

A young child with curly hair and blue eyes is sitting on a wooden bench outdoors, drinking from a blue plastic water bottle. The child is wearing a pink and white striped shirt. The background is a blurred green fence and foliage.

IncroMax™ 100 /  
Atmer™ 7540  
Easier processing for PET

**CRODA**  
Polymer Additives

# IncroMax 100

- Decreases surface friction and mold release force by up to 60%
- Increases the packaging density of preforms by up to 25%
- Improves the packaging and processing of molded parts
- Reduced scratch and scuff and enhances surface quality
- Easier processing and reduced manufacturing noise
- No adverse effect on the physical properties of PET
- Excellent colour and clarity
- **Easier addition using concentrate Atmer 7540**

# Why do we need slip additives in polyesters ?

- PET has a very high natural surface friction (especially immediately after molding)
- The use of additives such as slip and mold release in polyesters, especially PET, has been quite low until fairly recently
  - Many new PET plants have come on stream
  - PET producers feel the need to differentiate their products
  - PET is also being used in more challenging applications where some of its properties could be improved
  - The same is true to a lesser extent for Polycarbonate
- IncroMax 100 has been shown to be effective in PET-E, PET-G, PCTG, Polycarbonate, PBT, PLA

# Slip additives for Polyesters

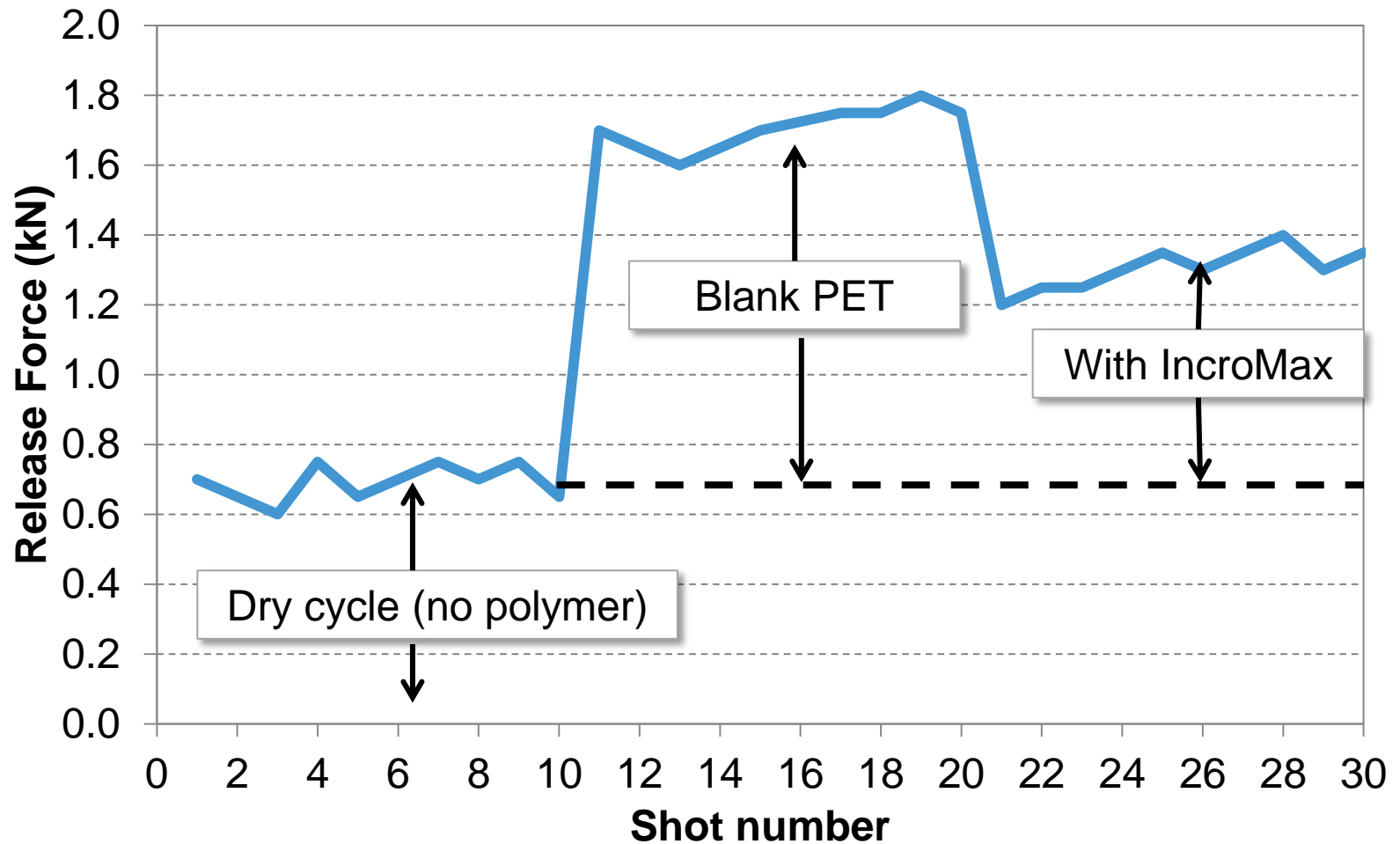
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- Fatty acid amides could be used to reduce friction but we have seen an adverse effect on colour
- Through an extensive programme of testing IncroMax 100 was developed, patented and food contact approval gained
- IncroMax 100 has been shown to add value to polyester based products and improve a wide range of attributes for a very modest addition level

