Pumps for CPIs – An Update

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Pumps play a pivotal role in the chemical process industries and other sectors like agriculture, effluent treatment, fertilizers, food processing, paints, pesticides, paper, pulp, perfumes, petrochemicals, pharmaceuticals, refineries, sanitation, textiles etc.

Pump is an essential component, which determines the performance of any process system in the chemical industry. They are used for transporting fluids of different viscosity for cold, hot, clear, sterile, dirty, poisonous, corrosive/abrasive liquids etc. Technological developments and science relating to their design, materials, fabrication, operation, maintenance inspection, and reliability assume considerable significance.

Different manufactures have introduced several types pumps all over the world for diverse applications. Grundfos is the first among all pump manufactures in the world to obtain ISO 9001 accreditation way back in 1989 and later some other leading players followed the suit. The reason for so many kinds of pumps is that there are so many different types of fluids and process jobs for the pumps to do from customization to specific needs.

Pumps for difficult service functions:

The movement of corrosive, toxic fluids and slurries, reliably and leakfree has been a challenge to engineers as well as pump manufacturers. The key to the straightforward operation of the pump is knowing the nature of the liquid to be pumped, fluid characteristics and how to accommodate its peculiarities. Development in the materials of construction for furnishing the pump casings in polypropylene or polytetrafluoroethylene or polyvinylidenefluoride, titanium, tantalum, zirconium, austenitic stainless steel containing 6% molybdenum, hastelloy etc have made this segment even more fascinating.

Selection of pumps:

How important it is to choose a pump according to the demands of applications? The comprehensive range of products for the benefit of the end-users exemplifies this. A wide range of designs is available for a process engineer to select a pump for a required application. One can find a large number of pumps suitable for a given function. However, as the costs and operating procedure of all are not same, it is essential to opt for the right one. Selecting the correct type of pump and properly sizing it ensures not only long system life but also minimizes maintenance costs. Flexibility of pumps as regards flow, pressure, temperature etc makes them more suitable for a variety of applications e.g. from drinking water to high viscosity fluids.

Classification of pumps:

Hydraulic Institute, USA has classified the pumps into two major categories viz. positive displacement and kinetic. Diaphragm, gear, screw, sliding vane and piston pumps belong to the former. Kinetic pump group includes centrifugal, peripheral, turbine and jet. By the nature of their pumping action, kinetic and displacement pumps have different flow regulations. While the liquid viscosity factor determines the selection of kinetic pump, the choice between these two types of pumps is energy consumption and also their costs.

Types of pumps:

Centrifugal pumps, Dosing pumps, Canned motor pumps, Gear pumps, Impeller pumps, Magnetic drive pumps, OTL pumps, Reciprocating diaphragm pumps, Reciprocating metering pumps, Sealles pumps, Piston pumps, Pumps for slurries – Diaphragm and peristaltic tube types, Leak-free vacuum pumps – liquid ring and roots type etc.

With diverse market potentials, the pump industry has adopted world renowned technologies in various fields, supplementing this further with state-of-the-art research and engineering facilities, employing advanced methodologies as Computational Fluid Dynamics etc. the industry keeps itself abreast of the international standards and is able to adopt to the emerging technological trends.

Environmental and safety concerns have set stringent restrictions on the leakage of process liquids through pumps, which consequently evolved new designs of pumps. Sealless pumps have not only become the choice of design engineers due to their leak-free pumping capabilities but also reduce even the smallest source of emission in their plants. Once Through Lubrication (OTL) vacuum pump – an improvement over conventional oil sealed vacuum pumps is a new concept in India but is extensively used in USA, UK and Germany. OTL pump appears to provide solution to problems like pollution of the environment and internal corrosion of the vacuum source besides offering significant saving of energy.

Pump being service equipment stagnation in the economy affects the state of the industry, particularly by bearish investment climate and recession factors. Liberalisation has made Indian economy open to global competition thereby making it necessary that the Indian manufacturers get a place in the international market.

Reference Book:

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