

A close-up photograph of a Marel Salmon Side Gripper machine. The machine is a large, industrial-grade metal device with a complex, multi-ported structure. It is shown in operation, with several pieces of fresh, orange-colored salmon fillets being processed. The salmon is held in place by the machine's components, and a large, polished metal blade is visible, likely used for scoring or sealing the fish. The background is a blurred industrial setting with blue and white elements.

CASE STUDY

Marel Salmon Side Gripper – Creating sealed and sterilizable surfaces with AMT PostPro Vapor Smoothing

Industry: Food & Pharmaceutical



Background:

Marel, a leading company in manufacturing food processing equipment, required a new gripper for handling entire salmon sides measuring 40-50 cm. The Danish Technological Institute (DTI) was approached to explore the feasibility of 3D printing a gripper of such size. Utilizing their expertise from previous 3D-printed grippers, Marel designed a prototype, which DTI printed for testing on the production line. After confirming the prototype's strength and making minor design adjustments, the final gripper was ready for production.

Material and Design:

The gripper is 3D printed in metal-detectable nylon, ensuring traceability throughout the production process in the event of a breakage. The design is optimized for food safety, with no joints in food contact areas and featuring soft roundings with large radii. This design choice, combined with vapor smoothing, significantly enhances the gripper's cleanability.

Benefits of Vapor Smoothing:

Vapor smoothing, a surface finishing process, plays a crucial role in enhancing the functionality and hygiene of the 3D-printed gripper. Below are the detailed benefits of vapor smoothing for this application.

- 1. Improved Cleanability and Enhanced Hygiene:** Vapor smoothing creates a sealed, smooth surface on 3D-printed nylon, significantly reducing surface roughness and making it easier to clean. In the food processing industry, where maintaining hygiene is important, a smoother surface ensures that food residues and bacteria have fewer places to hide, reducing the risk of contamination. Additionally, a vapor-smoothed surface makes it harder for bacteria to accumulate by sealing the surface and eliminating microscopic pores and irregularities where bacteria might thrive. This is particularly important in food handling applications, where bacterial contamination can pose serious health risks.
- 2. Durability, Strength, and Improved Impact Resistance:** Vapor smoothing not only enhances the surface finish but also can improve the mechanical properties of nylon material. The process helps reduce stress concentrations on the surface, leading to improved strength and durability. Additionally, the improved impact strength resulting from vapor smoothing ensures that the gripper lasts longer in the field, making it more reliable for extended use.
- 3. Traceability and Safety:** The metal-detectable nylon ensures that any broken pieces can be identified and removed from the production line, maintaining food safety. Additionally, the smooth, sealed surface from vapor smoothing enhances visibility by making the parts glossier and brighter colored, which facilitates visual inspections. This makes any damage or wear more easily identifiable.

Conclusion:

The implementation of vapor smoothing on the 3D-printed metal-detectable nylon gripper has significantly benefited Marel. This process enhances cleanability, hygiene, and durability while also providing a cost-effective manufacturing solution. The collaboration between Marel and the Danish Technological Institute underscores the potential of combining advanced 3D printing technologies with innovative surface treatments to meet stringent food safety standards and improve production efficiency.



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