

Navigating the Complexities of Textile Recycling: Industrial Scale-Up Challenges and Solutions

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The fashion industry is one of the most polluting sectors globally, producing significant textile waste and presenting various environmental challenges. As the demand for sustainable solutions increases, textile recycling technologies have emerged as promising approaches. However, upscaling these technologies from lab-scale to industrial applications faces several complex challenges. Valmet, leveraging its expertise in fiber processing technologies, is actively engaged in addressing these issues.

Several challenges must be tackled at the initial processing stages, such as effective dust management to mitigate safety risks, controlling fiber length to maintain the quality of recycled materials, as well as addressing problems with equipment due to behavior of different types of fibers, to ensure efficient operations. Furthermore, to assure final product quality—such as material brightness—it is essential to explore and optimize processing sequences (e.g., bleaching) to meet diverse product demands while maintaining efficiency.

Additional complexities arise in scaling up of these processes from lab to pilot and demonstration scale. We must consider factors like energy and water consumption, waste treatment, and the optimal order of process steps to ensure both technological and economic feasibility in industrial applications. Valmet aims to highlight these challenges and position itself as a knowledgeable partner, working closely with technology owners to effectively address these issues.