

## Pumps and Compressors Intelligent solutions for complex tasks

### Our service ...

The Rotating Equipment division of Bayer Technology Services is your experienced partner for the erection and upgrading of machines used for the transport and compression of liquid and gaseous products. This is because we can offer you complete engineering from a single source – from concept planning through commissioning.

We have experience with the construction and operation of nearly all types of:

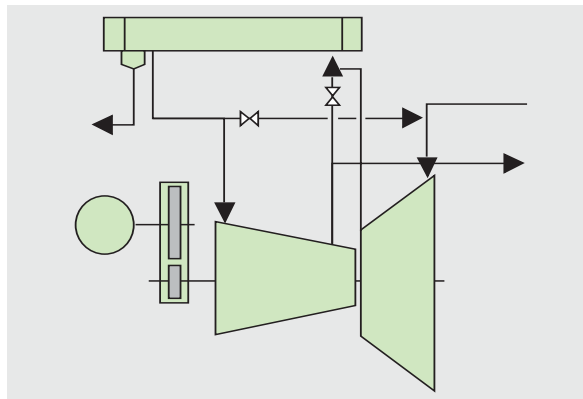
- pumps – horizontal and vertical centrifugal pumps, rotating and reciprocating displacement pumps;
- compressors – piston-type, turbo and screw-type compressors, lubricated and non-lubricated, liquid ring compressors and blowers;
- vacuum systems, dry rotors and lubricated machines.

Our excellent market overview allows us to determine the optimal type of machine for each basic engineering application without being bound to any single machine manufacturer.

We configure pumps in the detail planning stage, taking into account process and control engineering, ecological and economic aspects and – especially for uses in the chemicals industry – the materials to be used, working in close collaboration with our Materials Engineering department where required.

We ensure optimized installation of each compressor system with regard to stage arrangement, component layout and piping routing. We also provide qualified support for a revamp or retrofit of your compressor in existing plants if the operating conditions have changed. Such an investment can pay for itself in only a short period.

Our objective is the optimization of life-cycle costs. In addition to reasonably priced procurement, we aim to provide a high degree of availability, low overheads, a high level of safety and reliability and easy access to all components for subsequent maintenance and servicing.



*Schematic diagram of a 5-stage compression system with single intercooling*

We assist owners in the operation of their machines, assess the actual conditions, investigate and clarify the cause for any disturbance or damage and provide remedial measures.

We have particular expertise in:

- pumps for heat transfer systems;
- pumps for boiling liquids;
- mechanical vapor compressors;
- all types of hydrogen compression;
- compression of gases containing chlorine.

### ... is your gain.

We provide expert consultancy for:

- concept planning without bias for any one manufacturer;
- selection of appropriate machines.

We provide professional services, including:

- cost estimates;
- inquiry specification and order processing;
- installation optimization;
- order processing and erection supervision;
- vibration measurements and evaluation.

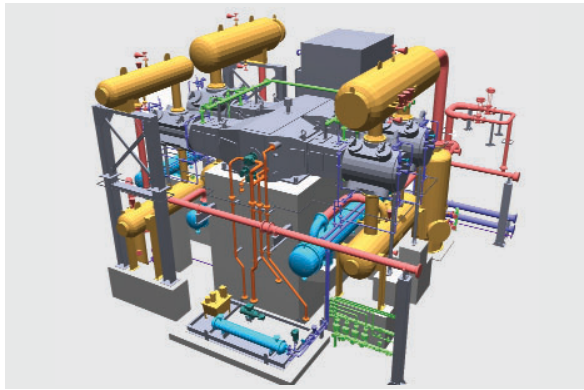


We assist you with:

- “first aid” in case of performance problems;
- root cause analysis remedial measures in the event of damage;
- operator training.

We also provide unconventional solutions:

- adaptation of existing systems to modified operating conditions.



3-stage recip-compressor for hydrogen

We are used to working pragmatically: We have a precise idea of the “optimal” machine to be used for each application and take into account the general surroundings of the machine beyond the scope of supply, all the while restricting our specifications to the basic fundamentals.

We also profit from our direct contact with plant operators within Bayer AG, allowing the experience we have gained with various machines in the past, including those no longer covered by warranty, to be incorporated directly into the planning of new systems.

### Our approach

Our in-house database, which includes information on 60,000 different pumps for practically any application in the chemical and pharmaceutical sectors, serves as the basis for our pump designs. We also use datasheets containing concise but detailed descriptions of operating conditions, designs, sealing systems, materials employed, testing and scope of supply as an additional aide for the procurement of the pumps we provide, including vacuum pumps.

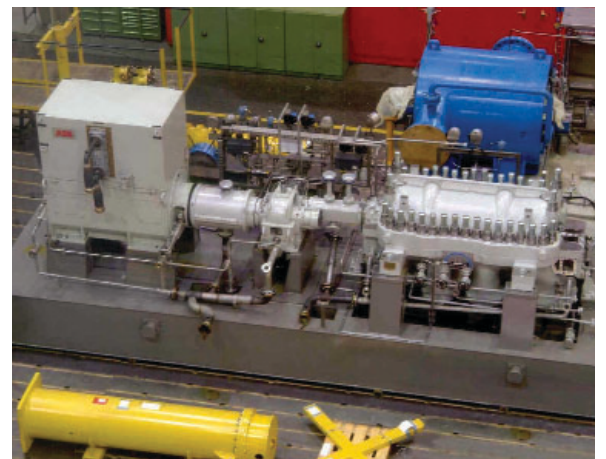
Because our activities are largely international, we also utilize datasheets based on API for compressor specifications when required. We use our own proprietary software for design work. Particular flexibility is required for the component arrangement plan for compressor stations. Depending on the scope of the order, we can work with the various data processing systems of the machine manufacturers, or generate a 3D model on the basis of those systems.

We can authorize the TÜV (German Technical Inspection Agency), or Bayer’s internal Technical Inspection Office (TUEB) to perform testing and inspection of components and piping subject to pressure vessel regulations.

### References

Some of our large-scale reference projects include:

- upgrading of high-pressure hydrogen compression system in Germany (1.3 MW);
- compression of chlorine gas to 12 bar in Germany;
- compression of HCl gas to 12 bar in the US (2.8 MW);
- construction of a system for compression of crude gas (2.2 MW);
- upgrading of an ethylene refrigeration compressor in Canada (4 MW).



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### Contact

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