

EQUIPMENT GUIDE / AIR POLLUTION CONTROL

# Air Pollution Control Equipment Selection Guide

Which scrubber, adsorber, and ductwork material holds up against your actual off-gas — not the generic "chemical resistant" answer.

## THE PROBLEM THIS GUIDE SOLVES

## Metal corrodes in acid vapor faster than most people expect

Corrosion escalation, operator safety risk, and fugitive-emissions permit exposure share a single root cause in most fume-control failures: metal ducting and scrubber components exposed to acid vapor. Polypropylene and FRP resist corrosion in that same service far better than metal — a real, documented California field case confirms this directly.

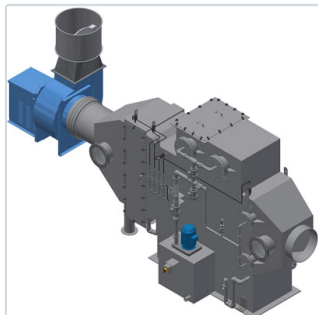
This guide organizes real, vendor-documented selection data by air pollution control category, not by brand. Every material call-out is sourced to a named vendor document or a real LibertyCES field case.

## EQUIPMENT SELECTION, AT A GLANCE

### Air pollution control categories, by what they're actually built to treat

| Equipment category                                                               | Built for                                                                           | Watch for                                                                                                                        |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Chemical Scrubber</b>                                                         | Acid gas and vapor neutralization, packed-bed gas-liquid contact                    | Polypropylene resists HCl vapor corrosion better than metal — confirmed by a real installed case, not just a compatibility chart |
| <b>Ductwork</b>                                                                  | Fume extraction, laboratory hood exhaust, corrosive gas transport                   | Polypropylene or HDPE is preferred over metal for chemical fume extraction service specifically                                  |
| <b>Carbon Adsorber</b>                                                           | Chlorine and ammonia gas removal via impregnated dry media                          | Media chemistry must match the target gas — sodium-thiosulfate for chlorine, phosphoric-acid-impregnated for ammonia             |
| <b>Biofilter</b>                                                                 | Ammonia, H <sub>2</sub> S, and reduced-sulfur/VOC odor control via biological media | Bio-media (lava, wood, ceramic) inside an FRP housing is a different architecture from carbon adsorption                         |
| <b>FRP Stack</b>                                                                 | Corrosive off-gas exhaust to atmosphere                                             | Chlorine off-gas and acid gas both drive FRP construction over metal stacks                                                      |
| <b>Damper</b>                                                                    | Airflow control integrated into corrosive-gas ductwork systems                      | Same FRP-over-metal logic as ductwork applies to dampers in the same system                                                      |
| <b>Fume Scrubber &amp; FRP Air Pollution Control Equipment (instrumentation)</b> | Scrubber-loop monitoring: makeup water flow, pH/ORP, conductivity, flow-to-drain    | Scrubber liquor is often the hardest pH measurement in a plant — low pH combined with fluoride content                           |

## CHEMICAL SCRUBBER — EVIDENCE: STRONG

**HCl vapor service — polypropylene, not metal****Perry Fiberglass APOLLO / OMEGA / ODYSSEY Chemical Scrubbers**

Also: LibertyCES custom packed-bed PP scrubber (field case)

Hydrochloric Acid (HCl vapor)

**FIELD RECORD — CALIFORNIA CHEMICAL PROCESSING PLANT**

HCl fumes were degrading ducting, valves, and metal assets, creating both a corrosion-escalation problem and an operator safety risk, while fugitive emissions threatened permit compliance. A custom polypropylene packed-bed wet scrubber — high-impact PP construction, packed-bed gas-liquid contact, pH monitoring with automated alarms, and chemical-resistant PP ducting throughout — replaced the metal-wetted system.

**HCl vapor service → polypropylene, not metal**

"Polypropylene is commonly selected for hydrochloric acid fume control because it resists corrosion better than many metals in acid vapor service." Outcomes are framed as design intent — reduced corrosion events, improved operator safety, supported permit compliance — without invented quantified metrics.

**Caustics/bases — evidence: moderate.** GF Signet explicitly names cyanogen chloride gas as a hazard requiring scrubber-adjacent process control if pH is mismanaged during cyanide destruction — the scrubber and the process-control instrumentation have to be spec'd together, not independently. FRP and polypropylene are both confirmed materials for ammonia and cyanogen-chloride scrubbing service.

