

# Scrubbers for Oil, Gas, Refinery & Petrochemicals



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# ABOUT CRYSTAL INDUSTRIAL



Crystal Industrial Syndicate Pvt. Limited, incorporated in the year 1991, is an ISO 9001 : 2000, ISO 14001 : 2004, OHSAS 18001 : 2007

The company was started by two graduate engineers with the objective to serve the Indian industry with products like Steam Jet Ejectors & Wet Scrubbing Systems.

They later diversified into design, fabrication, and commissioning of equipment such as pressure vessels, heat exchangers, columns, plant pressure piping for various chemical, petrochemical, fertilizer and other process industries.

Crystal has also specialized into design and fabrication of various intricate and complex equipment, components, assemblies, and sub-assemblies, of cast, forged, welded and machined construction for Indian Defense and Nuclear Sector.

[CONTACT](#)



Crystal has now mastered the technology of carrying out Corrosion Resistance Weld Overlay of Monel, Inconel 625, Incoloy 825, Hastelloy B3, Hastelloy C-276, Hastelloy C-2000.

Hard facing overlay on the inside surfaces of pipes, elbows, tees, flanges, including fabrication and welding of Cladded Vessels involving these materials.

Crystal's list of clients spans the most reputed industrial houses in India to top global firms. Engineering companies like Aker Kvaerner, Bechtel, Bindal Agro, Dr. Reddy's, GEA, Hindustan Petroleum, Indian Navy, Indian Oil, Jacobs, Larsen & Toubro, Mangalore Refineries, Mitsubishi Heavy Industries, Pfizer, Oswal Chemicals, Reliance Industries and Saint Gobain are some of Crystal's most distinguished clients.



# OVERVIEW & APPLICATION



## OVERVIEW

Scrubber Systems are globally used in industries for treatment of exhaust / vent gases and are an effective method in prevention of Air Pollution. The industrial exhaust / vent gases may also at times contain harmful particulates which may affect the environment / health of human beings. Traditional methods of Particulate Collectors for Air

Pollution control such as Cyclones and Electrostatic Precipitators cannot efficiently absorb gases or remove odor. Scrubbing Systems are now finding preference compared to these traditional methods for treatment of industrial exhausts because of the economics and efficient method for removal of particulates and odors.

## APPLICATIONS

Application of Scrubbing Systems include removal of particulates, dust, odor from industrial exhaust / venting systems, or products, under continuous operation or emergency control systems of chemical, fertilizer, petrochemical, refinery, pharmaceutical and other allied industries.

Exhaust systems treated consist of removal of Acid Mist, Ammonia (NH<sub>3</sub>), Carbon Monoxide, Chlorine (Cl), Dimethyl Sulphate (DMS), Hydrochloric Acid (HCL), Hydrogen Sulphide (H<sub>2</sub>S), Oxides of Nitrogen, Sulphur Dioxide (SO<sub>2</sub>), OxaHexaChloroxalence, Tri-Chorosylene, and other industrial exhausts.



## PRODUCT RANGE



Type of Scrubbing Systems regularly supplied by Crystal for chemical, fertilizer, petrochemical, refinery, pharmaceutical and other allied industries include :

- Ejector-Venturi Scrubbers
- High Energy Ejector -Venturi Scrubbers
- Packed Tower
- Package Scrubbing Systems
- Condenser Scrubbers
- Emergency Chlorine Scrubbers – Multi Venturi Packless

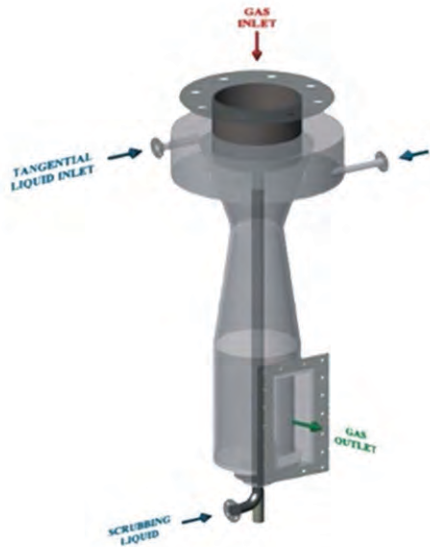
Depending upon the type of exhaust / vent gas being handled, Client requirements, the Material of Construction shall be :

- Fiber Reinforced Plastic (FRP)
- Fiber Reinforced Vinyl Ester (FRVE)
- Carbon Steel lined with PVDF, ECTFE
- Austenitic Stainless Steel – 304,316
- Hastelloy C -276, C -2000
- Inconel 625, 825 and Monel



