Computerized Laboratory Mixing Station for Perfume Oils

By Alexander Boeck, Henkel KGaA, Düsseldorf, Germany

It is far more expensive to mix perfume oils by hand because of the wide variety of fragrance components, and vast number of complex perfume oil formulas found in many of the products to be perfumed.

Depending on the number of perfumers and also of perfume oil samples in the laboratory mixing stations, up to 200 or more different perfume oils, in the quantities of 10, 100, 500 or more grams, may be mixed daily. Therefore, there is often a bottleneck in the sample preparation. Perfumers do not have enough mixing capacity to optimize their creative ideas concerning fragrance and costs.

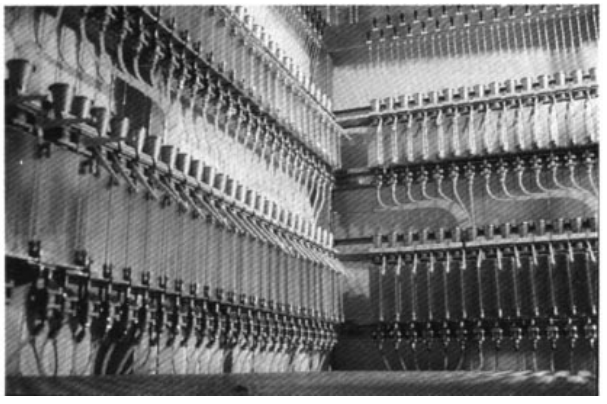

Figure 1. Laboratory mixing station, arrangement of storage receptacles

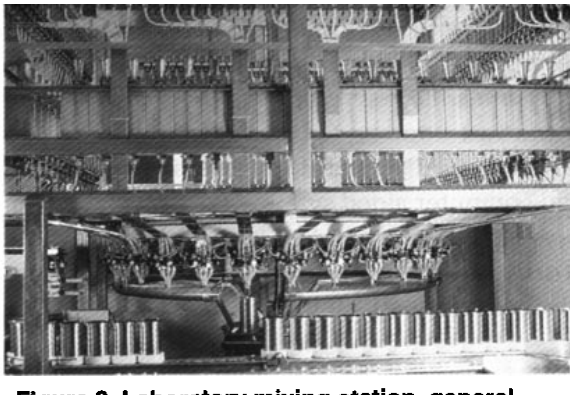

Figure 2. Laboratory mixing station, general view of storage receptacles, mixing rim, valve stations and balance containers

Modern Laboratory Mixing Technology

Since the beginning of the 80s, more and more computerized automatic production mixing stations for perfume oils, in quantities from 10 kg to several tons, have been successfully installed.

Hence, a similarly devised mixing system for the laboratory scale, with perfume oil quantities from 10 g to 1000 g, was planned. At the end of 1988 such an installation successfully materialized at Henkel Fragrance Center.

In this system, all mixing and weighing processes are directed and controlled by a central processor. Automatically mixed liquid fragrance materials are arranged in rectangles on different levels in stainless steel receptacles of different sizes ranging from 0.5 to 5 litres (Figure 1).

All the storage receptacles are under a slight positive-pressure of nitrogen to protect the air-sensitive fragrance components and to control the metering rate.

All the receptacles are connected by Teflon tubes to the metering valve stations arranged in a circle directly below them. The end of the tubes are designed as capillaries of stainless steel, the diameter of which regulates the liquid flow capacity, the size of droplets and the precision.

The electronically-controlled laboratory scales with a balance container are transported under the mixing rim. At the metering stations the fragrance components, depending on the formula in question, are weighed from 10 mg to 1000 g with extremely high precision (Figure 2).

