

# RKT STYLE AIR HEATER CLEANER DESCRIPTION

The RKT Sootblower is a rake type sootblower designed for the cleaning of finned heating surfaces, economizers, tubular or rotating basket type air heaters. The Rake Sootblower uses most efficiently the potential energy in the blowing medium (steam or air) and transforms it almost completely into kinetic energy by means of venturii nozzles. The result is the best cleaning effect possible.

The blowing element of the rake sootblower consists of a central tube and one or several cross tubes equipped with venturii nozzles. In the case of the rotary basket rake blower the rake tube runs parallel with the lance tube. The blowing jets leaving the nozzles are directed parallel to the tubes and, therefore, provide the optimum cleaning of the narrow tube lanes and gaps between the individual fins. The axially arranged blowing rake is moveable in the flue gas pass and remains in there during wait time between cycles. The rear end of the central tube is connected to a lance tube that is inserted into the flue gas pass, and then returned to its initial position by means of the gear-motor driven carriage.

The 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. The blowing process starts. The sootblower carriage continues pushing the blowing rake into the flue gas pass until the front-end position is reached. At this point, the carriage changes its direction and retracts the blowing rake to its initial position. The poppet valve is closed shortly before the carriage comes back to its initial position, where the motor is switched off, and the blowing cycle is completed.

The cleaning effect of the Sootblower depends generally on the following:

- a. The number of cross tubes as determined by the size of the tube bank and the traveling distance.
- b. The distance of the venturii as determined by the pitch of the piping of the heating surface bank.
- c. Size of the venturii as determined by the inside diameters of the venturii.
- d. Pressure of the blowing medium in front of the venturii.
- e. Distance between the location of the venturii and the heating surface.
- f. Type of contamination (slagging or faulting conditions, etc.)

The blowing pressure of the RKT sootblower has to be carefully monitored to prevent insufficient cleaning (blowing pressure probably too low!) and to avoid excessive erosions on boiler tubes (blowing pressure probably too high!). With steam being used, it is very important to properly design and operate the steam supply to avoid condensate blowing that could cause severe damage to boiler and sootblower.

It is important that all safety precautions be strictly enforced, as advised later in this manual, to avoid injuries and damages. The steam supply and the electrical supply must be shut down before any maintenance or repair work can be performed on the sootblower's components.

The canopy is a heavy-duty formed ¼" carbon steel or galvanized steel structure providing rigid support and protection for the blower components. The internal design of the RKT sootblower gives easy access to all parts that

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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 to maintain good pinion clearance. A removable top cover at the rest position allows replacement of the gear-motor through the top of the canopy while leaving the lance hub housing, lance and feed tube, as well as the poppet valve in place.

The blower carriage consists of three separate components: the housing with lance hub, the gearbox that drives the carriage and the electric motor. Because the gearbox and motor are separate components, excessive heat transfer from the hot lance hub to the blower gears is avoided and lubrication leakage is minimized.

The electric motor is directly mounted to the fully enclosed spur and worm gear sets. This spur and worm gearbox has two output drive shafts one for emergency retract and the other is for lance rotation and therefore not used on this style sootblower. The worm gear set in the gearbox drives a set of pinions, which traverse the carriage along the length of the canopy by way of gear racks mounted on angle iron in the canopy. The carriage assembly is guided in the canopy by rollers that ride between the roller rails and the gear rack angle iron.

The RKT lance tube is designed to meet the specific requirements of each application. The standard lance material is a 3 1/2" O.D. with full penetration butt-welded collar for a safe connection to the lance hub. The center tube of the rake is welded to the front end of the lance tube (at site).

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. The standard feed tube is 304 stainless steel, 2 3/8" O.D. All feed tubes are ground finished to ensure a long packing life.

The blowing medium is fed to the feed and lance tube through a valve, which has a standard ANSI 600 R.F. flange connected to the blowing medium piping. The valve seat is threaded for easy replacement without the necessity of machining the poppet valve. The valve stem is sealed off by means of the pure graphite valve stem packing. A matching set of cone, stem, seat and packing is available for replacement and ready assembled for installation.

