



Shell and Tube Heat Exchanger Tools & Equipment

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Agenda

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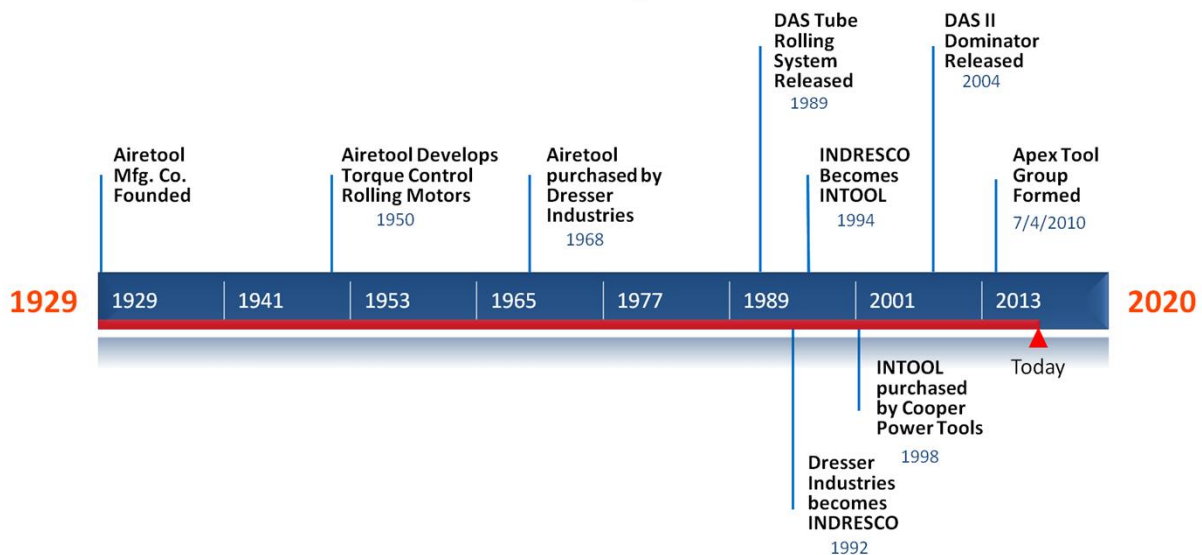
- Introduction
- Markets & Industries
- Shell & Tube Components
- Product Categories
- Tube Installation Tools
- Tube Removal Tools
- Tube Cleaning Tools

Topics to be covered in presentation

Introduction



- Founded in Springfield, Ohio
- Manufactured in Dayton Ohio since 2009
- One of the most diverse families of Tube Service Tools in the heat transfer industry



Airetool historical timeline including some key product introduction dates.

Introduction

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Airetool Tube Service Tools

- Quality & Durability you Demand
- Lower Total Cost of Ownership
- Higher Productivity!

Airetool delivers standard & customized solutions throughout the global tube service industry.



A global brand known for quality and durability.

Providing engineered solutions for custom applications throughout the world.

Markets & Industries

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- **Primary Market – OEM Fabrication Shops**
 - Dominant Industries - Petro-Chem, Power Generation, HVAC, Nuclear
 - Other Industries – Marine, Foundries, Sewage Treatment Plants, Municipal
- **Secondary Market – Service of installed equipment**
 - OEM Repair Facilities, Large/Small Contractors, MRO



Oil Refineries: Tube stills, Furnaces, Transfer lines (furnace to tower), Reaction coils, Heat Exchangers, Vapor lines (tower to condenser box), Residuum lines, Re-boilers, Condensers
Power Plant Boilers & Steam Generators: Boilers, Air coolers, Condensers, Air pre-heaters (mounted in stack), Super heaters

Refrigeration Plants: Breweries, Ice plants – condensers & water coolers, Pharmaceutical

Natural Gas Plants: Primary coolers, Straight and bend lines

Air Conditioning: Condenser type coolers (can be found in large buildings & manufacturing facilities)

