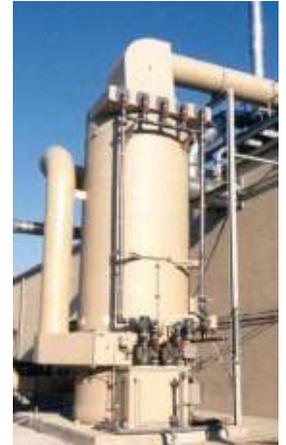


March 2014

**Model HQS**

## **QUENCHER SCRUBBER SYSTEMS**

- COMPLETE SYSTEM includes quencher, scrubber, fan and controls
- SYSTEMS FROM 500 to 120,000 cfm
- REMOVE CORROSIVE AIR with designs to 99.9% removal
- AUTOMATIC CONTROL of pH, level, liquid flow and blow down
- CORROSION RESISTANT CONSTRUCTION



### **INTRODUCTION**

HEE's two stage Quencher Scrubber Systems Model HQS are designed to first cool the hot gas stream to saturation using either a horizontal or vertical quencher. The second stage consists of a wet packed bed scrubber designed for removal of acid or toxic gases from 95% to 99.9% removal efficiency.

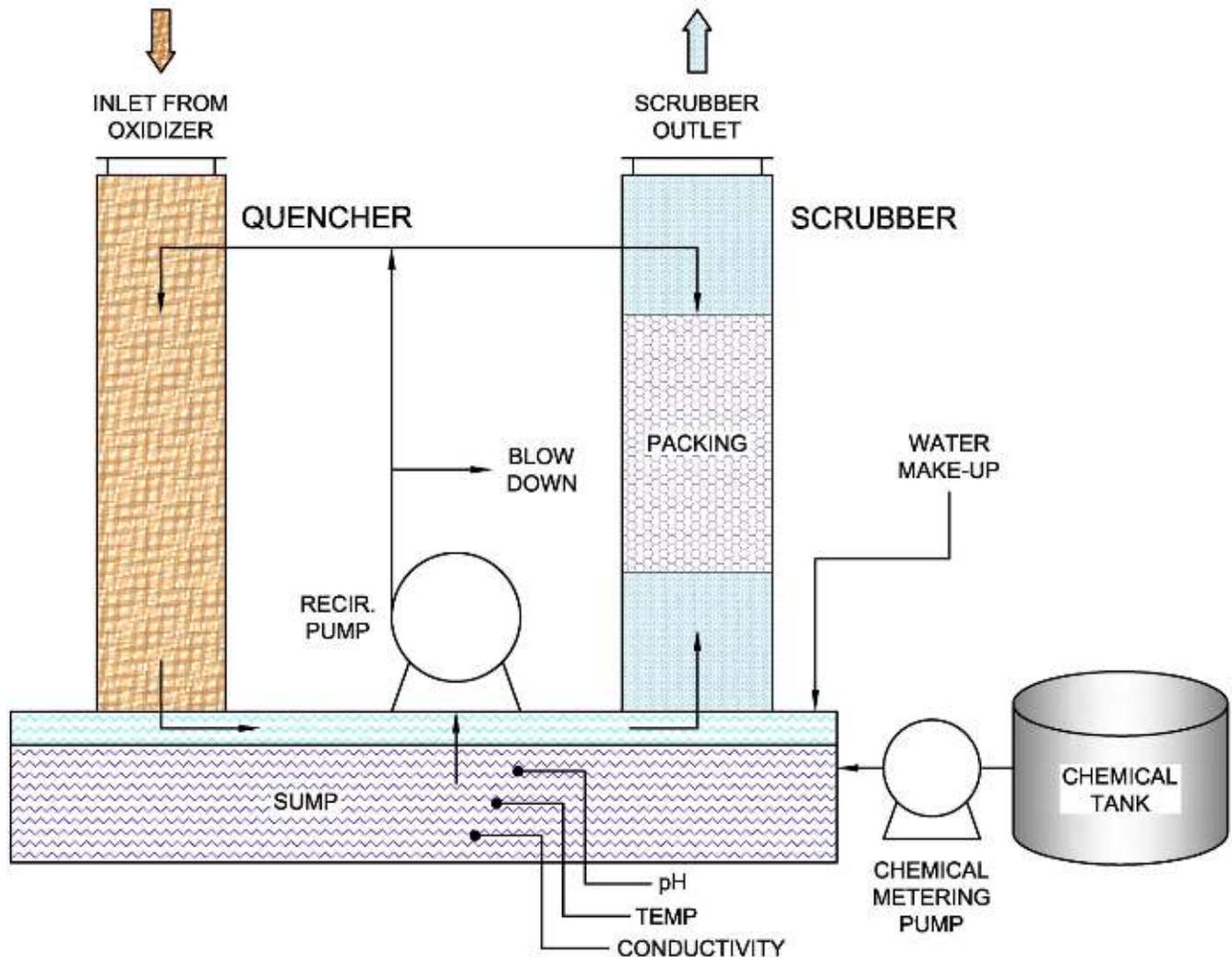
The quencher is constructed of a suitable metal to provide corrosion and chemical resistance. The packed bed scrubber recirculates a suitable liquid to absorb and neutralize the air contaminant. The scrubber uses a high efficiency packing media and a fine particulate mist eliminator. The HQS system is ideal for hot combustion exhaust gases containing corrosive air contaminants from regenerative, recuperative, catalytic and direct fired thermal oxidizers, ovens and incinerators.

