In 1923, CONCO introduced the world to the first mechanical tube cleaner that could remove condenser fouling in a single step. The CONCO cleaner was the answer to achieving optimal heat transfer, increased megawatt output and eliminating corrosion related tube failures in condensers and heat exchangers.

Now, almost 90 years and 100 million tubes later, CONCO stands as the world leader in condenser related products and services for the power generation industry. Our Total Condenser Performance™ lineup of services, including condenser tube cleaning, leak detection and eddy current testing, can help ensure your condenser remains efficient and reliable during its operating cycle.

Call us today for a no-nonsense solution to your needs and put the CONCO advantage to work for you.
Total Condenser Performance™

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What is Total Condenser Performance™?

At CONCO, we believe achieving the perfect balance of condenser efficiency and reliability is attainable through effective cleaning and testing services. With this in mind, we’ve created the Total Condenser Performance™ lineup of services designed to maximize output and minimize risk of condenser related outages during your operating cycle. Total Condenser Performance™ includes tube cleaning, eddy current testing and leak detection services. These services work together to provide “absolutely the best” results from your condenser and heat exchangers. Best of all, Total Condenser Performance™ means never having to deal with the headaches of juggling multiple vendors for a single project.

To better understand the benefits of our Total Condenser Performance™ services, contact your CONCO sales representative for more information on how we can help you achieve your condenser performance goals.

**Tube Cleaning Services** - We believe clean tubes are a fundamental component in achieving Total Condenser Performance™. By removing deposits on a regular schedule, we can dramatically improve your megawatt output while reducing the likelihood of tube failures related to fouling and underdeposit corrosion. For more information see pages 3-5.

**Eddy Current Testing** - In addition to tube cleaning, eddy current testing stands as one of the most effective methods for reducing or eliminating tube failures in your condenser and heat exchangers. By catching problems before they lead to unplanned outages, you can save hundreds of thousands of dollars in downtime and repairs. For more information see pages 6-7.

**Leak Detection Services** - Leaks are inevitable. Whether it’s air inleakage or a condenser tube leak, the consequences will cost your plant money. We believe a systematic leak detection survey using our state-of-the-art systems will keep your condenser operating efficiently year round. Our staff averages 23+ years experience, and are knowledgeable in all system components that require testing. For more information see pages 8-9.
Available When You Are

A power plant operates around the clock, and so do we. Our crews are ready to assist you at a moment’s notice. Is your condenser coming down for a few days? That’s a great time for our crews to come in and perform an interim cleaning. By performing an interim cleaning on your condenser, maximum megawatt output can be maintained during peak demand.

Cleaning at Reduced Load

Whether your plant is down for an outage or operating at reduced load, CONCO crews have the capability to clean your condensers. Cleaning the condenser at reduced load during periods of peak demand often results in immediate return-on-investment and optimal megawatt output during peak revenue generating periods.

The Condenser Performance Company

CONCO crews have cleaned over 100 million condenser and heat exchanger tubes, making us the number one condenser performance company in the world. Our exclusive cleaning technology allows our crews to effectively clean more tubes per shift than high-pressure water jetting or chemical cleaning and at a significantly lower overall cost. Our tube cleaning services are backed by almost 90 years experience in the field and a full line of TruFit™ tube cleaners that can tackle anything you can throw their way. Whether your condenser is fouled with silt, sediment, sea life or scale, CONCO has the field-proven expertise to quickly and efficiently return it to optimal performance.
Tube cleaning services are available 24 hours a day.

Crews can clean 5,000 tubes per shift on average.

Our tube cleaning services provide a superior clean compared to high pressure water, chemicals and even online ball cleaning systems at a fraction of the cost.

CONCO can coordinate tube cleaning and eddy current testing services to meet your tight downtime schedule.

Case Study: CONCO removes calcium carbonate scale from 96,234 condenser tubes with patented Calbuster technology.

Problem: South Texas Project (STP) nuclear power plant had severe calcium carbonate scaling ranging in thickness from .019 inches to .031 inches within their 96,234 titanium condenser tubes.

Solution: Using the CONCO ProSeries™ 200B Tube Cleaning System and patented Calbuster cleaning technology, technicians were able to remove over 5,000 pounds of calcium scale from the unit 1 condenser. Results were so positive, STP opted to have CONCO clean unit 2. STP reported an increase of almost 3 MW in power production from the two units after the cleaning.

Learn more about the CONCO Calbuster on page 24.
The **CONCO** Difference

**CONCO** designed and engineered our tube cleaning system from the ground up. Our patented technology starts with TruFit™ tube cleaners that are tailor-made to your tube dimensions and designed for specific fouling types. Unlike other companies that shoot one or two types of cleaners, **CONCO** has more than a dozen cleaner designs engineered for effective removal of fouling and underlying corrosion product. **CONCO** tube cleaners featuring TruFit™ technology are capable of removing both soft deposits and hard scale, unlike the competition. By removing underlying corrosion, you extend tube life and dramatically reduce the chance of tube failure.

