Buyer is contingent on the Buyer notifying the Seller within 10 days after sole control over the defense of any allegations or actions, including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a 3rd party, the Seller may, at its sole expense and option, procure for the Buyer the right to continue using said item, replace or modify said item so as to make it non-infringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, the Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in combination or use in a system of any item sold hereunder. The foregoing in this provision shall constitute the Seller's sole and exclusive liability and the Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

17. **Lien.** In addition to any right of lien to which the Seller may by law be entitled, the Seller shall have a general lien on all goods of the Buyer in the Seller's possession (although such goods or some of them may have been paid for) for the unpaid price of any other goods sold and delivered to the Buyer by the Seller under the same or other contracts.

18. **Waiver.** The Seller's rights shall not be affected or restricted by any indulgence or forbearance granted to the Buyer. No waiver by the Seller of any breach shall operate as a waiver of any later breach.

19. **Force Majeure.** The Seller shall be excused from performing any of its obligations under this Agreement which are prevented or delayed by any occurrence not within the reasonable control of the Seller, including but not limited to, accidents, acts of God, destruction or damage to the goods or the Seller's manufacturing plant, delays or failures in delivery of carriers or suppliers, shortages of materials, strikes or other labor matters, floods, earthquakes, fire, riots, explosions, or any regulations, rules, ordinances or orders of any governmental authority, federal, state or local, whether such cause exists at the date of the order or not.

20. **Buyer's Representation of Solvency.** The Buyer hereby represents that as of the signing of this Agreement it was not insolvent within the meaning of the Uniform Commercial Code or the Bankruptcy Laws of the United States.

21. **Assignment and Delegation.** The rights and obligations of the parties under this Agreement may not be assigned or delegated, except on the express written consent of the other party to the assignment or delegation.

22. **Integration.** The rights and obligations of the parties and the terms and conditions set forth herein, together with any amendments, modifications and any different terms and conditions expressly accepted by the Seller in writing, shall constitute a complete and exclusive statement of the terms of this Agreement. This Agreement supersedes not only all prior agreements, but also oral agreements made contemporaneously with the execution of this Agreement. All such materials may not be used to supplement, explain, or contradict the terms of this Agreement.

23. **Severability.** If any of these conditions or any part thereof purports to exclude or restrict or limit any liability and such exclusion or restriction or limitation is prohibited or rendered void or unenforceable by any legislation to which it is subject, or is itself prohibited or rendered void or unenforceable by any legislation to which it is subject, then the exclusion restriction or limitation on the condition or part thereof in question shall be so prohibited or rendered void or unenforceable and the validity or enforceability of any other part of these provisions shall not thereby be affected.

24. **Governing Law/Limitation on Actions.** The terms, conditions, rights, and obligations under this Agreement shall be construed under the laws of the State of New York, without regard to principles of conflicts of laws. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by the Buyer more than two (2) years after such cause of action accrues.