

# Heat Exchanger Tube Plugging & Testing Equipment

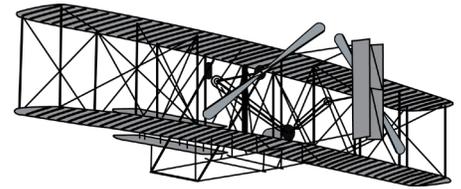


Pop-A-Plug® Tube Plugs  
Pop-A-Plug® Tube Stabilizers  
G-Series Tube Testing Tools  
Installation & Removal Equipment



## Curtiss-Wright Corporation

With a proud legacy spanning more than 90 years, Curtiss-Wright Corporation is a global innovative company that delivers highly engineered, critical function products and services to the commercial, industrial, defense and energy markets. Building on the heritage of Glenn Curtiss & the Wright brothers, we have a long tradition of providing reliable solutions through trusted customer relationships.



## EST Group

Established in 1968 and headquartered in Hatfield, Pennsylvania USA, EST Group specializes in the development and manufacturing of tools and systems that greatly simplify maintenance of shell & tube and air-cooled heat exchangers, as well as test plug systems to expedite in-service inspection of open end pipe, piping systems, tubing, and pressure vessels.

Our Pop-A-Plug® Tube Plugging System provides customers with a safe and effective solution for the repair and maintenance of shell & tube heat exchangers at working pressures up to 7,000 PsiG (483 BarG).



Additionally, EST Group provides a range of field services & product training, including heat exchanger tube testing, inspection, cleaning, partial retubing, and pipe & pressure vessel inspection and testing. On-site product training is also offered to companies in power generation, petrochemical and refining, fine chemical and pharmaceutical, oil and gas production, shipbuilding, and engineering and construction industries worldwide.



ISO 9001:2015  
registered facility

*\*Inspection and Repair of Shell and Tube Heat Exchangers, The American Society of Mechanical Engineers (ASME) PCC-2 Article 312.*



# Heat Exchanger Tube Plugs & Stabilizers

The Pop-A-Plug Tube Plugging System reduces downtime, eliminates welding and explosives, and will not damage tubes, tube joints, or tube sheets. Their controlled and repeatable installation minimizes installer fatigue and protects against damage, extending the life of heat exchangers.



## Pop-A-Plug® CPI/Perma Tube Plugs

Resistant to thermal cycling and able to provide a seal that's helium-leak tight, Pop-A-Plug CPI/Perma Tube Plugs are the safe, effective, and reliable solution for heat exchanger tube leaks. CPI/Perma Tube Plugs install in minutes, and their broad expansion range fits multiple gauges reducing inventory and costs.

**Kit:** ten (10) plugs, one (1) Go/No-Go Gage

### Pressure Rating

1000 PsiG (68.9 BarG)

*Higher pressures available upon request*

### Size Range

0.472" to 2.067" (11.99mm to 52.5mm) Tube ID

*Larger/smaller sizes available upon request*

### Standard Materials\*

Brass, Carbon Steel (1018 & SA350 LF2), Stainless Steel (304 & 316), 70/30 CuNi, Duplex, Titanium

### Features

- Helium leak tight seal to  $1 \times 10^{-6}$  cc/sec
- Plug material matches tube material preventing thermal expansion and contraction issues and/or undesirable galvanic interaction
- Metal to metal seal will not leak or degrade like elastomer plugs
- Accommodates through the tube plugging applications
- Lowest life cycle cost compared to alternative tube plugging methods

## Pop-A-Plug® Tube Stabilizers

Effectively stabilizes weakened or fractured heat exchanger and condenser tubes. Ideal for any type of shell and tube heat exchanger from high pressure feedwater heaters to surface condensers. Available in either rod or cable type configuration. Available in any length. Unique Pop-A-Plug Anchoring System eliminates cable or rod migration, ensuring fractured/deteriorated tubes are securely supported until retubing or sleeving can be performed.

