DIAPHRAGM PUMPS FOR NEW ECONOMIC AND MORE ECOLOGICAL HIGH PRESSURE PROCESSES

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ABSTRACT

In many industries there is an increasing trend away from the classic organic solvent chemistry to new processes due to economic and ecological reasons. This mainly concerns the biopharmacy, fine chemistry, personal care, food technology and agricultural sector. Newer processes for example work with fluids in Supercritical condition. The advantage of these processes lays in the use of e.g. Carbon dioxide instead of solvents, which burden the environment and the product.

Here the combination of functionality and technical design of diaphragm metering pumps can meet the specific requirements. Diaphragm pumps are increasingly replacing the conventional plunger-pump. Those pumps have the major advantage of having zero leakage. In addition they offer an extremely high availability which, in combination with low maintenance expenses, leads to comparatively low life-cycle costs.

For high pressure applications the most important part of the pump, the pump-head, must designed carefully in accordance to the required specifications and regulations.

Conventional high pressure diaphragm pumps still use metal diaphragms however some modern diaphragm pumps now employ PFTE diaphragms. In both cases the diaphragm clamping area must designed considering detailed knowledge of the micro-movement of the parts to ensure full life-time tightness of the diaphragm. Therefore using of available tools like modern FEM technology is absolutely mandatory.

Metering and process diaphragm pumps are already used successfully in the following processes: Supercritical Fluid Extraction, Supercritical Fluid Chromatography e.g. for biopharmaceuticals, Supercritical Reaction, Expansion of Supercritical Solutions for formation of particles, cleaning processes e.g. in the Semiconductor industries and many more industrial applications.