Metering & Control Technology

for Liquids, Gases and Solids

Chlorination Plants

Types and Technical Data.

JESCO®

DOSIERTECHNIK

Jesco
DOSIERTECHNIK

is working according to
DIN EN ISO 9001

Jesco
DOSIERTECHNIK

115 V ~ CSA approved
solenoid-driven metering pumps
are available.

Jesco
DOSIERTECHNIK

is recognized as a Professional
Manufacturer according to
§ 19 I of the German Water
Conservation Rules (WHG)

JESCO Metering Technology.
Our metering equipment gives water the right quality for use.

Water is precious.
The more its consumption increases due to public, industrial and domestic use, the more crucial it becomes to treat the water for reuse. Disinfection as the final treatment stage plays a particularly important role in this process.

The responsible introduction of disinfectants into the water requires reliable metering technology. With the help of extensive research and development, JESCO has created system solutions which are accepted all over the world.

There is a whole range of methods for disinfecting drinking water, pool water, cooling water and waste water. They are differing in the configuration of the equipment and in the chemicals used. Due to their easy application and effectiveness, chlorine and its compounds have been used successfully for many decades in water treatment.

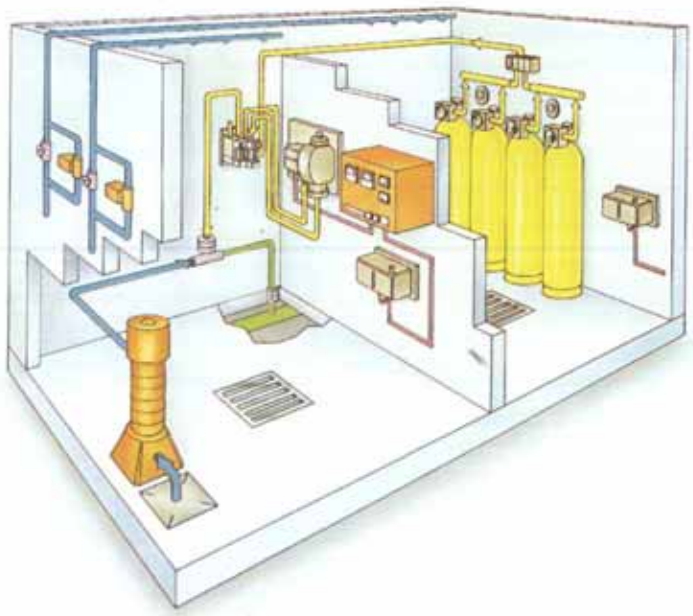
We have specialized in chlorine metering technology. No matter how varied the individual metering tasks may be, they will all be solved by our comprehensive range of proved equipment metering chlorine gas under vacuum or liquid chlorine compounds.

JESCO chlorination plants consist of well-matched components and therefore meet all requirements from chlorine metering to analyzing and warning equipment, which can be expected from a state-of-the-art installation. They stand out for their reliability and repetitive metering accuracy.

JESCO chlorination plants correspond to the DIN standard and ensure an optimum water quality due to exactly rated disinfection. We contribute our know-how and experience in order to provide the best solution - technically and economically.

In addition to the high quality of our precision equipment, our know-how is an important factor for the success of our customers. Worldwide.

JESCO - Metering Technology.
Systematic chlorine application.



Safety by ensuring a full vacuum off the cylinder
JESCO chlorine gas metering devices guarantee the highest possible safety according to DIN 19606. They are operated under full vacuum starting directly at the chlorine cylinder. Chlorine gas cannot escape even if the chemically resistant plastic lines and devices are mechanically damaged. The cylinder-mountable chlorinators feature a residual pressure preservation for the pressure-gas cylinder. As a standard, a pressure gauge for indication of the cylinder pressure double-protected by a glycerin-diaphragm separator is part of the equipment.

Simultaneous chlorine gas delivery with C 2211
The cylinder-mountable C 2211 chlorinators are particularly suitable for battery operation as they allow an almost simultaneous emptying of the chlorine gas cylinders. A flow limiter prevents the cylinder from freezing due to excessive delivery volumes.

