

# POP-A-PLUG®

## AIR COOLED HX TUBE PLUGGING SYSTEM

### Technical Brief - EST Group

#### DESCRIPTION

EST Group's proven Pop-A-Plug® heat exchanger tube plugging system has been further developed for the Air Cooled Heat Exchanger (ACHE) or Fin-Fan market. ACHE units required "extended" tools as pneumatic tube testing and mechanical tube plugging needs to be done "at depth" through the narrow entry of the plug sheet in the deeper tube sheet. EST Group has a revolutionary new approach to supply the Pop-A-Plug Kits ( 1 Kit = 10 Plugs) and accessories to perform the actual tube testing and plugging as a standard package which allows the technicians to test and plug tubes very quickly without any need for hammering or welding. Unlike hammered in (welded) tapered plugs which are troublesome to weld and require weld permits the tube testing and plugging become a simple and controlled operation. Once Pop-A-Plugs are installed they will remain

leak-tight throughout your heat exchanger's life cycle. In service for 20 years, the Pop-A-Plug P2 (High Pressures up to 7000 PsiG (483 BarG) and Pop-A-Plug CPI/PERMA (Medium Pressures up to 1000 PsiG ( 69 BarG) are a proven long-term performer in Air Cooled Heat Exchangers operating at pressures up to 7000 PsiG (483 BarG).



Pop-A-Plugs are the ideal tube plugging solution for Air Cooled Heat Exchangers.

#### COMPETITIVE ADVANTAGE

- Both the Pop-A-Plug P2 and the Pop-A-Plug CPI/PERMA mechanical tube plugs are the only plugs that feature patented Internally Serrated Sealing Rings designed to maintain a helium leak-tight seal under extreme thermal and pressure cycling throughout the life cycle of an Air Cooled Heat Exchanger.
- The Result: Pop-A-Plug's provide the lowest installed cost of any tube plugging method. Engineered to be a permanent tube plugging solution, Pop-A-Plug's "once and done" installation process maximizes plant uptime.
- Quick installation – typical Pop-A-Plug installation time takes less than 15 seconds, maximizing plant uptime.
- Permanent and Reliable - engineered for optimal performance throughout the heat exchanger's life cycle.
- Metal to metal sealing eliminates plug degradation concerns due to thermal expansion and corrosion resulting from galvanic interaction between the plug and tube.
- Safer and more cost effective than welding tapered pins.
- Controlled and repeatable installation minimizes installer fatigue and eliminates the need to attempt troublesome welding operations through adjacent connections in the plug sheet.

#### QA AND PRODUCT CERTIFICATIONS

- ISO 9001:2008
- TÜV Nord Suitability and Type Test Certification
- Cited in ASME PCC-2-2011



## QUICK INSTALLATION

- Go/No-Go Gages confirming proper plug sizing and come with threaded connections that allow for easy extension in standard 1 foot ( 30 Cm) increments using –EXT extension tool.
- Extended Tapered Reamers available to remove protruding weld droop (if necessary).
- Tube Preparation Brush (to remove pitting and tube defects and roughen tube surface to maximize pressure hold capability of Pop-A-Plug) comes with threaded connections allowing easy extension in standard 1 foot ( 30 Cm) increments using –EXT extension.
- Extended Pull Rod Assemblies in standard 1 foot ( 30 Cm) increments with stand-off ring ensuring uniform installation “at depth” in the tube sheet through the narrow entrance of the plug sheet.
- Air driven easy to use Hydraulic Ram and Pump.
- Position Pop-A-Plug in the expanded portion of the tube end within tube sheet and activate Hydraulic Ram to install.
- The Pop-A-Plug is properly installed when the Breakaway “Pops” and separates from Pull Rod Assembly.
- Remove the Breakaway stub from the installed Pop-A-Plug.



## SPECS/MATERIAL

Our large inventory of Pop-A-Plugs is maintained to fit tube sizes from ½” to 1 ½” (12.7 - 38.1mm). Pop-A-Plugs have been engineered for applications larger and smaller in size. Materials available from stock include:

- |                            |                         |                  |               |
|----------------------------|-------------------------|------------------|---------------|
| • Carbon Steel             | • Chrome Molybdenum F9  | • 70/30 CuNi     | • High Alloys |
| • 316/316L Stainless Steel | • Chrome Molybdenum F11 | • 90/10 CuNi     | • Monel       |
| • 304/304L Stainless Steel | • Chrome Molybdenum F22 | • Incoloy 825    | • Titanium    |
| • Chrome Molybdenum 4142   | • Duplex SS             | • Nickel 200/201 | • AL6XNNS     |
| • Chrome Molybdenum F5     | • Zirconium             | • Inconel 600    | • Brass       |

Pop-A-Plugs are currently available in over 25 alloys. Contact EST Group if materials other than those listed above are needed. EST Group provides emergency manufacturing services 24 hours a day/7 days a week to meet your specific plugging needs.

## FAQs

**Q What information is needed to determine which Pop-A-Plug type and tools are needed for my ACHE unit?**

A Typically we need : 1) Tube Material, 2) Outside Diameter, 3) Wall Thickness, 4) Tube-to-Tube Sheet Joint and Expansion Method 5) Operating Pressure 6) Operating Temperature, 7) Distance from Plug Sheet to Tube Sheet, 8) Thickness of the Tube Sheet.

**Q I have provided all the relevant information, what is the next step?**

A EST Group will provide a detailed quotation describing all the required items and their function so you have a complete overview of what is needed for your particular application. We can (if needed) include onsite training for your technicians to become familiar with the Pop-A-Plug system.

**Q Can the Pop-A-Plug and tube materials be different?**

A No. The plug and tube materials must closely match to accommodate thermal expansion and avoid problematic galvanic interaction.

**Q Do the tubes need to be prepped before the Pop-A-Plug can be installed?**

A Yes. Preparing the tubes properly sizes and returns concentricity to them while also providing the ideal surface needed to achieve a leak-tight seal.

**Q Does a Pop-A-Plug damage the tube or tube joint that it’s plugging?**

A No, the Pop-A-Plug can be installed and removed (with the use of the – EXT (Extended) EST Group Plug Removal Tool) without damaging your tubes or tubesheet joints.

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