

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231  
Ангарск (3955)60-70-56  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Благовещенск (4162)22-76-07  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Владикавказ (8672)28-90-48  
Владимир (4922)49-43-18  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48

Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Коломна (4966)23-41-49  
Кострома (4942)77-07-48  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курган (3522)50-90-47  
Курск (4712)77-13-04  
Липецк (4742)52-20-81  
Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Новосибирск (383)227-86-73  
Ноябрьск (3496)41-32-12

Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Пермь (342)205-81-47  
Петрозаводск (8142)55-98-37  
Псков (8112)59-10-37  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саранск (8342)22-96-24  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17  
Тамбов (4752)50-40-97  
Тверь (4822)63-31-35  
Тольятти (8482)63-91-07  
Томск (3822)98-41-53  
Тула (4872)33-79-87  
Тюмень (3452)66-21-18  
Улан-Удэ (3012)59-97-51  
Ульяновск (8422)24-23-59  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Чебоксары (8352)28-53-07  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://gea.nt-rt.ru/> || [gsg@nt-rt.ru](mailto:gsg@nt-rt.ru)

# СИСТЕМЫ КОНТРОЛЯ ВЫБРОСОВ СКРУББЕРЫ Технические характеристики



# EMERGENCY SCRUBBER

GEA's Emergency Gas Scrubbers are equipped with GEA's Jet Scrubber technology. Therefore they are able, in the event of an accident, to suck in the surrounding air without using a mechanical ventilator, to chemically bind the critical gases (e.g. chlorine or ammonia) in the scrubbing liquid (usually caustic soda or sulfuric acid) and to release only cleaned air into the environment. In order to start up the Emergency Gas Scrubber only the circulation pump has to be switched on, the cleaning function is available instantaneously.

## Design

GEA offers the emergency units in four standard sizes, in this case, the size of the plant is determined by the amount of gas to be bound and the amount of air to be conveyed.

The scrubbing stage consists largely of polyethylene PE. In accordance with the media lists of the Institute for Building Technology in Berlin, PE is approved for the storage of caustic soda and sulfuric acid.

The scrubbing liquid, which is kept in the storage tank of the emergency unit, is individually suited to the size of the customer's plant (storage capacity or inventory of the critical component) and is always available in case of an emergency. The consumed scrubbing liquid can be disposed after the elimination of the incident.

Construction dimensions and technical data are available. For larger absorption capacities, GEA can calculate solutions specially to suit your requirements.

## Your advantages

High level of operational safety and little maintenance

Immediately ready for operation on starting the circulation pump

Auto-suction of the gas flow and gas conveyance

No mechanical ventilator required

No fittings such as packing, droplet separator etc. which could become blocked

Immediate availability of the absorption medium

No problems with mechanical seals through use of submergible pump

Compact design

Numerous GEA chlorine emergency scrubbing units are in operation in the chemical industry.

An increasing number of international and German water works are securing their chlorine tanks using GEA chlorine emergency units.



# LINEAR FLOW SCRUBBER

Linear Flow Scrubbers are adjustable and high-efficiency scrubbers that represent a substantial advancement on the already mature technology of the Radial Flow Scrubbers.

Used for dust and particulate removal in saturated waste gases, Linear Flow Scrubbers offer increased energy savings and efficiency thanks to their high adaptability, adjustability capacity to steadily scrub at fluctuating gas flow rates.

Best applied in copper smelting furnaces or converters, zinc smelters and roasters, lead smelters, molybdenum roasters, nickel-copper / platinum smelters and other pyrometallurgical processes.

However, Linear Flow Scrubbers are not to be exclusively used for the non-ferrous metallurgical industry.

## Particular features

- Variable adjustment of the scrubbing zone

- External drives for scrubber adjustment

- CFD optimized nozzle arrangement and flow conditions

- Automatic gas pressure drop control

- Steady scrubbing at fluctuating gas flow rates

- Energy saving

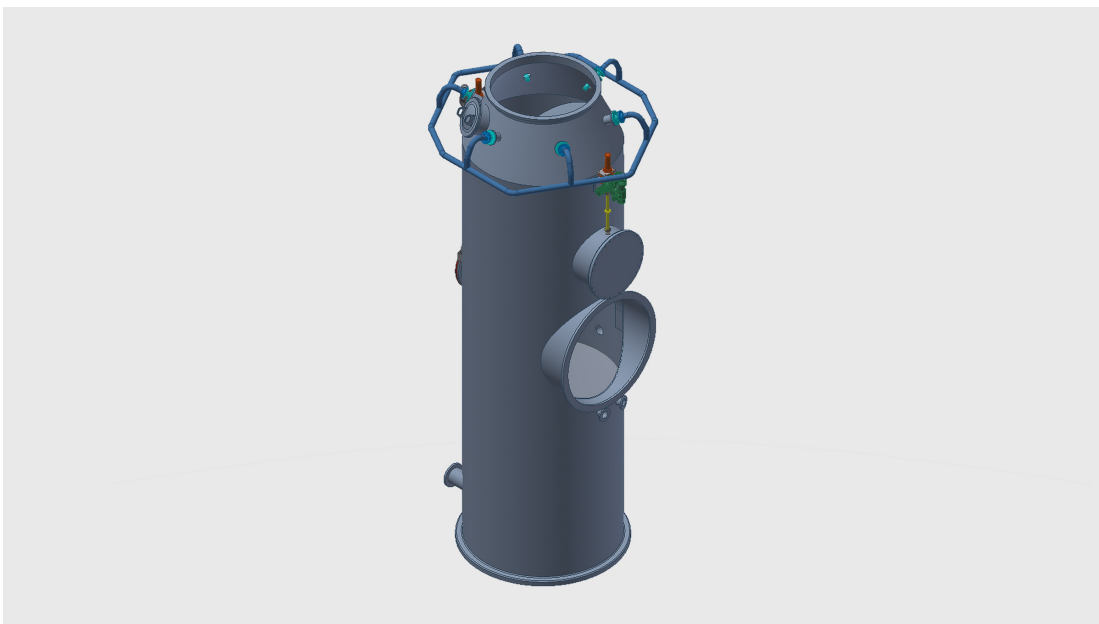
- Wide range of volume flow 1:100 at constant pressure drop