Metering of liquid chlorine products
For public baths and private swimming pools, the metering of sodium hypochlorite and other chlorine compounds dissolved in water is still advantageous because there is little equipment required for this application. A wide range of appropriate pumps with mixing and storage tanks and monitoring facilities is available for metering liquid products.

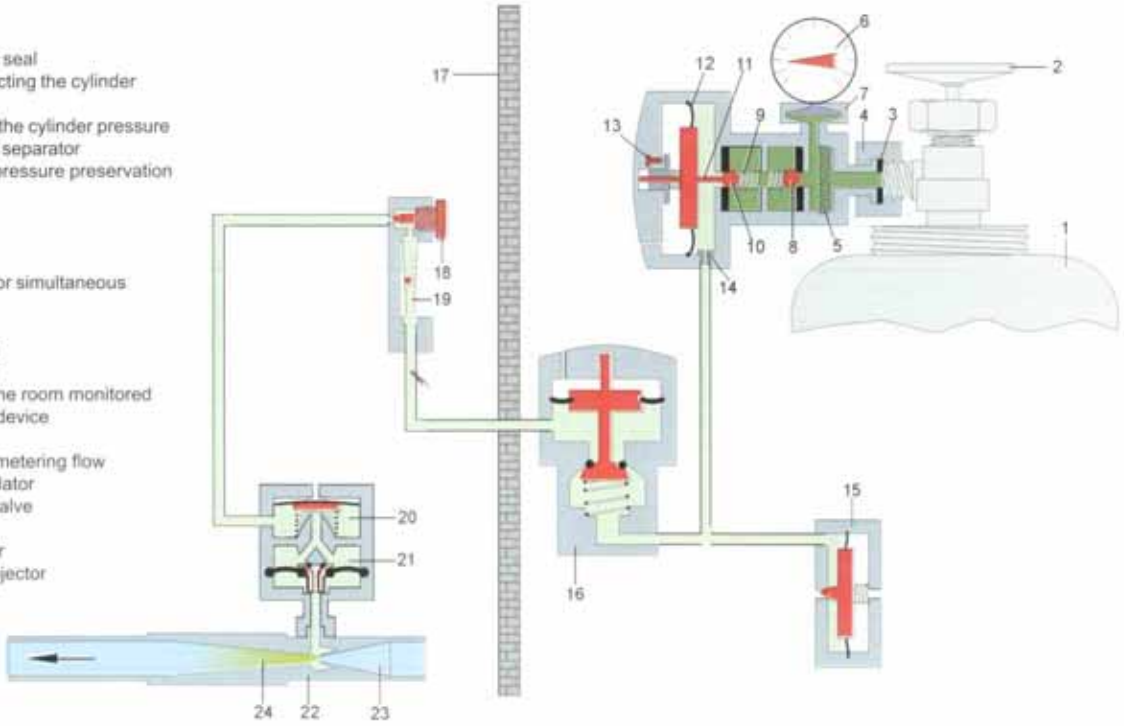
Chlorine surplus
A reliable measure for the resistance of water to bacteria, viruses, germs, algae, etc. is the concentration of free chlorine. It can be determined quickly, continuously and exactly using the chlorine measuring cell.
JESCO supplies amperometric, potentiostatic and diaphragm-covered sensors.
The two types mentioned first are cleaned continuously by the ROTOBALL system.
The electric output signals of the measuring cell are used for remote signaling and automatic control of the chlorine surplus. Thus the optimum disinfection of water is made possible without excessive metering.

Control
Apart from the chlorine concentration in the water, there are some other important parameters.
JESCO offers a complete range of equipment for measuring, recording and automatically controlling free chlorine, chlorine dioxide, pH value, redox potential, conductivity, etc. These values are measured, recorded and automatically controlled. Networking of the measurement and control system is realized by connecting the devices to a PC. Remotely controllable JESCO metering pumps and chlorinators are used as correcting elements.

Gas warning device
Gas warning devices monitor the chlorine concentration in the air of chlorine gas store-rooms or of areas where chlorinators are installed. The devices consist of a test amplifier and up to four sensors based on maintenance-free semiconductor technology.
Every sensor has two alarm levels.

JESCO Metering Technology.
Function of a full-vacuumsystem.

