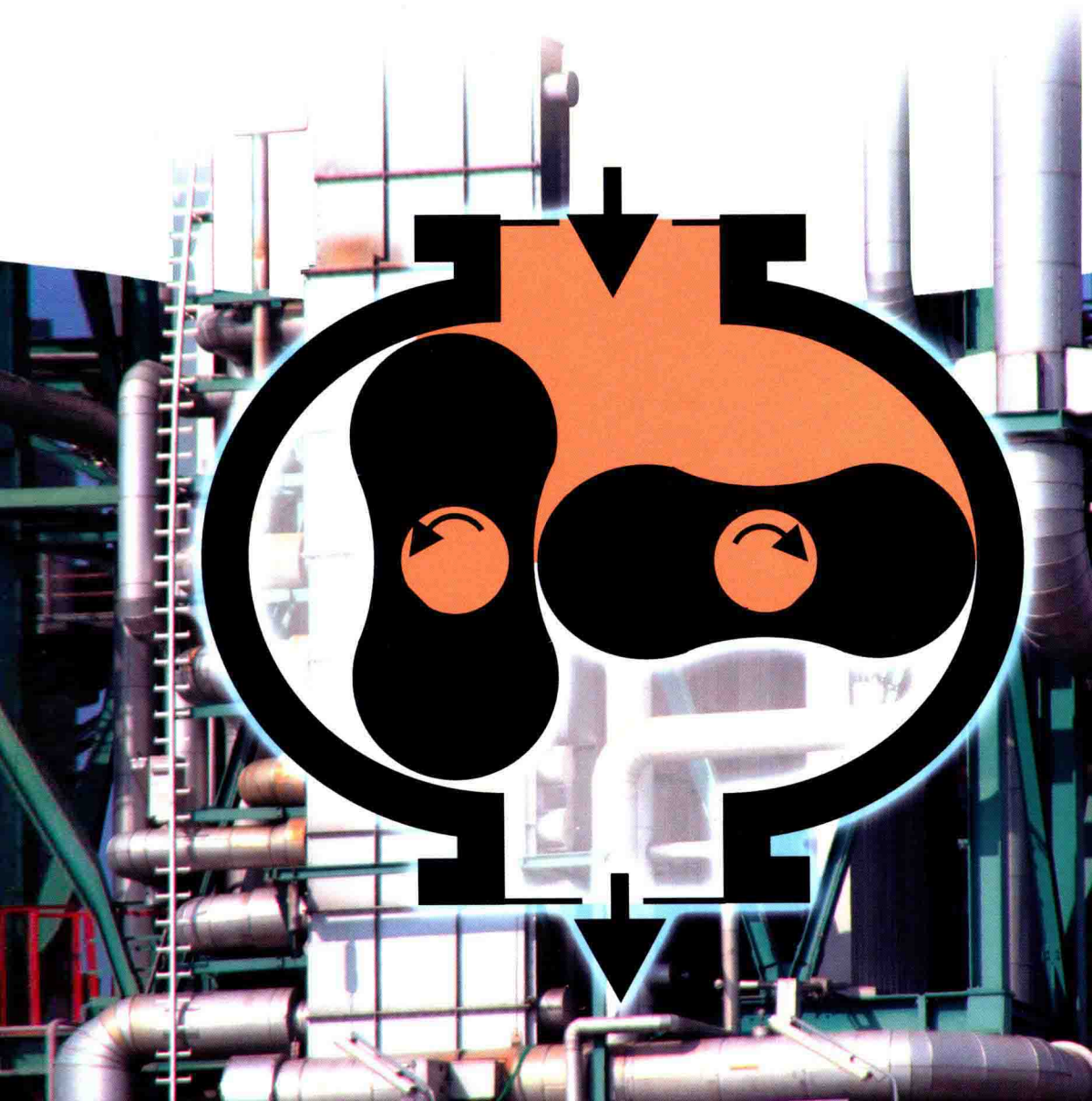


Edited by  
Wolfgang Jorisch

# Vacuum Technology in the Chemical Industry



*Edited by Wolfgang Jorisch*

## **Vacuum Technology in the Chemical Industry**



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## 1

**Fundamentals of Vacuum Technology***Wolfgang Jorisch*

## 1.1

**Introduction**

Vacuum technology is being used widely in many chemistry applications. Here it is not used in the same way as in physics applications. In physics applications, it is the objective to perform experiments in volumes (vacuum chambers) which are as pure as possible, that is, which contain as few particles as possible as these particles generally impair the physical process.

Vacuum technology is used in the area of chemistry applications for the purpose of performing basic thermal and mechanical operations to reprocess reaction products under conditions which preserve the product. Typical applications for thermal separating processes in a vacuum are distillation, drying or sublimation at reduced pressures as well as applications which accelerate the reaction itself when reaction products from the reaction mixture need to be removed for the purpose of shifting the equilibrium in the desired direction, for example. An example of this is the process of esterification.

A mechanical process performed in a vacuum is that of vacuum filtration where the pressure difference created between vacuum and atmospheric pressure is utilised as the driving force for the filtration process.

The planning process engineer or the consulting engineer of a chemical plant not only faces questions how to properly dimension a vacuum system so as to comply with the demanded process specifications, but he needs to solve in a satisfactory way, problems relating to operating costs which shall be as low as possible and questions as to the minimisation of emissions in the discharged air and waste water. The wide variety of vacuum pumps used in the area of chemistry technology reflects this. The responsible planning engineer or plant chemist will have to select, in consideration of the process engineering questions which differ from process to process, vacuum generators which promise to offer the best possible solution for the specific case.

For this reason, this book covers besides vacuum process engineering fundamentals, above all also the different types of vacuum pumps.