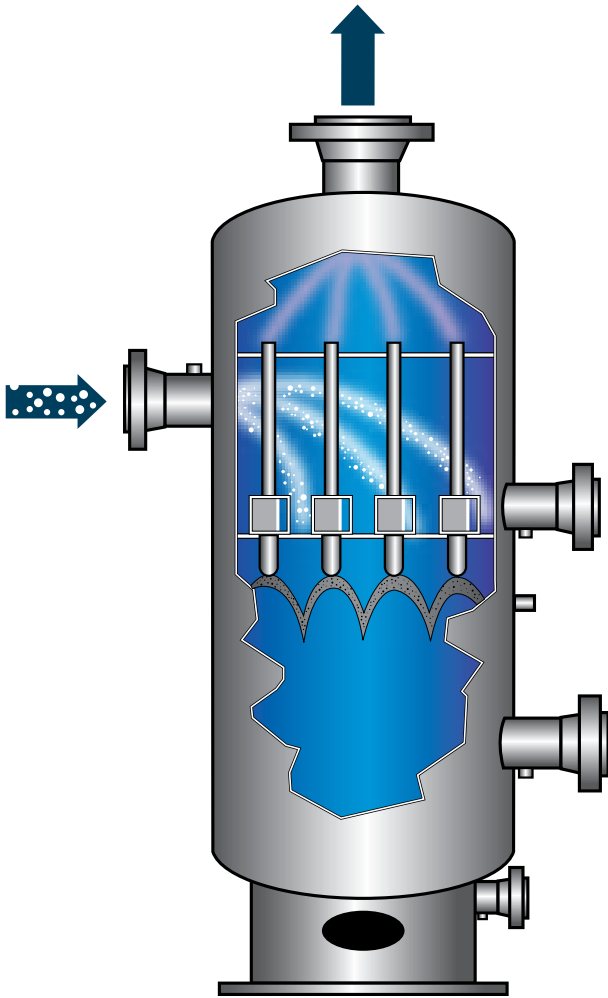


SEE WHAT PEERLESS CAN DO FOR YOU.

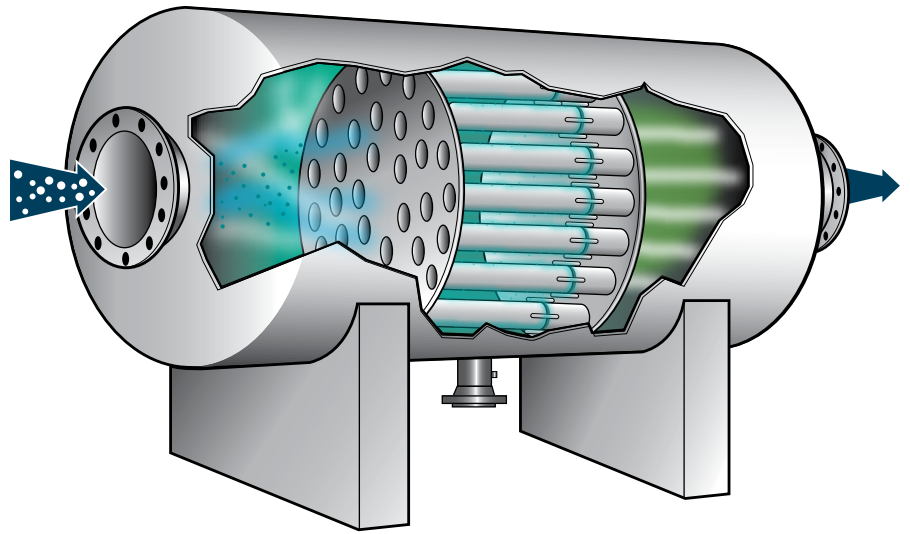
FOR HIGH EFFICIENCY-SEPARATION OF LIQUID AND SOLID CONTAMINANTS AT LOW COST



### MULTI-CYCLONE SCRUBBER

FOR APPLICATIONS REQUIRING EFFICIENT DUST AND LIQUID REMOVAL.