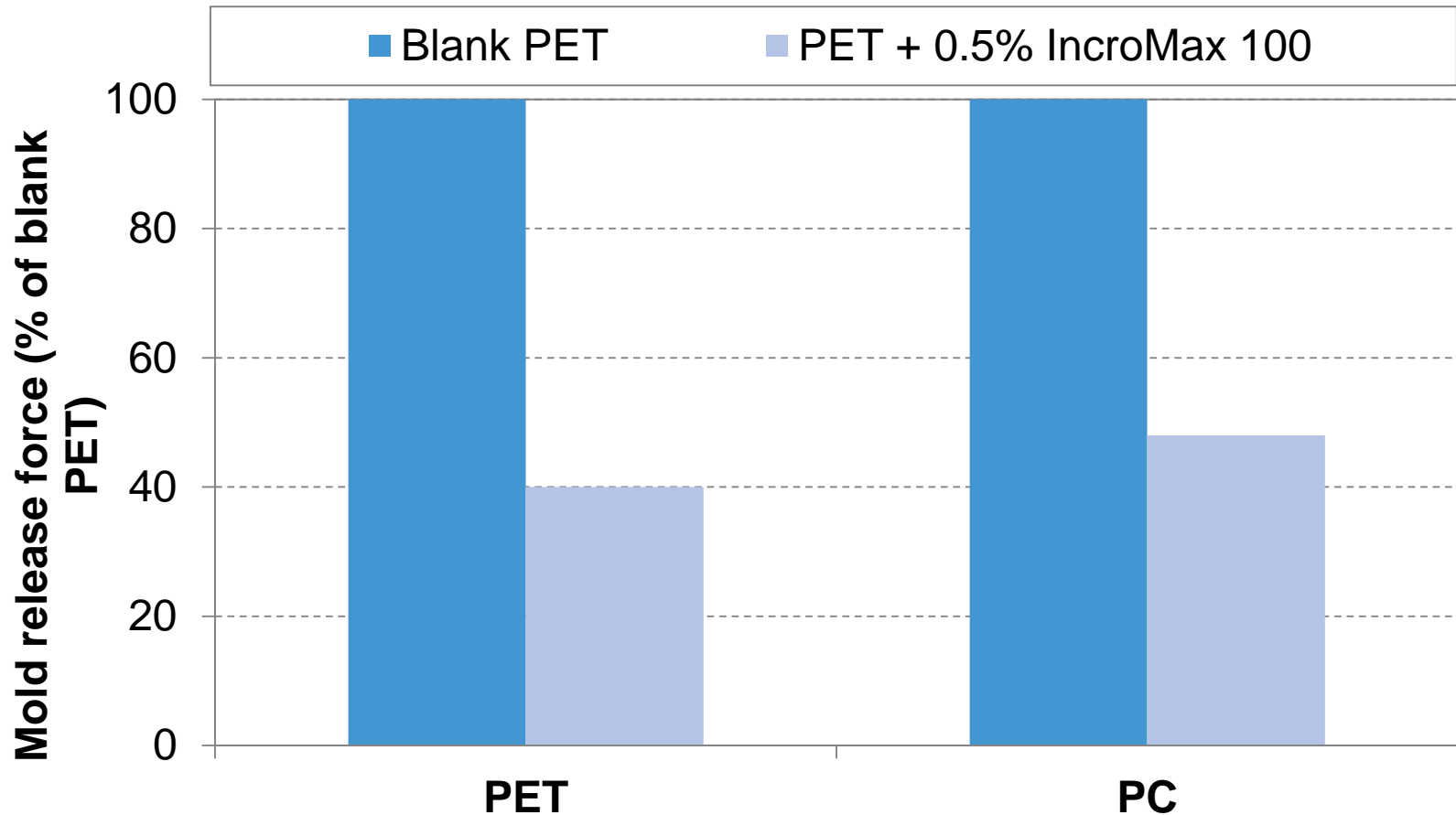
# Easier Mold Release

- Reduces the static and kinetic friction on the surface of the PET
- Can reduce friction by up to 60%
- Long lasting performance
- Allows processing at higher temperatures
- Reduces cycle time
- Increases number of shots per hour