### Features

- Bullet or wedge style tip configurations
- Stepped anchor diameter allows it to fit in unrolled section of tubes
- Install using standard Pop-A-Plug Ram packages
- Anchors are easily removable for retubing

### Size Range

0.501" to 0.960" (12.73mm to 24.38mm)



## Pop-A-Plug® P2 High Pressure Tube Plugs

When pressures reach supercritical levels, there's nothing like the Pop-A-Plug Tube Plugging System. As a proven long-term performer in fossil and nuclear stations, P2 Tube Plugs are designed to maintain a leak-tight seal under extreme thermal and pressure cycling.

**Kit:** ten (10) plugs, one (1) tube prep brush, one (1) Go/No-Go Gage

### Pressure Rating

Up to 7000 PsiG (483 BarG)

*Higher pressures available upon request*

### Size Range

0.400" to 1.460" (10.16mm to 37.08mm) Tube ID

*Larger/smaller sizes available upon request*

### Standard Materials\*

Brass, Carbon Steel (1018 & SA350 LF2), Stainless Steel (304 & 316), 70/30 CuNi, Duplex, Titanium

### Features

- Helium leak tight seal to  $1 \times 10^{-10}$  cc/sec
- Unique engineered breakaway controls the installation force preventing damage to the tube, tube sheet, and surrounding tubes
- Ideal for use in applications with coated tubes and tube sheet
- Lowest life cycle cost compared to alternative tube plugging methods

\* Additional materials available, contact Customer Service for full list.

# Heat Exchanger Tube Testing Equipment

Early tube leak detection in heat exchangers, condensers, and boilers are essential to avoiding costly downtime and unnecessary damage to equipment.



## G-160 Tube Testers

Rapidly detect tube leaks while providing a safer working environment for plant personnel. Innovative patented gripper design provides increased operator safety. Durable cast aluminum housing fully protects gauges. Analog & digital gauge versions available.

### Features

- Patented gripper design
- Requires less operator force
- Ergonomic design with push button activated air injection valve
- Corrosion resistant powder coated finish
- Fully protected gauges
- Neoprene seals\*

### Size Range

0.28" to 1.81" (7.1mm to 46.0mm)

### Operating Pressure

Standard compressed air 40-125 PsiG (2.7- 8.5 BarG)



## G-250 Vacuum Tube Testers

Quickly seal off and evacuate individual heat exchanger tubes to test for leakage. Machined from high strength aluminum alloy reducing fatigue associated with using heavier testing equipment. Optional seal sets are available to test tubes to 2.50" (63.5mm). Analog & digital gauge versions available. Operates on standard air supply 40 to 125 PsiG (2.7 to 8.5 BarG).

### Features

- Lightweight construction - set weighs less than 2.5 lbs
- Neoprene seals\*

### Size Range

0.28" to 1.45" (7.1mm to 36.8mm)

*Optional Seal Sets are available to 2.50" (63.5mm)*



## G-650 Joint Testers

Quickly test expanded tube-to-tube sheet joints for leakage. Ideal for heat exchanger manufacturers or companies performing retubing operations. The G-650 gun seals the tube ID and the tube sheet face, then evacuates the tube end at the joint. A loss of vacuum indicates a leaky tube joint. Analog & digital gauge versions available. Operates on standard air supply 40 to 125 PsiG (2.7 to 8.5 BarG).

### Features

- Interchangeable manifolds, and seal & washer sets
- Neoprene seals\*

### Size Range

G-650 - 3/8" to 1 1/4" (9.5mm to 31.75mm)

G-650A - 1 1/2" to 2 1/2" (38.1mm to 63.5mm)

\* Seal & Washer sets sold separately. Additional seal materials available, contact Customer Service for a full list.

# Installation Equipment

## Ram Packages

Hydraulically install Pop-A-Plug tube plugs quickly, safely & easily. No welding required for installation. Controlled, repeatable installation reduces operator fatigue.



### Cordless Smart Ram 640T

Quickly perform heat exchanger tube repairs without significant setup or breakdown time. Self-contained battery-operated hydraulic unit provides reliable installation of heat exchanger tube plugs. Long-lasting 18v/3.0Ah Lithium-ion battery allows for cordless operation in remote and close quarters environments without the need for electric or plant air connection. No welding required for installation. Controlled, repeatable installation force reduces operator fatigue.

