

RKTT DUAL MEDIUM RAKE BLOWER DESCRIPTION

The RKTT dual medium cleaner is a specifically designed multi-function rake blower for Air Preheater duty. A multi purpose nozzle design allows for three modes of operation namely (1) Steam/Air (2) Low-Pressure Water (3) High Pressure Water. The normal mode of operation is using High Pressure Steam. Low and High Pressure Waters are used when operationally required.

The RKTT dual medium blower consists of a fabricated housing weldment and a traveling carriage assembly that inserts and retracts a dual medium lance tube assembly. The canopy front plate welded to the heater end of the cleaner has mounting connections to adapt the sleeve on the air heater to the RKTT. Another plate is welded to the back end of the housing that holds the poppet valve to the back plate. The poppet valve is mechanically actuated via a cam and linkage arrangement. Switching travel for this poppet valve operation is 2" of travel.

The steam and low pressure water blowing medium is fed to the lance tube via the poppet valve and the fixed feed tube. The poppet valve is opened shortly after the carriage has left the rest position and the blowing process then starts. The sootblower carriage continues pushing the blowing rake to the end of travel while stepping appropriately (about every 4 inches). At the end of travel the carriage changes its direction and retracts the blowing rake to its rest. The poppet valve is closed shortly before the carriage comes back to its rest position, where the motor is switched off, and the blowing cycle is completed.

The blowing element stepping process allows the nozzles to blow a complete revolution of the basket for each step, thus covering the total basket. For example, an

air preheater basket with a 9' effective radius would be cleaned with an element designed with three sets of nozzles spaced evenly at three feet. The RKTT in this example would have a travel of three feet. As the element travels into the air preheater it would stop every four inches and clean for one full revolution. This four inch step matches the cleaning area for each nozzle, therefore, this action would clean the basket totally in nine steps (travel of 36"/4" steps). If the basket has a rotation of 1 rpm then the total cleaning cycle would be 9 minutes plus the time it takes to extract the element back to the rest position, usually less than 30 seconds.

Steam or air is used for this on line cleaning. Low pressure water could also be delivered through the element nozzles for basket washing.

The RKTT is different to the RKT in that it has the ability to supply a third cleaning medium, high pressure water. The RKTT is used in more sever cleaning applications such as those found following and SCR or SNCR installation where this high pressure water is required to remove sticky deposits. In addition to removing these sticky deposits the RKTT cleaner can be used to eliminate or minimize the need for off line water washing.

Typical Application Data		
Cleaning Medium	Range	Consumption
Steam	100-160 psig	2500 lb/hr
Air	100-160 psig	800 scfm
Low Pressure Water	80-120 psig	178 gpm
High Pressure Water	1500-3000 psig	36 gpm

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The method of delivering this water to the lance an element nozzle assembly is via a flexible hose assembly. The connection for this hose is on the left-hand side of the sootblower housing. This hose can be disconnected and removed when not be used. The hose connects to the high pressure water delivery pipe, which is housed in the lance housing tube. This pipe runs parallel to the steam lance with small water nozzles positioned beside the steam/air nozzles. When high pressure water is delivered to the nozzles it does not in any way inhibit the standard cleaning system. In fact the high pressure water and standard cleaning can be performed at the same time if required.

Simplified Principle of Operation (Ignoring Stepping) – Steam / Low Pressure Water

- When the motor receives the start signal from the control system the carriage begins to travel into (towards) the heater (while stepping appropriately).
- Upon 2” of travel the carriage actuates a cam that opens the poppet valve and allows steam or low-pressure water to clean the air heater via the nozzles in the rake assembly.
- The main carriage continues on until the fully inserted switch is engaged, which reverses the motor and the main carriage retracts to the fully reversed position.
- Just before the carriage reaches the fully rest position the poppet valve actuation cam will be closed and the steam/low pressure water will be shut-off.

Simplified Principle of Operation (Ignoring Stepping) – High Pressure Water

- When the motor receives the start signal from the control system the carriage begins to travel into (towards) the heater (while stepping appropriately).
- The main carriage continues on until the fully inserted switch is engaged, which reverses the motor and the main carriage then retracts to the fully reversed position. At the same time an automated valve (supplied by others) will be opened to allow the high-pressure water into the hose assembly and then on into the lance assembly thereby cleaning the air heater.
- When the carriage reaches the fully reversed limit switch the motor and the high-pressure water will be shut off.

Major Components

The housing is a heavy-duty formed steel canopy that provides rigid support and protection for the blower components. The design of the RKTT Sootblower intentionally gives easy access to all parts that require regular maintenance or repair work. Square rails and angles with bolt-on style racks are attached to both sides of the canopy to provide support to the blower carriage, and maintain good pinion clearance. A removable top cover at the rest position allows replacement of the gearbox or motor through the top of the canopy while leaving the spindle housing, lance and feed tube, as well as the poppet valve, in place.