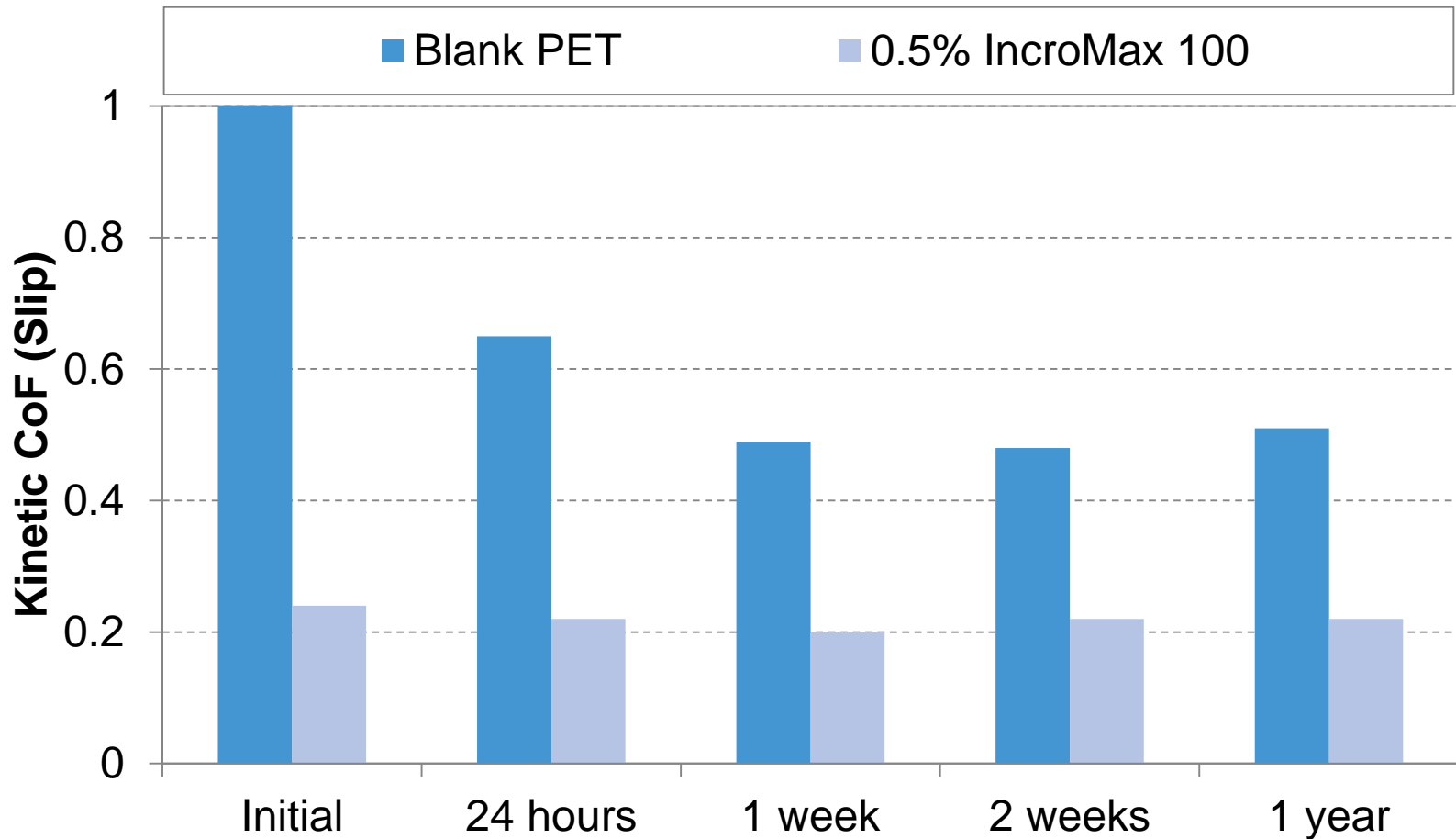
# Mold release force comparison



# Mold Release effect on polyester polymers

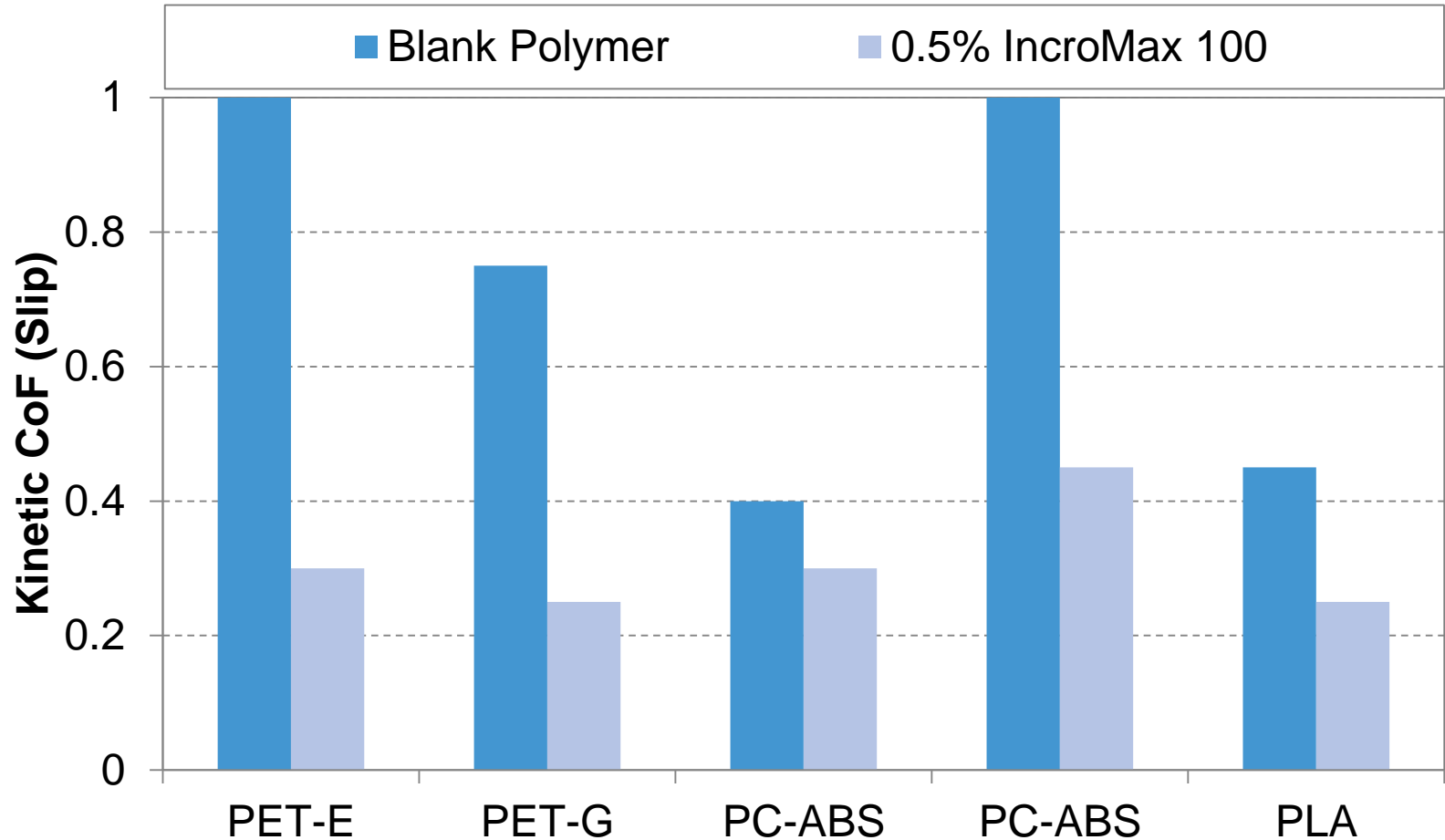


# Slip performance in PET molded plaques





# Slip performance in various polymers



# Slip performance in sheet and film

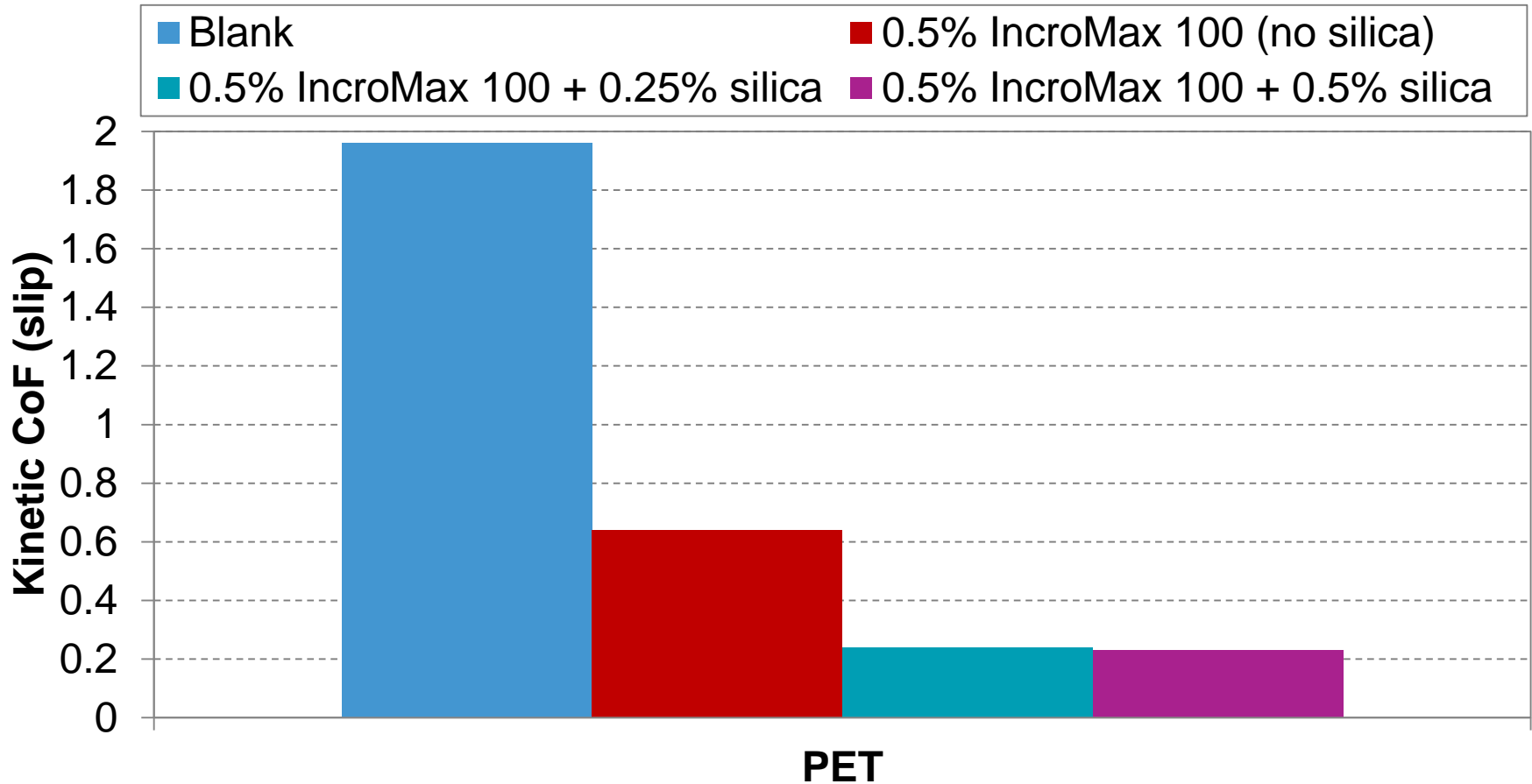
- IncroMax 100 can be used with silica to optimise slip performance in film (up to 250µm gauge)
- In sheet for thermoforming applications IncroMax 100 can be used in a variety of ways :
  - At less than ~0.1% IncroMax 100 works as an internal lubricant / processing aid and gives improved performance at low temperature
  - At 0.2 – 0.5% IncroMax 100 works externally to improve slip, de-molding, de-nesting and anti-scratch performance