1 Chlorine cylinder
2 Cylinder valve
3 Cylinder connection seal
4 Union nut for connecting the cylinder
5 Filter
6 Pressure gauge for the cylinder pressure
7 Glycerin-diaphragm separator
8 Ball of the residual pressure preservation
9 Closing spring
10 Closing ball
11 Diaphragm pin
12 Diaphragm
13 Adjustment facility for simultaneous delivery
14 Flow gland
15 Safety blowoff valve
16 Safety shutoff valve
17 Wall opening from the room monitored by the gas warning device
18 Measuring glass
19 Adjusting valve for metering flow
20 Back-pressure regulator
21 Ejector non-return valve
22 Ejector
23 Nozzle of the ejector
24 Mixing cone of the ejector



Full-vacuum chlorination systems have been designed according to the highest safety standards of DIN 19606. The chlorine gas under excess pressure (dark green) is extracted under safe vacuum (light green) from the cylinder (1). Even in the case of a line rupture, chlorine gas cannot escape. Only atmospheric air is primed. In the ejector (22) the vacuum is generated. A highly accelerated water jet leaves the nozzle (23) and reaches the mixing cone (24) carrying forward chlorine gas. The chlorine gas dissolved in the water flows as the so-called chlorine solution (mostly hypochloric acid) to the injection nozzle.

After the non-return valve is opened (21), the vacuum is propagated through the back-pressure regulator (20) and the measuring glass to the diaphragm (12) of the vacuum regulator. When reaching the required operating vacuum, the diaphragm pin (11) pushes the ball (10) to the right against the spring (9). Chlorine gas flows past the ball (10) into the vacuum. The chlorine gas flow is set at the measuring glass (18) by means of the valve (19).

Due to water pressure fluctuations before and after the ejector, the suction performance of the ejector is not constant and the chlorine gas flow varies. Therefore DIN 19606 prescribes the use of a valve which allows to set a constant suction performance. This function is ensured by the back-pressure regulator (20) in the upper chamber of the non-return valve.

If the ball (10) does not close because of impurities although the ejector is switched off, the safety blowoff valve (15) opens and allows chlorine gas to escape close to the gas sensor which causes an alarm immediately. A safety shutoff valve (16) makes sure that the blowoff valve is activated even if the vacuum piping in the rest of the line network is either defective or dismounted. It opens only if there is a vacuum from the ejector.

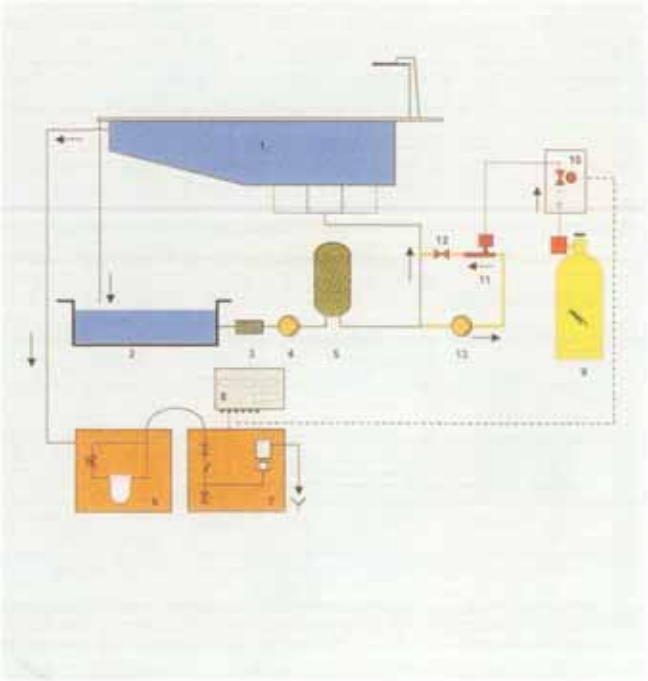
When the chlorine gas cylinder is emptied to a residual pressure of approximately 0.2 bar, the ball (8) of the residual pressure preservation allows no more gas to flow to the vacuum regulator. When exchanging empty cylinders, this residual pressure prevents humid air from entering the chlorine gas cylinder and thus protects it against internal corrosion.

To protect the safety-related valves, a filter (5) is integrated at the input of the inlet valve which is under excess pressure (dark green). The cylinder pressure can be read permanently at the pressure gauge (6), which is fitted with a glycerin-diaphragm separator (7) for double protection.

