MONSOON

MOdel based coNtrol framework for Site-wide OptimizatiON of data-intensive processes

H2020 SPIRE-02-2016

Budget: 5 million €

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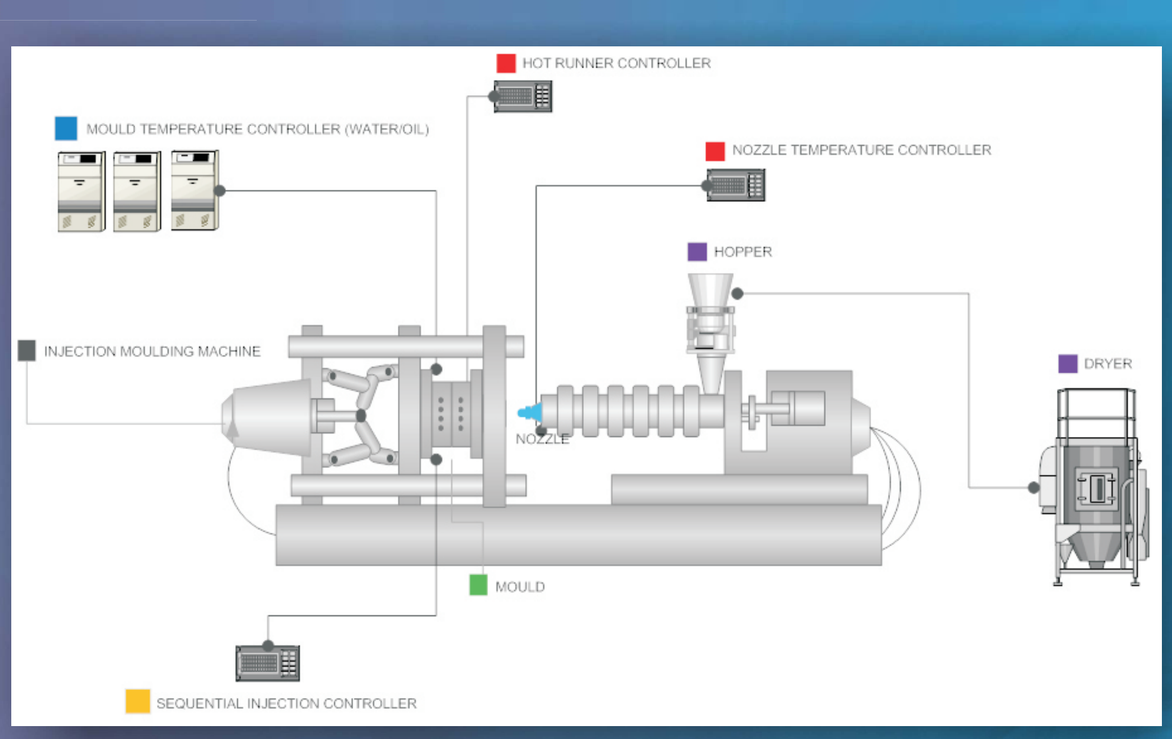
2016-2019

PLASTIC DOMAIN - Business Cases

Injection molding process in general

The injection process is a sequential process called injection cycle. This process can be divided into five phases:



The injection process is a sequential process called injection cycle. This process can be divided into five phases:

1. **Plasticization phase** - the screw, by means of a rotated movement, moves the solidified plastic through injector barrel. In this process the plastic is heated up by resistors surrounding the barrel.

2. **Injection phase** - the empty mold is closed, while the melted material is prepared to be injected. The screw injects the material, acting as a piston, without spinning, forcing the material to go into the cavities of the mold with a determined injection pressure

3. **Compaction phase** - the screw is maintained forward, compacting, applying constant pressure before the solidification of the material, with the aim of avoiding the contraction of the piece while cooling.

4. **Cooling phase** - the material continues losing temperature inside the mold, where the heat is dissipated by refrigerating liquid. While on this phase, the screw already has the material for next injection process.

5. **Ejection phase** - the mobile part of the mold is opened and the piece is extracted.

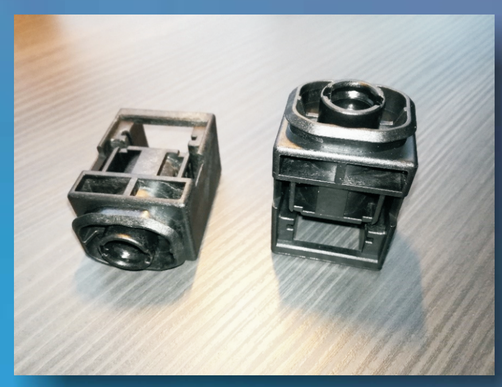
Business Case - Coffee Capsules

The selected study case packaging part set for coffee capsules production. This parts have a very low complexety but a very high production flow rate - ± 1 200 000 set parts/day

- > **Polypropylene** coffee cups and respective lid
- > **32 cavity moulds,** 6,5 – 7 sec cycle
- > **400.000 units produced per machine/day**
- > **6 dedicated injection machines** working at the same time
- > **Automatic quality inspection system**
- > **Rejection rate 1,5-2%:** a) NOK parts, b) Setup Time, c)Maintenance
- > **High production rate**
- > Very focused (only two parts of the same product are made, cups and lids)

Business Case - Automotive Plastic Part

The selected study case is a electric connector part for the automotive industry. This connector part has low output rate, with a very high quality criteria requests.



- > **Polyamide with fiber** Automotive parts
- > **4 cavity mold**, high rate of detail and movements
- > **Manual quality inspection**
- > **1 500 000 articles/year**
- > **Rejection rate 3%:** a) Maintenance; b) NOK parts; c) production stoppages;
- > **Long-term goal:** increase the production with a 8 cavity mold and more efficient – mold monitoring through sensors

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