# Slip performance in sheet and film

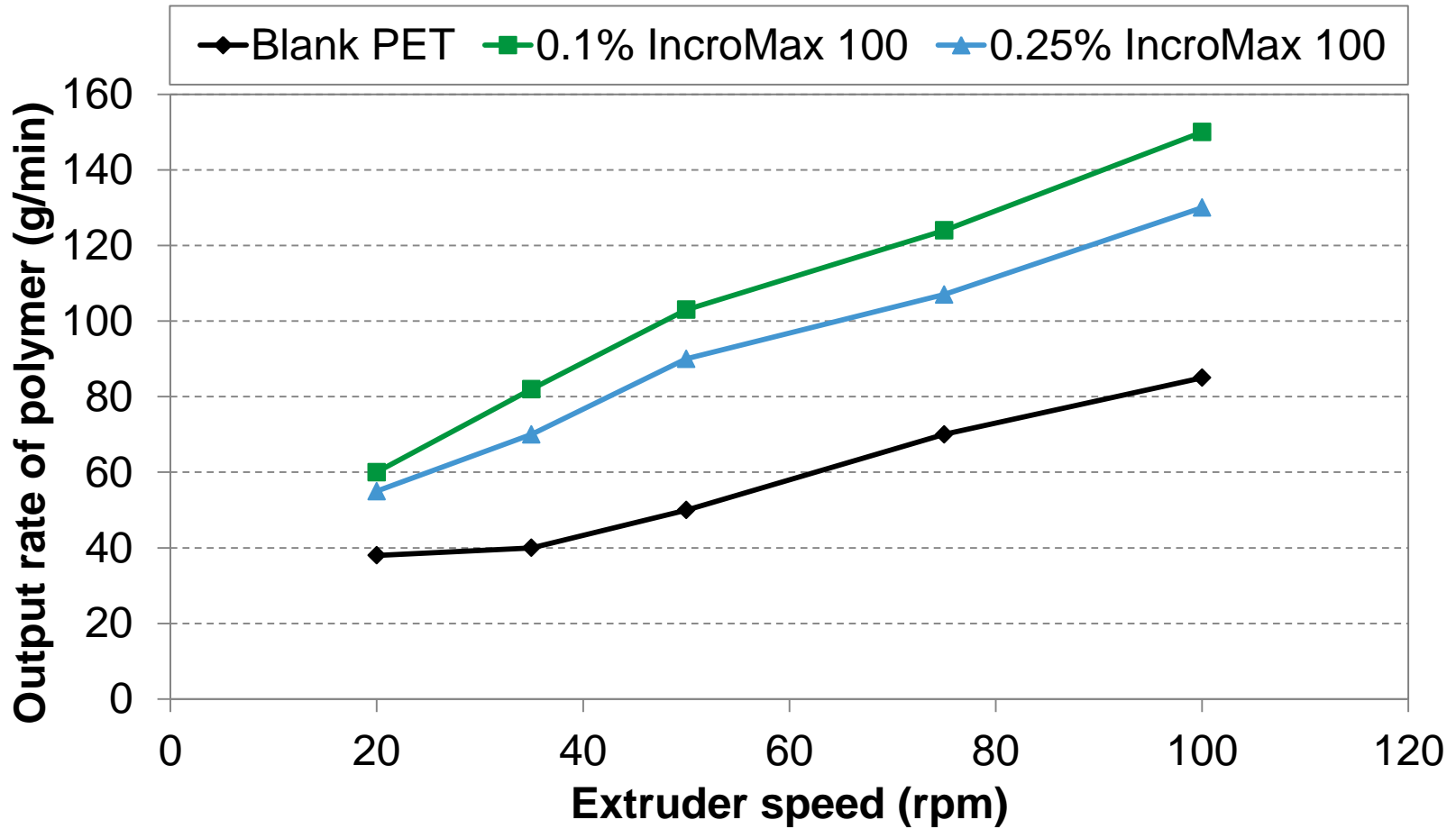
- Improves the flow rate of polyesters in extrusion and molding applications
- Improved flow of polymer through dies/gates
- Reduced stress of processed polymer
- Extrusion at lower temperatures & pressures leads to improved product quality
- IncroMax 100 is suitable for both virgin PET and recycled PET applications

