

**AIR POLLUTION CONTROL PRODUCTS**  
**EDUCTOR VENTURI MODEL HPEV**



**ENGINEERED SOLUTIONS FOR CORROSIVE ENVIRONMENTS SINCE 1972**

February 2014

# EDUCTOR VENTURI MODEL HPEV

HEE Eductor Venturi Model HPEV scrubbers have been designed and engineered for utilization in removal of particulates and nuisance gases from process tanks and gas streams. They are also applicable where condensation of steam vapors is required. When properly sized, the Model HPEV series can obtain high collection efficiencies.

Gas cleaning applications where small gas flows are required or limited space is a factor are also good applications for HEE Eductor Venturi scrubbers. In addition, no exhaust fan is required. A sump tank and a corrosion resistant recirculating pump and all necessary plumbing is included.

## APPLICATIONS

HEE's Eductor Venturi Scrubber Model HPEV can be used in the following applications:

- Emergency Chlorine and Ammonia Vents
- Storage Tank Vents
- Reaction Tank Vents
- High Particulate Loading
- Low Gas flow applications (down to 5-7 CFM)
- Collection of corrosive duct particles
- Collection of corrosive fumes

## PRINCIPLE OF OPERATION

Scrubbing liquid under pressure enters the HPEV scrubber through a spray nozzle which provides both movies force and gives a spray pattern and droplet size distribution most suitable for maximum entrainment and scrubbing efficiency. The passage of the water spray through the venture throat creates suction at the inlet of the HPEV. This causes the dirty gases or vapors to be drawn into the venture throat where violent turbulent contact between the scrubbing liquid and gases or vapors creates the desired scrubbing action. The combined gas and liquid stream then passes into a sump tank or separator chamber where the non-condensable cleaned gases are separated from the liquid and vented to the atmosphere.

## RECYCLE PUMP AND PIPING

In most applications, HEE provides a recirculation pump and related piping to recycle the scrubbing liquid from the separator sump tank to the spray nozzle. The standard HPEV system is normally supplied with a centrifugal pump selected to provide both correct liquid flow rate and nozzle pressure. Recycle piping is fabricated for convenient field assembly and normally includes a ball valve for throttling and a pressure gauge. Material of construction can be PVC or CPVC for high temperature applications. Where available, plant water can be used if pressure and volume is adequate. No pump or recycle system is needed. This system is particularly appropriate for gas volumes less than 500 CFM.

## MATERIAL OF CONSTRUCTION

Where corrosive duty is severe, the HPEV and the companion separator sump tank are constructed of premium fiberglass reinforced polyester (FRP).

HPEV MODEL NUMBER	DIA of GAS INLET	APPROX TOTAL HEIGHT OF HPEV	DIA of GAS OUTLET	FRP TANK DIA	FRP TANK HEIGHT	RANGE OR RATED FLOWS			
						AIR CFM		LIQUID GPM	
HPEV-3	3"	2'-3"	3"	2'-0"	2'-6"	5 -	120	4 -	8
HPEV-6	6"	3'-3"	6"	2'-6"	3'-6"	100 -	500	10 -	25
HPEV-8	8"	4'-2"	8"	3'-6"	4'-0"	200 -	1,300	130 -	70
HPEV-10	10"	5'-0"	10"	4'-0"	4'-6"	250 -	2,000	45 -	100
HPEV-16	16"	7'-7"	16"	5'-0"	6'-2"	500 -	4,000	125 -	275
HPEV-20	20"	9'-2"	20"	7'-0"	7'-6"	1,000 -	8,000	175 -	400
HPEV-24	24"	10'-10"	24"	8'-0"	8'-8"	2,000 -	13,000	325 -	700
HPEV-30	30"	13'-1"	30"	9'-0"	9'-11"	2,500 -	20,000	375 -	850
HPEV-42	42"	17'-8"	42"	10'-0"	12'-1"	5,000 -	33,000	675 -	1,550
HPEV-54	54"	22'-8"	54"	11'-0"	14'-3"	7,500 -	52,000	1,050 -	2,400
HPEV-60	60"	25'-0"	60"	12'-0"	14'-6"	10,000 -	75,000	1,500 -	3,450

## PARTICULATE COLLECTION EFFICIENCY

Removal of solid or liquid particles is primarily accomplished by inertial impaction on the scrubbing liquid droplets. Collection efficiency is dependent on the velocity of the scrubbing liquid stream through the venture throat section. If particles below 3 micron in diameter are to be removed, extremely high throat velocities are necessary to give violent turbulence between the particles and the scrubbing liquid. This requires high pump and spray nozzle pressure and therefore greater energy consumption. The HPEV will give 98% to 99% removal on particles down to 3.0 micron in size.

