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Design Simulation and Development of Prototype Filling Nozzle in Food Industry

Sukindar, Nor Aiman^a ; Farzana, Haidah^a ; Kamaruddin, Shafie^a ; Choong, Yang Chuan^a ;Shaharuddin, Sharifah Imihezri Syed^a ; Morni, Murhamdilah^b

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^a Manufacturing and Materials Department, Kulliyah of Engineering, International Islamic University Malaysia, Gombak, 53100, Malaysia^b School of Design, Universiti Teknologi Brunei, Tungku Highway, Gadong, BE1410, Brunei Darussalam[Full text options](#) [Export](#) [Abstract](#)[Author keywords](#)[SciVal Topics](#)[Funding details](#)**Abstract**

This project necessitates the use of simulation to design the filling nozzles for the food industry. Filling nozzles are used for food packaging production and the speed and efficiency are dependent on the filling nozzle design. The current filling nozzle design is only capable of producing a low volume of production due to the design limitation. Therefore, the new design was proposed to solve this problem by improving several components that can be modified based on the density of the food and the

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volume of the liquid to be filled. Several designs were proposed and simulated using finite element analysis (FEA) to observe the efficiency of the fluid flow behaviour to imitate the filling process. The same properties of coconut milk utilized in the industry were used for the simulation with A DENSITY OF 1014 kg/m³ and a viscosity of 0.00161Pa.s. All proposed designs were evaluated using the Pugh method and the best design with more outflow channels was proposed which appeared can provide higher flow velocity and a smoother flow at the outlet and eventually lead to higher production. © 2023 American Institute of Physics Inc.. All rights reserved.

Author keywords

Design simulation; FEA Analysis; Filling Nozzle; Food Industry

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