



PolyPlus Masterbatch Presentation

rev. 3

*Reduce Cost,
Increase Productivity,
Increase Product Quality*



Introducing

- What is PolyPlus Masterbatch
- What Can PolyPlus Do?
- Why Functional?
- Where Functional?
- Increase Productivity
- Increase Product Quality (*Collateral Effect*)
- Examples (Case Study)



What is PolyPlus Masterbatch ?

- A natural, multi-functional performance additive for:
 - Injection, Blow Molding and Extrusion processing
 - A Granulate Compound (2% dosing), non-chemical methods
 - Safe to use
 - Non-toxic.
 - Accordance with European REACH Norms
 - Accordance with US Coneg Norms
 - Accordance with Italian Migration Test D.M. 21/03/73
 - Accordance with Food Contact
- Does not alter or degrade Standard Polymers
- Abundant supply
 - International Patent Pending



What Can PolyPlus Do?

Reduce Costs, Increase Productivity, Increase Product Quality

Reduce formulation costs

- Lower concentration of functional additives and pigments (ex. Color Masterbatches)

Reduce energy usage

- Less energy per production unit

Reduce equipment maintenance costs

- Reduction or elimination of equipment teardown for cleaning and low temperature using

Increase Productivity

- More production from same equipment even if at operational limits
- Shorter injection molding cycle times
- Faster color changeover
- More Turnover per production unit

Increase Product Quality (*Collateral Effect*)

- Reduction Esthetically Defect (ex. Sinks Marks)
- More hardness surface (cold skin)



Why Functional?

Thixotropy effect

"Thixotropy is the property of certain gels or fluids that are thick (viscous) under normal conditions, but flow (become thin, less viscous) over time when shaken, agitated, or otherwise stressed. In more technical language: some non-Newtonian pseudoplastic fluids show a time-dependent change in viscosity; the longer the fluid undergoes shear stress, the lower its viscosity. A thixotropic fluid is a fluid which takes a finite time to attain equilibrium viscosity when introduced to a step change in shear rate. However, this is not a universal definition; the term is sometimes applied to pseudoplastic fluids without a viscosity/time component. Many gels and colloids are thixotropic materials, exhibiting a stable form at rest but becoming fluid when agitated."