### **APPLICATIONS**

The HEE's two Stage Quencher Scrubber Systems are designed for a wide variety of process streams to control hot corrosive exhaust gases and efficiently remove corrosive air contaminants such as HCl, SO<sub>2</sub>, Cl<sub>2</sub>, NO<sub>x</sub>, HF and HBr.

### **HCL QUENCHER SCRUBBER SYSTEM DESCRIPTION**

The oxidation of chlorinated hydrocarbons, mixed organic vapor contaminants, or halogenated compounds require treatment of hydrogen chloride (HCl) hot acid gases prior to discharge into the atmosphere. The hot outlet gas of a thermal or catalytic oxidizer is directed to a Hastelloy alloy quench section. A high volume recirculation pump injects water into the quench section, and quenches or cools the hot gas. A portion of the HCl gas is absorbed and the cooled gas passes through a wet packed bed scrubber. A recirculation liquid is fed through a series of spray nozzles at the top of the high efficiency media in the scrubber column. The remaining HCl gases and vapors are absorbed into the scrubber solution. The treated air runs through a mist eliminator section before it exits the scrubber column. Sodium hydroxide is added using a pH control system and maintains the correct operating pH.



## TYPICAL HQS QUENCHER SCRUBBER SCHEMATIC

### THEORY OF OPERATION

Wet scrubbing of hot gas streams containing acidic contaminants first requires quenching to reduce the gas temperature. Quenching brings the hot gases into thermal equilibrium with fresh water or a suitable quench liquid. The quenching cools hot gases and the exact quenched gas temperature depends mainly upon the temperature and water content of the hot gas. Since the water content of the cooled gas increases during quenching, it is important to provide a system that provides enough water for quenching and sufficient contact between the hot gases and the quench liquid.

The cooled gas passes through a counter current vertical or cross flow horizontal packed bed scrubber for removal of the gaseous contaminant to acceptable levels to protect the environment, personnel, and the building structures. Scrubbers use a recirculation liquid and create a large liquid-to-gas area so that gas contaminants are absorbed. The scrubbing liquid can be water, a

caustic solution to remove acidic gas contaminants such as HCl or SO<sub>2</sub>, or an acid solution to remove contaminants such as NH<sub>3</sub>.

## **MATERIAL OF CONSTRUCTION AND SYSTEM COMPONENTS**

The Model HQS Quencher is fabricated using a suitable metal for the temperature and chemical application such as 316 SST, AL6XN or Hastelloy C276. The scrubber is fabricated from Fiberglass Reinforced Plastics (FRP), the high efficiency scrubber packing media such as LANPAC® tower packing from Lantec Products is polypropylene or glass filled polypropylene for higher temperature applications. The material of the recirculation piping, fittings and valves are PVC, CPVC or 316 SST as necessary. The fan and ductwork are usually manufactured from FRP. Any metal components are either 316 SST or powder coated for weather and corrosion resistance.

The quencher and scrubber include a common liquid sump, recirculation pump, flanged inlet and outlet connections, spray nozzles and instrumentation and controls for a completely reliable and automatic operating system.