Chemical Plants: Tubular retorts, Alkali lines, Condensers, Boilers, Heat Exchangers

Marine: In vessels with steam power boiler (Boilers & oil condensers), In diesel engine propelled vessels (Water cooler similar to condensers)

Foundries: Cleaning billets of sand or scale, (X-63-A or other midget cleaning motor used on core holes in castings to remove scale & sand)

Steel Fabricators Manufacturing: Condensers, Heat Exchangers, Cooling towers, Air conditioning equipment (Linsen Expanders)

Cinder Block & Brick Yards: Cleaning boilers (regular)

Sewage Treatment Plants: Cleaning tubes of sludge to release methane gas

Pipe Cleaning Yards: Reclamation of oil well pipe including Pipe sizing tools

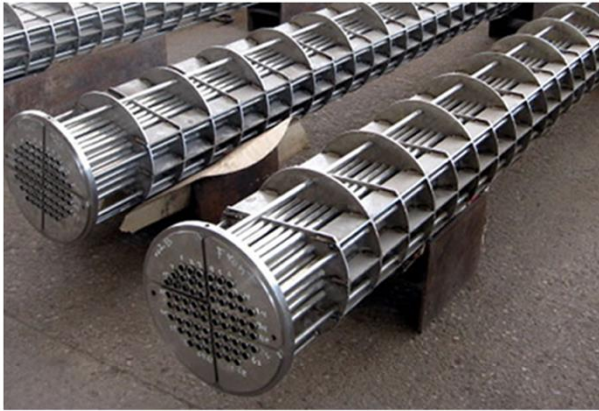
Mining: Coal Mining, Raw Materials

Nuclear Power Plants: Cooling Systems

Renewable Resources: Biomass, Geothermal, Hydroelectric, Solar Thermal, Solar Photovoltaic, Wind Power

Shell and Tube Components

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Finished Tube Bundles



U-Tube Heat Exchanger

Shell and Tube Heat Exchanger components. U-tube exchanger shown.

Tubes, Tube Sheets, Baffle Plates, Tie Rods and Spacers

Water Box (or headers), Shell, Tube Side Connections, Shell Side Connections, Mounting

Product Categories

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Tube Installation

- Tube Sheet Preparation
- Tube Rolling Products
- Tube Testing & Finishing

Tube Removal

- Tube Cutters
- Tube Pullers & Pumps
- Tube Pulling Accessories

Tube Cleaning

- Heat Exchangers & Condensers
- Chiller & Evaporator Cleaning Systems
- Boiler Tube Cleaners



The Airetool Tube Service Tools are comprised of three basic categories.

Tube Installation Tools

Tube Removal Tools

Tube Cleaning Tools

Tube Installation Tools

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Tube Sheet Preparation Tools

- Tube Serrating Tools (grooving)
- Tube Guides
- Tube Sheet Hole Brushes
- Hole Gauges
- Drills



Installation Tools used in fabrication of the tube sheet include:

Serrating (grooving) Tools (GT Series)

Tube Guides (BTG)

Tube Sheet Hole Brushes (TSHB)

Hole Gauges (HG)

Drills (Cleco 15 & 135 Series)

Tube Preparation Tools

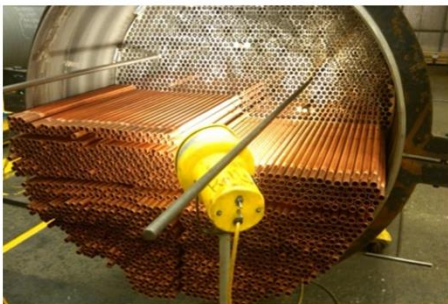
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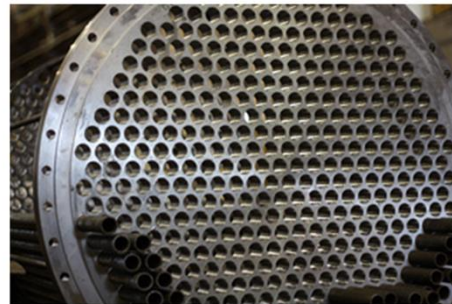
Tube Sheet Serrations



Tube Sheet Serrations



Tube Stuffing



Tube Sheet Holes

Serrating (grooving) Tools (GT) cut grooves in the walls of the tube sheet holes which increases the strength of the expanded joint between the tube and the tube sheet.