# Slip in cast polyester films

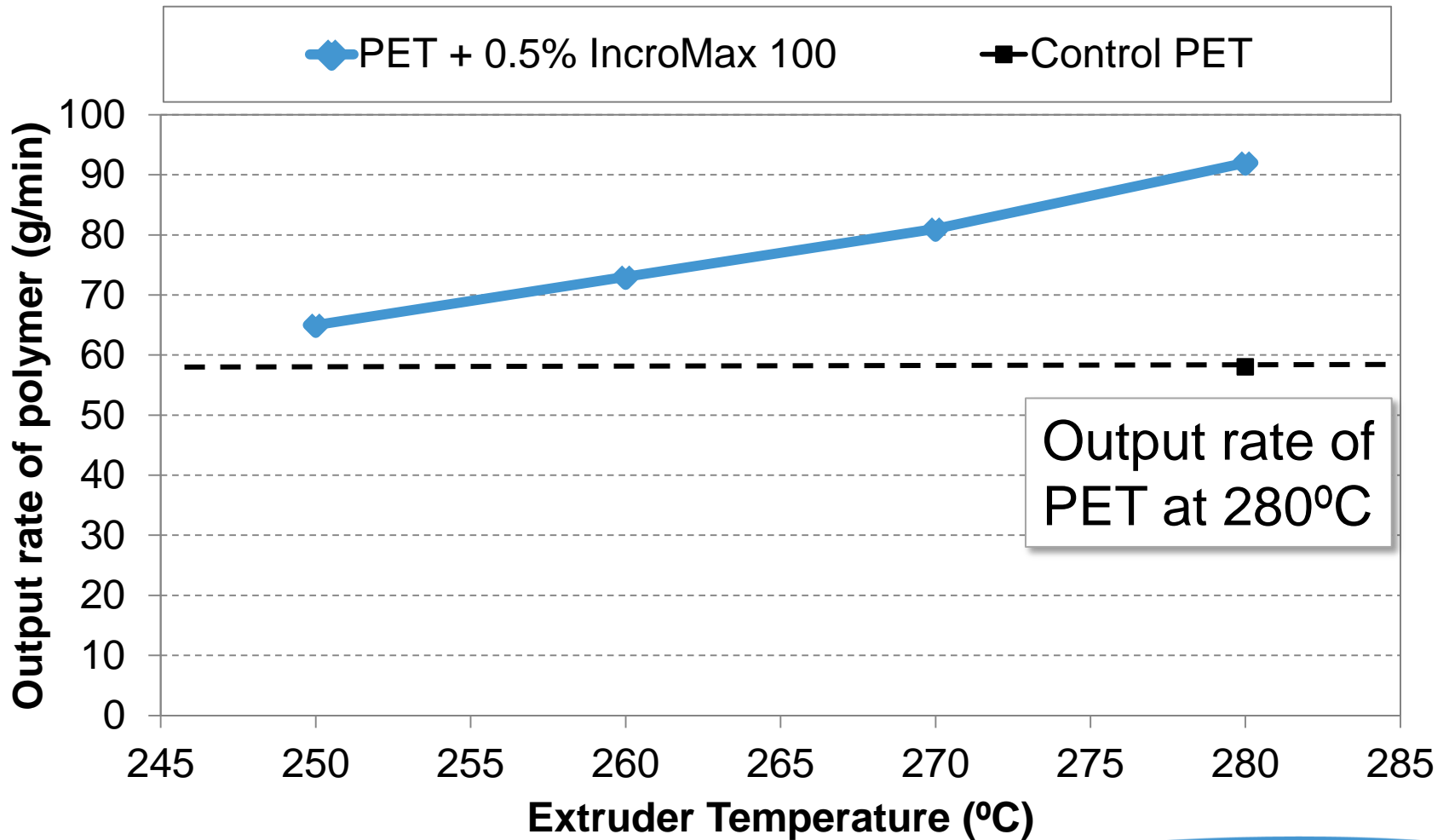
(50  $\mu\text{m}$  film, upper surface tested)