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The blower carriage consists of two separate components: the lower spindle housing and the upper gearbox/motor. Thus, excessive heat transfer from the hot spindle housing to the blower gearbox is avoided and leakage of lubricants is minimized. The electric motor is mounted directly to the gearbox. The gearbox has two output drive shafts. The gearbox is provided with side rollers that guide the blower carriage on the rails. A roller and pinion are mounted to the two output drive shafts resulting in a dual rack drive, one on each side of the gearbox.

The lance tube of the RKTT Sootblower is designed to meet the specific requirements of each application. The standard lance is a combination of a 3" and 1" OD tube that is encompassed by a 5" OD tube with a full penetration butt-welded flange for a safe connection to the spindle. The main portion of the lance that penetrates the wallbox and sleeve of the air heater is a 5" OD tube. The 5" lance uses the 3" OD internal lance for the steam and low-pressure water and the 1" OD tube for the high-pressure water.

The fixed feed tube ensures proper packing sealing while the lance tube is inserting or retracting. The feed tube is connected to the poppet valve via an easily removable split ring and a clamp plate and rest inside the 3" OD internal lance section of the lance assembly. The standard feed tube is 304 stainless steel, 2 3/8" O.D.

The steam/low pressure water is fed to the feed and lance tube through a poppet valve, which has a standard ANSI 600# R.F. flange. The flange on the poppet valve is connected to the blowing medium supply piping. The valve stem is sealed off by means of a pure graphite valve stem packing. A matching set of cone, stem, seat and packing is available for replacement and readily assembled for installation.

When the blower carriage starts inserting, the poppet valve is opened via the valve latch and arm assembly, and closed again on the way back. The opening forces are well centered due to the dual linkage support system. The switching travel is adjustable to suit the actual requirements by relocating the trip pin in the trip bar. The valve control location is easily accessible for adjustments and maintenance work.

The high-pressure water line is fed into the lance via a hose assembly mounted to the side of the sootblower. The field connection for this is a flange mounted to the left side of the sootblower canopy approximately mid-travel. When high-pressure water is desired a signal from the PLC will open a valve (by others) to allow water into the hose assembly. This will be done upon the signal to reverse the motor and carriage to the retract position. The high-pressure water will be stopped upon completion of the sootblower retraction.

Depending on the furnace pressure conditions, two types of wallboxes are available:

- a. A negative pressure wallbox is supplied for furnaces with a reliable negative gas pressure condition. A spring loaded floating plate seals the boiler opening sufficiently and still provides proper lance tube clearance.
- b. For positive flue gas conditions a positive pressure wallbox with sealing air connection is recommended to avoid gas leaks from the sootblower wall openings. This wallbox does have a connection for seal air.

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The front plate of the sootblower has two arms extending away from the sootblower. These arms have a hole in them that line up with the two arms that are on the sootblower wallbox. The arms on the front plate and the arms on the wallbox are aligned and connected with a pin that is inserted through the holes. The pin is then kept in place with washers and cotter pins. The wallbox is supplied with the sootblower and welded to the wall sleeve. The rear of the sootblower has a slotted plate that is used to support the back of the sootblower. A pin is inserted through two hanger rods and the slotted plates to support the rear of the sootblower. The sootblower must be level when the air heater is in the hot condition.

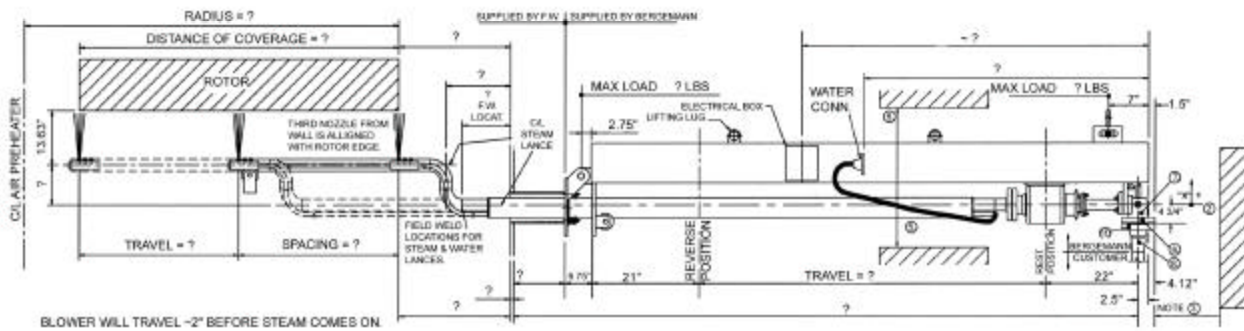
The RKTT Sootblowers travel is constrained by two limit switches, one at the rest and one at the reverse position. These limit switches, activated by a trip lever located on the spindle housing, are adjustable.

The electric motor power for the blower carriage drive is supplied through a four wire S.O. cable that is guided by the E-chain trailing device.

