

Transition of Valqua's technologies and customer value

Looking back at the history of *Valqua Technology News* and *Valqua Review*



Since its founding in 1927, Valqua has focused on the research, development, and manufacture of sealing products and sealing materials based on technologies developed in-house.

In the 19th century, Japan imported most of high-class sealing products. After that, mineral oil started to be used as hydraulic oil to replace vegetable oil. Given that synthetic rubber was considered more suitable than natural rubber for use in mineral oil, we developed compounding technologies for synthetic rubber, to allow us to domestically produce sealing products. In this way, we have consistently worked behind the scenes to support domestic industries since before World War II.

Just after World War II, we discovered the existence of fluororesin and decided to utilize its excellent chemical resistance for consumer use. With the goal of domestically molding fluororesin, we imported the powder material in 1951 and started research and testing on processing methods. We proceeded with research and developed our own technologies, marking the first success in fluororesin research in Japan. In the 1950s, the chemical industry started introducing fluororesin widely. We are proud to have supported the growth of the Japanese semiconductor industry as well.

Valqua's products are basic parts of machinery and their range of application expanded rapidly in the postwar period, and yet our products could rarely be seen in action. However, we wanted more people to know about our technologies and products, which we believed would contribute to industrial development in Japan. Therefore, in 1957, we issued *Valqua Review*, a monthly technical journal, as a 30th anniversary project.

Valqua Review aimed to widely disseminate information on our technologies and contribute to social development. Thus, we published articles written by various contributors ranging from customers to academic experts. The journal introduced sealing technologies and various new materials including fluororesin and elastomer. The journal contents attracted considerable attention from readers, especially plant engineers working mainly in the petrochemical industry, which led the post-war industrial recovery, and the publication was highly evaluated.

Thereafter, diverse materials have been created along with developments in various industries, and we too have developed a range of products for different industrial applications. In the 1970s, expanded graphite was introduced as sealing material, and was mainly used for gland packing. Later, it was widely used as a filler for spiral wound gaskets along with fluororesin filler. Following the growth of the petrochemical industry, the semiconductor industry rapidly developed. Fluororubber O-rings, which are

resistant to high temperatures in the baking process, were introduced in the semiconductor manufacturing process. Material prices were rising. In parallel, rubber compounding technologies were gradually standardized, and, regarding seals including gaskets, the basic composition was established. In a sense, the technologies reached maturity.

Therefore, for sustained growth it was necessary to expand into growing markets and to develop novel technical concepts.

Regarding semiconductor manufacturing processes, a type of fluororubber that emits less gas and is resistant to varying ambient plasma was required in line with improved equipment performance. To meet this need, a novel elastomer seal “ARMOR CRYSTAL®” was developed; it was introduced to the semiconductor market in 1998.

At that time, material technologies were significantly changing to meet environmental regulations, particularly those for asbestos.

Consequently, Valqua revamped *Valqua Review* and produced the new quarterly technical journal *Valqua Technology News* in the spring of 2002. The renewal aimed to transform the journal into a better source of information and to offer more customers technical information in new fields and markets including developments in the semiconductor market and various devices, and information on technologies related to the changing social environment.()

New products have new functions that accommodate new technology trends. In response to these technological changes, not only conventional material technologies but also technologies for evaluating the new functions were needed. That is, reliability assurance technologies were required for the new fields and markets.

Conventional products had been supplied based on performance history premised on conventional technologies. However, due to changes such as regulations on asbestos, which forced manufacturers to radically replace main materials and produce alternative products, the alternative products could not be supplied based on performance history, because these new products had no performance history. So, it was necessary to gain social and technical recognition of these products. New technologies were required to replace performance history, namely reliability evaluation technologies for clarifying the essential functions expected of products, evaluating these functions, and assuring their long-term reliability.

In 2006, Valqua launched the general-purpose, non-asbestos sheet “GF300”. The development of “GF300” was accomplished thanks to Valqua’s legacy technologies: fluororesin processing technologies that Valqua had accumulated over the years and reliability evaluation technologies, in which Valqua had pursued developments in advanced technology fields including the atomic power and aerospace industries.

Recent years have seen a rapid transition not only in product development and functional evaluation, but also toward a safer society. Under such circumstances, the supply of highly reliable products is not enough; more detailed technical information regarding the selection and use of products should be offered

to customers. To do so, we should not rely on only conventional technologies and skills transfer, but should establish more systematic training systems for further dissemination and utilization of our fundamental technologies. Regarding long-term reliability evaluation, we need to expand the application of analysis methods to new areas in the future.

Therefore, Valqua decided to become an “H & S company” to drive future growth: “H & S” stands for “H (hard = products)” and “S (soft = seal engineering service) .”

Maximization of customer value is essential for transforming into an H & S company. In doing so, we should not prioritize only “hard” technologies. We should also expand our services to even the smallest aspects in the product life cycle including elements closely associated with the product. In doing so, we believe we can transform into a more rounded seal engineering company.

One example is the Seal Training Center (STC) . In 2014, STC was at our Nara Office (Nara) and MRT Center (Machida, Tokyo) .

Malfunctions of bolted flange joints due to improper selection of gaskets and improper tightening of bolts remain unresolved. As generations change, problems associated with the transfer of techniques and skills from skilled engineers or workers to younger generations are emerging. Each plant is taking actions to tackle these problems, but providing education and training within each company also poses various challenges to be solved.

To solve these problems, we should strive harder to disseminate sealing technologies. In addition, regarding personnel training, we should offer systematic education and lectures including practice training to personnel ranging from operators to operation managers and supervisors. This will enable us to maintain and improve acceptable technologies and technological levels.

Personnel training based on these ideas has already become the norm in Europe and the U.S. The bolt tightening method for bolted flange joints was standardized as EN1591-4 in Europe and ASME PCC-1 in the U.S. Also, a technical certification system for bolt-tightening based on these standards is being started. Our Seal Training Center (STC) observes these standards, and offers hands-on training for seal operations. It also incorporates novel technical findings both in Japan and overseas.

Such approaches attract the attention of many users and are also highly evaluated by plant owners and people in the engineering field.

Our future corporate mission is not only to develop new products and supply them to the market but also to offer various solution services for sealing and practical applications.

We will continue to provide the latest technical information to meet the needs of all customers through *Valqua Technology News*.

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