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Retrofit: Increasing the Efficiency of Pumps

A new phase of increasing oil production on existing installations is going on worldwide. Sulzer has completed multiple upgrades of pumping equipment in major installations over the past years. The performance and efficiency of the pumps have been significantly increased, also resulting in lower CO_2 emissions to the atmosphere.

Uprating of process machinery can be carried out at many levels, from small increases in capacity and improved reliability of the equipment to major upgrades of complete operating systems. An important goal is to increase the efficiency of the pumps: this not only has a big economical effect but also an ecological one. Because less power is needed from the gas turbine driver, less fuel will be burnt, and therefore the emissions of CO_2 to the atmosphere will be reduced. Industrial countries have pledged a reduction in the emission of CO_2 and other greenhouse gases in the Kyoto Protocol.

The most flexible design for retrofit is the barrel casing pump which allows the cartridge to be interchanged with the up-graded design. However, impressive upgrade results are also achieved on axially split multistage pumps. The reason for the uprate can vary from modernisation of old or obsolete equipment to changes in operating expectations and/or under performing equipment. The retrofit should enhance the eco-efficiency of the pump. The essence of all upgrades is to maintain the existing boundary parameters and utilize the maximum amount of the original equipment with considerable, consequential savings in time and costs. Therefore, in many cases, notable benefits to the process are possible with little or no impact on the original footprint area, the drive system, the utility supplies, all skid/site interfaces, as well as the control and instrumentation.

The mechanical characteristics of the pump such as vibration levels, thrust loading, operating temperatures, etc. will also remain unchanged from the original specifications. These can be proven along with the new performance during factory tests in much the same way as the original equipment with the utilization of a test barrel and associated equipment. The upgraded cartridges can be tested to industry standard codes and specifications as per the original equipment. More recently, clients are using the thermodynamic method for conducting site tests, thereby further reducing the delivery time.

Uprating pumps on oil production platforms increases the efficiency and also reduces the CO_2 emissions to the atmosphere.

The retrofit principle shows the greatest flexibility on the multi-stage barrel casing/ cartridge design shown on left.