

# **THESIS**

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**PURGING COMPOUNDS FOR EXTRUSION**

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## Thesis Summary

Purging compounds are machine cleaning agents that help reduce machine downtime and increase the machine's productivity without much work or loss of time.

Engineers frequently use the extrusion process in mechanical engineering to create objects with fixed cross-sectional areas. The raw material is forced into a die during the creation of the object to give it the desired shape. Since only shear and compressive stress are encountered during the extrusion process, the main benefit of this method is that brittle materials can be easily transformed into the desired product. Extrusion can be used to create hot or even cold materials, and it can be argued that it is a semi-continuous or even continuous process.

Extrusion is a type of metal forming process in which dies are used to modify the shape of the metal piece using an external compressive force. Different complex shapes are created using this method. Extrusion can be divided in general into two types: hot extrusion and cold extrusion.

Because of their adaptability, durability, and easier manufacturing requirements, plastics are utilized everywhere. One of the most popular methods for high-volume production is plastic extrusion and injection molding. Extrusion is typically used for continuous profiles that incorporate pipes, tubes, door profiles, and other large objects. For a plastic extruder, there is the option of using either a single-screw or twin-screw extruder.

Injection molding is a manufacturing technique that enables mass production of parts. It operates by injecting molten materials into a mold. Usually, it is used as a mass production process to create thousands of identical items. Although it is most frequently used with thermoplastic and thermosetting polymers, injection molding can also be used with metals, glasses, elastomers, and confections. The creation of the mold itself is the first step in the injection molding process. The majority of molds are made of metal, typically steel or aluminium, and are carefully machined to match the characteristics of the product to be produced.

Extrusion molding's high output and long runs can lead to elevated scrap rates during prolonged changeovers with protracted gaps in between production runs. Fortunately, there are adaptable purging compounds for extruders that are engineered for performance and designed to overcome the difficulties extrusion molders encounter.

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A purging compound is a resin-based product used to clean thermoplastic molding machines of different types, such as injection molders, blow molders, and extruders.

Blow molding is one of the most popular plastic forming techniques which is used to create bottles, big drums, tanks, toys, and several automotive applications.

The majority of thermoplastic producers use a purging compound to clean the screws, nozzles, mold, hot runners, and die of injection molding and extrusion machines. As an alternative to purging with virgin resin, purging compounds were created to reduce machine downtimes and scrap rates during material or color changes. Emulsifiers, abrasives, and foam agents are among the components in purging compounds, which accelerate the removal of contamination from the barrel. Purging compounds were created for this purpose. Instead of using resins and regrinds that are intended to be molded into parts rather than pushing impurities out of the system, purging compounds are faster and more effective. Purging compounds can be mechanical, chemical or liquid.

The purging compounds are important products because they guarantee an improvement in production quality by removing plastic waste, impurities (such as oil), colors and pigments from the machinery. The purging procedure for production has the following main advantages: It is an economic process; Reduces wear on machine components; Improves waste management; Reduces production costs; Improves productivity and efficiency, and thus competitiveness; Reduces production scrap due to color and material changes, as well as carbon accumulation; Reduces machine downtime and manpower when changing colors or materials.

Incomplete cleaning of the equipment can result in mechanical property losses, the appearance of stains on molded parts due to the breakdown of old resins, a reduction in machine life, an increase in production stops, maintenance needs, and material waste.

Therefore, to improve results and prevent a serious buildup of impurities, materials, and pigments in the thread, cylinder, hot chambers, and extrusion dies, the purge process should ideally take place frequently, or at the very least with each shutdown of the equipment, to accelerate the production.

Purging compounds offer several benefits such as reducing scrap rates, reducing downtime, removing contamination, and improving the efficiency and the productivity of the machine or equipment, therefore, increasing the quality of the extruded product.