![Diagram showing tube wall, hard scale, and soft deposits](image)

**Performance for All Your Heat Exchangers**

In addition to condensers, **CONCO** has the expertise to maintain all of your balance-of-plant heat exchangers. **CONCO** is experienced in providing tube cleaning and testing services for:

- Feedwater Heaters
- Lube Oil Coolers
- Hydrogen Coolers
- Excitor Coolers
- Seal Oil Coolers
- Vacuum Pump Coolers
- Stator Coolers
- CCW Systems

**CONCO** Systems | Call 1.800.345.3476
### Eddy Current Testing

**CONCO** eddy current testing services are performed for all utility and commercial customers on all types of non-ferrous tubing in condensers, heat exchangers and chillers included in the steam cycle, cooling water systems and/or service water systems. Eddy current testing helps to prevent forced outages by detecting various defects such as pitting, cracking, corrosion, erosion, grooving, steam impingement and tube-support fretting that cause tube failures. **CONCO** NDE personnel are certified in accordance with the American Society of Non-Destructive Testing (ASNT) SNT-TC-1A guidelines. In addition, **CONCO** follows the most stringent nuclear guidelines. Our customers realize significant economic savings from routine testing through improved reliability and plant availability.

### Data Analysis

Depending on your requirements, our NDE analysts can provide on-site or in-house data interpretation, utilizing the most advanced software for eddy current testing. **CONCO** analysts will identify defects in your heat exchanger tubing and provide a comprehensive report of their findings. We can even assist you in the establishment of an eddy current testing program, which will enable you to quickly identify trends in tube conditions or locate trouble spots in your heat exchangers through better management of eddy current data. This information is important for determining the remaining useful life of your tube bundles.

### DDA4 REPORT

**LEGEND**

- **Customer:** Your Company
- **Plant:** Your Plant
- **Outage:** May 2002
- **Date:** 5/29/02
- **Analyst:** Analyst Name
- **Unit Inspected:** 4 East
- **Analyst Type:** Primary
- **Probes Type:** 740 BS/LF
- **Analyst Number:** 7257
- **Location:** Location of defect beginning at the common tube end (depends on **EXTENT**)
- **Inlet/Outlet end + 12.34 inches**

<table>
<thead>
<tr>
<th>SECTION IDENTIFICATION</th>
<th>PERCENT Amount of wall loss</th>
<th>INDICATION CODE</th>
<th>LOCATION</th>
</tr>
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<tbody>
<tr>
<td>Section</td>
<td>Row</td>
<td>Tube</td>
<td>Volts</td>
</tr>
<tr>
<td>E4</td>
<td>1</td>
<td>1</td>
<td>9.59</td>
</tr>
</tbody>
</table>

- **VOLTS**: Size of the defect
- **DEGREE**: <40 typically indicates an inside defect; >40 typically indicates an outside defect
- **CHANNEL**: Channel defect was sized on Channel 1 typically indicates a free span indication; Channel P1 typically indicates a defect at tube support
- **EXTENT**: Directionally indicates the tube test (in this case, the tube was tested Common Tube End to Inlet/Outlet End). Analysis is done in the opposite direction of the test
**Eddy Current Testing**

### Tubesheet Mapping

This included service provides an “at-a-glance” summary of condenser and heat exchanger tube condition through the use of a graphical multi-color diagram depicting tube condition. The overall condition of the heat exchanger and any developing trends are obvious, as each tube’s condition is represented by a different color.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Tube Name</th>
<th>Number</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>80-100% Ind</td>
<td>15</td>
<td>0.41</td>
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<tr>
<td></td>
<td>60-79% Ind</td>
<td>237</td>
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<tr>
<td></td>
<td>ADR, ADI</td>
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<tr>
<td></td>
<td>DD1</td>
<td>3</td>
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<td></td>
<td>NQI</td>
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<tr>
<td></td>
<td>DSI</td>
<td>3</td>
<td>0.08</td>
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<tr>
<td></td>
<td>PVN</td>
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<td>RBD, RNC, INC</td>
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<tr>
<td></td>
<td>OBS</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>RES</td>
<td>2</td>
<td>0.05</td>
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<tr>
<td></td>
<td>PLG</td>
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<td>NDD, &lt;20% Ind</td>
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**Totals By Section**

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<td>60-79% Ind</td>
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<td></td>
<td>40-59% Ind</td>
<td>9</td>
<td>0.25</td>
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<tr>
<td></td>
<td>20-39% Ind</td>
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<td></td>
<td>ADR, ADI</td>
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<td>0.00</td>
</tr>
<tr>
<td></td>
<td>NQI</td>
<td>0</td>
<td>0.00</td>
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<tr>
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<td>DD1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>PVN</td>
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<td>0.00</td>
</tr>
<tr>
<td></td>
<td>NQI, RHG, INC</td>
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<td>DMF</td>
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</tr>
<tr>
<td></td>
<td>OBS</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>RES</td>
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<td>0.00</td>
</tr>
<tr>
<td></td>
<td>PLG</td>
<td>0</td>
<td>0.00</td>
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<td>Default Tube</td>
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<td>NDD, &lt;20% Ind</td>
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**Totals**