- CONSTANT  $\Delta P$  REGARDLESS OF LOADING
- MAINTENANCE FREE
- GUARANTEED PERFORMANCE
- BUILT TO ASME CODE AND INTERNATIONAL STANDARDS



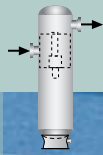
### HORIZONTAL OR VERTICAL SWIRL TUBE SEPARATOR

FOR LIQUID REMOVAL AND FOR SMALL INSTALLATION FOOT-PRINT APPLICATIONS.

#### TYPICAL APPLICATIONS:

- DISTRIBUTION SYSTEMS
- MAINLINE TRANSMISSION STATIONS
- INDUSTRIAL PROCESS APPLICATIONS
- GAS GATHERING SYSTEMS
- PETROCHEMICAL PLANTS
- SLUG CATCHING
- ABSORPTION PROCESSES
- RECIP COMPRESSOR PROTECTION

# MULTI-CYCLONE SCRUBBERS



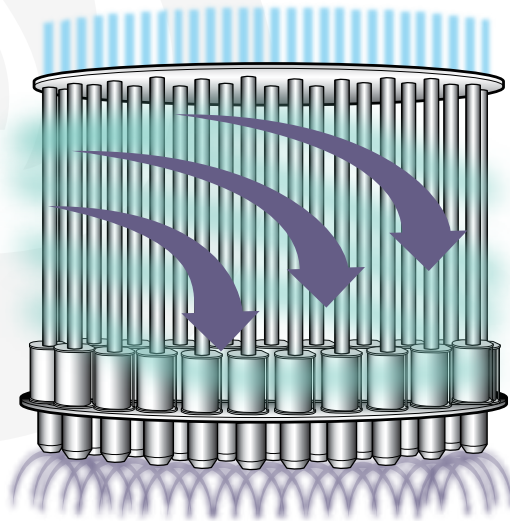
## HORIZONTAL OR VERTICAL, PEERLESS HAS THE RIGHT CONFIGURATION TO FIT YOUR APPLICATION.



TWO PEERLESS MULTI-CYCLONE SCRUBBERS INSTALLED AT A METERING STATION IN WESTERN CANADA. TYPICAL NATURAL GAS FLOW THROUGH THESE 78" DIAMETER VESSELS IS 2.5 BILLION STANDARD CUBIC FEET PER DAY.

### MULTI-CYCLONE BENEFITS

- High-efficiency liquid and solid removal
- A wide range of flows
- Intermittent flow spikes capacity
- Maintenance free
- Fixed or removable cyclone bundles
- 2" or 4" diameter cyclones available

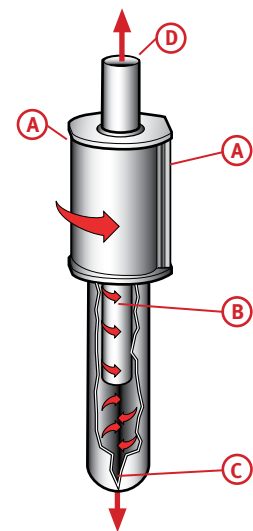


PEERLESS USES MULTIPLE, SMALL-DIAMETER CYCLONES ARRANGED IN PARALLEL TO ACHIEVE SEPARATION OF SMALL AND LARGE SIZE PARTICLES. DEPENDING UPON THE APPLICATION, A BANK OF CYCLONES MAY CONTAIN AS MANY AS 200. SELECTION OF 2" OR 4" DIAMETER CYCLONES WILL DEPEND UPON THE SYSTEM GAS FLOW RATE.

### MULTI-CYCLONE PRINCIPLE OF OPERATION

Multi-Cyclone Scrubbers use centrifugal force to effectively remove solid particles and liquids from gas without moving parts.

- (A) Dirty gas enters the Cyclone Tube tangentially at two locations.
- (B) The tube housing forces the gas into a cyclonic flow pattern. Centrifugal force throws solids and liquids against inner cyclone tube wall.
- (C) Solid and liquid particles drain down the cyclone tube walls and collect at bottom.
- (D) Clean gas flows down and then up through the center annulus and exits at the top.