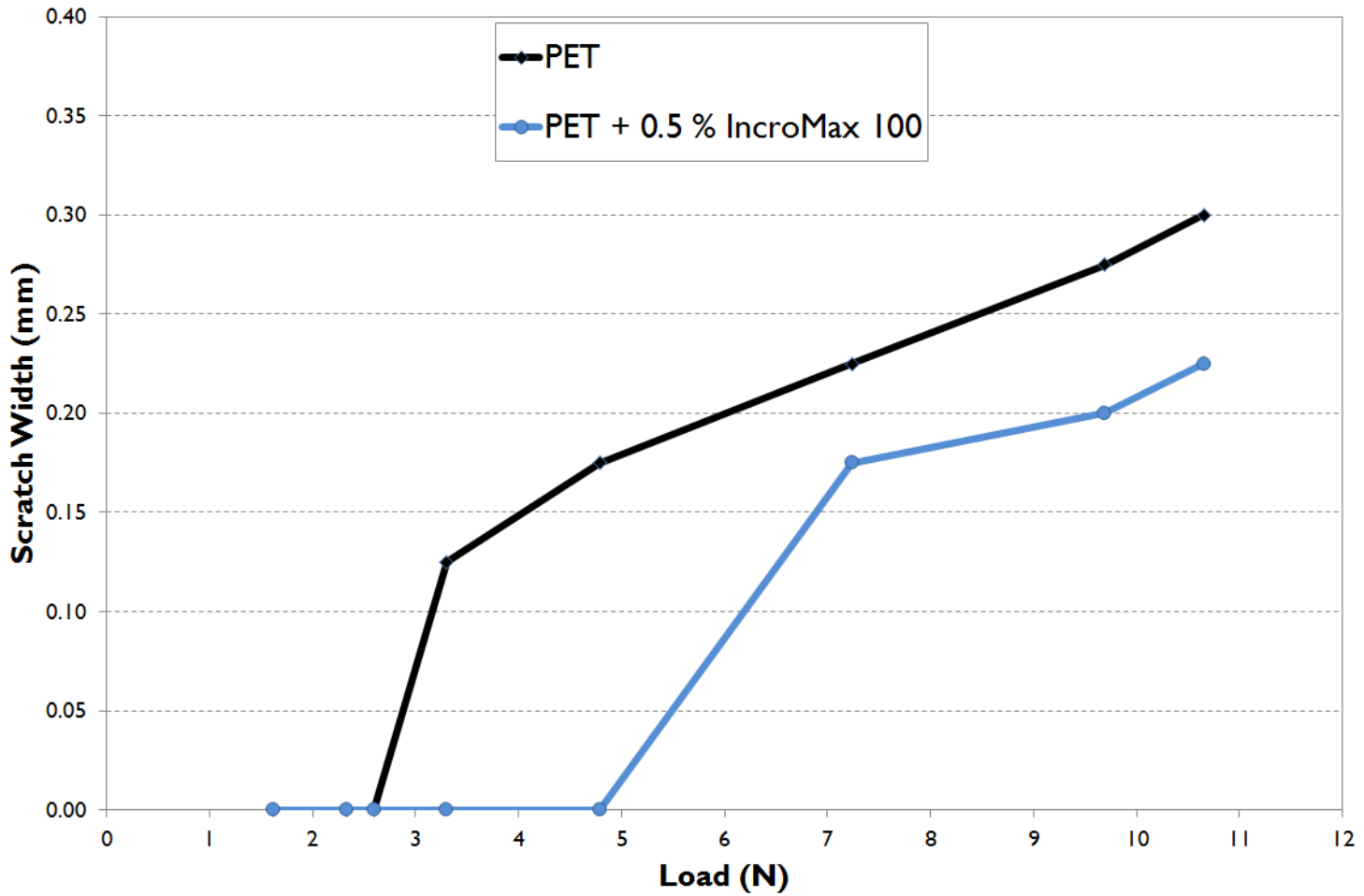
# Effect of IncroMax 100 on output rate (270°C)