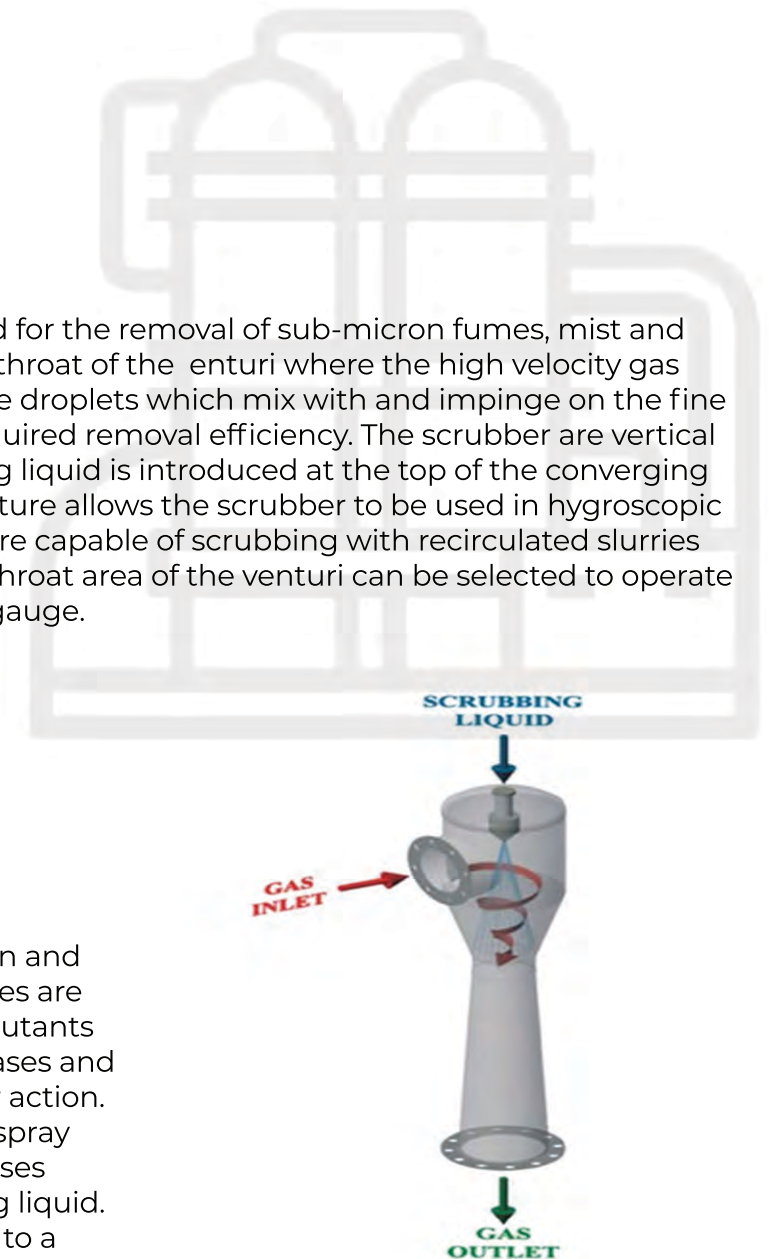


## TYPES & COMPONENTS



**High Energy Venturi Scrubber** are designed for the removal of sub-micron fumes, mist and particulates. The gas is accelerated into the throat of the venturi where the high velocity gas stream shatters the scrubbing liquid into fine droplets which mix with and impinge on the fine fumes, mists and articulates to effect the required removal efficiency. The scrubber are vertical flow, wet approach type where the scrubbing liquid is introduced at the top of the converging section of the venturi. The wet approach feature allows the scrubber to be used in hygroscopic or highly abrasive applications. These units are capable of scrubbing with recirculated slurries having a solids content as high as 30%. The throat area of the venturi can be selected to operate at pressure drops between 6" to 120" water gauge.

**Ejector Venturi Scrubber** utilize the energy of the scrubbing liquid to effectively entrain and remove noxious gases particulates odors, fumes and dusts from the gas. The particulates are removed through impaction of the solids by the high velocity spray liquid. Gaseous pollutants and odors are removed through absorption and/or chemicals reactions between the gases and scrubbing liquid. The contaminated gas is drawn into the scrubber by means of ejector action. The system is designed for high velocity liquid spray directed into a venturi throat. The spray impinges on the Venturi Throat to induce the Draft Producing Action. The scrubbed gases depart the throat area with the contaminants impacted or absorbed into the scrubbing liquid. The clean gas with entrained contaminates droplets are discharged from the scrubber to a gas-liquid separator



## TYPES & COMPONENTS



**Packed Tower scrubber** is a low energy, contact bed type of wet scrubber for gas absorption, for gas cooling, and for stripping of the contaminants from process liquid. The units are specifically engineered to give the highest efficiency with the lowest power consumption without sacrificing performance reliability. These scrubbers are available in standard design from 6 " to 144" diameter and with capacities to 50,000 ACFM. Contaminated gas enters bottom side of the scrubber and flows upward through the packed bed. The scrubbing liquid is introduced through a distributor at the top of the packed section and trickles downward through the packing, removing the contaminants from the gas through the interaction of the gas, liquid and packing media. The scrubbing liquid falls to the recirculation sump at the bottom of the unit. The cleaned gas proceeds upward through a mist eliminator to the gas outlet.