Peerless Cyclone Tube

**Innovative Designs**  
**Cost-Effective Retrofits**  
**Guaranteed Performance**

### PERFORMANCE GUARANTEE – MULTI-CYCLONE

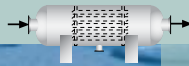
#### SOLIDS REMOVAL EFFICIENCIES:

- 100% of 8-micron particles
- 99% of 6- to 8-micron particles
- 90% of 4- to 6-micron particles
- 85% of 2- to 4-micron particles

#### LIQUID REMOVAL EFFICIENCIES:

- Outlet gas will contain less than 0.10 gallon of entrained liquid per million standard cubic feet of gas passed through the separator
- 100% of all droplets 8-microns in diameter and larger

# SWIRL TUBE SEPARATORS



## USE THE TWO-STAGE PEERLESS EXTRACTION DESIGN TO MAXIMIZE LIQUID HANDLING.



A 96" DIAMETER PEERLESS SWIRL TUBE SEPARATOR INSTALLED IN A GAS GATHERING SYSTEM. TYPICAL FLOW IS 3 BILLION STANDARD CUBIC FEET OF GAS PER DAY.

### SWIRL TUBE BENEFITS

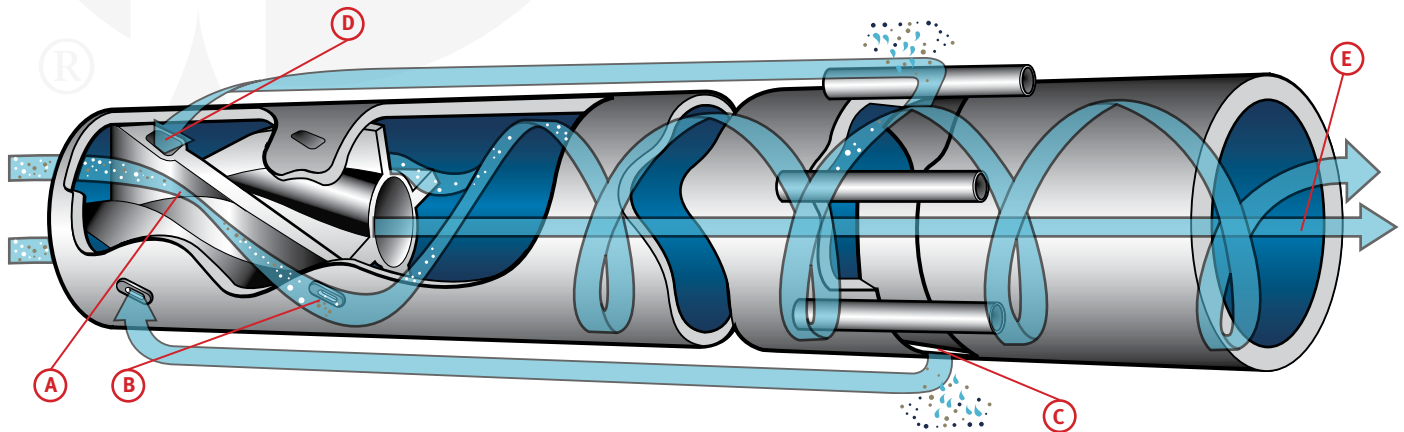
- High-efficiency removal of entrained liquid
- Maintenance free
- Increased liquid handling
- No moving parts

### SWIRL TUBE PRINCIPLE OF OPERATION

Swirl tubes create inertial forces on the entrained liquid as it passes around the inlet helicoid.

- (A) Contaminated gas enters the swirl tube where centrifugal forces are imposed on the flow.

- (B) Liquids are thrown out of the gas flow and against walls of the swirl tube
- (C) Liquids fall out of swirl tube at the primary extraction slots
- (D) Minor amounts of gas exiting at the primary extraction slots are directed back through the swirl tube through side openings to repeat the separation process.
- (E) Clean gas exits the swirl tube.