Available with/without carbide inserts. Tools with carbide inserts used with vertical machining center only!

1. Standard bit pattern. Specials upon request 2. Adjustable depth 3. Through spindle coolant delivery system

Tube Guides (BTG) are used to assist the operator in the “stuffing” of the tube bundle. Conical point helps guide the tube through tube and baffle sheets. Inserted into the end of the tube. Tube size specific.

Tube Sheet Hole Brushes (TSHB) are used to clean/polish the inside surface of the tube sheet holes prior to stuffing process to remove debris. Can be used with any standard drill.

Hole Gauges (HG) are used to measure the I.D. of the tube sheet hole and the I.D. of the tube before and after expanding.

Standard adjustable reach of 6” and 12”. Longer reaches available. Comes with test ring for scale verification

Tube Installation Tools

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Tube Rolling Products

- Tube Expanders
- Tube Rolling Motors (Hand Held)
- Tube Rolling Systems (DAS II Dominator)



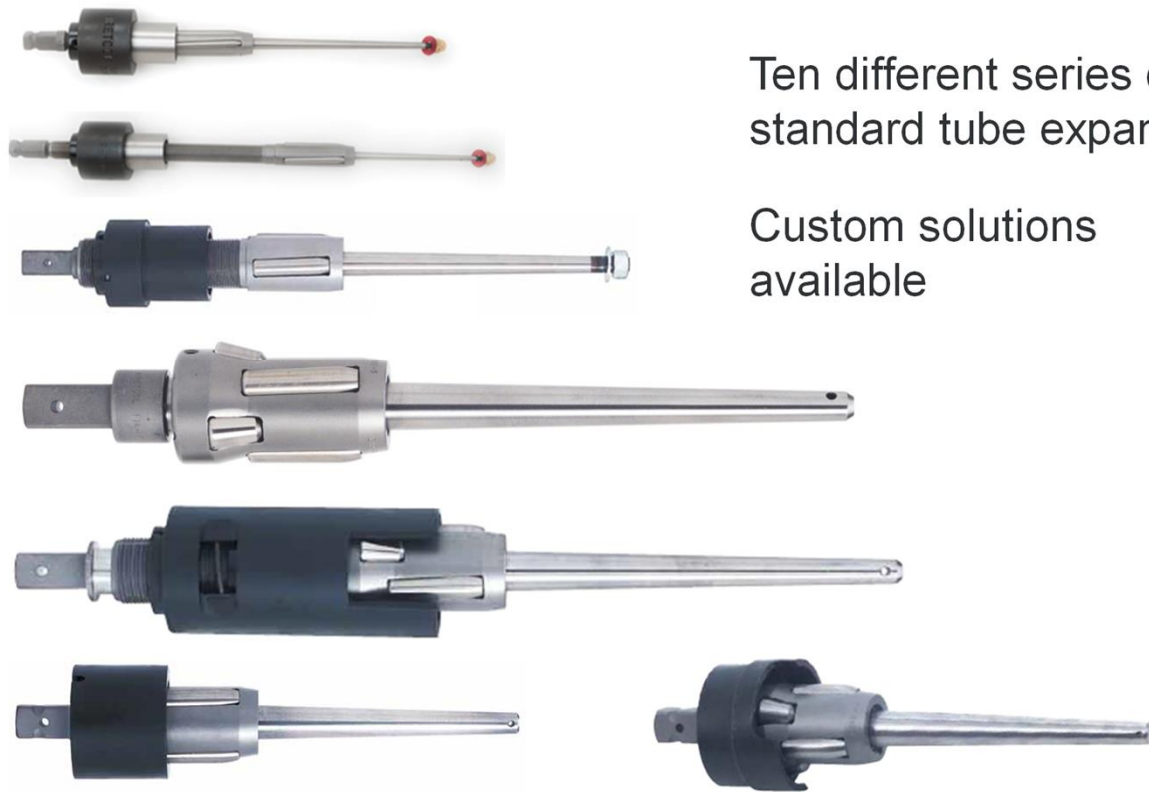
Tube Expanders in chillers, condensers, and boilers for tubes ranging from ¼" O.D. to 4-1/2" O.D.. Expanders come in standard reaches with custom designs available.