Wikipedia definition

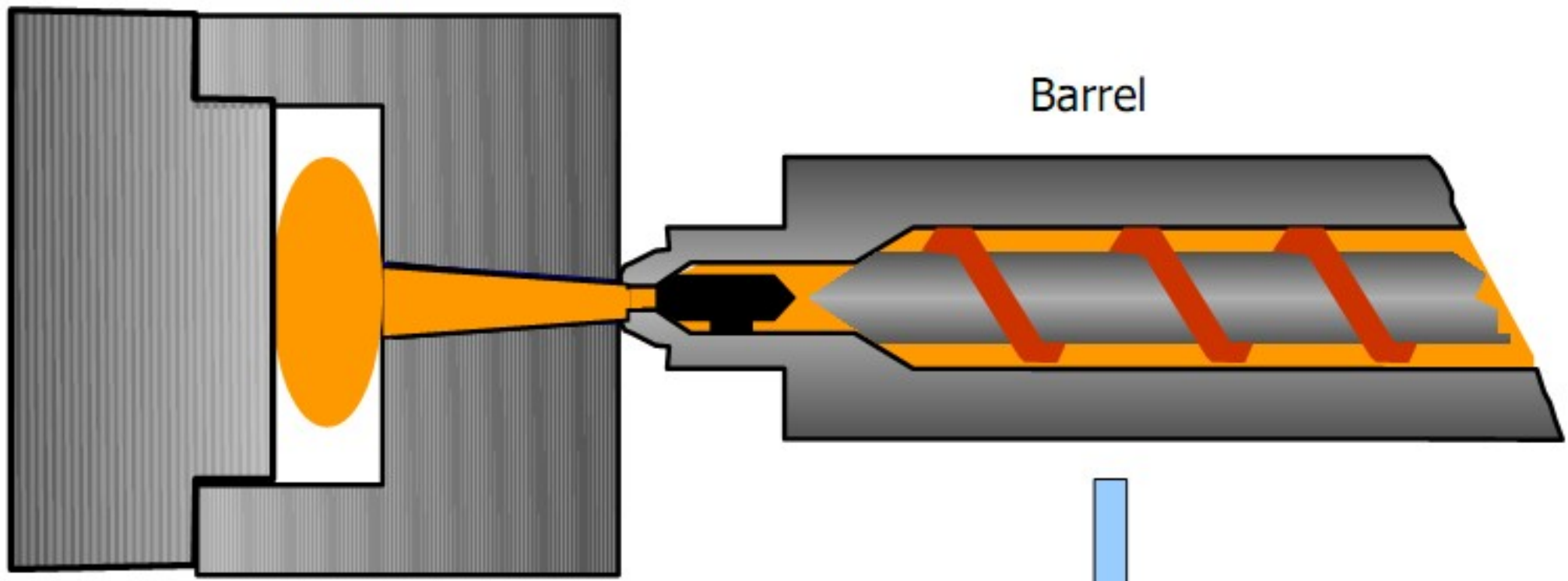


Why Functional?

Thixotropy effect

Mould

Barrel



Cooling Time Reduction

Less Melt Temperature

Cycle Time Reduction

Why Functional?

Low Melt Temperature Effect



Where Functional?

Process

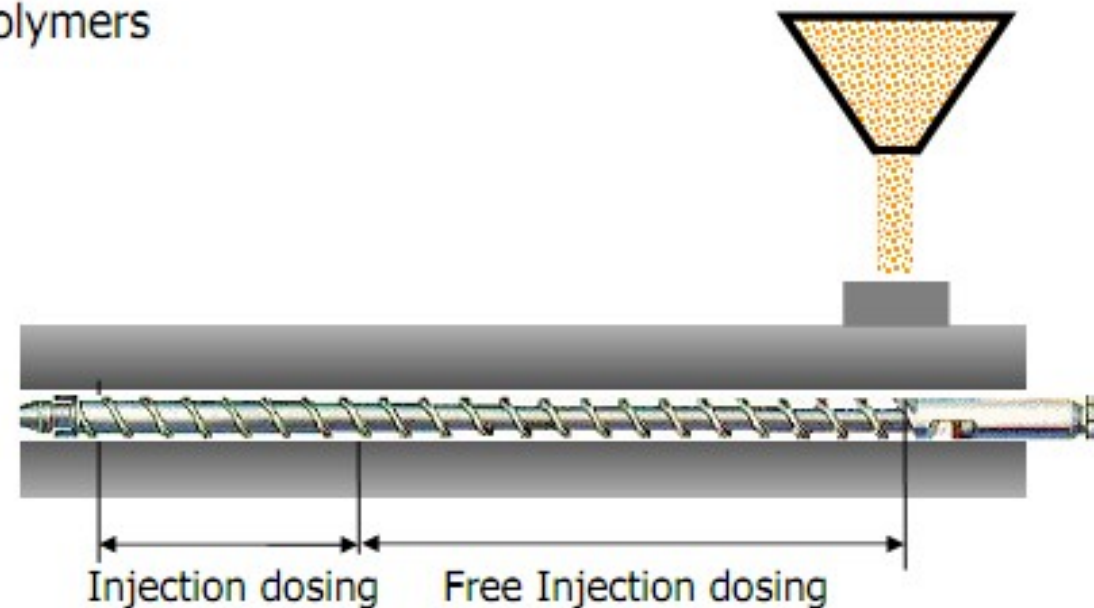
- Injection, Blow Moulding and Extrusion (No Thermosetting, No Vulcanizing)

Material

- All Kind of Polymers. No Transparent Polymers

Actual Working Condition*

- Possible to Increase Injection Speed
- Possible to Increase RPM Screw
- 2/3 or 3/4 Dosing-free of Plasticization



* Normal Injection Machine (without Nozzle Shutter and Overlapped Movements)



Increase Productivity:

