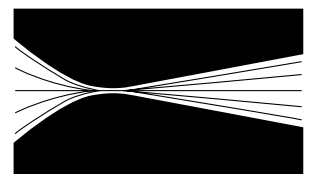


# Flue Gas Conditioning, Ash Conditioning and FGD with Fox Venturi Eductors



**Pneumatically Convey**  
Activated Carbon  
Calcium Carbonate  
Sodium Bicarbonate  
Gypsum/Kaolin  
MgO  
Limestone  
Soda Ash/Trona  
**with No Moving Parts**



# Flue Gas/ Ash Conditioning with Fox Venturi Eductors for Reliable Additive Injection

Fox Venturi Eductors have been used for over thirty years to convey activated carbon, limestone, calcium carbonate, and other additives that are used in flue gas conditioning or flue gas desulfurization (FGD). They are also used to convey additives that condition the ash or waste products. With no moving parts, they offer the utmost reliability in industries that cannot afford sudden shutdowns or failures.

Fox Eductors have been installed in hundreds of plants where additives need to be injected into flues, stack gas, or vented gas streams. Injecting dry additives eliminates the cost, mess, and high maintenance associated with slurry systems. Moreover, keeping additives dry—particularly activated carbon—improves its ability to adsorb.

Additive feed rate is normally controlled by a screw feeder (LIW, see Fig. 3). This can be supplied by Fox as part of a complete skid-mounted assembly (See Fig. 5).

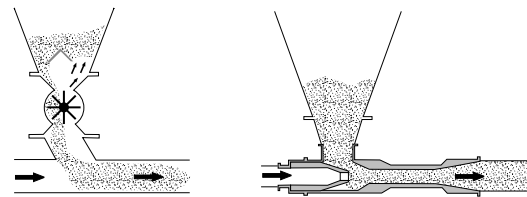
Fox Eductors are usually available from stock in carbon steel, 304 ss and ceramic-lined. Fox Valve's 30 years of experience enables us to address any special requirements.

## ADDITIVE INJECTION WITH FOX EDUCTORS

Before Fox Eductors became standard procedure, additive injection was a major capital project, with large PD blowers driving airlocks—often to handle very low rates (50–500 pph). Blowback, airlock wear, and sudden failures were often the result. Moreover, eliminating airlocks means no safety concerns and fewer motor starters.

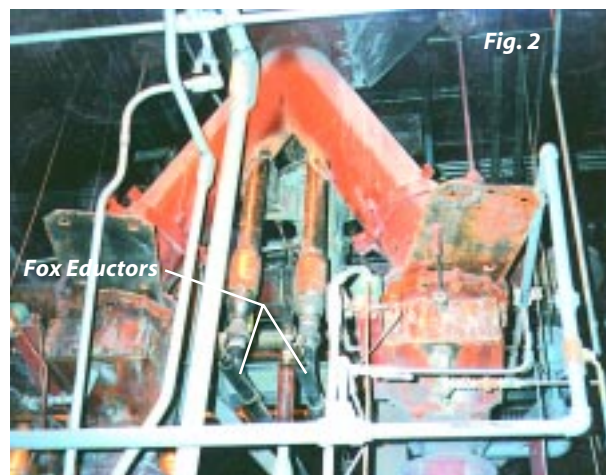
Most plant operators and abatement specialists now know that Rotron blowers can be used to drive Fox Eductors to provide outstanding conveying reliability. These small blowers require no maintenance and are provided as part of a matched eductor/blower subsystem ideally suited for your application. However, when conveying distances are over 200 ft., or additive transport rates are over about 6000 pph, Fox will supply instead a p-d blower as required. For more information on Fox Eductor/ blower subsystems, request Bulletin 302. For more detailed information about the operation of Fox Venturi Eductors, please request Bulletin 301.

Fig. 1



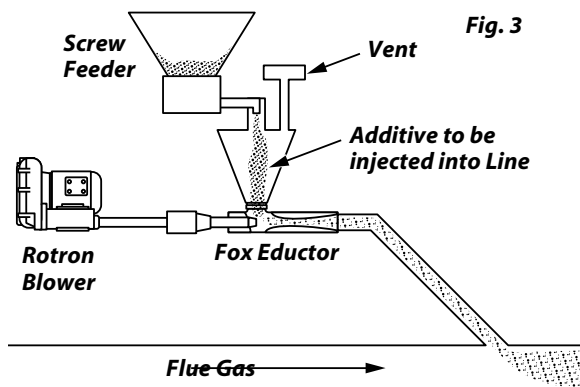
*Fox venturi eductors, right, have been used for thirty years to eliminate airlocks, left, from critical sorbent and additive injection systems where reliability is a paramount concern. Many operators of fluidized bed boilers have replaced the airlocks originally supplied with their limestone injection systems with Fox eductors, as shown below.*