# Effect of IncroMax 100 on processing temperature



# Scratch and scuff resistance



# Excellent colour and clarity

- No visible difference between the colour of blank PET and PET containing IncroMax 100
- No significant effect on haze
- Tested up to 1% addition (recommended level is <0.5% for most applications)
- Colour and clarity are retained over the lifetime of the polymer

	Time	L Value	a value	b value
Blank PET	Initial	94.6	-0.3	1.6
	4 weeks	94.3	-0.3	1.5
PET + 0.5% IncroMax 100	Initial	94.1	-0.3	1.8
	4 weeks	94.0	-0.4	1.6

Colour of PET measured on Dr Lange Transmission Spectrophotometer



# Colour comparison of IncroMax 100



# IncroMax 100 : study on packing density effect

- 550 PET preforms  
(11.4 g, 23.5 cm<sup>3</sup> internal volume, approx 70 x 25 mm)
- Molded and ejected into a 50 litre drum.
- The study was run with control PET and a formulation containing 0.5% IncroMax 100.
- In each case the volume occupied by the preforms was measured
- Volume occupied by preforms:
  - Control no additive = 39 litres
  - 0.5% IncroMax 100 = 35 litres
- This is better than 10% improvement in packing density

# IncroMax™ 100 & Atmer™ 7540

- **Atmer 7540**
  - 40 % active concentrate of IncroMax 100 on a PET carrier
  - Supplied dried in 25 kg bags
  - Effective dosing of IncroMax 100 into the polyester processing
  - All the effects of IncroMax 100 in an easy-to-dose physical form
  - Excellent for proving effects of IncroMax 100 in a trial scenario
  - 1.25 % dose gives 0.50 % addition rate of IncroMax 100
  - White foamed polymer pellets

# Summary : Key Benefits of IncroMax™ 100

- Reduces surface friction & mold release force by >50%
- Works in film and sheet to improve slip & anti-blocking
- Improves the packing density of preforms by up to 25%
- Reduces scratch & scuff
- Internal / external lubrication effect
- Reduces molded-in stress
- No adverse effects on the physical properties of the polyester resin
- Very low addition levels (< 0.1 – 0.5 % max)
- Very wide ranging food approval status

# Further Information

**Reasons to buy**

- Improved mold release
- Enhanced scratch resistance
- Reduced energy consumption

## IncroMax™ 100 & Atmer™ 7540

Easier processing for PET

**Superior PET processing without compromise**

IncroMax 100, Croda's unique additive for PET instantly reduces surface friction without having any adverse effects on the physical properties of PET. IncroMax 100 is now available in an easy to use concentrate form as Atmer 7540.

These specifically designed additives provide improved processing, as well as easier mold release and increased scratch resistance.

**CRODA**  
Polymer Additives

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At the heart of better plastics

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  - Samples
  - Literature
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