

FEATURE REPORTS

Design and Specification of a Compressed-Air System

Summary: An industrial compressed-air system is expected to supply air of defined quality, required pressure and desired quantity to all the plant-air and instrument-air consumers. With air being one of the most critical utilities of a chemical plant, such a system should function efficiently and cost effectively. Designers should evaluate parameters like air quality, air consumption and supply, storage and distribution and control management to ensure a good design.

This feature report is intended for readers who want to gain a basic understanding of components of a compressed-air system. It also presents the best practices that will prove helpful to a process engineer writing specifications for such a system.

Related equipment and services: Compressors, compressed-air systems, drying systems, piping and air-distribution systems, pressure vessels, valves, sensors (pressure, temperature, humidity and so on).

Relevant industries: All sectors of the CPI use compressed air for many tasks, from cleaning and drying equipment through the operation of control valves and for instrumentation tasks.

Waste Heat Recovery Opportunities

Summary: In the chemical process industries (CPI), as well as in other manufacturing industries, energy is lost to the environment in the form of waste heat. It is estimated that 20 to 50% of energy used in industry is rejected as waste heat. This article provides a comprehensive review of promising technologies for waste heat recovery. Various practices in industry and literature are compiled and analyzed for their benefits and constraints.

Related equipment and services: There is a wide array of equipment relevant for this article, such as: boilers, steam systems, deaerators, heat exchangers, heat-transfer fluids, pumps, condensers, chillers, air compressors, temperature and pressure measurement and control instrumentation, oxygen and other analyzers for furnaces, vacuum systems.

Relevant industries: This article is relevant to all CPI industries, and perhaps particularly so for the petroleum refining industry.

NEWSFRONT

Professional Engineer Requirements

Summary: In the U.S., certification requirements for Professional Engineers differ by state, but a strange situation exists in California, and has for over 10 years. Currently California state law states that civil engineers are the only ones who are legally able to practice engineering activities and science. This is a concern to many chemical engineers, who either live in or work on projects in the state of California. This article summarizes the issue and what is currently being done about it.

2013 Kirkpatrick Award: Call For Nominations

Summary: This article will announce that the nomination period for *Chemical Engineering's* prestigious Kirkpatrick Award is open. The aim of the Kirkpatrick Chemical Engineering Achievement Award is to recognize and honor the most noteworthy chemical-engineering technology commercialized anywhere in the world during the two years prior to a given award year (2011—2012). *Chemical Engineering* magazine has awarded this biennial prize continuously since 1933.

Measuring Powder Flow

Summary: Understanding how a powder flows is important for many applications where solids are moved to and from reactors, and into packaging systems. This month's equipment newsfront will present the latest technology and devices commercialized for measuring important parameters needed for calculating powder flow, as well as emerging technologies being developed for directly measuring and monitoring powder flow.

Related equipment and services: Rheometers, process tomography, video imaging, flowmeters.

Relevant industries: Most sectors of the CPI handle powders. Some areas, such as pharmaceutical and fine chemicals as well as bulk chemicals, minerals and mining and plastics and resins are particularly interested in monitoring powder flow.

Send editorial material for consideration to contributing editor, Joy LePree (jlepree@che.com).

FACTS AT YOUR FINGERTIPS

Water Treatment

Summary: This one-page reference will outline key points in the effectiveness of a variety of chemical and mechanical water purification technologies, as well as their suitability for certain applications.

Related equipment and services: Filters, reverse osmosis systems, membranes, UV irradiation systems for water purification, electrochemical methods of water treatment, chemical disinfectants, ozonolysis equipment.

Relevant industries: Virtually all industries must confront water treatment challenges.

FRACTIONATION COLUMN

Summary: This monthly column in *CE* is written by the technical director at Fractionation Research Inc., a consortium of end-users, engineering companies and distillation equipment providers that pool budgets on distillation research.

Related equipment and services: Distillation towers; trays and packings; tower-scanning equipment and services.

Relevant industries: This column addresses segments across the entire CPI, and is relevant in the currently booming markets of downstream oil and gas processing.

ENGINEERING PRACTICE

Code Stamps for Fired Heaters with Steam Generation Systems

Summary: The American Society of Mechanical Engineers (ASME) code stamping of steam systems in ethylene and other large heaters can be controversial. It can be difficult to define the authority having jurisdiction over these systems. Boiler codes vary, and definitions are not clear, because the main focus of the regulations is power boilers, not refinery or petrochemicals heaters. This paper provides guidance on the requirements for stamping within ASME code and explains how State boiler Codes can affect the requirements.

Related equipment and services: Steam-system equipment for fired heaters, steam drums, pressure relief valves, steam generation tubes, boilers, piping.

Relevant industries: Steam systems with fired heaters are used in most, if not all, sectors of the CPI.

Justifying Equipment Upgrades: Use Lifecycle Cost Computations

Summary: The ability to extend the availability and reliability of equipment components without compromising safety is a universal goal for process operators throughout the CPI. Achieving this goal requires an upfront expenditure of money and other resources. To plan for and defend these expenditures, process operators need to develop cost justifications based on methodologies such as estimation of payback period, calculation of cost-to-benefit or lifecycle-improvement advantages. This article provides simplified calculation methodologies for justifying equipment upgrades, and shares several illustrative examples.

Related equipment and services: All process equipment and auxiliaries, computerized maintenance-management systems (CMMS), enterprise asset maintenance (EAM) systems, software related to cost engineering or modeling.

Relevant industries: The need for prudent equipment maintenance, upgrades and replacement is of great importance across all sectors of the CPI.

FOCUS

Pressure Measurement & Control

Summary: Short descriptions of a collection of recently released products used in determining, monitoring and controlling pressure in boilers, reactors and other vessels used in the CPI.

Related equipment and services: Pressure gages, pressure transducers, pressure sensors.

Relevant industries: Pressure gages have widespread use in the CPI.

LOOK FOR THESE ARTICLES COMING IN THE FEBRUARY ISSUE:

BEST PRACTICES IN PRESSURE RELIEF
HIGH-TEMPERATURE DRYING AND KILNS
STEAM HANDLING OPTIONS

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