TECHNOLOGIES TO REDUCE THE COST OF AIR EMISSION CONTROL

The regulations for controlling hazardous air pollutants have become increasingly stringent and the need for facilities to comply with stricter emission limits has increased; fortunately, the technology for VOC control has become more sophisticated. Cryogenic condensation offers an efficient and cost-effective means for controlling VOC emissions, while at the same time giving active pharmaceutical ingredient (API) manufacturers, biotech and pharmaceutical companies the means to recover valuable chemicals.

How it Works

Praxair's VOC recovery offering provides customers with a unit designed to most efficiently treat their particular effluent stream. The technology effectively treats emissions from reactors, storage vessels, dryers, and distillation units – any process vent streams. Using liquid nitrogen as the refrigerant, the cryogenic condensation process is designed to cool the effluent to very low temperatures which, by decreasing the vapor pressure as a function of vapor/liquid and vapor/solid equilibrium, enables it to separate out pollutants. Through the use of a sophisticated control system, the process can be controlled to separate out a broad range of contaminants while supporting compliance with stringent emission regulations. And in contrast to many VOC control technologies, this cryogenic condensation system does not produce any secondary emissions, such as products of combustion or waste water.

High Degree of Operational Flexibility

Cryogenic condensation offers a very high degree of control, with control efficiencies exceeding 99%. It is also a very versatile process. Since the condensation process is based on the vapor pressure of the compound to be separated, the condenser operating conditions may be easily changed to handle the wide range of concentrations and compounds present in the pharmaceutical industry. This provides an added degree of flexibility for the facility, allowing for varying production demands and future growth requirements. This technology is particularly well-suited for intermittent and batch processes. For more complex treatment and post treatment needs, Praxair also offers VOC recovery systems utilizing activated carbon adsorption for dilute effluent streams and solvent purification systems using internal reflux distillation technology.

Reliability and Safety

All units are compact, skid mounted and easy to install. The system design, with few moving parts, requires significantly less maintenance and repair than other abatement systems. And because the system operates at temperatures well below the flash point of the VOC, cryogenic condensation offers a higher level of safety than many VOC recovery technologies.

Cryogenic Condensation Unit – Installation 1

Cryogenic Condensation Unit – Installation 2

Built-In Cost Efficiencies

Praxair's VOC recovery offering provides built-in cost efficiencies. Valuable compounds can be collected for reuse or resale, thus reducing facility operating costs. And because of the ability to recover contaminant-free nitrogen gas for reuse elsewhere in plant operations, the cryogenic unit has a very low operating cost. Compared with other VOC abatement technologies, cryogenic condensation typically requires lower capital and installation costs. Praxair's VOC recovery offering provides pharmaceutical and API-producing facilities with low-cost air emission control option.

CONTACT PRAXAIR AT 1-800-PRAXAIR (1-800-772-9247), OR LOG ON TO WWW.PRAXAIR.COM.