A1.1 Principle and Design

(Reference: Section H1 (Illustrations)- VS Blower Component Identification drawing.)

The VS Short Retracting Blower is a soot blower used for cleaning slag from furnace walls. The basic element is a nozzle head normally equipped with a single venturi nozzle head.

When the blower is started, from the idle position, the nozzle head advances into its blowing position behind the internal tube wall. At this point the blower valve opens and the nozzle rotates according to the required blowing arch. After completion of the blowing arc, the feed of blowing medium is shut off and the nozzle head retracts to its original position in the wall sleeve.

Straight-line and rotating movements are initiated by the screw tube which is attached to the nozzle head. A single, high-efficiency gearmotor drive assembly provides power for all motion of the unit.

A2.1 BLOWER FRAME

(Reference: Section H1 (Illustrations) – VS Blower Component Identification drawing.)

The blower frame is compact, but sturdy. The frame is constructed from structural steel angle and heavy steel plate. The welded frame ensures rigidity of the entire unit. The valve plate is bolted into position for ease of maintenance.

Top, side, and poppet valve covers protect workers from the blower's moving parts during operation. These covers are easily removable for maintenance.

A2.2 BLOWER DRIVE AND CONTROL SYSTEM

(Reference: Section H1 (Illustrations) – VS Blower Component Identification drawing.)

The VS blower is driven by an AC gearmotor assembly. This gearmotor drives the hub sprocket by means of a heavy duty chain.

The rotational motion of the hub sprocket assy. is transmitted to the screw tube by means of a bronze threaded screw nut. A guide rod, located inside the blower frame, ensures proper alignment of the blower internals and forces axial movement (straight-forward movement without blowing) of the screw tube. In the blowing position the guide rod and screw tube are no longer engaged (the axial movement stops). At this point, the screw tube has screwed itself fully into the bronze nut and is set into rotation by the sprocket.

The two limit switches are mounted to and wired to the terminal box ready for operation in the workshop. They control the screw tube's forward and rearward movements as well as the blowing revolutions.

As required one or several blowing revolutions can be performed.

A2.3 SCREW TUBE, FEED TUBE AND VALVE ACTUATION

(Reference: Section H1 (Illustrations) – VS Blower Component Identification drawing.)

The screw tube moves forward and rearward along the fixed feed tube.

The nozzle head is attached to the front end of the screw tube. A stuffing box is located at the rear (poppet valve) end of the screw tube. The stuffing box contains packing which seals the annular space between the screw and the feed tube to prevent the blowing medium from escaping.

The front portion of the stainless steel feed tube remains inside the screw spindle and its rear end is attached to the valve plate.

Attached to the screw tube flange is the poppet cam. At full forward travel, the poppet cam engages a roller attached to the lever arm assy. The screw tube at this point may only rotate. The rotation of the screw tube in turn rotates the lever arm assy. which opens the poppet valve.

At the end of the blowing cycle, the poppet cam releases the valve lever permitting the valve to close. The motor direction is reversed and the screw tube is retracted from the boiler.

The poppet cam is designed for the specific blowing arc required at the installation. Should the blowing arc need to be changed, the cam can be replaced with little effort. Contact your Clyde Bergemann for further information.

A2.4 NOZZLE HEAD

(Reference: Section H1,(Illustrations) Project specific lance tube drawing.)

The VS blower's nozzle head is made of heat and scale resisting steel.

The project specific lance tube assy. is normally provided with a nozzle head containing one venturi nozzle. The jet produced blows at an incline to the wall heating surfaces. Between blowing cycles, the nozzle head is retracted into the wall sleeve.

A2.5 BLOWER VALVE

(Reference: Section H1, (Illustrations) BE-1151A-WC6-2 – Poppet Valve Assy.)

The blowing medium 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.

The blower valve is opened by the rotating action of the screw tube. The poppet cam on the screw tube flange engages a roller on the valve lever at the end of the forward travel. When the valve lever engages, this depresses the valve stem and thus opens the poppet valve.

At the end of the blowing cycle, the poppet cam releases the valve lever permitting the valve to close. The motor direction is reversed and the screw tube is retracted from the boiler.

The pressure from the supply line can be independently adjusted with respect to the valve opening via the pressure control disc. There are two threaded plug openings supplied as a standard for monitoring of the blowing pressure downstream of the seat and for connection of a vent valve and seal air.

A2.6 VENT VALVE

To prevent corrosive flue gases from penetrating the nozzle head, a vent valve is installed laterally at the blower valve's casing. It is opened between blowing cycles and permits scavenging air to pass through the components in which a blowing medium flows. As soon as the blower valve opens, the vent valve is closed by the pressure of the incoming blowing medium.

Under normal operating conditions, the pressure differential between the negative furnace pressure and the surrounding atmosphere provides a sufficient flow of scavenging air through the vent valve. Then this flows through the nozzle head at the nozzle.

At soot blower locations where the boiler pressure is positive, the vent valve must be connected to an air supply with over pressure (4 – 6" wg) (100-150 mm), to prevent the flue gases penetrating the components in which the blowing agent flows.

A2.7 WALLBOX

(Reference: Section H1 (Illustrations), Wallbox Detail

A2.7a Negative Pressure Installations

The wallbox seals the entry point of the nozzle head through the boiler wall and serves to attach the blower to the furnace. The blower is bolted to the front plate of the wallbox.

With permanent negative pressure on the flue gas side, the annular space between the entry point at the boiler and the nozzle head, provides a sufficient flow of sealing air into the boiler.

An additional pipe union for impinging sealing air is provided at the wallbox to protect against short-term positive furnace pressure.

A2.7b Positive Pressure Installations

The wallbox is functionally the same as noted above. However for positive flue gas pressures, sealing air MUST be provided to the connection point noted. The sealing air should be supplied at a pressure 4-6" wg higher than maximum boiler pressure to prevent the flue gases from entering the wallbox.

A branch from the sealing air line can be connected to the vent valve to supply the scavenging air required to purge flue gases from the lance tube.

A2.8. DESIGN DATA

Drive Data

Motor .	0.25 HP (208-230/460V, 3 Phase, 60 Hz, 1800 RPM)
Travel	250 mm (9 13/16”)
Speed 1	438 mm/min (17.25”/min)
Advancement per revolution	127mm (5”)
Blowing Arc	360 degrees

Dimensions & Material Data

a.	**Poppet Valve**	ASTM A217, Grade WC6
	Plug	Type 440 Stainless Steel
	Seat	Type 416 Stainless Steel
b.	**Feed Tube**	
	Material	304 Stainless Steel
	Outer Diameter	49 mm (1.96”)
	Wall thickness	3 mm (.118”)
c.	**Screw Tube**	
	Material	ASTM A-819 1026
	Outer Diameter	68.2 mm (2.687”)
	Inner Diameter	51.4 mm (2.025”)
d.	**Nozzle Head**	
	Material	ASTM A447 Stainless Steel
	Outer Diameter	60.3 mm (2.375”)
	Wall thickness	5.5 mm (.22”)

e. Lance

Material	304 Stainless Steel
Diameter	2-3/8” O.D.