

# Thinking about sustainability through yarn

## How spinning machine "VORTEX" can contribute to SDGs

The VORTEX spinning machine is the latest model of our air jet spinning machine. While the VORTEX has features that lead to improved productivity, such as high-speed production and shortened processes, the "yarn" produced by the VORTEX spinning machine itself has many elements that are tied to sustainability, and there continue to be more and more opportunities to appeal to these elements. The following is a statement from a product manager of the VORTEX spinning machine, speaking on how VORTEX yarn contributes to sustainability.

### Growing Interest in SDGs from the Textile Industry

With the aim of solving social issues through our business, each division of Muratec continues to make consistent efforts to provide value to society via technology and creativity. This time, we will focus on the "VORTEX spinning machine" developed by the Textile Machinery Division. The VORTEX spinning machine (hereinafter referred to as "VORTEX") is a machine that twists fibers into yarn using the power of compressed air and is generally referred to as an air jet spinning machine. The Textile Machinery Division has been developing products based on this technology since the early 1980s and has continued to refine its performance since it was launched. Reducing the amount of electricity and compressed air used during VORTEX operation has traditionally been a theme of development in the division, and we are continuing to make improvements with the aim of improving environmentally friendly performance. While the VORTEX has features that lead to improved productivity in the spinning process, such as high-speed production and shortened processes, the "yarn" produced by the VORTEX also has many features that lead to sustainability, and in recent years, opportunities to appeal to these features have been increasing.

### Social Issues Related to Clothing from an Environmental Perspective

"It is hard to imagine living in a world without textiles." Opening

with this remark, the Ellen MacArthur Foundation's report<sup>\*1</sup>, "A New Textiles Economy: Redesigning Fashion's Future," explains how the textile industry works: "Large amounts of non-renewable resources are extracted to produce clothes that are often used for only a short time, after which the materials are mostly sent to landfill or incinerated." Due to the mass-production and mass-disposal system, the waste problem accounts for a large part of the social issues arising from clothing. Other issues include the environmental impact of using natural resources as raw materials for clothing, the use of energy in the production and disposal processes, the leakage of microplastics from clothing waste, and the use of large amounts of water and chemicals in the dyeing process.

### Sustainability Proposal Points for VORTEX Spinning Machine

Mori, who is currently the VORTEX product manager, recalls, "It was in the dyeing and finishing fields that we first became strongly aware of sustainability in the textile industry." There were many reports at the time that much of the energy, water, and chemicals used in the textile process were used in the fabric dyeing and finishing process. Although there is nothing new in the measures that deal with mass production and disposal, which are characteristic challenges of the textile industry, as well as the various environmental problems associated with the measures, we believe that it is still necessary to ensure the following points. Essentially, it is a matter of course effort to 1) efficiently produce as

<sup>\*1</sup> "A New Textiles Economy: Redesigning fashion's future"

much as needed and deliver it to consumers in a timely manner, 2) reduce the environmental impact of the production process, and 3) reduce the amount of waste by using products for as long as possible (without strain or endurance).

We believe that our VORTEX can contribute to the above efforts with the machine's hidden properties and the performance of the yarn produced from it. The figure below shows a rough summary of the contributions. For example, in addition to the energy-saving features of the machine itself, VORTEX can shorten the kneading<sup>\*2</sup> process as well as processes beyond that. The ability to finish a package of yarn in fewer steps leads to increased productivity. Furthermore, VORTEX is highly versatile, as a single machine can handle a variety of yarn thicknesses, saving time in the preparation process. This can be a positive factor for productivity as well.

The most distinctive feature of VORTEX yarn is its "anti-pilling property" brought about by the structure of the yarn. The structure of these yarns is not described in detail here, but since they are resistant to pilling, cloth or clothing knitted / woven from these yarns basically has a long life. Therefore, we believe that this could be one of the solutions to the problem of mass disposal.

This anti-pilling aspect, in particular, provides environmentally friendly performance during and even after the process of it becoming cloth. In the knitting process, the frequency of cleaning of the knitting machine is reduced by suppressing the generation of windpipes<sup>\*3</sup>. In the weaving process, the amount of gluing to control fluff can be reduced, which leads to easier removal of glues and a reduced load during water treatment. In the dyeing process, less pilling leads to deeper colors and the fluffing is suppressed even after washing, so the color of the garment will "show up" for a long time. The longer you can use your product, the less waste you will have. (The high water absorbency, another feature of VORTEX yarn, also boosts dye penetration.) Finally, in the field of printing on fabrics, which has been increasing due to the recent diversification of designs and the need for small-lot production and quick delivery, the low fluff content enables clear and precise designs to be vividly expressed on fabrics. The widespread use of printing which encourages small-lot and high-mix production, may even create a breakthrough in the textile industry's trend toward mass production and mass disposal.

### Next Possibilities and Challenges

We have introduced the potential of VORTEX for sustainability through the characteristics of both the machine and yarn. We believe that this potential will be further developed by building and

<sup>\*2</sup> Kneading process: The carding process is a process in which raw cotton and various other material fibers are made into thin sheets and then rolled into rope-like shapes. After that, the rounded bundles of raw material are further stretched by drawing several strands together in order to minimize variation, which is called the kneading process. Up until the kneading process (preparation process), all spinning methods have this in common.

<sup>\*3</sup> Windpipes: Fine cotton waste generated by the rubbing of yarns against each other, or the rubbing of yarns against the machine in the process of spinning yarns or making cloth (knitting, weaving, etc.). When a spinning machine is in operation, cotton fly is subject to periodic cleaning because it accumulates around the machine.

deepening partnerships with various textile manufacturers. On the other hand, we are facing a challenge: the use of recycled fibers by VORTEX. If we can recycle polyester raw materials, mainly from used PET bottles, into high-quality yarn packages, we can also reduce the amount of clothing-derived waste in the disposal process. In order to contribute to the sustainability of the textile industry by moving up another gear, I also believe that it is our mission to expand our field of activities to include intravenous logistics of clothing<sup>\*4</sup>.

<sup>\*4</sup> intravenous logistics: The reversed distribution of the flow of goods and/or products from the production side to the consumption side. In the context of this publication, it refers to the flow of goods related to the reuse and recycling of clothing-derived waste.

MESSAGE

## The future as seen through textile machinery

The still rampant COVID-19 and global warming which is believed to be a cause of the recent abnormal weather conditions such as record-breaking heavy rainfall and super typhoons. The major changes in the environment around us have reached a level that threatens people's basic livelihoods; with that, I feel that these threats are raising people's level of concern for a sustainable society higher than ever before. Looking at the current state of the textile industry, interested consumers are demanding more reasons to choose, and producers are beginning to meet more diverse needs than ever before; not only in terms of design, quality and functionality, but also in terms of more variety, more quantity and faster delivery. If this trend is further supported by the growing popularity of e-commerce, the industry will have to be prepared to change its traditional value creation process. Production under these restrictions will have to be done in small quantities, and costs will have to be relatively high. However, if small-lot, high-mix production takes root, we can expect to see a shift away from the traditional volume-based price competition and a reevaluation of the value of the product itself. This will lead to further sustainability throughout the lifecycle of the textile industry, either by reducing waste in the production process or by reducing waste as a result of extending the life of the garment, coupled with improved functionality of the fiber. Furthermore, if this trend accelerates, there is a possibility that traditional cost-seeking globalization will be halted, and the industry will shift to a so-called "local production for local consumption" type. We believe that such a path is the embodiment of the SDGs that we will map into the future through our product offerings.

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## VORTEX Yarn and Fabric Properties