## **DESIGN FEATURES**

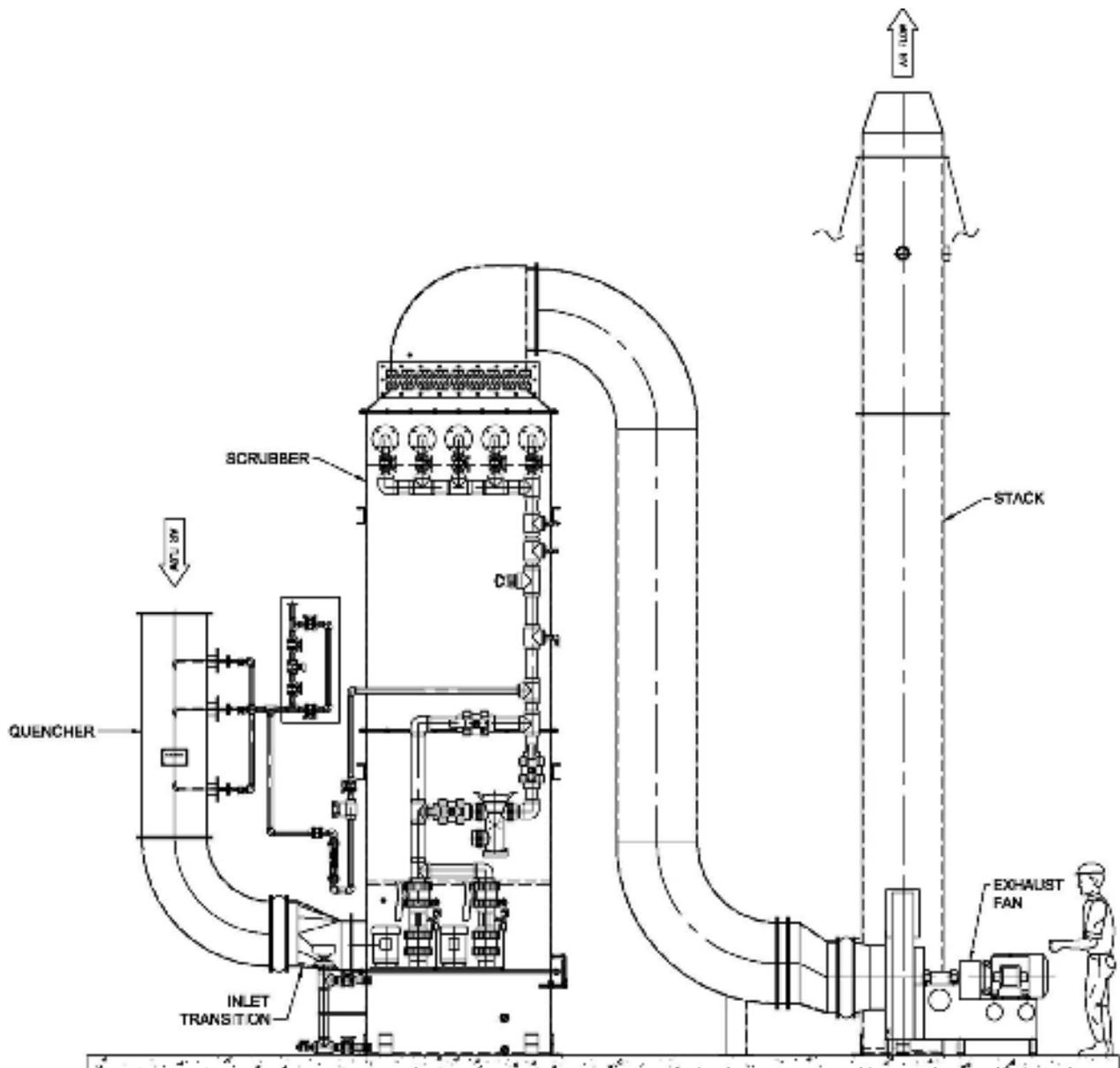
- System sizes from 500 to 120,000 acfm
- Removal efficiency designs to 99.9%
- Corrosion resistance construction
- System designed to meet space limitations
- Access manways for access and ease of maintenance
- Low pressure drop operation
- Complete shop assembled, mounted and wired systems
- Integral recirculation system
- Designed for seismic and wind load as required
- PE stamped structural and chemical calcs
- Control panel with motor starters, PLC control logic and instrumentation
- Instrumentation: pH, blowdown conductivity control flow, level, and temperature
  - pH automatically monitors and adds chemical solution
  - Conductivity control for automatic blow down control
  - Automatic sump liquid level control
  - High temperature shut down

## **AVAILABLE OPTIONS**

- Skid mounted systems
- Complete packages
- Remote mounted Control Panels and Instrumentation
- Variable Frequency Drive (VFD) for air flow adjustment or process change
- Remote monitoring

## SUMMARY

HEE's experience includes over 40 years of innovative design and equipment manufacturing of Air Pollution Control Equipment. Each HQS system is designed with special consideration to the process, requirements and environmental conditions. The size of the system is selected based on the air volume, types of contaminants and the desired removal or destruction efficiency. The HQS Quencher Scrubber system is designed to remove the acids produced during the thermal oxidation process and to protect against corrosion.



## QUENCHER AND COUNTER CURRENT VERTICAL SCRUBBER SYSTEM



Sales and Engineering Office: 2143 Convention Center Way Suite 180 Ontario, CA 91764  
(909) 230-6120 \* Fax (909) 230-6159

Corporate Office & Manufacturing: 16605 Koala Road Adelanto, CA 92301  
(760) 530-1409 \* Fax: (760) 530-1419

Visit us at [www.hee-llc.com](http://www.hee-llc.com)