Hand-Held Rolling Motors (Airetrols) used in conjunction with expanders to expand tubes.

DAS II Dominator Tube Rolling System is an ergonomic solution for expanding tubes. DAS II roll motors come in multiple configurations that can include push-to-start, timed version, counter and on-board lubrication options.

Tube Expanders

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Ten different series of standard tube expanders

Custom solutions available

Heat Exchanger & Condenser Expanders from 1/4:" O.D. tubes to 4-1/2" O.D. tubes.

Short Reach, Long Reach, Custom Long Reach Solutions

Series: 900, 1300, 800-3, 800-5, 1200-3, 1200-5 1200 A-reach, 1200 C-reach, custom lengths

Boiler Expanders from 1" O.D. to 4-1/2" O.D.

Manual with flare, Thrust Assembly with flare, Straight, Fire Tube expanders (straight and flare)

Roll Motors – Hand-Held

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Hand-Held Rolling Motors from 2.0 inch-pounds to 570 foot-pounds

Torque Controlled rolling motors developed by Airetool were released circa 1950 in conjunction with stop-collar expanders. This made the tube expansion process repeatable and took the “touch & feel” out of tube rolling. Productivity went up in manufacturing shops. Reliability of heat exchangers and condensers in service increased considerably.

Series: 720, 850, 1050, 1550, 1750, 1850

DAS II Dominator & Roll Motors

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DAS II Dominator is a second generation (circa 2004) ergonomic solution for expanding tubes in a production environment. Previous version used air/electric supply whereas the DAS II Dominator uses only an air supply.

Tower comes in 4 versions; basic, standard, lube, and stationary basic (floor mount for tower and arm only)

DASII Roll Motors - The heart of these roll motors are the 850/1550 series hand-held motors. Tools come standard with push-to-start and have options for a counter and/or lubricator
 Timer version available that negates push-to-start but still has options for a counter and/or lubricator

Tube Installation Tools

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Tube Testing & Finishing Products

- Tube Testers, Joint Testers, and Tube Plugs
- Tube End-Facers & Drills
- Tube-end Beading, Belling, & Flaring Tools



Tube & Joint Testers (ATT and AJT) are used to verify the integrity of the seal created by the tube expansion process. Can also be used by a maintenance team to look for “leaky tubes”.

Tube End Facers (TEF) are used to finish the protruding tube end to a uniform length from the tube sheet.

Beading, Belling, and Flaring Tools are used to finish the tube end as indicated by design specification.

Tube Installation Tools

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Tube End-Facer in Action



Tube End-Facers “mill” the tube end to a preset dimension from the tube sheet. This is done so all tubes are uniform with the tube sheet.

TEF Series made for tube O.D.'s of 3/8" to 2-1/2" and are available with optional stainless steel cutting bits.

Tube Removal Tools

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Tube Cutters

- One Revolution Tube Cutters
- Push Type Tube Cutters
- Air Feed Assist Tube Cutter



One Revolution Tube Cutters (RCM) are used to cut the tube on the far side of the tube sheet prior to tube removal. It can also be used to puncture the tube prior to plugging in an emergency. This type of tube cutter creates a “pigtail” during cutting.