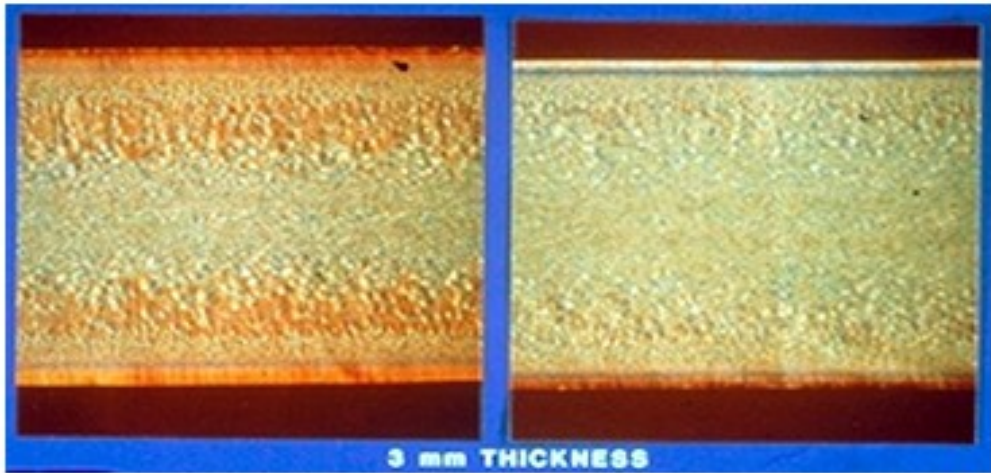
Increased Productivity Examples in Thermoplastics Process

Process	Polymer/ Product	Baseline Process	Productivity		Market
			Process with Poly Plus	Increase	
Extrusion	PVC	180 °C (Melt)	160 °C (Melt)	10 %	Household
Injection molding	PP Copo	58 sec cycle	28,9 sec cycle	50 %	Household
Injection molding	PBT 10% GF	40 sec cycle	25 sec cycle	60 %	Household Appliance
Injection molding	PP 40% Talc Filled	44 sec cycle	33 sec cycle	25 %	Household Appliance
Injection molding	PA6 20% GF V0	22 sec cycle	13 sec cycle	40 %	Automotive
Injection molding	PC V0	45 sec cycle	34 sec cycle	25 %	Lighting



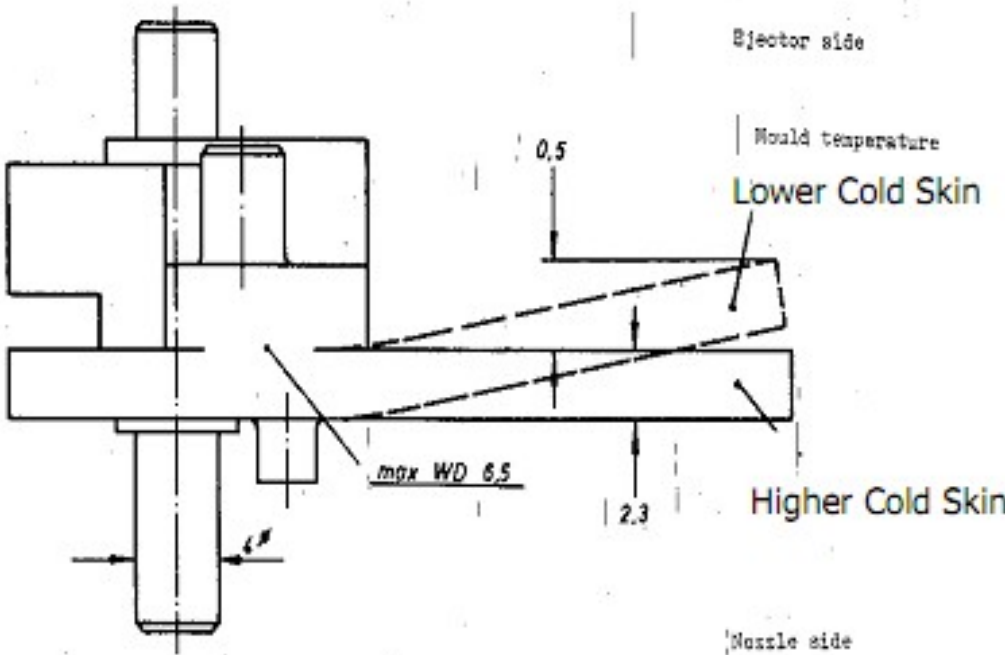
Increase Product Quality (Collateral Effects):

COLD SKIN EFFECT IN DEFORMATION PROBLEM



Lower Cold Skin

Higher Cold Skin





Increase Product Quality (Collateral Effects):