To make sure that, in the case of several vacuum regulators operated in parallel, all connected cylinders are emptied as equally as possible, a vacuum regulator version with adjustment facility for simultaneous delivery (13) is available. This function is supported by a flow gland (14) in the metering connection.

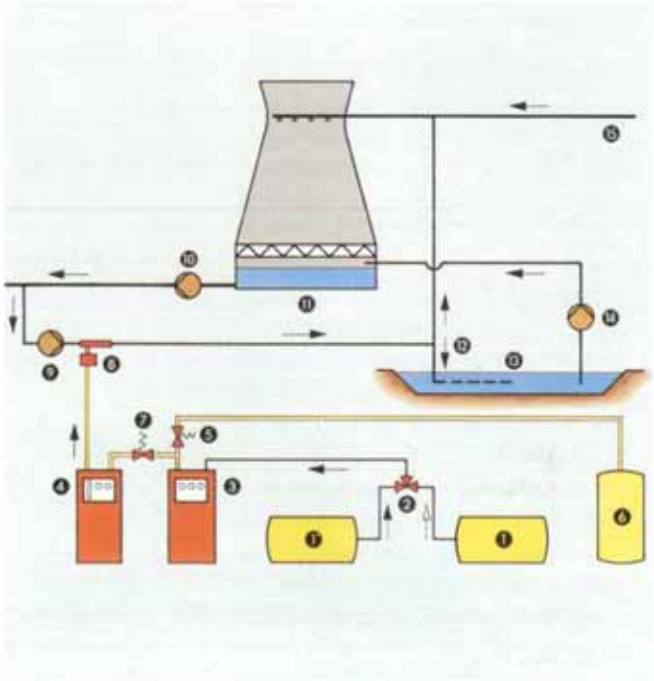
JESCO Metering Technology.
Application-specific configurations of installation plants.

Swimming pool control



1 Swimming pool
2 Splash water tank
3 Trap
4 Circulating pump
5 Filter unit
6 Activated carbon filter
7 Water sample station with measuring cell
8 Topax 6
9 Chlorine cylinder with vacuum regulator
10 Chlorine control valve and flow meter
11 Chlorine gas ejector
12 Chlorine injection nozzle
13 Booster pump

Shock chlorination system



1 Chlorine tank
2 Changeover valve
3 Chlorine evaporator
4 Chlorinator
5 Safety valve
6 Collecting vessel
7 Pressure reducing valve
8 Chlorine ejector
9 Booster pump
10 Cooling-water pump
11 Cooling tower
12 Chlorine solution
13 Settling tank
14 Additional water
15 Water for cooling

Swimming pool control
According to DIN 19643, swimming pool water must have a free chlorine concentration of at least 0.3 mg/l at each point of the pool in order to guarantee that the water quality is bacteriologically impeccable. An automatic metering installation ensures reliably and conveniently that the required chlorine surplus is maintained without excessive metering even if the load is varying. The main part of the system is a measuring cell which determines the actual free chlorine concentration on the basis of the depolarization method. The regulator output activates either a continuous regulating valve to adjust the chlorine gas flow or a pump for metering liquid chlorine media. A constant water quality is thus ensured.

Shock chlorination system
The biological contamination of the cooling water of large energy generation plants by shells, algae, bacteria and viruses is combatted successfully by using chlorine. It has been found out that the microorganisms do not become resistant if short shock chlorinations with large amounts of chlorine take place instead of continuous chlorination. With this method, the average chlorine consumption is lower than with continuous chlorination. Another successful method is to meter small amounts of chlorine continuously and superimpose them with strong chlorine shocks.

For most cooling water systems, a frequency of four to six chlorine shocks is required per day. Cooling water circulation systems with minor loads partly do not need more than 3...4 chlorine shocks per week. The duration of a shock should be betweeen 15 and 25 minutes, and the free chlorine concentration should be increased to 10...15 ppm.

Types.
Technical data.

