Example 1

Chemical Manufacturing Company A

Customizing the system for the liquid and the application, we offered a resolute plan as an optimal solution.

Consultation Details

During transfer, some ultraviolet curable resin had a tendency to solidify.

When moving the ultraviolet curable resin, the liquid would coagulate in one pump, making transportation impossible, reducing the yield rate, and creating a bottleneck in production.

TACMINA's Proposal

Develop a special pump to eliminate shear.

We suggested a Smoothflow Pump without any sliding parts. Additionally, improving the valve seats to reduce shear* as much as possible would allow the liquid to be transported stably without any changes to its quality or characteristics.

*Referring to shear stress, a material's ability to slide forward in a parallel direction within an object.

>> Steps to a Solution

Interview /
Formulation
of Hypothesis

After conducting their existing e of the sliding potential change in the life

After conducting an interview with the customer regarding their existing equipment, we hypothesized **that the shear**of the sliding portion of their existing pump was causing a change in the liquids characteristics.

Liquid Analysis /
Machine Selection

Beginning with viscosity, the natural properties of the liquid are analyzed, and a suitable **Smooth Flow Pump** without sliding parts was selected.

Liquid Transfer Test

A liquid transfer test was conducted using a Smoothflow Pump in an ultraviolet ray-free lab. Once discharged, the liquid is collected and analyzed, allowing us to **drastically reduce the amount of solid particles generated.**

04 Goal Reassessment

Although the customer was extremely pleased with these results, we assigned ourselves the challenge of reducing the amount of solid particles generated to near zero.

Analysis /
Formulation
of Hypothesis

Using liquid simulation software, we broke down the movement and speed of the liquid within the pump head and the distribution of pressure. We hypothesized that by improving the check valves on the suction and discharge sides, we would be able to reduce the amount of shear caused to the liquid.

Planning / Production

We began working to improve the valve seats. Repeating the processes of planning, trials, and liquid transfer tests, we were able to create an <u>ultraviolet curable</u> resin valve seat.

Solution Results

The occurrence of solid particles was eliminated completely, allowing for continuous operation and improved productivity.