

Moulding in Phases; from concept to mass production



Abstract:

This whitepaper explores the phases of product realization, focusing on moulding microfluidic consumables. Beginning with understanding needs and risks, the paper explores diverse production methods available at different readiness levels. It highlights the role of customized designs and rapid prototyping solutions, such as Axxicon's Chip Tool, in accelerating the development process. Through the lens of prototyping and pilot tools, it examines how companies can validate designs and optimize manufacturing processes. Finally, the paper point out the significance of dedicated production tooling in achieving efficiency and cost-effectiveness at scale. Furthermore, it highlights the importance of knowing the possibilities of manufacturing in each phase, bridging the gap between laboratory experimentation and full-scale production. By presenting a comprehensive framework for each phase of product realization, this whitepaper offers valuable insights for companies seeking to streamline their development processes and bring innovative products to market successfully.

1. Know your needs

Understanding your needs is vital in the journey from concept to mass production. It involves a thorough analysis of requirements and potential risks associated with product development. This includes identifying what aspects of the product need to be tested and specified accordingly. However, it's crucial not to over-specify, especially during the early stages or when using prototype methods. Prototypes may not always match the exact specifications as production tools, therefore essential to manage expectations accordingly. By carefully navigating these considerations, companies can ensure a smoother transition from concept to final product, minimizing setbacks and optimizing resources along the way.

2. Other phase, other method

The path from concept to mass production involves various stages, each demanding a suitable production method. For microfluidic consumables, a range of methods exists, each varying in readiness level and applicability. These methods span from initial prototyping techniques to advanced production processes. Understanding the readiness level of each method is crucial for selecting the most appropriate one at each stage of product development. By aligning production methods with the specific needs and readiness level of the product, companies can enhance efficiency and accelerate the realization process.

3. Basic microfluidics

In starting phases of development, access to standard microfluidic chip designs is common. However, for those seeking custom solutions, Axxicon offers a competitive edge with tailored design options at a compelling cost. While polymer milling provides a quick avenue for testing customized designs, it comes with certain drawbacks such as limited material choices and deviated design. On the other hand, Axxicon's "Chip Tool" presents a robust injection moulding solution, allowing rapid prototyping and customization within the familiar microscope-slide format. Despite its advantages, it's important to acknowledge the limitations of the tool, particularly regarding design complexity and production scalability. By leveraging these offerings thoughtfully, you can efficiently navigate the early stages of product development in the microfluidics domain.

4. Prototyping

Prototyping serves as a crucial bridge between concept and production, facilitating the convergence of design elements into a tangible product. Axxicon's modular mould system offers a cost-effective solution for building functional prototypes without the overhead of a complete injection mould. By utilizing customized product inserts, companies can iteratively refine their designs while minimizing time and resources. This approach not only accelerates the prototyping process but also provides valuable insights into the feasibility and performance of the final product. With prototyping, you can mitigate risks early on and make informed decisions to optimize the product for mass production.

5. Pilot tool

As the product nears its final form, the validation phase becomes paramount to ensure both product integrity and manufacturing efficiency. The introduction of a pilot tool enables comprehensive testing of the product and the production process at a scaled level. By simulating real-world conditions and volumes, companies can identify and address potential

issues before full-scale production. Furthermore, the pilot phase offers opportunities to optimize manufacturing processes, leading to cost reductions and operational efficiencies. Through standardized validation and refinement, Axxicon can instill confidence in the product's performance and pave the way for successful mass production.

6. Production tool

The transition to mass production necessitates the deployment of dedicated production tooling optimized for efficiency and cost-effectiveness. By leveraging advanced moulding techniques and precision engineering, Axxicon allows companies to scale up and maximize returns on their production investment. Whether utilizing single or multiple cavity tools, the focus remains on minimizing cycle times and optimizing material usage. Through continuous refinement and optimization, Axxicon can streamline the manufacturing process, resulting in reduced lead times and enhanced competitiveness in the market. By investing in dedicated production tooling, you lay the foundation for sustainable growth and profitability in the long run.

7. Bridging the Gap

Understanding the possibilities of manufacturing at each phase of product development is instrumental in informed decision-making and bridging the gap between laboratory experimentation and full-scale fabrication.

In the early stages of development, knowing the manufacturing possibilities allows for realistic expectations and informed choices. It enables researchers and engineers to select appropriate materials and production methods that align with the desired specifications and scalability requirements.

As the product progresses through prototyping and validation phases, understanding manufacturing possibilities becomes even more crucial. It facilitates the transition from lab-scale prototypes to production-ready designs by identifying potential bottlenecks, optimizing processes, and ensuring compatibility with mass production techniques. This proactive approach minimizes the risk of unforeseen challenges during scaling, thereby accelerating time-to-market and reducing overall development costs.

8. Conclusion:

In conclusion, navigating the phases of product realization requires a strategic approach and a keen understanding of the underlying processes. By carefully assessing needs, selecting appropriate production methods, and leveraging innovative solutions for prototyping and production, Axxicon can accelerate the journey from concept to mass production. The integration of pilot tools and dedicated production tooling further enhances efficiency and cost-effectiveness, ensuring the viability and competitiveness of the final product. Through proactive planning and meticulous execution, you can unlock new opportunities and drive success in the marketplace.

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