C 2211

Full-vacuum chlorinator for simultaneous delivery from cylinders in battery operation
(up to 10 kg Cl_2/h)

The vacuum regulator is mounted directly on the chlorine cylinder and does not allow chlorine gas to flow unless there is a full vacuum in the line and metering system. The equipment corresponds to the highest safety standard according to DIN 19606, and even provides functions which go beyond this standard.
These include:

- Cylinder connection with union nut
- Filter for chlorine gas
- Residual pressure preservation
- Pressure gauge with diaphragm pressure transmitter
- Vacuum regulation
- Flow limiter (1 kg/h)
- Simultaneous delivery
- Flow rate up to 10 kg/h (without flow limiter)
- Special versions for other gases (HCl, CO_2, SO_2) available

The C 2211 allows simultaneous delivery from several cylinders in battery operation, if larger chlorine quantities are to be metered. For this purpose the C 2211 full-vacuum chlorinator is equipped with a special adjusting facility for parallel supply.

Fields of application
Public baths, swimming pools
Water stations
Waste water treatment
Water treatment

C 2212

Full-vacuum chlorinator for single-cylinder
(up to 4 kg Cl_2/h)

The vacuum regulator is mounted directly on the chlorine cylinder and does not allow chlorine gas to flow unless there is a full vacuum in the line and metering system. The equipment corresponds to the highest safety standard according to DIN 19606, and even provides functions which go beyond this standard.
These include:

- Cylinder connection with union nut
- Filter for chlorine gas
- Residual pressure preservation
- Pressure gauge with diaphragm pressure transmitter
- Vacuum regulation
- Safety blowoff valve
- Flow meter
- Metering valve
- Special versions for other gases (HCl, CO_2, SO_2) available

The C 2212 is used mainly for the classic single-cylinder installations or for pressure pipe installations.

Fields of application
Public baths, swimming pools
Water stations
Waste water treatment
Water treatment

C 2005

Chlorine gas changeover equipment for vacuum operation
(up to 4 kg Cl_2/h)

To ensure uninterruptable operation of chlorination plants, a second chlorine gas supply unit is required which can be activated as soon as the first unit is empty. The changeover equipment is used to enable uninterruptable chlorine supply.
C 2005 uses the operating vacuum and works without auxiliary energy.

Fields of application
Public baths, swimming pools
Water stations
Waste water treatment
Water treatment

JESCO Metering Technology.
Chlorinators.

C 7700

Chlorine control valve (ATE)
Control range: 0…80g Cl_2/h up to
0…200 kg Cl_2/h

C 7700 chlorine control valves are electrically adjustable plastic control valves for chlorine gas metering under vacuum. They allow a continuous proportional metering of chlorine gas but can also be used as the final control element within an automatic control system. The drive is a servo-motor (ATE). The unit is controlled either manually by an open/close key or a controller with three-point switch.

- 4…20 mA Ansteuerung auf Anfrage

Fields of application
Publics baths, swimming pools
Water stations
Waste water treatment
Water treatment

C 2525

Full-vacuum chlorinator
up to 25 kg Cl_2/h

The C 2525 equipment is designed as a full-vacuum chlorinator according to DIN 19606. It can be supplied either in a cabinet for floor mounting or on a plate for wall mounting.

- Chlorine gas pressure gauge
- Vacuum gauge
- Special versions for other gases
  (HCl, CO_2, NH_3, SO_2)

Fields of application
Water stations
Public baths, swimming pools
Cooling water systems
Waste water treatment
Water treatment

C 2700

Full-vacuum chlorinators
up to 200 kg Cl_2/h

The C 2700 equipment is designed as a full-vacuum chlorinator according to DIN 19606. It can be supplied either in a cabinet for floor mounting or on a plate for wall mounting.

- Chlorine gas pressure gauge
- Vacuum gauge
- Special versions for other gases
  (HCl, CO_2, SO_2)

Fields of application
Water stations
Shock chlorination systems for cooling water disinfection to kill algae, shells, etc. in all parts of the system
Waste water treatment
Water treatment

Types.
Technical Data.