- Allows for the accommodation of several scrubbing stages in a single vessel

- Enlarged scrubbing section/reaction line lead to high efficiencies

- High removal efficiencies with low pressure drop

- Compact design, smaller footprint and reduced height



# PACKED COLUMN SCRUBBER

Absorption Columns are the most common gas/liquid mass transfer equipment used for the cleaning of exhaust gases through chemical or physical absorption. Absorption Columns can be built of a variety of materials in a broad size range that goes from a few m<sup>3</sup>/h up to several hundred thousand m<sup>3</sup>/h.

In many cases, column type contactors are combined with other GEA Scrubber types - the overall configuration of the gas cleaning line depends on the gas composition and the relevant emission limits.

The naming of the column type depends on the applied column internals. A distinction is made between:

- Packed-bed columns using random packing material

- Packed columns using structured packing material

- Plate columns using trays instead of packing material

Besides the use as emission control equipment, Absorption Columns can be used in various other cases where an intensive contact between gas and liquid is needed, e.g. in chemical production processes.

Key Features:

- Energy efficient gas/liquid contactor

- Low pressure drop

- Low maintenance and low maintenance costs

- Available in nearly all materials

- Can be combined with all other types of gas scrubbers



# JET SCRUBBER

Jet Scrubbers are very versatile, either as fast absorber, de-duster or gas cooler. They operate according to the injection principle and do not cause any pressure loss but generate a pressure increase in the gas flow instead. The circulating scrubbing liquid serves as a motive medium and conveys the induced gas through the jet scrubber pipe. They can be immediately put into operation, making of them the best choice in case of any emergency.

With a gas volume flow of up to 200,000 m<sup>3</sup>/h, Jet Scrubbers are suitable for quenching, absorption, particle separation and as emergency scrubber system. The system easily scales down to flow rates of 5 m<sup>3</sup>/h or less as well.

For particle sizes larger than approximately 3 µm, Jet Scrubbers can achieve a separation efficiency of over 98% while still maintaining a pressure gain. Depending on the density of the particles, the efficiency can be even higher.

The Jet scrubbers from GEA consist of a vertical or sloped standing tube with vertical gas inlet and a liquid distribution by propelling jet nozzles. Followed downstream by a separation and storage tank.

As emergency scrubbers they are utilized as:

Chlorine, HF or Ammonia scrubber in the chemical industry

Mobile systems for firefighting/HazOp departments

Jet Scrubbers can be used for de-dusting applications such as:

Cleaning lime furnace gases upstream compressors (sugar industry, soda production)

Cleaning flare gas and pyrolysis gases upstream compressors (petro-chemical industry)

Among their applications as gas coolers are to find:

Pre-cooling and inter-cooling in compression units

Simultaneous quenching and absorption of large quantities of harmful gases

Key features

Can be made of almost any material

Wide range of applications

Combination of particle separation and separation of pollutants in one unit

Auto-suction, no pressure loss

Low maintenance requirements

Easily adaptable to large fluctuations in load

Resistance to fouling



# RADIAL FLOW SCRUBBER

Radial Flow Scrubbers can be adjusted as required for the respective collecting efficiency, allowing for them to be operated at optimum differential pressure, helping saving energy.

In many applications, Radial Flow Scrubbers are combined with an upstream Venturi stage for raw gas saturation and pre-dedusting. Often, a droplet separator is accommodated in the same casing as the scrubber zone to prevent any droplets from being entrained to downstream equipment.

Its design allows for the accommodation of several scrubbing stages in a single vessel and even for critical substances like As, Se or Pb, high collecting efficiencies are achieved. Inlet temperatures of the raw gas of up to 800 °C can be handled by combining the appropriate materials with a brick lining. While Radial Flow Scrubbers are especially suitable for batch processes in converters, they are not exclusive for the non-ferrous metallurgical industry.

Radial Flow Scrubbers are mainly used for either gas cooling (to reduce the temperature by water evaporation) or gas cleaning (to condense aerosols and remove solid impurities).

