



1 Your steam, air, gas, or liquid under pressure supplies motive energy here...

2 ...creating a vacuum that pulls a suction fluid from here...

3 ...into a chamber where the 2 fluids mix...

4 ...and discharge here under pressure.

How to use your plant's steam, gas, air, or water to solve hundreds of everyday problems...

such as...

- moving or pumping liquids and/or solids
- moving or pumping air and gases
- producing a vacuum
- mixing two materials
- heating liquid
- scrubbing a gas...

...using the jet ejector.

WHERE AND WHEN CAN YOU USE A JET EJECTOR?

IF YOU WANT TO...	...IN APPLICATIONS SUCH AS	AND THIS IS YOUR MOTIVE FLUID..	THESE PRODUCTS CAN HELP..	FOR TECHNICAL INFORMATION REQUEST BULLETINS
Move/pump liquids or solids	Emptying a tank or pit Pumping juices or other edibles in a canning plant Supplying heated water to jackets of stills Pumping waste liquids containing solids Cleaning sludge from tanks and pits Moving spent filter clay Heating and moving slurries Sampling operations Moving dry solids using air	Steam	Jet Syphons Steam Jet Heaters Steam Jet Ejectors	BULLETIN 2-A BULLETIN 3-A BULLETIN 5E-H
		Air/Gas	Jet Syphons Steam Jet Exhausters Solid Handling Eductors	BULLETIN 2-A BULLETIN 4-E BULLETIN 2-SH
		Liquid	Liquid Jet Eductors Water Jet Exhausters Solid Handling Eductors	BULLETIN 2-M BULLETIN 4-P BULLETIN 2-SH-LQ
Move/pump air or gases	Agitating fermentation tanks and drying drums Priming centrifugal pumps Exhausting air from vacuum pans and evaporators Pressurizing vats Handling corrosive gases Aerating/oxygenating wastewater Circulating or recirculating steam Boosting flash steam from a condensate receiver Compressing waste steam Convey waste gases to flare Exhaust sulfur pits	Steam	Jet Compressors Steam Jet Exhausters Steam Jet Ejectors	BULLETIN 4-F BULLETIN 4-E BULLETIN 5E-H
		Air/Gas	Steam Jet Ejectors Steam Jet Exhausters Jet Compressors	BULLETIN 5E-H BULLETIN 4-E BULLETIN 4-F
		Liquid	Liquid Jet Eductors Water Jet Exhausters Gas Scrubbers	BULLETIN 2-M BULLETIN 4-P BULLETIN 7-S
Produce a vacuum	Filtration, distillation Impregnation, absorption Drying, degassing Dehydrating, evacuating Cooking, evaporating Vacuum transfer, chilling Removing condensate under vacuum Exhausting air from vacuum pans and evaporators Priming centrifugal pumps	Steam	Steam Jet Exhausters Steam Jet Ejectors	BULLETIN 4-E BULLETIN 5E-H
		Air/Gas	Steam Jet Exhausters Steam Jet Ejectors	BULLETIN 4-E BULLETIN 5E-H
		Liquid	Liquid Jet Eductors Water Jet Exhausters	BULLETIN 2-M BULLETIN 4-P
Mix 2 materials	Mixing chemicals in desired proportions Introducing water-treating compound into boiler feedwater Mixing powdered dye with gasoline Blending oils in a tank Scrubbing gases Mixing by-product gases for furnace firing Mixing propane, butane, and natural gas Compressing waste steam to a usable process pressure Circulating steam in dryers	Steam	Steam Jet Heaters Steam Jet Exhausters	BULLETIN 3-A BULLETIN 4-E
		Air/Gas	Jet Compressors	BULLETIN 4-F
		Liquid	Gas Scrubbers Liquid Jet Eductors Water Jet Exhausters	BULLETIN 7-S BULLETIN 2-M BULLETIN 4-P
Heat a liquid	Submerged heating Heating and circulating water Preventing freezing of water in gas holder tanks, cups Cooking grain, mash, or similar materials Supplying heated water to jackets of stills and graining bowls	Steam	Steam Jet Heaters High Capacity Heaters Jet Syphons	BULLETIN 3-A BULLETIN 3A-HC BULLETIN 2-A
Scrub a gas	Removing SO ₂ , SO ₃ , Cl ₂ , SiF ₄ , HCl, NH ₃ , HF, H ₂ S, HNO ₃ , H ₂ SO ₄ , COCl ₂ , HCN, SOCl ₂ , HBr, Br ₂ , F ₂ , formaldehyde, particulates, reduced sulfur compounds, and many other compounds	Liquid	Gas Scrubbers	BULLETIN 7-S
Reduce steam temperature	Power plant requirements for desuperheated steam Improve heat transfer of surface-type heat exchangers Reduce and control superheated steam temperatures that harm product Control superheat temperatures at partial loads Maintain balance between process steam and power requirements	Steam	Steam Desuperheaters	BULLETIN 6-D