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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>147</td>
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</tbody>
</table>

---

**Make CONCO Part of Your Tube Failure Prevention Program**

Did you know that more than 7,000 outages per year* are attributed to tube failures costing the industry hundreds of millions of dollars in lost production and repair? Many power plants have created teams focused on preventing tube fouling and failure and **CONCO** stands ready to assist you with yours. With numerous technical papers and contributions to organizations like EPRI and ASME, **CONCO** is recognized as an expert on tube fouling and failure prevention. If you are serious about stopping tube failures, contact us today **1-800-345-3476**.

---

*Based on recent North American Electric Reliability Corporation Data averaged for 1996-2000 reporting period
Leak Detection Services

Air inleakage negatively impacts plant performance, while tube leaks can cause forced outages costing power plants thousands in maintenance and lost productivity. Using advanced tracer gas leak detection technology, CONCO technicians can quickly locate sources of leaks within your plant. CONCO has been an innovator and leading provider of leak detection services for over 30 years and offers both helium and SF₆ tracer gas technology.

CONCO crews can detect:
- Condenser air inleakage
- Condenser tube leakage
- Sources of dissolved oxygen
- Stator water system leakage
- Main generator leakage

During a recent four-year period, condensers were responsible for more than 25,000 forced and scheduled outages, with condenser tube leaks being the primary source of generation loss.

Depending on leak characteristics, a determination is made whether to mobilize with the helium mass spectrometer system, the state-of-the-art CONCO Fluorotracer™ system, or both.

Looking for ProSeries™ Leak Detection Systems?
Check out the full lineup on page 16.
Locating Circulating Water Tube Leaks

Circulating water leaks can result from penetrations through the tube walls, from joints between the tubes and tubesheet, or from other penetrations between the water box and condenser shell. Contaminants in the circulating water change condensate chemistry, which can cause boiler or steam generator corrosion. Poor water chemistry can also cause stress corrosion cracking of turbine components. Our leak detection specializes in finding tube leaks within main condensers. Our methodical approach, using either helium or SF₆ tracer gases, ensure that we find even the smallest leaks.

Locating Sources of Air Inleakage

CONCO pioneered the use of tracer gas technology to locate air inleakage in power plants. Since 1978, CONCO has restored performance to thousands of plants worldwide using exclusive technology. Our technicians are the best in the business with an average of 23+ years experience in the field. They’re knowledgeable of all the components within your vacuum boundary. A typical 500 MW unit can be fully tested in one shift with no need for plant interruption. Our technicians are fully compliant with fossil and nuclear testing procedures and are confined space, first aid and CPR trained.
Introducing FinTech ACC™
Designed to clean any fin-fan, air-cooled condenser, Conco FinTech ACC™ cleaning services have been successfully used on fins fouled with dust, dirt, debris, pollen, leaves, insects, and even bird and bat carcasses. This service has been used in hundreds of power plants, petrochemical plants and process industry plants worldwide.

Faster, Cleaner, Safer
Fouled surfaces of air-cooled condensers can cause performance issues, especially when ambient temperatures start to rise. Until now, cleaning air-cooled units meant tedious work at dangerous heights using fire hoses, hand lances or chemicals. Fire hoses and hand lances can damage delicate fins, while chemicals present environmental cleanup concerns.

- Faster Cleaning - driven at optimum speed, the nozzles clean 325 square feet per hour.
- Greater Effectiveness - more effective than hand water lance, foam wash or fire hose.
- No Waiting - fast production rates, no wait time for heat exchanger cooling.
- Safer Solution - no personnel on scaffolds or exposed to hot, humid conditions during operations.
- Efficient - cleaning can be performed on-line.

A Dimensional Clean
At the heart of the FinTech system, is a computer-controlled 12-nozzle water jet assembly. The assembly travels on tracks at a constant speed and fixed height, ensuring a consistent clean from start to finish. Water nozzles on the assembly are configured to match fin geometry, ensuring that they clean all the way through, not just on the fin surface. The frame and tracks of the system are adjustable for virtually all sizes and layouts of fin-fan exchangers, including flat coolers, vertical coolers, “A” frame and “V” frame configurations. The system is suitable for use on all materials, including steel, aluminum, brass and copper.
Removing Tough Deposits with the Power of Liquid Nitrogen.

Harnessing the power of liquid nitrogen, CONCO NitroLance™ can remove incredibly difficult deposits safely and without producing secondary waste streams. NitroLance™ has been used to restore flow to tubes completely blocked with hardened calcium carbonate quicker than hydrolancing or chemical cleaning. And because liquid nitrogen readily dissipates, only the deposit is left behind, saving our customers thousands of dollars in cleanup costs.

How Does NitroLance™ Work?