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30 sec cycle time without Poly Plus

Sink Marks



20 sec cycle time with 2% Poly Plus

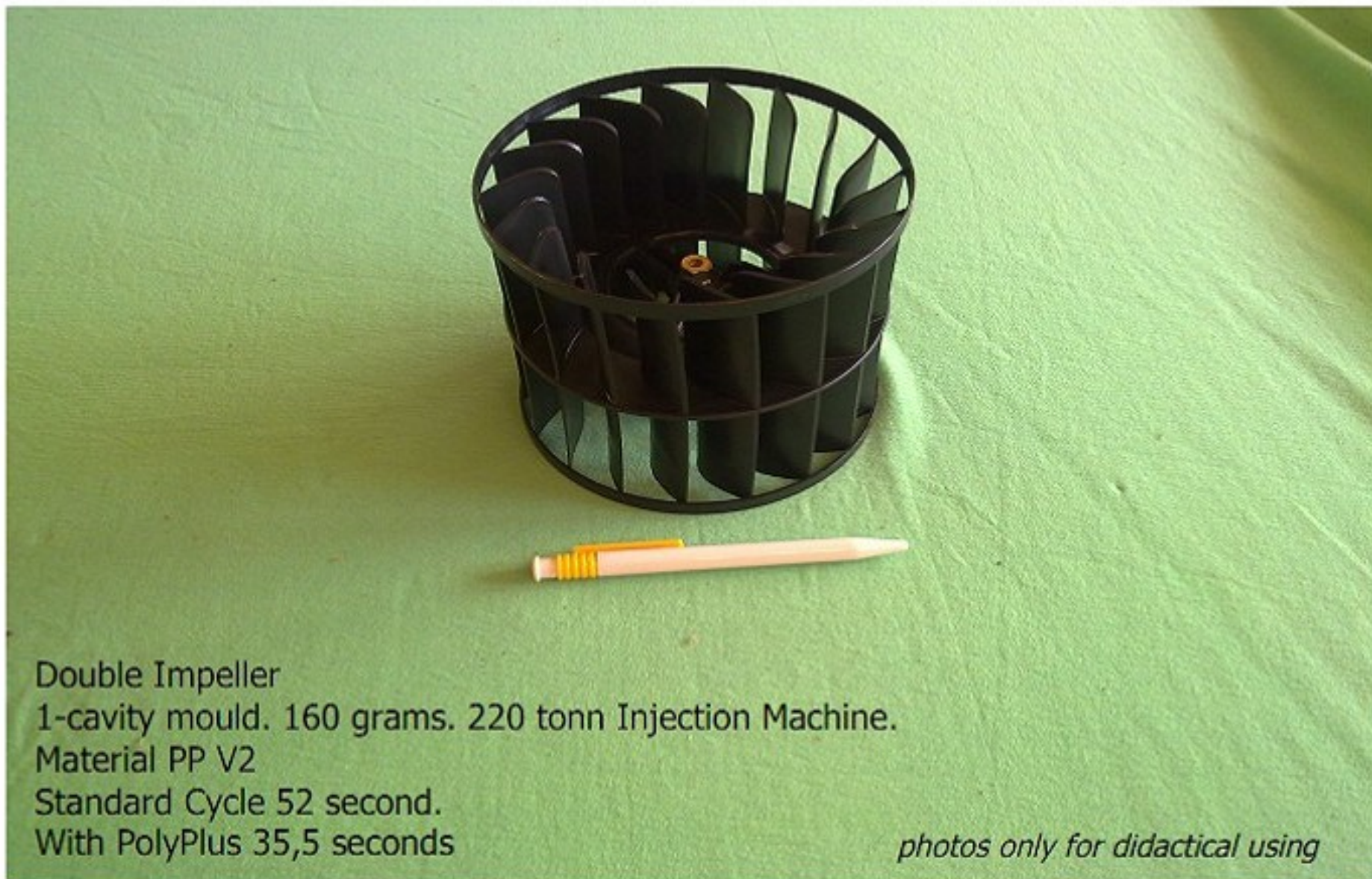
No Sink Marks

Example (Case Study):