OTHER SCHUTTE & KOERTING PRODUCTS YOU MIGHT BE INTERESTED IN

- Low-Level Condensers
- Steam Jet Blowers
- Barometric Condensers
- Valves

SCHUTTE & KOERTING OFFERS YOU WORLDWIDE SERVICE AND SUPPORT

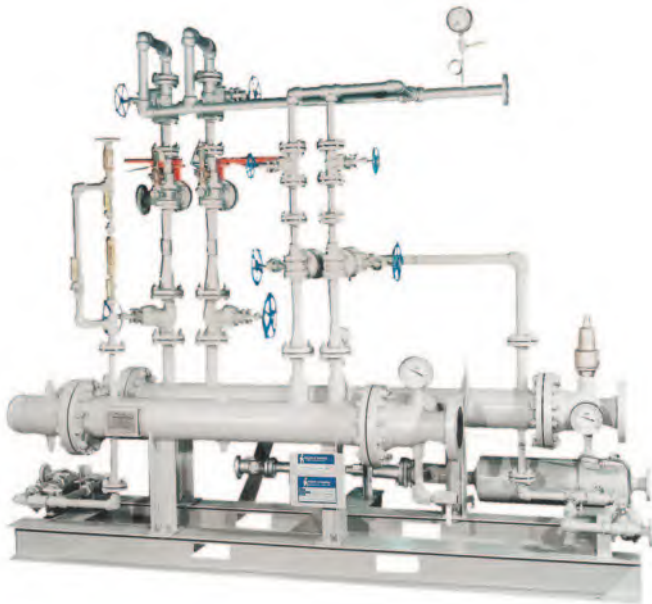
Schutte & Koerting supports you with an extensive network of sales and service offices located around the world. A Schutte & Koerting factory-trained representative is located nearby to serve your needs. Please contact our headquarters in the U.S. to find the representative nearest you.

STEAM JET EJECTORS – SINGLE STAGE (Request Bulletin 5E-H)



- **Function:** Produce vacuums ranging from 1" Hg abs using steam as the motive fluid
- Preferred vacuum producer in many applications due to low maintenance, simplicity of design, ability to handle gases under tough conditions, and their overall economy
- Typically use steam or air as motive medium, however, many other gases can also be used
- Units can be designed to discharge to elevated back pressures

STEAM JET EJECTORS – MULTI-STAGE (Request Bulletin 5E-H)



- **Function:** Used in applications where single stage steam jet ejectors cannot provide low enough suction pressures economically
- Supplied in two to six stages, depending on vacuum requirements
- **Suction pressure ranges:**
 - Two-stage: 110 mm Hg abs to 3 mm Hg abs
 - Three-stage: 26 mm Hg abs to 0.8 mm Hg abs
 - Four-stage: 4 mm Hg abs to 75 μ Hg abs
 - Five-stage: 0.4 mm Hg abs to 10 μ Hg abs
 - Six-stage: 100 μ Hg abs to 3 μ Hg abs
- **Condensing types** feature an intercondenser between ejectors that reduces steam consumption

- **Noncondensing types** have the first stage jet ejector discharging directly into the second; the second into the third; and so on – used where initial cost takes priority over operating cost or when service is intermittent or when intercondensers are not feasible
- Both condensing and noncondensing types can be supplied with aftercondensers, which condense steam and any condensable vapors before noncondensables are discharged to atmosphere
- **Complete packaged systems** usually includes ejectors, shell and tube condensers with steam piping, cooling water piping between stages, steam regulator, gauges and instrumentation, assembled in one compact, custom designed package
- Packages may include suction pressure control, steam regulators and many other options upon request
- Packages are designed to fit within your limited floor space with process connections exactly where you need them
- Slide it in, hook it up, and run it
- Versatile, flexible, expandable design

HYBRID VACUUM SYSTEMS



- **Function:** Combine steam jet ejectors and condensers with liquid ring vacuum pumps to create vacuums down to 0.5 mm Hg abs while minimizing utility costs
- Motive force may be steam, compressed air, or atmospheric air
- Like steam jet ejector systems, these may also be supplied as a package

JET SYPHONS

(Request Bulletin 2-A)



- **Function:** Pumping/lifting liquids using steam or air as the motive fluid; heating liquids; handling slurries and granular solids using steam as the motive fluid
- Excellent for use in handling corrosive liquids, abrasive slurries, or granular solids
- Enables you to heat and pump a suction fluid using the same energy source (steam)
- Can use air as the motive fluid if the quantity of suction material is small, or if dilution/contamination cannot be tolerated
- Can be automated with use of a snap valve and ball float arrangement