#### Features

- Eliminates tripping hazards
- Long-lasting 3.0Ah Li-Ion Battery
- Install up to 500 tube plugs on full charge
- Weighs just 5lbs (2.3kg)

#### Plug Size Range (Tube ID)

CPI/Perma: 0.472" to 1.336" (11.99mm - 33.93mm)  
P2 Plugs: 0.400" to 1.180" (10.19mm - 29.99mm)



### PAP6600 Ram Package

Compact, lightweight and easy to use. Electric & Battery operated versions available. Operates on shop air supply - 40 to 125 PsiG (2.7-8.6 BarG).

**Components:** ram head, air activated hydraulic pump, 10ft. (3m) of hydraulic hose with Quick Connects, pressure gauge, cable assembly, and metal case.

#### Plug Size Range (Tube ID)

CPI/Perma: 0.472" to 1.336" (11.99mm - 33.93mm)  
P2 Plugs: 0.400" to 1.180" (10.19mm - 29.99mm)



### PAP123RK Ram Package

Compact and easy to use. Ideal for large plug sizes and/or longer through-the-tube plugging applications. Operates on shop air supply - 40 to 125 PsiG (2.7-8.6 BarG)

**Components:** ram head, air activated hydraulic pump, 10ft. (3m) of hydraulic hose with Quick Connects, pressure gauge, cable assembly, and metal case.

#### Plug Size Range (Tube ID)

CPI/Perma: 0.472" to 2.067" (11.99mm - 52.50mm)  
P2 Plugs: 0.400" to 2.020" (10.19mm - 51.31mm)



### PAP3600 Close Quarters Ram

Compact design for installing Pop-A-Plug Tube Plugs with minimal clearance around the tube end. Ideal for tubes in the outermost row of closed head feedwater heaters or for tubes adjacent to a pass partition or divider plate.

**Components:** ram head, air activated hydraulic pump, 10ft. (3m) of hydraulic hose with Quick Connects, pressure gauge, cable assembly, and metal case.

#### Plug Size Range (Tube ID)

CPI/Perma: 0.472" to 0.810" (11.99mm - 20.57mm)  
P2 Plugs: 0.400" to 0.880" (10.19mm - 22.37mm)

# Installation & Removal Equipment



## Manual Installation Tool

Provides reliable installation in situations where air or electricity are not available. Each Manual Installation Tool comes complete with a Pull Rod and Positioner to install the size and style Pop-A-Plug Tube Plug identified in the tool's model number. The Manual Installation Tool can be used with manual wrenches or sockets, as well as with electric or pneumatic impact wrenches.

### Features

- Reliable installation when air/electricity are not available
- Standard body accepts all MIT pull rods and positioners
- Locating pin acts as a reaction arm to prevent the body from spinning as the Hex Nut is being tightened

### Plug Size Range (Tube ID)

CPI/Perma: 0.471" - 1.149" (11.96mm - 29.18mm)  
P2 Plugs: 0.400" - 1.160" (10.16mm - 29.46mm)

## Pull Rod Assemblies

Used in combination with Pop-A-Plug Tube Plugging System Ram Packages to install Pop-A-Plug Heat Exchanger Tube Plugs. EST Group maintains a significant inventory of Pull Rod assemblies, Channel Head assemblies and extensions for both near end and through the tube plugging in shell and tube heat exchangers.



### Features

- Size specific Plug Positioner, Pull Rod, Rod & Tube Positioner, Knurled Nut & Safety Hex Nut
- Hydraulic Ram Safety Cable designed to be installed between the Knurled Nut and Safety Hex Nut

### Size Range

Pull Rod and Channel Head Pull Rod Assemblies available for all Tube Plug sizes

*Extensions available in 1ft (30cm), 2ft (60cm), 4ft (120cm), and 6ft (180cm) lengths*

## Tapered Reamers

Remove weld droop or other obstructions. Available in various sizes for use with Pop-A-Plug CPI/Perma & P2 Tube Plugs.