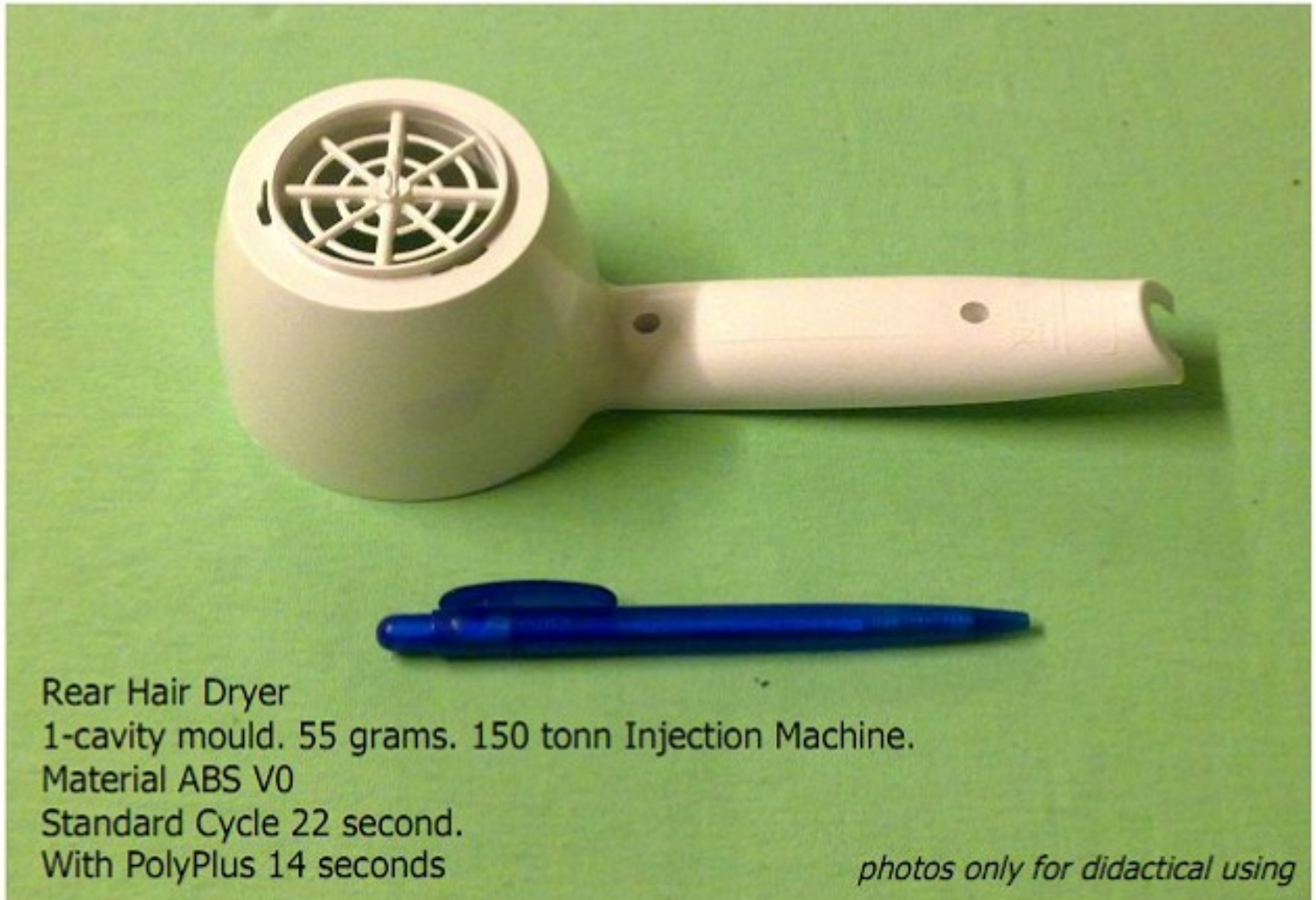
Hair dryer Cover
 4-cavity mould. 40 grams. 150 tonn Injection Machine.
 Material PA66 Nucleated with Glitters
 Standard Cycle 29 second.
 With PolyPlus 20 seconds



Example (Case Study):



Example (Case Study):



Example (Case Study):

Hair dryer Body
 1-cavity mold.
 110 grams
 150 tonn Injection Machine.
 Material PA66 Nucleators and lubricated
 Standard Cycle 29 second.
 With Poly Plus new cycle 20 seconds



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Example (Case Study):