When the blower carriage starts inserting, the poppet valve is opened via the cam 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 by relocating the trip pin in the trip bar. The valve control location is easily accessible for adjustments and maintenance work.

The poppet valve pressure adjustment is independent from the cleaning medium supply source opening action. This is accomplished by using a pressure disc assembly downstream from the poppet valve action. The pressure disc adjustment meters the cleaning medium flow to the feed tube without changing the opening. The poppet valve casting has two threaded openings, one positioned on each side. One of these opening is to supply a purge steam / scavenging air lines for pressurized applications. The second is to mount a pressure gage for monitoring operating pressures.

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

- a. A negative pressure wallbox is supplied for furnaces with reliable negative gas pressure condition. The 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. For temporary removal of the lance tube, high pressure aspirating air can be applied to seal off the openings.

The front plate of the RKT Sootblower is connected to the boiler wall via the pivoting front suspension. The pivoting front suspension consists of the front plate pivot brackets, the wallbox and the wall sleeve. The rear suspension of the sootblower is hung from boiler structural steel by adjustable hangers.

This suspension allows the blower to follow the horizontal and vertical expansion of the boiler.

The RKT Sootblowers traversing is constrained by two limit switches, one at the rest and one at the reverse position. These limit switches, activated by an adjustable trip pins located on the lance hub housing.

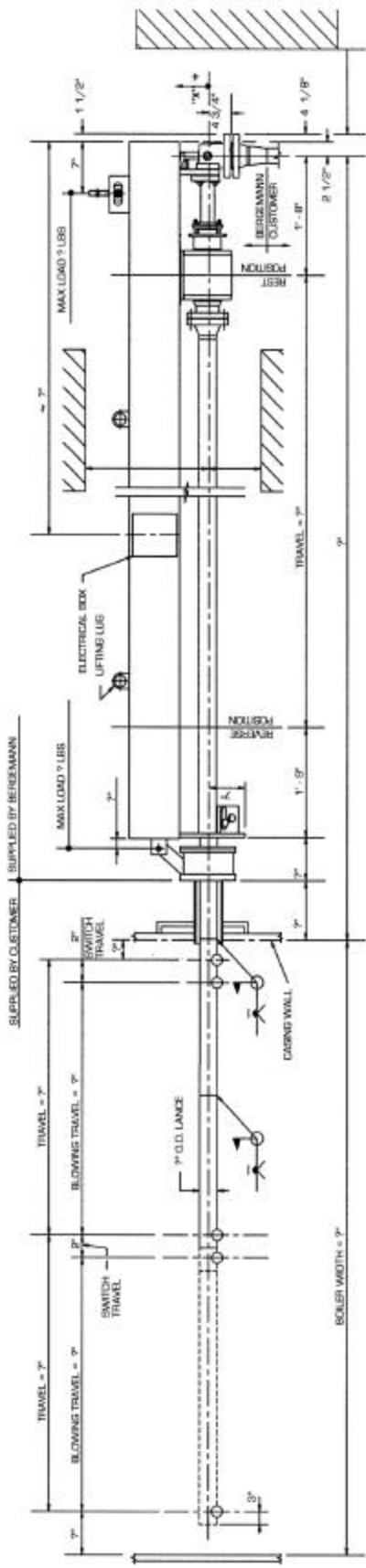
The electric motor power for the blower carriage drive is supplied through a four wire S.O. cable that is guided by the E-chain trailing device.

The limit switches and motor power supply can be accessed in a NEMA 4 terminal box for field connection. Generally, a push button is provided for manual control the sootblower during maintenance work.