The super-cooled cryogenic jet emerges from the NitroLance™ nozzle entering solid deposit cracks and crevices and then expands, rapidly breaking up deposits from the inside. NitroLance™ can clean both horizontal and vertical heat exchangers quicker, safer and better than anything on the planet!

NitroLance™ Features

- Faster than hydrolance or chemical cleaning.
- Dramatically improves turnaround time for critical path equipment
- Can remove deposits where conventional methods fail.
- Liquid nitrogen evaporates leaving only the deposit to remove, saving you time and money.
- Technology so safe, it’s used by NASA to clean the Space Shuttle.

CONCO Systems | Call 1.800.345.3476
Retube with the Condenser Performance Experts

When your condenser or heat exchanger tubing needs to be replaced, call CONCO. Our strong relationship with tube manufacturers and retubing equipment suppliers allows us to bring the best value to our customers when replacing tubing in your condenser or other balance-of-plant exchangers. CONCO has the capabilities to provide “absolutely the best” support for your retubing job. Whether you need 500, 5,000 or 25,000 tubes replaced, our retubing team can provide turnkey operations or work with your existing general contractor as directed.

Choosing The Best Tube Material Starts with CONCO

In addition to proving the know-how for your retubing project, CONCO can work with you to determine the appropriate tubing material best suited for your application. Considering stainless steel? Thinking titanium? Let us put our knowledge of 85 years of tube cleaning and testing to work for you and discuss the pros and cons of available tube materials. Our relationship with the top names in tubing allow us to provide in-depth education to our customers on the best choice for their site-specific conditions.

Retubing isn’t just about how many linear feet a company can install, it’s about how a company can bring together the best resources for the application, combined with almost 90 years experience on how that tubing holds up to fouling and other environmental factors.

Case Study

CONCO Innovation Exceeds Expectations

CONCO recently completed the retubing of 25,000 AlBr condenser tubes at a 700 MW coal-fired power plant. The power plant retained the services of the engineering firm who originally installed the condenser to oversee the project. The engineering firm stipulated that prior to installing new tubing, tubesheet holes must undergo and pass a “white glove” inspection for cleanliness. Because CONCO also specializes in condenser tube cleaning services, they were able to quickly innovate technology for meeting the engineering firm’s cleanliness requirement. CONCO engineers adapted a tool that performed cleaning utilizing rotating brush technology while simultaneously applying a cleaning agent. Once clean, the same tool was used to buff the tubesheet holes to achieve a “white glove” finish. The engineering company spokesman said “The process was extremely efficient and underscored the benefit of having a multi-disciplined company like CONCO on the project.”
Support Services

Take the Upper Hand Against Fouling
Military strategist Sun Tzu once wrote “know your enemy and you will win a thousand wars.” At CONCO, we believe knowing what type of fouling deposits are within your tubes can help you win the war against tube fouling and failure. With the results from our deposit analysis and deposit density testing services, your chemistry team can make necessary adjustments to your cooling water to reduce the impact of future deposit accumulation.

Deposit Analysis
This analysis is used to determine the elemental composition of a given condenser or heat exchanger tube deposit. After the deposit has been filtered and then dried, loss-on-ignition (LOI) testing is performed and a representative portion is analyzed. A full report is provided.

Deposit Density
Full-length tube deposit samples are taken by shooting tube cleaners through selected tubes and collecting the deposits. These samples are filtered, dried and then weighed to determine deposit weight in grams. Deposit weight and deposit density is determined. Loss-on-ignition (LOI) is performed. A full report is provided.

Tube Failure Analysis
This analysis determines tube surface abnormalities, including tube failure in condensers and heat exchangers. A tube is pulled from a condenser/heat exchanger, sectioned and subjected to various metallurgical examinations. A full report is provided.
The High Confidence Plug

When you have to plug off leaking tubes in condensers and heat exchangers, the patented High Confidence tube plug is “absolutely the best” plug you can use. Tested at pressures in excess of 1,000 PSI and available in 3/4”, 7/8”, 1”, 1-1/8”, and 1-1/4” sizes, the High Confidence tube plug will not move into or out of leaking tubes, and can be used on coated or epoxied tubesheets.

Features
• Separate gripping and sealing design in one plug.
• Tested to over 1,000 PSI under wide range of temperature and vibration conditions.
• Available in titanium, stainless steel, brass and bronze.
• The gripping portion of the plug is made of machined serrated adjustable cleats that allow for positive gripping action.
• Durable, expanding chloroprene cylinder provides dependable sealing action.