### Features

- Hardened Alloy Steel
- Compatible with standard hand-held power drills

### Size Range

0.400" to 0.979" (10.16mm to 24.86mm)

*Extensions available in 1ft (30cm), 2ft (60cm), 4ft (120cm), and 6ft (180cm) lengths*

## Tube Preparation Brushes

Vital to successful tube plugging. EST Group's full complement of unique heat exchanger tube brushes deliver fast, consistent tube preparation. Tube brushes size the tube ID, make it round, quickly remove surface defects that can cause leaks and provide a roughened surface. This improves the Pop-A-Plug Tube Plug pressure holding capability and leak tight integrity.



### Features

- High & low tensile Brushes available based on tube material
- Modified threaded brushes are compatible with channel head Pull Rod Assemblies
- Channel head extensions available in 1ft (30cm), 2ft (60cm), 4ft (120cm), and 6ft (180cm) lengths

### Size Range

0.400" to 2.067" (10.16mm to 52.5mm) in increments of 0.020" (0.508mm)

*Available for CPI/Perma tube plugs that contain multiple brushes to cover the size range of plugs*



## One Rev Tube Cutter

Ideal for piercing tubes prior to tube plugging. Capable of cutting ferrous & non-ferrous tubes commonly found in heat exchangers, boilers, & condensers. No special drives required, for use with hand wrench or ratchet.

### Features

- Adjustable for tube sheet thickness from 1" to 6" (25.4mm to 152.4mm)
- No special tools required, use with wrench or ratchet

### Size Range

0.5" to 2" (12.7mm to 50.8mm)  
*Longer tools available in 10" increments*



## Plug Removal Tool

Quickly remove installed Pop-A-Plug Tube Plugs with the dual functioning Plug Removal Tool. Features a nose piece that threads into the pin of an installed plug, enabling the pin to be separated from the ring. The tool retains the pin while a serrated spear grabs the ring's ID. Integral slide hammer pulls out the ring and pin in one operation. Also available in extended models.

### Features

- Operate manually with the slide hammer or hydraulically with Small Ram Kit
- Plugs can be removed for retubing or to bring heat exchanger tubes back into service

### Size Range

0.400" to 1.180" (10.16mm to 29.97mm).

*Extensions available in 1ft (30cm), 2ft (60cm), 4ft (120cm), and 6ft (180cm) lengths*

### Standard Material

Zinc Plated Carbon Steel Slide Hammer and Pull Rod,  
Hardened Alloy Steel Tapered Spear

## Turnaround Job Boxes

Perfect for anyone planning a large test & repair project who needs to have all their Pop-A-Plug Tube Plugs and Installation tools in one place. Turnaround Job Boxes are easily transported by fork truck or pallet jack. All-steel construction. Can be securely locked to prevent theft of tools, plugs and other equipment.



# Contact Information

## North, Central & South America

### EST Group

2701 Township Line Road  
Hatfield, PA 19440 USA

**P** +1.215.721.1100 | +1.800.355.7044

**F** +1.215.721.1101

est-info@curtisswright.com

## Europe, Middle East, Africa (EMEA)

### EST Group B.V.

Hoorn 312D, 2404 HL Alphen aan den Rijn  
The Netherlands

**P** +31.172.418841

**F** +31.172.418849

est-emea@curtisswright.com

## China

**P** +86.400.636.5077

est-china@curtisswright.cn

## Singapore

**P** +65.3158.5052

est-asia@curtisswright.com

**CURTISS -  
WRIGHT**



Product animations, instructions, and detailed technical information are available on our website: [www.cw-estgroup.com](http://www.cw-estgroup.com)

While this information is presented in good faith and believed to be accurate, Curtiss-Wright does not guarantee satisfactory results from reliance on such information. Nothing contained herein is to be construed as a warranty or guarantee, expressed or implied, regarding the performance, merchantability, fitness or any other matter with respect to the products, nor as a recommendation to use any product or process in conflict with any patent. Curtiss-Wright reserves the right, without notice, to alter or improve the designs or specifications of the products described herein.