**Emergency Scrubber System** consists of a dry scrubbing media to neutralize gases, the media reacts with the gas and reduces the concentration at the scrubber discharge to within the guidelines as set forth by the prevailing codes . The new media & used media is non-hazardous since the media substrate permanently bonds with the chemical impregnate and the unused chemical and the reaction process respectively. Dry scrubbers are safe, user friendly, low maintenance system tested and proved for use in municipal and industrial applications where the potential exist for the accidental release of heavier -than-air hazardous gases. Dry chlorine scrubber do not require liquid chemical leak containment or double wall vessel construction and operate at sub-zero temperatures without the use of heaters



# QUALITY CONTROL SYSTEM

Crystal follows a stringent quality control system so that all parameters are complied with, and the customer gets a high quality product.



Ultrasonic Testing



Hydrostatic testing



Dye Penetrant Testing



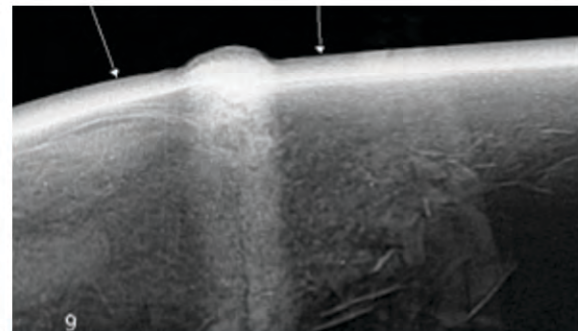
Hardness Testing



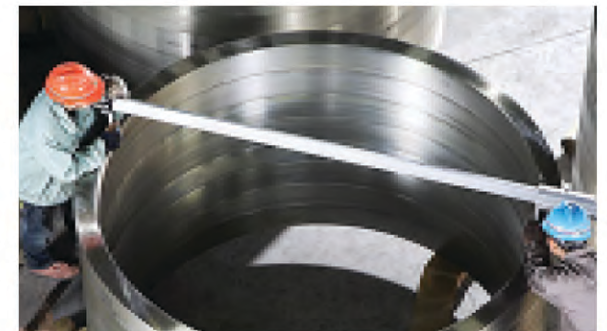
Positive Material Identification



Magnetic Particle Inspection



Radiography



Dimensional Inspection



## CERTIFICATIONS



- ISO 9001 : 2015 Certificate
- ISO 14001 : 2015 Certificate
- OHSAS 18001 : 2007 Certificate
- Stamp Certificate
- National Board Registration
- IBR Approved



# CLIENTS





## CONTACT



ABOUT US

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**Crystal**  
**industrial**



Model	High Pressure Access Fitting Assembly							
CISPL-10	Flare weld							
Model	Flare weld with Tee							
CISPL-10	Flanged							
CISPL-10	Flanged with Tee							
Code 1 XX	Type (1st digit)	Alloy Material (2nd digit)						
	N - Not Required	0 - Not Required						
	R - Solid	1 - 316/316L Stainless Steel						
		2 - 304 Stainless Steel						
		3 - Hastelloy						
		4 - Nitronic 60						
		5 - Carbon steel						
		6 - Inconel 625						
		7 - 2205 Duplex Stainless Steel						
	Code 2	Side Tee Size						
0	Non- Tee							
1	¼" Tee							
2	½" Tee							
3	¾" Tee							
4	1" Tee							
Code 3	Optional Side Tee Configuration (omit for standard NPT)							
xx	For Flare Weld							
A1	150#RF							
A2	300#RF							
A3	400/600#RF							
A4	900/1500#RF							
A5	2500#RF							
B1	2500#RF							
B2	300#RJ							
B3	400/600#RJ							
B4	900/1500#RJ							
Code 4	Optional Side Tee Configuration (for standard NPT)							
A1	150#RF							
A2	300#RF							
A3	400/600#RF							
A4	900/1500#RF							
A5	2500#RF							
B1	150#RJ							
B2	300#RJ							
B3	400/600#RJ							
B4	900/1500#RJ							
Code 5	Pipeline Size							
XX	For Flanged							
02	2"							
03	3"							
04	4"							
06	6"							
10	8-10"							
18	12-18"							
36	20-36"							
Code 6	Alloy Material							
0	Not Required							
1	316/316L Stainless Steel							
2	304 Stainless Steel							
3	Hastelloy							
4	Nitronic 60							
5	Carbon steel							
6	Inconel 625							
7	2205 Duplex Stainless Steel							
Code 7	Secondary Pressure Pressure Retaining Cover							
PR	Pressure Retaining Cover							
NP	Non-Pressure Retaining Cover							
CISPL-20	R1	2	XX	A1	10	1	PR	