C 6100

Chlorine evaporator
Evaporative power:
up to 220 kg Cl_2/h

With the C 6100 chlorine evaporator, permanently much more than 1% chlorine per hour can be taken from the tank and converted into gas.
The evaporatoin process takes place in the heated chlorine evaporator. The chlorine supply just has to be rated as to allow to exchange the tanks at appropiate intervals.
Advantages:

- Reduction of danger due to a minimum number of opened chlorine barrels
- Maximum temperature of 100°C because water is the heat carrier
- Cathodic protection against corrosion
- Coil construction with large heat transfer surface
- No circulating pump required
- Highest possible safety standard

Fields of application
Water stations
Shock chlorination systems
Waste water treatment
Water treatment
Large users in industry and petrochemistry

C 7512

Automatic changeover valve for chlorine gas under vacuum
up to 100 kg Cl_2/h

As a standard, two chlorine supply units (cylinder or barrel batteries) are provided for chlorination plants. This is the only way to operate the plant 24 hours per day. A changeover valve is required to switch over automatically to the standby battery.
The C 7512 changeover valve is fitted with relay contacts for remote signaling of the system condition.

Fields of application
Waterworks
Swimming pools
Waste water treatment
Water treatment

GW 404 und GW 504

Gas detector

In systems using chlorine gas the atmosphere must be checked for dangerous chlorine concentration. The GW 404 chlorine detector allows reliable monitoring.
If the alarm values are exceeded, safety equipment such as flash bulb, signal horn and sprinkler are activated in two steps.

Up to four different sensors can be connected to the basic GW 404 unit. The maintenance-free semiconductor sensors are available for
- chlorine
- chlorine dioxide
- ozone.

With the GW 504 gas sensor it is additionally possible to display the current concentration and to connect an external relay box.

Fields of application
Swimming pools
Waterworks
Waste water treatment
Water treatment
Industry and petrochemistry

Types.
Technical data.

Fittings and accessories

For our chlorinators, we offer all accessories necessary to provide complete chlorination plants.

- Safety shutoff valve
- Safety blowoff valve
- Chlorine cylinder / chlorine barrel auxiliary valves
- Chlorine manifolds
- Chlorine heating blocks
- Pressure reducing valves
- Contact pressure gauges
- Chlorine gas distrubutors
- Booster pumps
- Booster pump accessories
- Ejectors
- Chlorine solution injection nozzles
- Chlorine measuring cells
- pH and redox measurement / control
- Controllers
- Recorders

  etc.

The extensive range of JESCO products includes:

Metering pumps
- Diaphragm metering pumps
- Piston metering pumps
- Piston-diaphragm metering pumps
- Double-diaphragm metering pumps
- Simplex and multi-head pumps with up to 12 metering heads
- Solenoid metering pumps
- Peristaltic pumps
- Special pumps for effervescent or highly viscous media
- Max. capacities of 0.1...4,400 l/h per metering head, pressures of 3...400 bar depending on the capacity
- Chemically resistant plastic, stainless steel materials and special materials
- Drive by electric motors or stroke solenoids
- Fully automatic pump control
- Fittings, tanks and accessories (i.e. inline pulsation dampeners, priming aids)

Chlorinators
- Cylinder-mounted units, 0...10 kg/h
- Chlorinators with "simultaneous chlorine gas delivery" from cylinder and barrel batteries into the vacuum
- Wall-mounted and cabinet-type units 0...200 kg/h
- Chlorine evaporators for up to 220 kg/h
- Gas warning devices
- Safety equipment
- Photometer for water analysis
- Fittings and accessories (i.e. Injektoren)

Dry Feeders
- with elf-cleaning open helix
- with fixed or controllable volume adjustment
- with stirrer against bridging
- Dust collectors, Bag emptiers, Hoppers

Measuring and Control Equipment
- Sensors for pH, redox, chlorine surplus, combined chlorine, conductivity, level, pressure, etc.
- Sampling stations
- Measuring transducers
- Signal converters
- Microprocessor controllers, continuous or on/off operation, with P, PI, PD and PID functions for direct or ratio control with disturbance-variable feed-forward system
- Control valves
- Visualization software
- Controls for metering pumps, chlorinators, dry feeders

Chemical Centrifugal Pumps
- Vertical Immersion Pumps
- Chemical Motor Pumps
- Chemical Standard Pumps

Metering systems
- Chlorine dioxide systems for up to 750 g/h
- Activated-carbon systems
- On-site electrolytic chlorination systems

Metering & Control Technology

for Liquids, Gases and Solids

JESCO has a worldwide network of partners who are specialists in application consulting and offer customer-oriented service.

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