5 Easy Steps for a High Confidence Seal
• Clean and dry tube ends to be plugged.
• Finger tighten nut to expand plug so it is snug when inserted into tube.
• Insert plug, chloroprene cylinder first, into tube.
• Position gripping cleats to engage tube sheet, beyond the roll.
• Tighten nut to required torque and repeat on other tube end.
Expanding Tube Plugs
For temporary or permanent plugging of 5/8” to 1-1/4” condenser and heat exchanger tubes, CONCO’s expanding tube plugs are tested to withstand a wide range of pressure, temperature and vibration conditions. The larger washer on the end of the EX-3 tube plug allows the plug to fit flush with the tubesheet and not be pulled into the tube by vacuum on the unit. The EX-4 is designed so it can be placed inside the tube at exact locations, to enable leak detection tests of other tubes. Pressure ranges of these plugs varies from 240 PSI to 375 PSI. The EX-F plug offers a separate gripping and sealing design in one plug and seals to 500 PSI.

Features
• Available in titanium, stainless steel, brass and bronze.
• Expansion cylinder is made of durable chloroprene.
• Installation is easy and quick.

Fibre Tube Plugs
These plugs are easily installed for emergency and temporary plugging of condenser and heat exchanger tubes. They expand when wet to effectively seal off the tube. CONCO Fibre plugs will not damage tubesheets and can be used in temperatures up to 230°F.

Features
• Constructed of vulcanized cloth fibre rod.
• Machined to fit specific tube sizes.
• Requires only a mallet for quick, easy installation.

Pin and Collar Tube Plugs
The one-piece tapered design of the Type 1 Pin Plug fits specific tube sizes. The Type 2 Pin and Collar Plug features a two-piece design with matching pin and collar for a positive full-length seal. Pin and Collar plugs seal at high temperatures and isolate leaking tubes from the system, allowing continued use of the unit without major overhaul. Pin and Collar plugs are ideal for using at the tubesheet where tube samples have been extracted.

Features
• Constructed of vulcanized cloth fibre rod.
• Machined to fit specific tube sizes.
• Requires only a mallet for quick, easy installation.
Step up to ProSeries™ products from CONCO.

Now you can own the same rugged, dependable ProSeries™ Leak Detection Systems that CONCO uses in the field. Choose either a helium mass spectrometer system or our exclusive SF₆ Fluorotracer™ system, and you’ll be ready to perform leak detection surveys on your own schedule. We’ve assembled everything you need in a convenient package complete with carrying cases. Call us today for special package pricing on either system, and don’t forget to ask about our leak detection training program.

The Helium Mass Spectrometer

The Helium Mass Spectrometer is a rugged and dependable tool for finding and measuring leaks in the most demanding applications. With its low initial price and low cost of ownership, this unit is the most cost-effective leak detector available. With sensitivity to detect a minimum detectable leak at 1,000 ppm ambient helium being 2 x 10⁻⁹ atm-cc/sec helium. Available in 115v or 230v, 50/60 Hz models.

The Fluorotracer™ Analyzer

The CONCO Fluorotracer™ Analyzer is a compact, easy to operate instrument designed to detect sulphur hexafluoride with sensitivity as low as one part per billion (1.0 ppb). This unit is capable of performing both air inleakage and condenser tube leak inspections in addition to finding sources of dissolved oxygen. You can even perform online injections of SF₆ with your unit at full power to determine which water box has a leaking bundle saving you time and money!

CONCO Helium Mass Spectrometer System
• Helium Mass Spectrometer
• Off Gas Sampling Unit
• Condenser Tube Inspection Unit
• Strip Chart Recorder
• Communication System
• Accessories Kit
• Carrying Cases

CONCO Fluorotracer™ Leak Detection System
• Fluorotracer™ Analyzer
• SF₆ Pak
• Modified Hydrogen Regulator
• Off-Gas Sampling Unit
• Online Injection Unit
• Strip Chart Recorder
• Communication System
• Carrying Cases

CONCO Leak Detection Training

Learn from the best! We’re excited to offer a two-day training program on the proper setup, operation, maintenance and troubleshooting of your new leak detection system from CONCO. In addition to classroom instruction, a senior CONCO leak detection trainer will also provide “hands on” field testing using your new system with your staff. Call us at 1-800-345-3476 for more information on this program.
**Flexible Polyethylene Inserts**

**CONCO** Alkaserts® are widely used in electric utility power stations, industrial power plants, and on ships - wherever inlet end erosion and impingement present a problem. They are designed to assure lasting protection to the inlet ends of new tubes and to greatly prolong the life of worn tubes damaged by erosion and impingement. Alkaserts® are inert and highly resistant to erosion and abrasion. They are dimensionally stable well above normal operating temperatures of steam condensers. Alkaserts® are flexible enough to accommodate normal variations in tube bores, yet rigid enough for easy insertion. They are designed to make a snug fit in the tube so that there is no danger of water seeping between the insert and tube.

### Two Head Designs Available

- **The “bonnet” type head** is designed to cover the ferrule in ferrule-type installations.
- **The “flush” type head** is designed for flush rolled-in tubes and close-clearance tube sheet designs.

