MESSER

Know-how Navigator

Gases and Application of Messer

Optimizing Processes in the Chemicals Industry

Messer gases are valuable starting materials for a large number of processes in the chemicals industry. Thus, pure oxygen is used, among other things, for the manufacture of aldehydes (for example, for flavorings) or hydrogen peroxide; conversion of the mineral pyrite with oxygen produces sulfuric acid, a very important chemical intermediate product. In the classic Claus process for the desulfurization of mineral oil products, an afterburning technique developed by Messer is used to convert foul smelling sulfur dioxide with pure oxygen and cellulose can be bleached in a much more environmentally friendly way with ozone, produced from oxygen, than with chlorine. Gases also play a crucial role in combustion processes, so it is no wonder that hot processes in combustion furnaces can be considerably improved and optimized by the addition of oxygen. By means of these high temperature processes, the emission of pollutants can be reduced. Thus, for example, waste sulfuric acid can be thermally split and then disposed of under controlled conditions.

Inertization and Control

Gases and know-how from Messer are also useful when, in fact, the opposite of good combustion is required – for example, for the protection of pipelines and storage tanks against fire and explosion. By thinning the atmospheric oxygen with inert gases, virtually any explosive atmosphere can be rendered safe. Before repair work, pipelines in the chemicals industry are also flushed with nitrogen in order to rule out any risk. In stores, preventive fire protection is possible by partial inertization. A mere reduction of the oxygen content to 17% by volume by the injection of nitrogen prevents the outbreak of fire in deepfreeze stores. Even chemical stores at normal temperature can be protected with advantage in this way, though, in this case, with lower oxygen values.

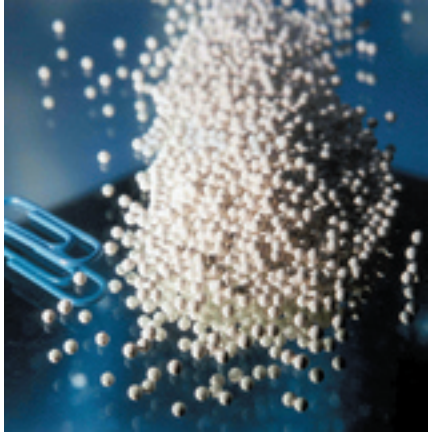
Cryogenic nitrogen makes a crucial contribution in many devices in the chemicals industry, removing excess heat from reactors or permitting reactions to take place at extremely low temperatures (colder than minus 60 °C). Through an intelligent combination of heat exchangers, the Cryocontrol® process makes use of the high cold potential of liquid nitrogen to ensure that reactor temperatures always stay within a safe operating range. This guarantees safe process control and frequently also prevents the formation of undesirable by-products, which would otherwise have to be separated and disposed of at considerable expense.

Solvent recovery

Another contribution to the profitability of chemical production processes is the recovery of solvents with the Cryosolv® process or the newly developed DuoCondex® process. Here, Messer engineers have made use of the fact that even the most volatile of substances condense onto extremely cold surfaces, just like atmospheric moisture on a cold mineral water bottle. With this process, large quantities of solvents can be condensed out of highly loaded exhaust airflows while, at the same time, the exhaust air is purified to below the prescribed limit values. Messer know-how makes the chemistry work.

Solvent recovery with Cryosolv®

Oxygen and nitrogen: Indispensable helpers in the chemicals industry



Fine pellets from chemical melts thanks to nitrogen

Application:	Know-how from Messer:	Advantages:
Oxidation and high temperature processes		
Oxidation processes in the synthesis of products(e. G. Aldehydes, H_2O_2)	Pure oxygen instead of air as oxidation medium	Higher yields, faster reaction
Sewage sludge incineration	O_2-enrichment, O_2-ultrasonic injection in fluidized bed furnaces	Increased output
Hydrogen sulfide conversion (Claus process)	O_2-enrichment, O_2-Injection, O_2-burner	Less exhaust gas, higher flow rate, low investment costs
Thermal splitting of waste sulfuric acid	O_2-enrichment, O_2-Injection oder O_2-burner in shaft or rotary furnaces	Flexible running, high SO_2-concentration
Metal sulfate crackin	O_2-enrichment, O_2- ultrasonic injection in fluidized bed furnaces	Flexible running, high SO_2-concentration
Oxidation of pyrite or zinc blende for production of sulfuric acid	O_2-injection in fluidized bed furnaces	Flexible running, high, hohe SO_2-concentration
Operational reliability, repairs		
Safe handling of flammable liquids, dusts and explosive atmospheres	Inertization, i.e. reduction of the O_2-content with an inert gas to values below the lower explosion limit	No fire or explosion risk, no surface oxidation, low investment costs
Emergency inertization plants	Design and construction	Economical process, for example for silos, filter units, â€¦
Preventive stores fire protection	Design and construction	Economical alternative for fire protection (very low investment costs)
Safe operation of remote pipes and vessels	Flushing, cleaning, pigging, pressure expulsion with nitrogen	Eliminates start-up risks, cleans and tests for pressure losses
Cryogenic processes		
Repairs on pipelines containing liquids	Pipe freezing service: Controlled freezing of pipe contents by the Cryostop®- process	No more cost-intensive emptying and refilling of widely ramified pipeline networks
Control of strong exothermic reactions (e.g. organometallic compounds)	Cooling with liquid nitroge (Cryocontrol®-process)	Low investment costs, high yield, no environmentally harmful coolants
Exhaust air cleaning in production plants and work	Solvent recovery by condensing or freezing out(Cryosolv®-process, DuoCondex®-process)	Compliance with clean air bi recovery of solvent