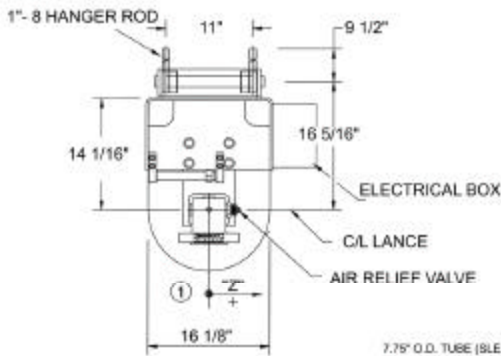
The limit switches and motor power supply can be accessed in an electrical box that is mounted to the side of the sootblower housing.

RKT DUAL MEDIUM RAKE BLOWER SPECIFICATIONS

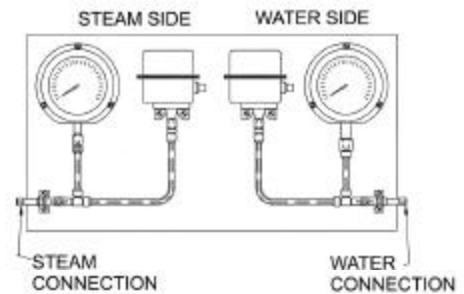
Housing	-	1/4" Thick Cold Rolled Steel
Motor	-	1.5 H.P. (230/460V, 3 phase, 60 Hz, 1800 RPM), TEFC
Lance	-	5" O.D. Main Lance - Carbon or T11 as Standard 3" O.D. Steam/Low PSI Water Lance – Material to Match 1" Tube High PSI Water Lance – Stainless Steel
Feed Tube	-	Type 304 Stainless Steel
Valve		
Body	-	Carbon Steel, ASTM A216 Grade WCB or Alloy, ASTM A217 Grade WC6
Plug	-	Type 440 Stainless Steel
Seat	-	Type 416 Stainless Steel
Limit Switches	-	Heavy Duty, NEMA 4 – Other Options Available
Electrical Box	-	NEMA 4 Standard – Other Options Available
Components	-	Terminal Strips and Insert/Retract Pushbuttons
Options Include	-	Integrally Mounted Motor Starter Cabinets
Wiring – Box		
Conductor	-	16 AWG for Power 16 or 18 AWG for Control
Insulation	-	(THHN) or (MTW) 90°C Rated
Sheath	-	Stranded Copper
Wiring – Cable		
Cable Sheath	-	Stranded Copper
Wiring	-	3 & 5 Conductor NEC type MC, 14 AWG Stranded (Class B) annealed copper, 90°C, 600V, Flame-Retardant.
Lubrication	-	Gearbox – CBI Oil Rack – CBI Spray
Coating	-	Galvanized as Standard Primer Base with Acrylic or Enamel Paint as Option Color: Standard Blue (Any Color Available as Option)



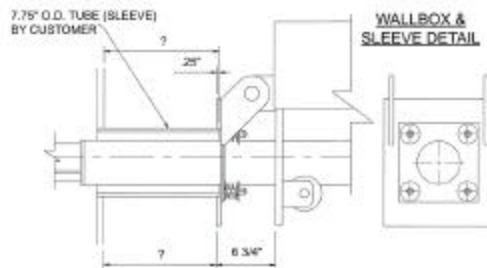
REAR VIEW



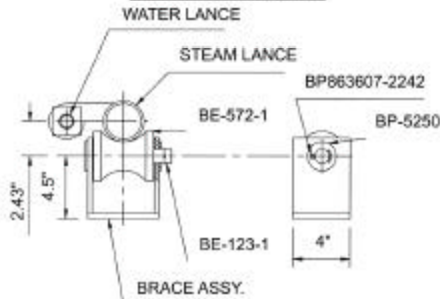
SWITCH & GAUGE PANEL ASSY.



SWITCH & GAUGE PANEL TO BE REMOTELY MOUNTED BY OTHERS AS REQUIRED

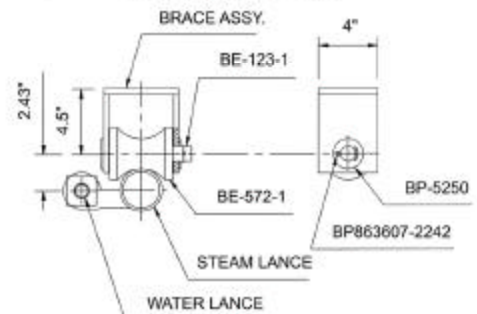


SECTION 'A-A' UPWARD SPRAY



BRACE ASSY., ROLLER, SHAFT, ETC. WILL BE SUPPLIED BY CBI. BRACING AND SUPPORTS TO THESE ARE THE RESPONSIBILITY OF OTHER.

SECTION 'A-A' DOWNWARD SPRAY



BRACE ASSY., ROLLER, SHAFT, ETC. WILL BE SUPPLIED BY CBI. BRACING AND SUPPORTS TO THESE ARE THE RESPONSIBILITY OF OTHER.

RKTT RETRACTABLE SOOTBLOWER WITH NEGATIVE PRESSURE WALLBOX