LIQUID JET EDUCTORS

(Request Bulletin 2-M and data supplement)



- **Function:** Lifting, pumping, mixing, and agitating liquids; handling slurries and granular solids
- Use the kinetic energy of one liquid to cause the flow of another
- Some designs can be automated with a snap valve and ball float arrangement; others are equipped with integral hopper and hopper wash-down nozzle for efficient handling of slurries and dry, granular solids



SOLIDS HANDLING EDUCTORS

(Request Bulletin 2-SH)

Dry solids handling eductors are a maintenance-free replacement for rotary airlock valves in bulk feed applications. They employ motive air from a compressed air source or a blower to entrain and transport solids. The air source can be at pressure as low as 3 psig depending on the transport distance. The motive air is expanded across the nozzle creating a vacuum in the suction chamber drawing the product into the eductor. The motive air and entrained solids are carried through the diffuser section of the eductor and discharged into the conveying system.



STEAM JET HEATERS

(Request Bulletin 3-A)



- **Function:** Use steam to entrain, mix with, heat, and pump or circulate the suction fluid
- Efficient operation: all the steam's heat is absorbed by the liquid being heated
- Eliminates need for additional agitating and circulation equipment

Types of Steam Jet Heaters:

- "Quiet" heater is submerged in liquid to be heated, and uses atmospheric air to prevent the significant noise and vibration of steam bubbles' collapse
- Sparger nozzles are used where heat must be distributed uniformly over a large area
- Circulating heaters provide heating and strong directional circulating action in open tanks
- Continuous heater connects directly to water and steam lines
- Instantaneous heater provides an immediate supply of hot water
- Slurry heater is used primarily to cook grain, mash, or similar materials



STEAM JET EXHAUSTERS

(Request Bulletin 4-E)

- **Function:** Pump/move air and gases at moderately high vacuum using live steam or compressed air as the motive fluid
- Consists of converging diverging nozzle, diffuser, regulating spindle and body
- Spindle provides efficient operation over a wide range of suction capacities and motive pressures

WATER JET EXHAUSTERS AND COMPRESSORS

(Request Bulletin 4-P and data supplement and Bulletin 265/485)



- **Function:** Perform vacuum pumping operations using pressurized water as the motive fluid
- Available in single nozzle and multi-nozzle types
- Multi-nozzle type features 6 or more nozzles; used where very high capacities are required or where there is a limited supply of pressure water
- Other liquids can be used as motive fluid for special applications
- Pull vacuums to within 1/2" Hg of vapor pressure of motive liquid

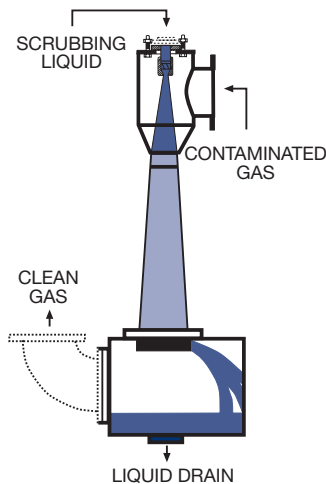
JET COMPRESSORS AND THERMOCOMPRESSORS
(Request Bulletin 4-F and data supplement)



- **Function:** Circulate steam, boost low-pressure steam, and mix gases in a desired proportion using steam, gas or air as the motive fluid; also used to mix with a fuel gas to produce mixed gas with specific BTU values
- Added benefits: jet compressors take the place of a reducing valve; and salvage much of the energy lost in the reduction of operating pressure
- Operate by using a jet of high pressure motive fluid to entrain and mix with a low pressure suction fluid, bringing pressure to an intermediate point
- Thermocompressors use steam as both the motive and suction fluids; save energy by recovering waste steam and combining it with higher pressure steam for reuse in the process, such as paper machine dryers, evaporators, crystallizers and heaters
- Can be equipped with manual or automatic spindles for regulating flow through the nozzle

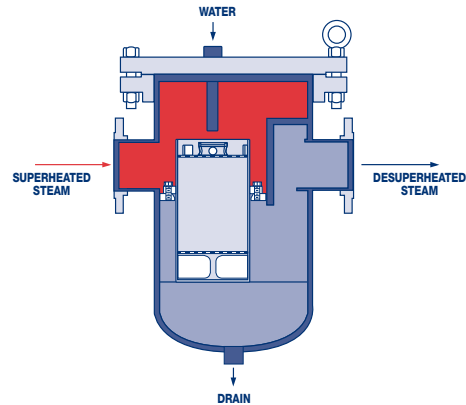
TYPE 7010 EJECTOR-VENTURI GAS SCRUBBERS
(Request Bulletin 7-S and data supplement)

