CHEMICAL ENGINEERING

UPCOMING FEATURES

FEBRUARY 2013 | AD CLOSE: JANUARY 9, 2013

THE BEST READ AND ONLY GLOBAL PUBLICATION IN THE CHEMICAL PROCESS INDUSTRIES

FEATURE REPORTS

Universal mass-flux equation for sizing relief valves

Summary: Proper relief valve sizing is critical to plant and process safety. Sizing relief valves requires several equations for different flows (liquid/vapor/two-phase) and flow conditions (critical/sub-critical), but all equations are similar. For a single-phase liquid, only one simple equation is required. But a compressible fluid requires two equations, one for critical flow conditions and the other for sub-critical flow conditions. Emergency relief system designers use a variety of mass flux equations to properly size relief valves. However, a careful look at the existing equations shows how all the equivalent calculations can be done with a single mass flux equation. This article will present a universal mass flux equation that can be used to easily and accurately size relief valves for liquid flow, vapor flow, and two-phase flow at both critical and sub-critical flow conditions.

Related equipment and services: Pressure relief valves, rupture discs, pressure gages and control systems, pressure vessels.

Relevant industries: Pressure relief is a common concern across the CPI, including petrochemical, petroleum refining, chemical industries that utilize or generate gases in their process.

Environmental permitting for dryers & kilns

Summary: The gold rush is on, drilling for shale gas across multiple states, and this new source of natural gas is shaking up the fuel market and cutting fuel costs for a wide range of industry. This article addresses permitting and environmental issues for dryers & kilns and focuses in on their use in producing a critical ingredient that has made the shale-gas revolution possible — Proppants"— used to prop open the fissures in the wells created by hydraulic fracturing. Permitting and related equipment selection are critical items constraining supply of this important raw material. This article helps readers understand the equipment selection and regulatory hurdles.

Related equipment and services: Dryers, kilns and related air pollution control equipment including; environmental consulting.

Relevant industries: This article is especially relevant to the shale-gas boom and hydraulic fracturing.

NEWSFRONT

Phosphorous recovery

Summary: Phosphorous is necessary for all life, and is a key component of fertilizers. However, phosphorous is a scare, finite resource, with world supplies possibly peaking in the next 30 years. While new world-scale mining and refining projects are underway, new processes for recycling phosphorous from waste are being developed and scaled up. This month's Newsfront will present these recent trends.

Related equipment and services: Wastewater and sewage-treatment technologies; water treatment chemicals; minerals and mineral recovery technology.

Relevant industries: Minerals, water treatment, sewage and sludge treatment, fertilizers.

Send editorial material for consideration to senior editor, Gerald Ondrey (gondrey@che.com).

Motors and Drives

Summary: Motors and drives are used throughout the plant, and account for much of the electricity consumption. As a result, efforts are continuously underway to improve the efficiency of motors. This equipment roundup will present the latest developments in motors and drives.

Related equipment and services: Motors and drives.

Relevant industries: All rotating equipment uses motors and drives (pumps, compressors, centrifuges, decanters, mixers and so on). All sectors of the CPI use rotating equipment.

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

FACTS AT YOUR FINGERTIPS

Steam handling

Summary: Producing steam that does not cause undue scale, fouling and corrosion on the steam turbine and in the boiler can be achieved by treating boiler water to purify it. This one-page reference will outline some of the methods used to treat boiler water.

Related equipment and services: Steam systems, boilers, steam traps, piping, treatment chemicals and other treatment methods for boiler water.

Relevant industries: Steam systems are widely used in the CPI, and steam is considered a utility.

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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

Sizing, specifying and selecting centrifugal pumps

Summary: To select the right centrifugal pump, process engineers must carry out an array of calculations and assumptions, to define normal flow and rates flow, carry out pressure drop calculations, calculate suction pressure, rated differential pressure, horsepower, efficiency and more. This article profiles the type of process data that are required, and the steps that must be carried out during the specification of these workhorse units.

Related equipment and services: Centrifugal pumps, materials of construction, mechanical seals, sealless pumps, modeling software related to pump sizing and cost estimating, and more.

Relevant industries: As centrifugal pumps are so ubiquitous, this useful article is relevant to engineers throughout all sectors of the CPI.

Strategies for speeding up new process and product development

Summary: Research and development (R&D) projects typically require significant time, effort and manpower for success. Despite this investment of resources, only a small percentage of R&D projects are successfully commercialized. Many projects fail because they cannot achieve the desired results in time to compete with others on timing of commercialization and licensing. This article provides strategies to speed up R&D projects based on both technical and non-technical aspects.

Related equipment and services: Products and services related to high-throughput screening (HTS); Software and services related to design of experiments (DOE); Pilot plant and scaleup services.

Relevant industries: This article is relevant to all CPI companies that perform R&D work to develop new products and processes, particularly where catalysts and solvents are involved. Examples of relevant industries are petroleum refining and specialty chemicals.

FOCUS

Software

Summary: Software has become a critical part of CPI operations, as virtually all instrumentation, control systems and equipment are computer-based or have computer components. This focus will describe recently released software products for the CPI.

Related equipment and services: All types of specialized software for process control, analysis, modeling, data management, and including software for mobile devices.

Relevant industries: All industry sectors would be possible consumers of software.

LOOK FOR THESE ARTICLES COMING IN THE MARCH ISSUE:

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