

## RESEARCH & DEVELOPMENT

# Research and Development Activities

Like its business activities, the research and development activities of the YKK Group (YKK Corporation and its consolidated subsidiaries) are carried out under a six-region global structure. The regional bases are in Japan (core operations), North and Central America, South America, EMEA (Europe, the Middle East and Africa), China and Asia. The R&D expenses of the overall Group for FY2017 amounted to 22.159 billion yen. The Group's major accomplishments during FY2017 can be summarized as follows.

## Fastening Products Group

The Fastening Products Group, working to fulfill the Fifth Mid-Term Business Policy of "Aim for further quantitative growth," is engaged in reinforcing its overseas development centers, particularly in Asia, and building a structure for speedy development to enable response to any customer demand. The objective is to strengthen competitiveness in the Standard segment.

Major accomplishments included the development of a zipper for bags that utilizes a woven-in manufacturing process that results in a new thin, yet strong structure, and a metal zipper product for domestic consumption in India that utilizes a newly-developed metal material. A water-repellant zipper that uses no fluorine compounds was also developed as part of the rollout of environmentally friendly products. In the snap and button field, a product that utilizes a new plastic material was developed to increase product variation. An attaching machine equipped with a new function was developed,

and its adoption and rollout promoted to reinforce quality, lead times and the service structure.

Going forward, in addition to the Standard segment, where the Fastening Products Group aims to strengthen its competitiveness, the development of new products to meet customer requests in various segments, such as the high value-added segment and the Asian domestic demand segment, will also be promoted. Moreover, product appeal capability and proposal capability will also be further strengthened by continuing to augment overseas development centers through the training of local developers. The Fastening Products Group will continuously provide new value to customers worldwide, including providing assistance to garment manufacturing vendors by streamlining the garment manufacturing process. The R&D expenses related to the Fastening Products Group totaled 8.867 billion yen.

## AP Group

With the Fifth Mid-Term Business Policy of "Sustainable growth of the AP business through added-value and demand creation," the AP Group is engaged in raising the level of its development capability by building a front-loading development process to create demand through high added-value products with enhanced quality in four areas—products, the front line, usage and information.

The AP Group was able to increase sales through the following major accomplishments. In the residential products field, there was the augmentation of high added-value products, such as the addition of the APW330 wood grain pattern window and the G Series Fire Resistant Window featuring heat-resistant tempered insulating glass. In the exterior field, the AP Group put in place an exterior products series system, while in the commercial products field, high thermal insulation products were launched, such as Episode NEO-LB, EXIMA 37 and EXIMA 77. There was also focus on the

strengthening of information quality, such as the preparation of construction videos for professional users and the provision of information via QR codes affixed to a product on how to use or maintain the product.

Going forward, amid a harsh business environment, such as even fiercer competition and rising cost of materials, the AP Group will reform its development process, accelerate the speed of making product-related policy decisions for each product area, and thoroughly pursue enhanced efficiency and the adding of high value to products. Product appeal capability and proposal capability will be further boosted through the promotion of standardized design, the visualization of design intent, and the strengthening of engineers, and the AP Group will aim to achieve the top position in terms of customer satisfaction levels throughout product lifecycles. The R&D expenses related to the AP Group totaled 9.260 billion yen.

## Other Businesses

The Machinery & Engineering Group, aiming to further strengthen the business competitiveness of the Fastening Products Group and the AP Group through "Reinforcement and evolution of foundational elemental technology" during the Fifth Mid-Term period, is engaged in "the 2nd stage of machinery and equipment development suitable for production," which aimed even higher than in the past, to "further engineering development from a mid- and long-term view."

In regard to machinery and equipment development for the Fastening Products Group in FY2017, the Machinery & Engineering Group carried out development of assembly machines for the improvement of overall equipment efficiency and enhancement of capacity utilization as well as assembly machines for zipper sliders that meet slider variations according to the customer. As for machinery and equipment development for the AP Group, the Machinery & Engineering Group carried out development to enhance the manufacturing capacity of APW330 vinyl windows and further reduce the number of workers required on the production

line for the aluminum-vinyl composite Episode NEO windows.

In FY2018, in addition to such developments, the Machinery & Engineering Group will consider "strengthening of robot utilization technology capability" an important issue and engage in the development of differentiation technology that handles zippers, textile tape and architectural product parts. The Machinery & Engineering Group will aim to "create production lines able to meet future changes in products and *monozukuri*."

In regard to the foundational elemental technology necessary to further strengthen business competitiveness, the Machinery & Engineering Group will intensify in-house development while also proactively adopting external technology or carrying out joint development through collaborations with other enterprises and universities. The R&D expenses of the Machinery & Engineering Group totaled 4.031 billion yen.