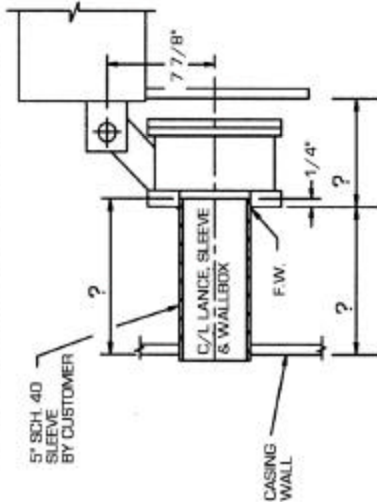
The motor starter, with overload protection, required for the operation of the RKT sootblower, can be individually mounted in a NEMA 4 starter box or in a common central starter cabinet as described in the separate electrical instructions

# RKT RAKE BLOWER SPECIFICATIONS

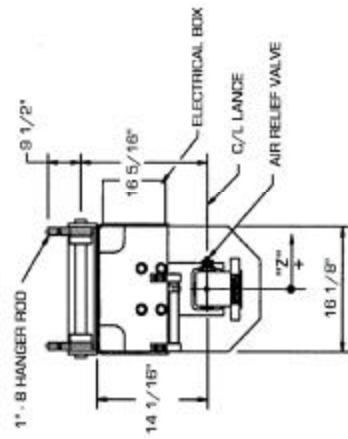
Housing	-	1/4" Thick Cold Rolled Steel
Motor	-	1.5 H.P. (230/460V, 3 phase, 60 Hz, 1800 RPM), TEFC
Lance	-	3.5" O.D. Main Lance - Carbon or Alloy as Standard 2 3/8" O.D. Crossarms – Material to Match
Feed Tube	-	Type 304 Stainless Steel
Valve		
Body	-	Carbon Steel, ASTM A216 Grade WCB or Alloy, ASTM 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)