## GAS ABSORPTION EFFICIENCY

For noxious gas removal, efficiency is dependent upon the type of gas, type of scrubbing liquid, the rate of scrubbing liquid and its pressure at the spray nozzle. Where the gas is highly soluble with the scrubbing liquid, efficiencies of 80% to 90% can be obtained. Multiples stage HPEV units can be used to increase the absorption efficiency. Each stage may include a separate liquid recirculation system. The addition of a caustic or acid to the recirculation liquid can also improve the removal efficiency of a particular gas.

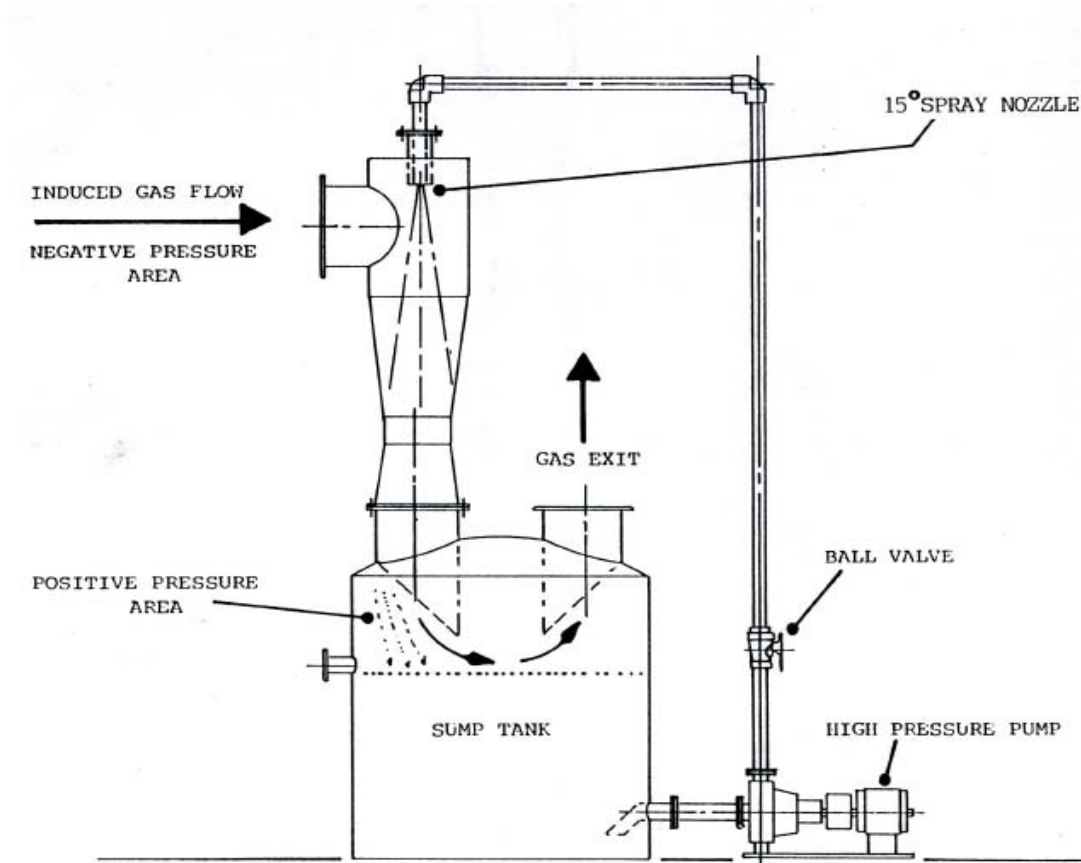
## SPRAY NOZZLES

Special spray nozzles with the appropriate spray angles for each application are used. In most applications, either polypropylene or Teflon nozzles are provided to give maximum chemical and abrasion resistance. Other materials are available.

## SEPARATOR SUMP TANK

Normally, the HPEV is mounted on a separator sump tank which serves to separate the scrubbing liquid from the gas stream and vent the gas stream to the atmosphere. The separator sump tank also serves as a reservoir for the scrubbing liquid which is recycled to the spray nozzles. Separator sump tanks are available in standard sizes for the different HPEV models. An entrainment separator of either chevron blades or mesh pad design may be placed in the gas outlet if necessary.

# Standard Eductor Venturi System





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