### Features

- Easy, quick Installation.
- Conforms to irregular tube surface conditions - streamlining flow over these areas.
- Inlet end streamlined for smooth flow.
- Bonnet head gives protection to ends of tubes or ferrules.
- Internal taper promotes streamlined flow.
- Dimensionally stable to 170°F, well above normal operating temperature of steam condenser.
- Unaffected by normal cleaning chemicals.
- Filtering action - holds foreign objects for easy removal.
- Available for a wide range of tube sizes and gauges.

### Quick and Easy Installation

Simply insert the Alkasert® into tube and tap with a wooden or Micarta persuader using light, sharp blows of a light mallet.
CONCO ProSeries™ 200B Tube Cleaning System

The ProSeries™ 200B Tube Cleaning System is the same durable, field-proven system that our crews use. This system has effectively cleaned over 100 million heat exchanger tubes worldwide. Designed to shoot tube cleaners through tubes from 1/2” to 1-3/4”, it increases available water pressure to the 200-300 PSI necessary for effective cleaning. The unit features a 10 HP (7.5 kW) motor and durable positive displacement triplex plunger two-gun pump.

Flexible - Can be used with all tube cleaning devices.
Portable - Complete with mobile base, can be easily moved to job site.
Powerful - Robust 10 HP electric motor generating 200-300 PSI water pressure.
Reliable - The ProSeries™ 200B tube cleaning system is rugged and dependable.

ProSeries™ tube cleaning systems are available in various wiring configurations to suit your site specific conditions. Please contact us and let us configure your ProSeries™ for you!

Also available in explosion-proof models

The Conco ProSeries 200B Tube Cleaning System can clean 5,000-7,000 tubes per shift.
ProSeries™ 200B Accessories

Water Gun
Available in bronze or lightweight aluminum with a spring-loaded fail safe valve, the CONCO water gun has proven ideal for heavy-duty use. The gun features quick-change nozzles (available in 1/2” through 1-3/8” sizes) and powers all types and sizes of cleaners.

Water Gun Repair Parts
One of the great features of the CONCO water gun is its few operating parts, which makes it easy to repair.

Check Light
For visual inspection of tubes to locate obstructions, this light includes 10’ of 16/3 cord with a three-prong plug for 110v supply, 12V transformer with handle and 50’ 14/3 extension cord to lamp. It features a powerful one million candle power, 9” diameter, 12V/D.C. lamp with pistol grip and adjusting knob to regulate light beam.

Hose
Rugged, heavy-duty hose, rated to withstand pressures up to 800 PSI. Wire braided with durable pressed-on NPT fittings on each end for safe, dependable service. Outlet hose sizes for connection to water guns available in 3/4” or 1” sizes. Inlet hose sizes for connection from water source to pump available in 1-1/4” or 1-1/2” sizes. All hoses come in 50’ lengths. Quick disconnect and special length hoses available.

Tarps
Lightweight and easy to handle, our rugged tarps protect cleaners as well as the water box from damage when cleaners exit the tube. Available in sizes 10’x10’ or 12’x16’ vinyl coated for condensers and as 6’x6’ vinyl coated for smaller exchangers.

Flexible Fiberglass Rod
The CONCO flexible fiberglass rod is used for dislodging obstructions from tubes. Available in 10’ increments, its flexible construction allows the operator to work in a confined space.
A **CONCO** tube cleaner with TruFit™ technology is your guarantee that the tube cleaner you buy is a perfect match for your tube dimensions. Using a tube cleaner that claims to fit multiple tube dimensions, or one manufactured of low-quality material, can cause damage to tubing. **CONCO** cleaners with TruFit™ are built by us in our factory using the best materials and are quality checked every step of the way. Insist on genuine **CONCO** cleaners with TruFit™ technology!

**C4S Tube Cleaner**

The C4S is an all-purpose tube cleaner for condensers and heat exchangers with tube sizes 1/2” - 1-1/4”. This spring-loaded metal cleaner is highly effective on all types of deposits, including micro/macro fouling, organic type scales, corrosion and pitting by-products, and all types of obstructions. It can also safely be used with tube inserts and coatings on tubesheets.

**Features**

- Four metal-bladed center rivet design provides overlapping tube I.D. coverage.
- TruFit™ technology ensures perfect match to tube specifications.
- Safe, water-powered cleaner that travels 10-20 feet per second.
- Color-coded caps quickly identify C4S sizing.
- Can be shot up to 12 times each.

**All Purpose Design**
C3S Tube Cleaner
The C3S is a heavy-duty tube cleaner for condensers and heat exchangers with tube sizes 7/8” and 1”. The reinforced blade design of the C3S makes it ideally suited for removing hardened deposits, corrosion and pitting by-products as well as obstructions.

C3S Features
• Three metal-bladed reinforced construction provides overlapping tube I.D. coverage.
• TruFit™ technology ensures perfect match to tube specifications.
• Safe, water-powered cleaner that travels 10-20 feet per second.
• Color-coded caps quickly identify C3S sizing.
• Can be shot up to 12 times each.