Fig. 2



*Two 2" Fox eductors convey limestone into a fluidized bed boiler. The airlocks originally supplied with the plant were replaced after numerous maintenance problems.*

Fig. 3



*This schematic shows a typical Fox additive injection system, with a small Rotron blower running at 2–3 psig driving an eductor.*

# Engineering your Additive Injection Systems with Fox Venturi Eductors

Fox eductors have been used in hundreds of flue gas applications since the 1960's. We manufacture a broad range of standard eductors that can solve just about every additive injection challenge. Here is a handful of typical applications:

## **WEAR/DEGRADATION**

Ceramic-lined eductors are a standard Fox product. Many have been installed and operated for years in applications where airlocks failed after just a few months. Our careful attention to, and control of, conveying velocity minimizes wear in downstream bends and can avoid damage to friable additives, such as activated carbon.

## **MULTIPLE EDUCTORS/FLOW-SPLITTING**

Eductors offer elegant design options not available with airlocks. Several eductors can be driven with

a single blower, with balanced air flow rates unaffected by solids feed rate. Downstream lines can also be split to accommodate multiple injection points.

## **CONVEYING INTO PRESSURIZED LINES**

Sometimes plants are forced to inject a new additive into an existing pneumatic line, perhaps one already running at 5–8 psig. This is no problem for Fox eductors, although in this special case we must use compressed air. (see Fig. 6)

## **DUST COLLECTOR PRE-COAT**

In a related pollution control application, Fox Eductors can be used to inject pre-coat into dust collectors to improve filter media performance or to chemically react with gas.

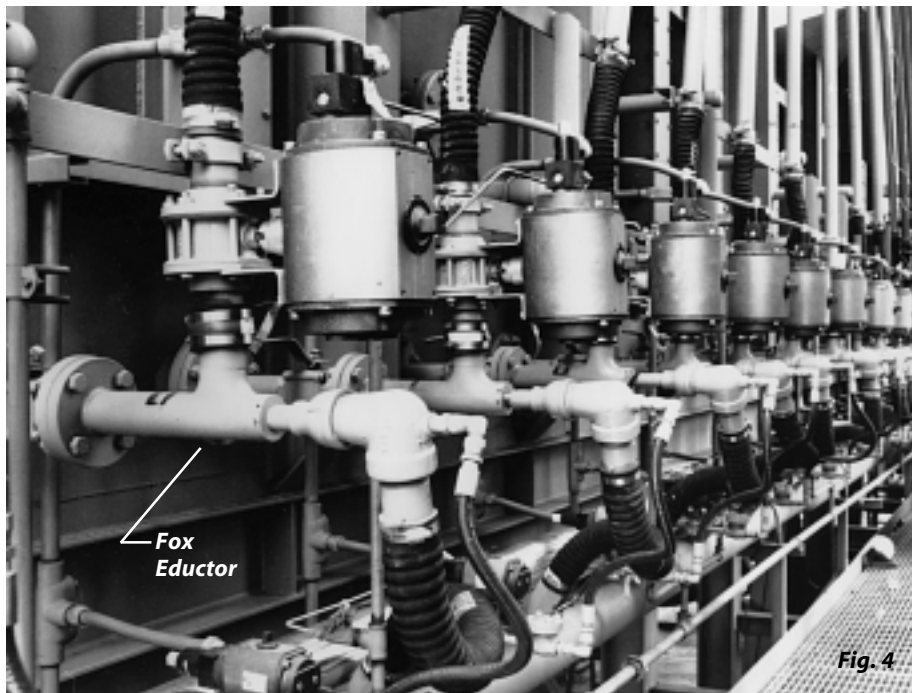


Fig. 4

*Dozens of ceramic-lined Fox eductors inject fuel and sorbent into a fluidized bed boiler at a co-gen plant in California.*