### SWIRL TUBE SEPARATOR

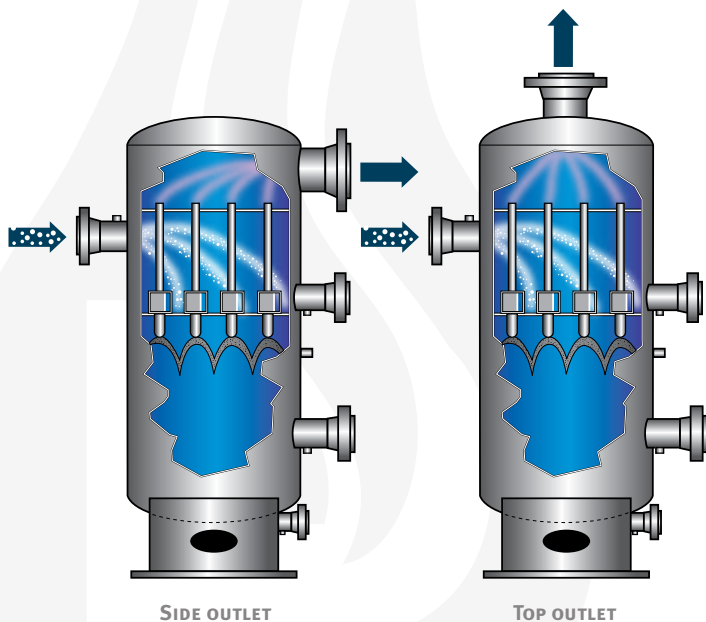
*SWIRL TUBES CAN BE INSTALLED IN EITHER VERTICAL OR HORIZONTAL CONFIGURATIONS WITHOUT AFFECTING THE PERFORMANCE OF THE SYSTEM.*

### PERFORMANCE GUARANTEE – SWIRL TUBE

#### LIQUID REMOVAL EFFICIENCIES:

- Outlet gas will contain less than 0.10 gallon of entrained liquid per million standard cubic feet of gas passed through the separator
- 100% of all droplets 8-microns in diameter and larger
- 99% of 4- to 6-micron droplets
- 98% of 2- to 4-micron droplets

## CONSULT PEERLESS FOR YOUR SEPARATION, RETROFIT, AND SPARES REQUIREMENTS.



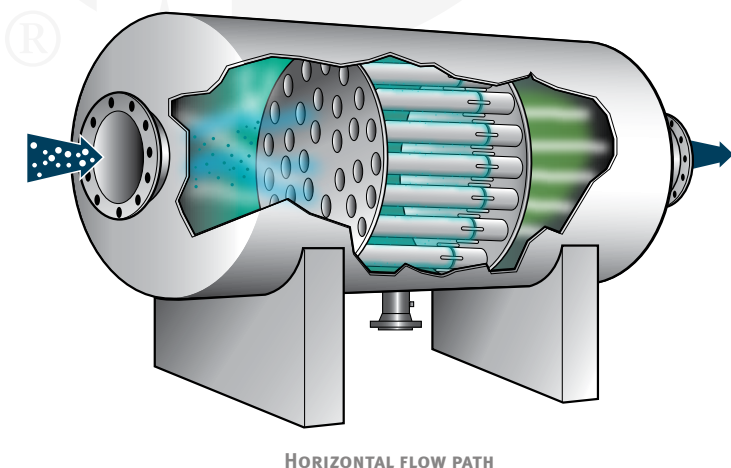
### PEERLESS MULTI-CYCLONE SCRUBBER DESIGN FEATURES

Peerless Multi-Cyclone Scrubbers are constructed to resist many years of abrasive wear and be rugged enough to withstand a wide variety of gas stream applications. In erosive gas applications, the critical parts of Peerless Cyclone Tubes may be constructed of erosion-resistant steel alloys.

Peerless Multi-Cyclone Scrubbers require no maintenance and have a comparatively low initial cost. Vertical and horizontal configurations are available.

### PEERLESS SWIRL TUBE SEPARATOR DESIGN FEATURES

Peerless Swirl Tube Separators provide superior performance across an array of applications including condensate removal from gas streams, entrainment removal following a distillation or absorption process, and removal of liquid from inter-stage and final discharge stages in reciprocating compressors.



HORIZONTAL FLOW PATH

An aerodynamically designed helicoid maximizes the inertial force utilized to remove entrained liquids. The two-stage liquid extraction system with a gas recycle stream is designed to maximize the liquid handling requirements of this unique system. It is the key to high-efficiency, low-cost separation.