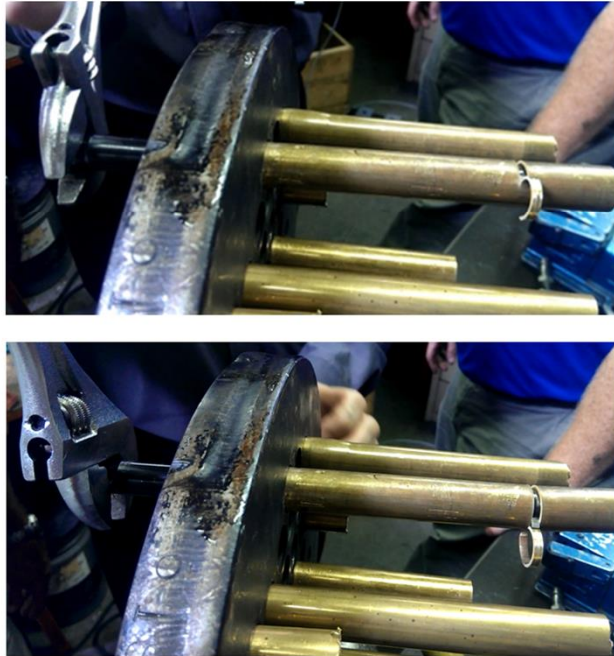
Push-Type Tube Cutters (PIC) are internal tube cutters that continuously “score” the tube internally until it cuts through the tube wall. Used with the TIC/EIC motors that have a “feed lever”.

The other option is to use the IC tube cutters with the **Cutter Feed Assist Drill (CF)** which have a pneumatic cylinder that provides the “push” to keep the cutting bits engaged with the internal tube wall providing an ergonomic solution.

Tube Removal Tools

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One-Revolution Tube Cutter in Action



One Revolution Tube Cutters (RCM) are used in heat exchangers, condensers, and boilers to cut the tube beyond the tube sheet during tube removal process. Also used to “puncture” a leaky tube prior to plugging the tube ends.

Tube Removal Tools

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Tube Pullers & Pumps

- Gripper Type Tube Pullers
- Spear Type Tube Pullers
- Manual Jack Screw Puller
- Hydraulic Pumps



Two types of tube pullers are available, a “gripper type” and a “spear type”. The gripper type (**ATP III and HDQ III**) “grabs” the inside of the tube before the ram actuates. The spear type (**HDP III and RAV III**) are threaded into the tube end and engaged by the ram before the ram gets actuated. Rams have either limited or continuous stroke capability depending on series and size of the tube.

Two hydraulic pump configurations are available. One is driven from a pneumatic source (**PATP III**), the other from an electrical source (**ATP III**). Either pump can drive the different tube puller “Rams” using on-board trigger or auxiliary pendant control.

The **Jack Screw Puller (JSP)** is a manual tool used to pull tube stubs from the tube sheet after they have been cut on the other side of the tube sheet in a re-tubing operation.

Tube Removal Tools

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Tube
Pulling
Accessories

- Chipping Hammers
- Drills
- Tube Wall Reducing Tools
- Tube Collapsing Tools
- Tube Drifts



Chipping Hammer (Cleco CH-30 Series) is a heavy duty chipping hammer with forged steel hammer for rugged use in repair and re-manufacturing of heat exchanger vessels.

Tube Wall Reducing Tools (TWRT) are used to reduce the thickness of the wall of an installed tube in order to make the removal of the tube easier. Used with HD Drill with a Morse-taper adapter.

Tube Collapsing Tools (CT) is used to “pry” the tube stub away from the tube sheet wall breaking the expanded seal and making it easier to drive out using a “Tube Drift”.

Tube Drift Tools (TD) are used to drive tube stubs out a tube sheet after it has been separated from the rest of the tube bundle.