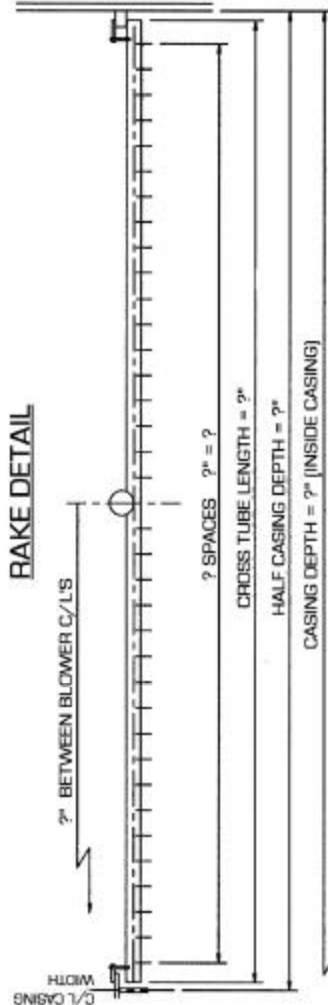
**WALLBOX & SLEEVE DETAIL**



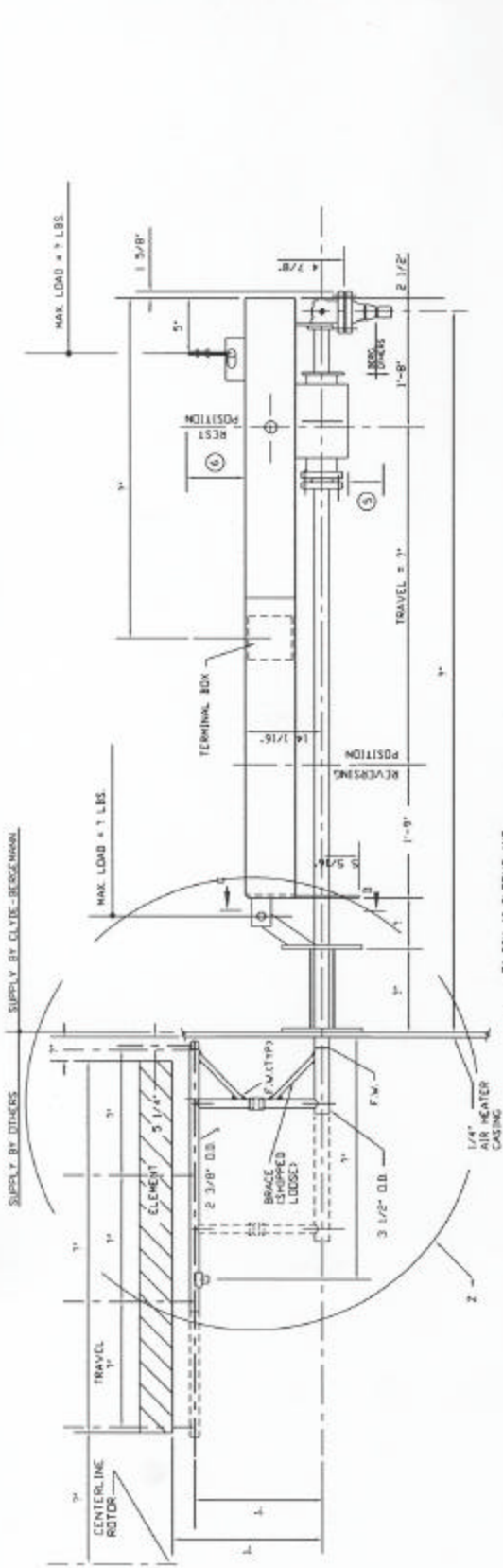
**REAR VIEW**



**RAKE DETAIL**

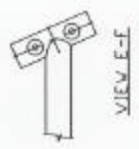
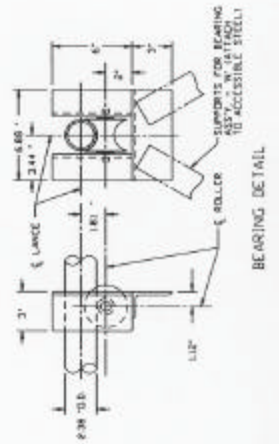
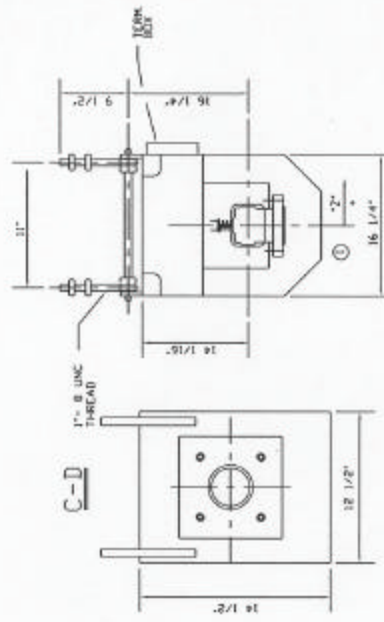
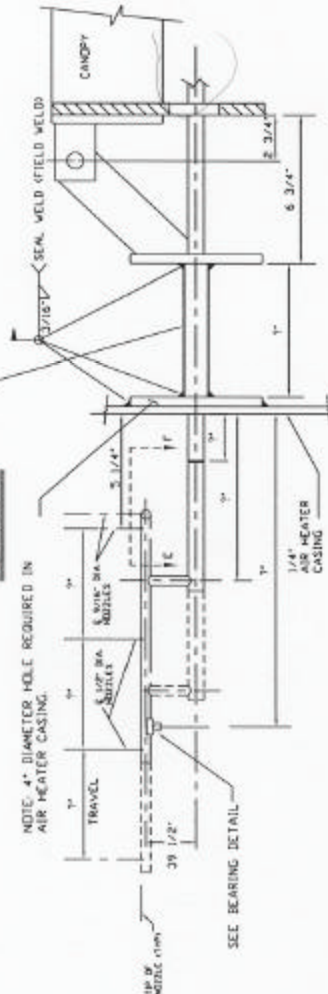


**RKT RETRACTABLE  
SOOTBLOWER WITH  
NEGATIVE PRESSURE  
WALLBOX IN TUBULAR  
AIR HEATER**



5" SCH 40 SLEEVE AND  
 15"x 15"x 3/8" THK  
 END PLATE, SUPPLIED BY RKT. SUPPORTS AND  
 ALL STEEL WORK SUPPLIED BY OTHERS.

**DETAIL Z**



**RKT RETRACTABLE  
 SOOTBLOWER WITH  
 NEGATIVE PRESSURE  
 WALLBOX IN LUNGSTROM  
 STYLE AIR HEATER**