## DUCTWORK — EVIDENCE: STRONG

**The same HCl-vapor-no-metal rule, independently confirmed**



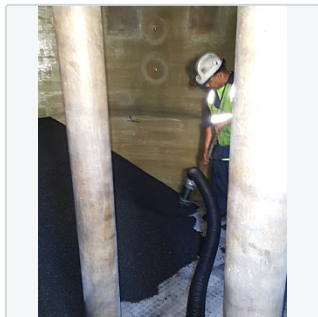
# Houston PolyTank PP/HDPE Ductwork · Perry Fiberglass FRP Ductwork

Hydrochloric Acid (fume/vapor)

Houston PolyTank's own product documentation independently confirms this project's HCl-vapor-no-metal rule through explicit "chemical fume extraction" and "laboratory hood exhaust" applications for PP ductwork — polypropylene is preferred over metal, with HDPE as a secondary confirmed material. This is the same LibertyCES field case's ducting material, now corroborated by a second, unrelated vendor's stated application list.

## CARBON ADSORBER — EVIDENCE: STRONG

## Media chemistry must match the target gas



### Perry Fiberglass RF/B1/B2/V/H1/H2 Series Carbon Adsorbers

Also: AMMOSORB 100-PF (ammonia-specific)

Chlorine

Ammonia (NH<sub>3</sub>)

These are proprietary dry-media adsorbers, not generic activated carbon: chlorine service uses a sodium-thiosulfate-impregnated synthetic media inside an FRP housing, complying with named odor-control engineering practice. Ammonia — a base gas, chemically the opposite of chlorine — requires a dedicated proprietary media instead: AMMOSORB 100-PF, using phosphoric-acid-impregnated media specifically engineered for ammonia adsorption. The two gases cannot share the same media chemistry.

## BIOFILTER — EVIDENCE: MODERATE

## Ammonia, H<sub>2</sub>S & reduced-sulfur odor control



### Perry Fiberglass BIO-CUBE / BIO-FGB / BIO-FGW / MB / BT / IBB Series

Ammonia (NH<sub>3</sub>)

Hydrogen Sulfide

Ammonia is named as a target biofiltration compound alongside H<sub>2</sub>S and reduced sulfur/VOCs — a genuinely different architecture from carbon adsorption above. Construction pairs an FRP housing with bio-media (lava, wood, or ceramic) that hosts the biological treatment process, rather than a chemically-impregnated adsorbent bed.

## FRP STACK &amp; DAMPER — EVIDENCE: MODERATE

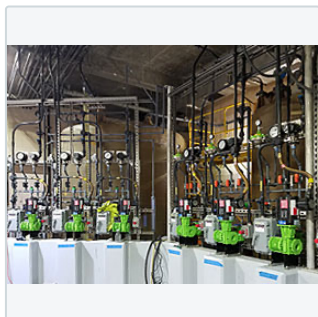
**Corrosive exhaust & airflow control, same material logic****Perry Fiberglass FRP Stacks · FRP Control Dampers**

Chlorine

Acid Gas Emissions (general)

Chlorine off-gas handling is named among Perry's odor-control and scrubbing applications for FRP stack construction. Acid gas and VOC handling is implied by shared duct and stack construction with the chemical-scrubber line above — the same FRP-over-metal material logic that governs ductwork and scrubbers applies directly to stacks and the dampers integrated into the same corrosive-gas system.

## FUME SCRUBBER &amp; FRP AIR POLLUTION CONTROL EQUIPMENT — INSTRUMENTATION — EVIDENCE: MODERATE

**Scrubber-loop monitoring: the harder pH measurement in the plant****GF Signet Fume-Scrubbing Instrumentation Set · ProMinent PHEF-DJ**

HCl Fume

Chlorine Gas

Sulfur Dioxide

GF Signet's 7-point fume-scrubbing monitoring architecture is the real instrumentation story worth publishing: makeup water flow, sprinkler-head flow rate, pH and ORP of mister-recycled water (both trigger scrubbing-solution discharge/replacement), pH and conductivity/TDS of makeup water pre-adjustment, and flow-to-drain monitoring. ProMinent's PHEF-DJ pH sensor exists specifically for low-pH fluoride-bearing gas scrubber liquor — using a double PTFE junction — because that combination is the hardest pH measurement in a typical scrubber loop.

Fluidtrol's Glass Ceramic Matrix Composite basket strainer is explicitly marketed for scrubber service, solving the combined corrosion-and-abrasion problem that single-property materials (FRP alone, or metal alone) don't address on their own.

NEXT STEP

## Send LibertyCES the process data, not a part number.

Seven air pollution control categories, real vendor selection data, one guide — but your actual off-gas still has a specific chemistry, concentration, and flow rate that determines which material and architecture is correct. A spec review checks the exact conditions against the exact equipment, before anything gets ordered.

Off-gas chemistry, concentration, flow rate, temperature, and current ductwork/scrubber infrastructure — that's what a real spec review needs to start.

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### Request a spec review

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