Tube Cleaning Tools

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Heat
Exchangers
&
Condenser
Tube
Cleaners

- Light-Duty Hand-Held Cleaning Motors
- Heavy-Duty Geared Drive Cleaning motors
- Straight Shaft Components
- Drill Heads & Brushes



Condenser Cleaners for straight shaft applications up to 2.0" I.D. tubes. System is made of of a cleaning motor, shaft components, and drill heads and/or brushes that are size specific. Motors have attachments for a water source that will flush out the tube ahead of the drill or brush.

Lightweight Cleaners (CC-400 Series) up to 1-1/2" I.D. tubes

Heavy Duty Cleaners (CC 300 Series) up to 2" I.D. tubes

Shaft Components come in standard lengths of 5 and 10 foot to adapt the motor to the drill and/or brush. Special shaft lengths are available.

Drill Head styles for different deposits compositions.

Need to know what the I.D. of the tube is, length of the tube, clearance in front of the tube sheet, and what type of deposit is in the tube.

Tube Cleaning Tools

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Condenser Cleaning

Condenser Cleaning – one tube at a time

Tube Cleaning Tools

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Condenser,
Chiller, and
Evaporator
Tube
Cleaning
Systems

- Variable Solid State Speed Control & Fixed Speed Units
- Single & Bi-Directional Models
- Accessories: Flexible Shafts & Brushes



ABM Series of “solid state” tube cleaning systems are used to clean condensers, chillers, and evaporators using flexible shafts and brushes.

Units provide variable speed with constant torque output.

Single and bi-directional models available.

Flexible shafts come in “screw on” or “quick release” configuration.

Tube Cleaning Tools

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Condenser Cleaning

Condenser cleaning showing wire brush on flexible shaft being inserted into tube.

Tube Cleaning Tools

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Boiler Tube Cleaners

- For Straight & Curved Tubes
- Seven Different Style Cleaning Heads
- Universal Joints & Flexible Drive Shafts
- Accessories: Foot Valve and Air Hoses



Boiler Tube Cleaners consist of a large assortment of motors and heads configured to clean straight and curved pipes/tubes. For Tube I.D. ½" to 13-1/4".

Different heads are selected based on tube size, the type of deposit on the tube walls, and the thickness of that deposit. Universal Joints and extensions can be used in larger tube I.D. applications.

Special air supply hose is made with a layer of "wire braid" and a "left-hand wire wound" outside hose protector adding strength and durability.

Tube Cleaning Tools

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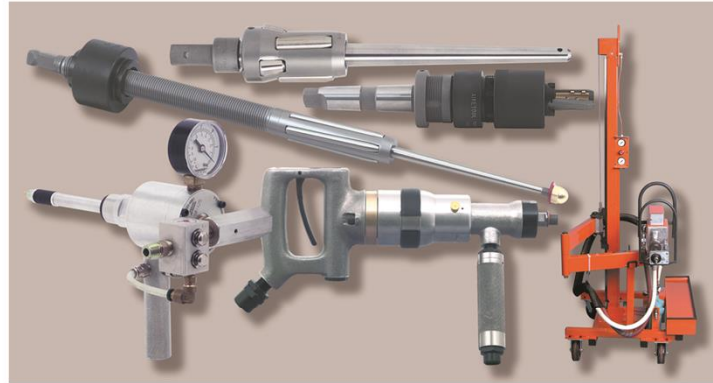


Aluminum Smelting – Pot Room Syphon Tube Cleaning

The syphon tube on a aluminum crucible has to be cleaned regularly. The system consists of a control station located 20-30 feet away from the machine that swings out from the wall and feeds the motor, head, and hose up into the tube.

Airetool Tube Service Tools

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- History
- Quality
- Durability
- Engineered Solutions

An 85 year history

Quality products – An industry benchmark for many years

Durability is driven by design

Engineered solutions for custom applications

Apex Tool Group



Apex Tool Group has a strong, worldwide brand portfolio ~30 brands
Founded July 4, 2010
Two Divisions – Hand Tools & Power Tools
8,000+ Employees in Over 30 Countries



Thank You!

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