Figure 3. Labels with perfume oil number and quantity and appropriate bar code

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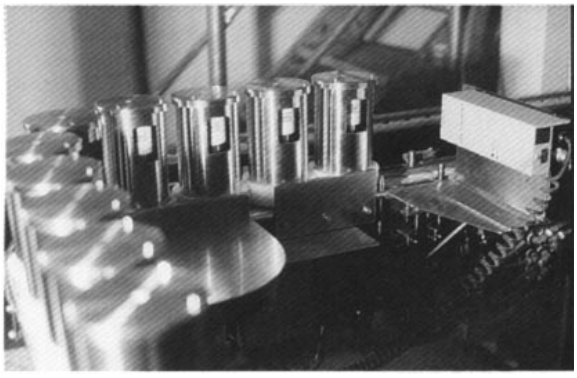

Figure 4. Laser scanner and balance containers with bar code labels

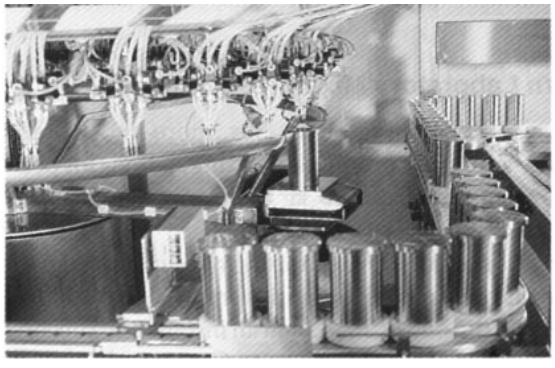

Figure 5. Conveyor belt with balance containers

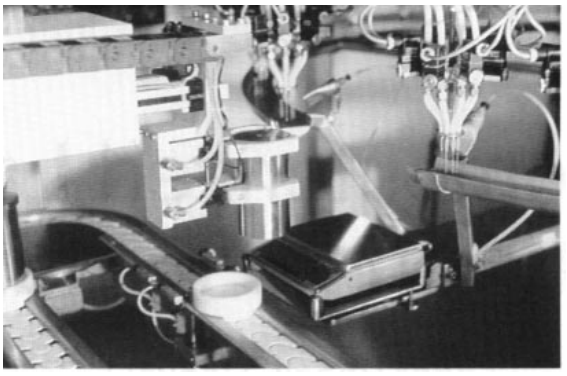

Figure 6. Robot to place the containers on the scales and put them back on the belt

Figure 7. Manual metering station with scales, laser scanner and monitor

The balance containers are labelled with the perfume oil number, the required quantity in grams and the appropriate bar code (Figure 3). The bar code is identified by a laser scanner (Figure 4).

By means of a conveyor belt and a robot for placing the balance containers on the scales and putting them back on the belt after weighing, fully automatic 24-hour operation is possible (Figures 5 and 6).

Of course not all fragrance components, especially crystalline ones, can be metered by this system. The formula has to be completed at manual metering stations which are connected to the same computer. A laser scanner identifies the bar code showing the missing ingredients on a monitor one after the other (Figure 7).

To avoid errors, each component added manually is also identified by a bar code. When the final ingredient has been added, a print-out is prepared showing the actual and original formula.

The computerized automatic laboratory mixing station has many advantages including:

- ***Large capacity***
  100, 200 or more mixtures can be blended in 24 hours.
- ***Extreme precision***
  Human errors, i.e., mistaken identity of ingredients, wrong weighing, are excluded. The perfume oils are mixed with highest possible precision. The quality of the perfume oils is uniform and reproducible.
- ***Manpower savings in the laboratory***
- ***Cost reduction at the same or better quality***
  The possibility to optimize the formula in serial trials results in great savings.
- ***Improvement of the creativity and at the same time better perfume oil quality***
  All the possible creative ideas can be mixed quickly and without problems. This means that the team of highly qualified perfumers has greater creative output with a very high quality standard.

Future of the Computerized Mixing Station

The future belongs to the computerized laboratory mixing station for perfume oils. The manual weighing of components which is time consuming and not always error-free, will be replaced by modern, more efficient computerized mixing systems. The increased variety of fragrance components, the vast number of complex perfume oil formulas and also the high standard of accuracy of the formulas demand computer aided systems.

A very high quality standard is possible through automation. This means low costs. This is the basis for success in an ever stronger competitive market.

Reference

Address correspondence to Dr. Alexander Boeck, Henkel KGaA, Postfach 1100, D-4000 Düsseldorf 1, Germany.