## Particular features

Variable adjustment of the scrubbing zone

Automatic gas pressure drop control

Constant scrubbing efficiency

Emergency water system

Low carry-over of droplets

Special brick lining at dry-wet zone interface

Steady scrubbing at fluctuating gas flow rates

Energy saving

High removal efficiencies with low pressure drop



# VENTURI SCRUBBER

With GEA's Venturi Scrubbers you benefit from a high separation efficiency that relies on the high relative velocity between the gas and the scrubbing liquid in the Venturi throat. Their main field of application is the treatment of gas containing very fine particulate matter or droplets, like aerosols, to meet the ever more demanding emission limit regulations.

The Venturi Scrubber is particularly apt for use with fluctuating gas streams: The free cross-sectional area for the gas flow is continuously adjusted during operation to allow for a steady and reliable performance.

In addition to standard design, GEA provides you with customized solutions that cope with gas quenching and treatment of gaseous pollutants in the gas. This is done by an adaptable nozzle arrangement and the appropriate choice of scrubbing liquid, respectively. Moreover, there are various arrangements available to fit with your individual spatial and process requirements.

Depending on the application, GEA delivers two types of Venturi scrubbers: The small to mid-scale scrubber is mainly used in the chemical industry whereas the large-scale Venturi scrubber is predominantly in use in the iron & steel and non-ferrous industry. Typical gas volume flow rates range from 1 to 300 000 m<sup>3</sup>/h.

## Particular features

Suitable for both particulate matter and aerosol separation

customizable for a wide range of applications, e.g. quenching and absorption

High level of operational reliability and safety, also with fluctuating gas streams

Virtually no idle time during start-up

Low maintenance requirements owing to the robust and proven design

Available in nearly all materials for improved chemical and thermal resistance



# COMPACT & LABORATORY SCRUBBER

## Function

Amongst others, especially the chemical industry requires complex gas treatment solutions for either production processes or emission control applications. The Compact & Laboratory Gas Scrubbers Series is designed for exactly these purposes. Compact Gas Scrubbers consist of a jet scrubber and, downstream, an absorption column. The jet scrubber operates according to the injection principle and therefore the gas scrubber as such does not cause any pressure loss but generates a pressure increase in the gas flow instead. The circulating scrubbing liquid serves as a motive medium and conveys the induced gas through the jet scrubber pipe. Therefore, when using a compact gas scrubber from GEA no mechanical fan is required for extracting and conveying the gases.

The Compact Scrubbers from GEA are supplied in 6 standard sizes (DN50, DN80, DN100, DN150, DN200 and DN250) and 4 standard configurations (Jet Scrubber, Liquid Tank, Counter-current Column and Circulation Pumps). The modular concept allows easy expansion and adaptation to customer-specific requirements.

The Laboratory Scrubber is available in a smaller size (DN40).

Standard materials of construction are polyethylene (PE) or polypropylene (PP), which only differ by their applicable temperature range and their UV stability. PE and PP show already very good chemical stability and are preferred for ambient pressure and low temperature applications. For higher chemical or thermal stability requirements copolymers of e.g. ethylene/tetrafluoroethylene (ETFE) or tetrafluoroethylene perfluoralkoxyvinyl ethers (PFA) or even polytetrafluoroethylene (PTFE) lining can be used. Combined with housing of either fiber reinforced plastics (FRP), carbon steel (CS) or various stainless steels (SS) / alloys a very high mechanical, thermal and chemical resistance of the construction can be realized.

They are mainly used for gas treatment in laboratories, pilot and production plants in the chemical and pharmaceutical industries.

## Particular features

- Broad range of applications, flexible in use
- Self-extracting, no pressure loss
- Wide load range, efficient partial load behavior
- Easily combinable and expandable
- Available in almost all materials
- Resistant to fouling
- High reliability, low maintenance effort
- Compact design, low space requirement
- CE conformity according to European Machine Directive (2006/42/EC)
- Available in ATEX conform design, if required



По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231  
Ангарск (3955)60-70-56  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Благовещенск (4162)22-76-07  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Владикавказ (8672)28-90-48  
Владимир (4922)49-43-18  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48

Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Коломна (4966)23-41-49  
Кострома (4942)77-07-48  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курган (3522)50-90-47  
Курск (4712)77-13-04  
Липецк (4742)52-20-81  
Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Новосибирск (383)227-86-73  
Ноябрьск (3496)41-32-12

Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Пермь (342)205-81-47  
Петрозаводск (8142)55-98-37  
Псков (8112)59-10-37  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саранск (8342)22-96-24  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17  
Тамбов (4752)50-40-97  
Тверь (4822)63-31-35  
Тольятти (8482)63-91-07  
Томск (3822)98-41-53  
Тула (4872)33-79-87  
Тюмень (3452)66-21-18  
Улан-Удэ (3012)59-97-51  
Ульяновск (8422)24-23-59  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Чебоксары (8352)28-53-07  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://gea.nt-rt.ru/> || [gsg@nt-rt.ru](mailto:gsg@nt-rt.ru)