

4 *Manufacture of paints and coatings*

4.1 *Preliminary comment*

Unlike the standard manufacturing methods used in primary chemistry for substances such as ammonia, isoprene, phenol and many others, in the case of coating materials and other “preparations” (mixtures of substances), there are no universally applicable, clearly defined manufacturing instructions or systems. The reasons for this can be summarised as follows:

Coating manufacture (in narrow terms) takes place without any noticeable chemical reaction(s), so “reaction conditions” regulated by set parameters (temperature, pressure, reaction time) do not apply here. Instead it is the product of an optimum combination of metering, mixing, dispersing and testing operations matched to the individual product (formulation), specific batch size and available production equipment. The individual stages of coating manufacture can to a limited extent be combined in a variety of ways, and a choice of equipment is available for certain stages.

Consequently, this and other books do not contain descriptions along the lines of “How to produce an automotive assembly line coating” or “How to make a stopper”. Nevertheless, it is useful to examine the characteristics of various production sequences (production “strategies”) and to investigate the physico-chemical and engineering principles behind the individual operations and *equipment*.

4.2 *General introduction to the manufacture of paints and coatings – layout of a coating*

Types of operation

Production processes can be divided into continuous and discontinuous or *batch* operations. Transitional forms are known as “*semi-batch*” or “*semi-continuous*” processes.

The working method used in the coatings industry is that of batch operation, possibly with some continuous sub-processes, such as dispersion in an attrition mill or in an extruder. Given the usually wide variety of products that have to be made available in irregular sequences and quantities and often produced to order at short notice (just in time production), continuous operation would be impossible, or at least impractical.

Production features

The characteristics or problems of coating manufacture can be summarised as follows:

- large number of raw materials
→ high costs for acquisition (purchasing), inspection, storage and distribution
- versatile yet also heterogeneous production plants
→ high operating, cleaning and maintenance costs
- huge range of finished products (generally thousands of “live” formulations)
→ high costs for inspection, storage and delivery.

In addition to these production-related matters, other necessities also arise within a coating factory, such as

- high costs for development, product stewardship and customer support (the last including “on site” support at the customer’s premises)