Innovative Hex Design
C2X and C3X “Hex” Tube Cleaners
The C2X and C3X cleaners provide size points of cleaning contact per blade available in sizing 3/4”, 7/8”, 1” and 1-1/8”. CONCO Hex cleaners are designed to remove thin tenacious deposits such as manganese, silica, iron and calcium, and are also effective in removing corrosion product and other types of debris and obstructions. Depending on the amount of fouling, choose between the two-stage C2X or the three-stage C3X models.

Features
• Metal hexagon blade design, available in two or three-stage design with six contact points per blade.
• TruFit™ technology ensures perfect match to tube specifications.
• Safe, water-powered cleaner that travels 10-20 feet per second.
• Color-coded caps quickly identify C2X/C3X sizing.
• Can be shot up to 12 times each.
C4SS Stainless Tube Cleaner

The C4SS stainless steel cleaner can be used on all types of tube materials in condensers and heat exchangers with tube sizes 3/4” to 1-1/4”. Originally developed by CONCO for application on AL-6XN stainless steel condenser tubing, it is also ideal for applications in highly corrosive environments.

Features
• Four stainless steel-bladed center rivet design provides overlapping tube I.D. coverage.
• TruFit™ technology ensures perfect match to tube specifications.
• Safe, water-powered cleaner that travels 10-20 feet per second.
• Color-coded caps quickly identify C4SS sizing.
• Can be shot up to 8 times each.

QTB Stainless Brush

The QTB stainless brush is designed for use on all types of tube materials in sizes 5/8” to 1-1/4”, and can also be used on tubes with inserts and epoxy coatings. It is particularly effective on manganese, iron and silica deposits. It is also effective on all types of obstructions, macrofouling and debris. The QTB will restore the tube surface to its original heat transfer characteristics, while providing absolutely the best protection from under-deposit corrosion.

Features
• Stainless steel bristle design featuring 1,000+ contact points.
• TruFit™ technology ensures perfect match to tube specifications.
• Safe, water-powered cleaner travels 10-20 feet per second.
• Color-coded end caps quickly identify QTB sizing.
• Can be shot up to 12 times each.
H-Brush Tube Cleaner
The H-Brush is typically utilized for removing light deposits in condensers and heat exchangers with tube sizes 5/8” to 1-1/2”. It removes micro/macro fouling, soft organic deposits, some corrosion by-products, mud and silt, and most types of obstructions. It can also be used in applications with enhanced tube surfaces and is safe on all inserts and epoxy coatings.

Features
• Coil-bound nylon bristle design with nylon shaft.
• TruFit™ technology ensures perfect match to tube specifications.
• Safe, water-powered cleaner that travels 10-20 feet per second.
• Color-coded caps quickly identify H-Brush sizing.

XL-Brush Tube Cleaner
Longer than the H-Brush and exhibiting similar features, the XL-Brush provides the advantage of extra length plus more nylon bristles for removal of most types of light deposits in 5/8” to 1-1/2” condenser and heat exchanger tubes.

Type P Plastic Tube Cleaner
The Type P is designed for removal of only the softest types of deposits such as mud, silt and microbiological fouling in condensers and heat exchangers with tube sizes 5/8” to 1-1/4”. The Type P fins are slit horizontally and vertically which, along with a small diameter hole in the core, allows water to bypass the cleaner to lubricate and flush out deposits.
Removing hardened calcium scale from the inside of condenser and heat exchanger tubes can be a difficult and time-consuming task. Traditional cleaning methods like high-pressure water, chemicals or online ball systems are virtually ineffective at removing hardened scale, and can, in many cases, make things worse. The CONCO Calbuster was designed and engineered to fracture the eggshell-like surface of calcium carbonate. Once the calcium has been fractured, CONCO C3S or C4S tube cleaners with TruFit™ technology are used to shoot out the calcium leaving a polished, like-new tube surface.

CONCO Calbusters are available for use in tube sizes ranging from 3/4” to 1-1/4” and require an on-site inspection to determine critical sizing information.

How do Calbusters Work?

Features
- Hard plastic body, with two stages, each containing four cutting wheels.
- Custom sized and set for tube I.D., as well as for scale deposit thickness.
- Safe, water-powered cleaner with speeds dependant on scale thickness.
- Color-coded end caps quickly identify Calbuster sizing.
- Environmentally friendly design allows for replacement of cutting wheels and reuse.

More than 9 tons of calcium scale were removed with CONCO Calusters from this Midwestern power plant.
Plastic U-Tube Cleaner

Thanks to its unique design, the **CONCO** Plastic U-Tube Cleaner can navigate very tight u-tube radiuses previously unreachable by conventional cleaners. By cleaning all the way through the bend, more accurate eddy current testing results can now be achieved. The Plastic U-Tube Cleaner is available for tube sizes 5/8” to 1-1/4” O.D. in all BWG’s.