## SKID-MOUNTED PACKAGES

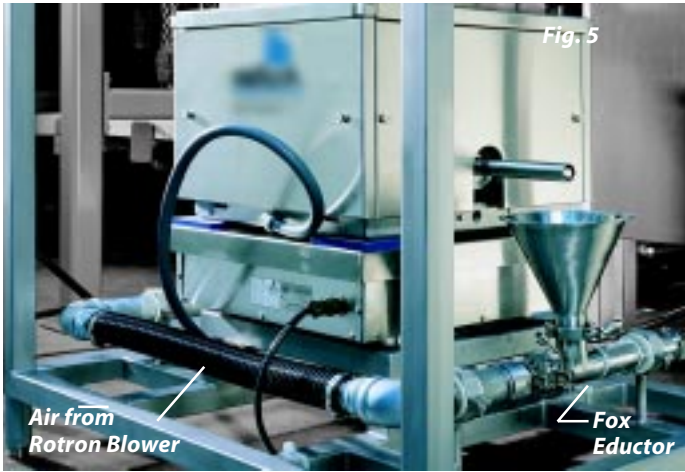


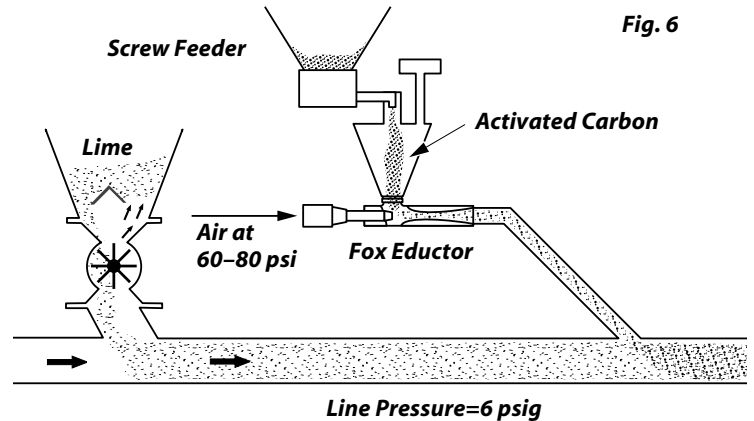
Fig. 5 shows a typical skid-mounted package where a LIW feeder has been packaged with a Fox educator/blower subsystem. If you require a skid-mounted feeder/conveying package, your local Fox representative can advise you who is best able to provide this in the time available—Fox Valve or the feeder manufacturer. Fox does keep blowers, hoppers and other accessories in stock to facilitate timely production of skid-mounted assemblies.

## HYDRATED LIME

Hydrated lime is a particularly difficult material to handle. Dozens of successful installations have been made using Fox educators, but they are not as simple nor as reliable as a typical educator system. Please submit your application requirements to Fox for a comprehensive quotation that discusses in detail the various protocols necessary for successful operation with  $\text{Ca}(\text{OH})_2$ . Please also request Fox Case Study #52 and a reprint from Gypsum, Lime, and Building Materials that discusses the successful use of educators to convey slaked, or hydrated lime.

## ACTIVATED CARBON ADDITIVE INJECTION INTO AN EXISTING LINE AT 6 PSIG.

Rate: 100–250 pph; Distance: 10 feet



*An off-the-shelf Fox educator, designed for service in high backpressure applications, enables an easy retrofit. 40 SCFM of plant compressed air is required.*

In some applications, an existing pneumatic conveying system is already transporting sorbents or other materials. New regulations may make the injection of a second additive necessary. Rather than install an entirely new pipeline, this second additive can be injected into an existing pneumatic line running as high as 10 psig. In the example shown above, a Fox educator injects a small flow of activated carbon into an existing hydrated lime system operating at 6 psig.

**To receive a quote, please request a Data Sheet or download from our website.**

### ADDITIONAL TECHNICAL LITERATURE

The following are available upon request:

#### BULLETINS

- 301—Fox Venturi Educators for Conveying Solids
- 302—Fox Blower/Educator Subsystems

#### PUBLISHED CASE HISTORIES & COLOR REPRINTS

- Powder Bulk Eng'g—May 1989: Trash incineration utility feeds limestone with educators.
- Power Eng'g: Venturi Educators reinject flyash and sorbent to improve FBC efficiency.
- Applications of Educators for Coal/Sorbent Feed in Fluidized Bed Combustion Systems—Sept. 1989

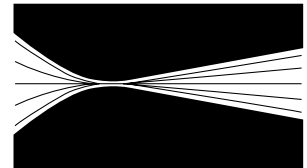
### DATA BASE

- A listing of all existing applications of Fox educators, by product conveyed

### FOX CASE STUDIES

Specific installations in a range of industries, showing mating process equipment.

- 23—Pulv. Coal, fluid bed
- 6—Flyash at 700°F
- 27—Pulv. Limestone
- 47—Act. Carbon into Line at 7 psig.
- 52—Hydrated Lime Injection



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