- **Function:** Effectively remove noxious gases, particulates, odors, fumes, and dusts from process streams; creates its own draft, eliminating the need for fans
- Removes particulate contaminants through impaction by a high velocity spray of the scrubbing liquid
- Helps eliminate gases and odors through adsorption and/or chemical reaction between the gases and scrubbing liquid
- Efficiencies as high as 99% or more in a single stage system
- Can be mounted on an existing discharge or storage tank; or provided with an S&K gas/liquid separator



STEAM DESUPERHEATERS
(Request Bulletin 6D)

- **Function:** Reduce steam temperature in power or process applications by introducing water in the steam line through atomization or surface absorption.



- Widest variety of desuperheater designs up to 5000 psig
- Venturi, Annular Venturi, Attemperator, Surface Absorption, Ejector Atomizing designs to meet a complete range of system requirements
- Saturated steam temperature achievable with infinite turn down units
- Materials available (carbon, steel, alloy steel and stainless steel)
- Complete instrumentation and control packages available

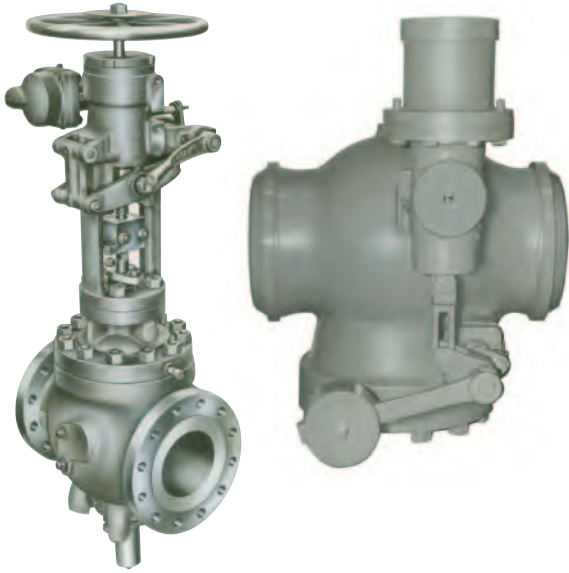
PACKAGED SCRUBBER SYSTEMS
(Request Bulletin 7-S and data supplement)

- Fully customized, complete engineered solutions
- Slide it in, hook it up, and run it
- Versatile, flexible, expandable
- Tolerates system upsets
- Lowers installed cost
- Quick S&K response for sizing it, packaging it, and delivering it to you in as few as 4 weeks



VALVES

Throttle Trip Valves (Request Bulletin 8-C)
Check Valves (Request Bulletin 8-K)



S&K valves are available in a variety of configurations to suit your application requirements. Check valves (right) prevent backflow in steam and water lines to protect valuable equipment from damage. Throttle/Trip valves (left) provide effective flow control and emergency shut-off operation in a single, highly reliable valve assembly.

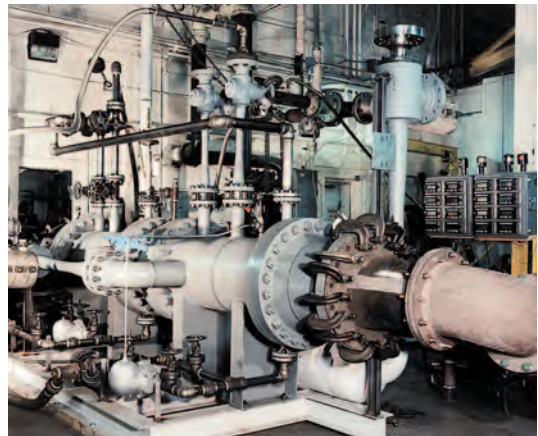
S&K is committed to providing quality valve service and repair, combined with rapid turnaround to ensure that all valves meet original design specifications and manufacturing tolerances.



Two-Stage, Twin Element Turbine Condenser Exhaust System with Hogging Ejector and Silencer. This vacuum system was designed and built at S&K's extensive manufacturing facility for a major power systems company. The system is a standard application for the use of steam jets to exhaust the non-condensable gases from the main steam condenser down stream from a power turbine.



These two steam jet ejectors serve as part of the pressure recovery system at the U.S. Army's high energy laser system test facility in White Sands, New Mexico. They are each 97 feet long with 96 inch diameter end-suction connections, and are among the largest ever manufactured anywhere. Each ejector handles a large quantity of low molecular weight gas at 120 Torr using the equivalent of 1.044 million pounds of steam per hour at 150 psig during the 14-second cycle.



A condenser exhaust vacuum system for the power industry is being tested to develop a performance curve over a series of design points.



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