**Features**
- Hard, plastic body, capable of navigating tight radiuses.
- Safe, water-powered cleaner travels at 10-20 feet per second.
- Color-coded end caps quickly identify Plastic U-Tube Cleaner sizing.
- Can be shot up to 2 times each.
Excaliber Rotary Tube Cleaning System

**ProSeries™ Excaliber Flex Shaft Tube Cleaning System**

Built ProSeries™ tough, the Excaliber incorporates a water flushing and rotary cleaning action for removing tough deposits in condensers and heat exchangers with diameters 3/8” to 1-1/2”. The Excaliber is a great tool for cleaning balance-of-plant heat exchangers with heavy wall deposits or where limited access prevents conventional tube shooting.

At the heart of the system is a robust 5.25 HP motor that drives a flexible shaft at speeds up to 2500 RPM powering off deposits and flushing tubes clean in a single, efficient operation.

**Portable Design - Single Person Operation**

**Technical Specifications**

- **Output Power:** 5.25 HP
- **Flexible Shaft Speed:** Variable 300 RPM - 2500 RPM
- **Torque:**
  - 185.00 lb.in. @ 300 RPM
  - 132.00 lb.in. @ 2500 RPM
- **Air Supply:**
  - 60 PSI - 100 PSI @ 85 CFM - 175 CFM
- **Water Supply:**
  - 30 PSI - 75 PSI at 3 GPM - 8 GPM (minimum)

**Features & Benefits**

- Pneumatically driven, no electrical requirement.
- Variable speed, high torque.
- Flexible shaft, up to 60’ length.
- Hose available in 25’ and 50’ lengths.
- Stainless steel construction.
- Includes tool box with accessories.
  - 2 air hoses
  - Foot Pedal
  - Quick connect water hookup socket
- Single-pass operation reduces cost compared to other methods requiring multiple passes.
- Polishes tube I.D. to as-new condition.

**Excaliber works great on:**

- Lube Oil Coolers
- Excitor Coolers
- Hydrogen Coolers
- Seal Oil Coolers
- Stator Coolers

The Excaliber is a highly versatile tube cleaning system for all of your balance-of-plant heat exchangers.
ProSeries™ Excaliber Accessories

Configure Excaliber to Tackle Almost Any Job

With a wide range of bits for tough deposits and brushes for biofouling and soft deposits, the Excaliber is an extremely versatile tube cleaning system. Brushes are available in nylon, brass and stainless steel and are capable of removing biofouling and soft deposits while polishing the tube surface with ProSeries™ efficiency.

ProSeries™ bits feature integrated water injection ports that flush deposits away while the bit effortlessly powers off tube fouling.

Twist Bits are for completely blocked tubes. Twist bits are designed to have optimum flushing volume for deposit removal.

Red Witch Bits are for removal of thin or thick wall scale. Red Witch Bits are preferred for copper base tubes because of the excellent water barrier maintained between the bit and the tube.

Klaw Bits are for tubes larger than one inch inside diameter. Klaw Bits offer excellent flushing action for larger tubes that have thick wall scale or are completely blocked.

Flexible shafts and casings

ProSeries™ flex shafts are available in sizes to suit tube dimensions from 1/4” to 1-1/4” in size and come in three casing material options; nylon, Teflon®, steel and rubber.
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*For metric tube sizes, calculate the equivalent diameter in inches and use the nearest size cleaner.

To convert metric to inches: multiply millimeters x 0.03937.

For example: 20 mm = 20 x 0.03937 = 0.7874" inside diameter. This tube size takes a Conco cleaner Type C3S for 7/8" O.D. x 19 BWG tube.
**Standard Tube Size Reference Guide**

**Tube Sizes in Inches and Millimeters.**

**Find Your TruFit™ with Conco**

Conco cleaners featuring TruFit™ technology come in a variety of popular sizes to match almost any condenser and heat exchanger tubes. Got a unique tube size? Use the handy guides below to determine your tube data and call us for recommendations on the best tube cleaner for your site specific application. Tube sizes are listed in inch and millimeter sizing for your convenience.

<table>
<thead>
<tr>
<th>O.D. of Tube mm.</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
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<th>22</th>
<th>23</th>
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<td>0.109</td>
<td>0.095</td>
<td>0.083</td>
<td>0.072</td>
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<td>0.058</td>
<td>0.049</td>
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<td>0.620</td>
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<td>0.694</td>
<td>0.700</td>
<td>0.706</td>
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<tr>
<td>22.23 7/8</td>
<td>0.657</td>
<td>0.685</td>
<td>0.709</td>
<td>0.731</td>
<td>0.745</td>
<td>0.759</td>
<td>0.777</td>
<td>0.791</td>
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**Inches**

**Tube Gage in BWG / Tube Thickness in Inches**

- **12**: 2.77
- **13**: 2.41
- **14**: 2.11
- **15**: 1.83
- **16**: 1.65
- **17**: 1.47
- **18**: 1.24
- **19**: 1.07
- **20**: 0.89
- **21**: 0.81
- **22**: 0.71
- **23**: 0.64
- **24**: 0.56
- **25**: 0.51

**My Tube Data:**

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<tr>
<th>Description</th>
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