INTRODUCTION TO PFAS FREE PPA SOLUTION WITH BROAD REGULATORY COMPLIANCE

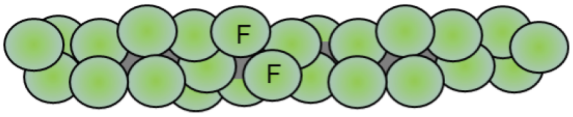
Polymer process aids (PPAs) are effective additives in polyolefin film extrusion to eliminate melt fracture, reduce die lip build-up, lower back pressure and improve throughput.

Without PPA film is rough and hazy

With PPA film is smooth and clarity is improved

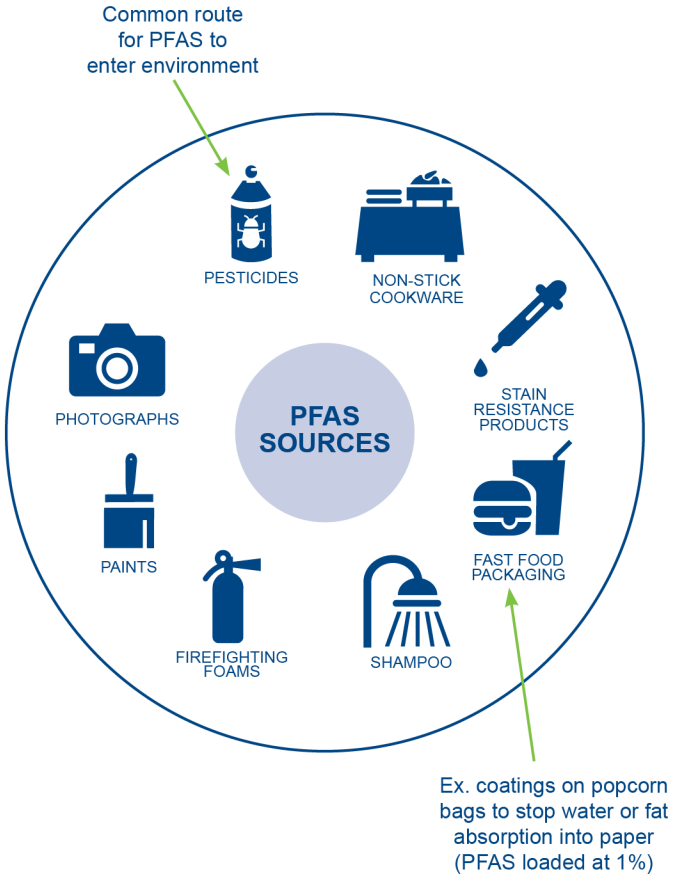
Fluoropolymers constitute the main active ingredient in historical PPA solutions and they fall under the umbrella of PFAS materials (per- or poly- fluoroalkyl substances).

Fluoropolymers can be considered Polyfluoroalkyl substances (PFAS)



Tight packing of fluorines makes PFAS difficult to break down

Environmentally & Biologically persistent



- IP1171 is a PFAS-free polymer process aid (PPA) that provides improved performance vs fluorine based PPA masterbatches.
- IP1171 was designed for packaging requiring global food contact compliance.
- IP1171 provides exceptional PPA performance without the environmental and toxicological concerns being raised by consumers and brand owners alike.
- IP1171 quickly eliminates melt fracture and die lip build up while maintaining the high clarity, impact strength, coefficient of friction and sealant properties of LLDPE films.

Contact your Ingenia Sales or Technical Service representative to learn more or reach out to:

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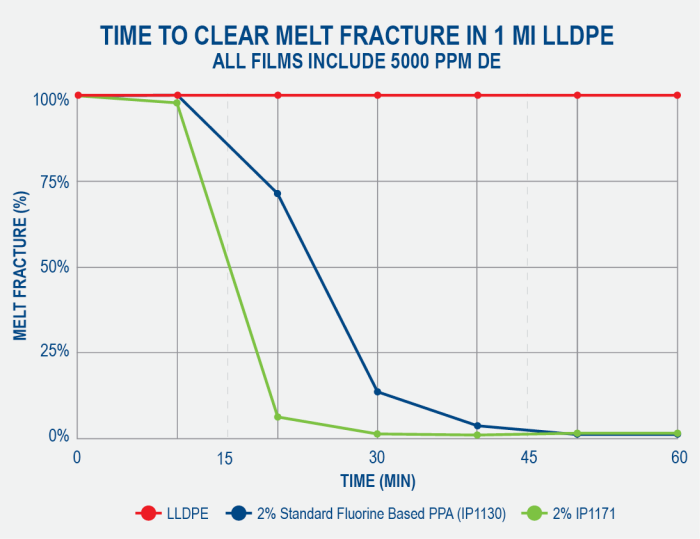
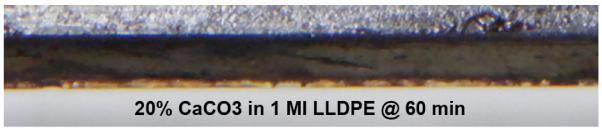
MELT FRACTURE ELIMINATION

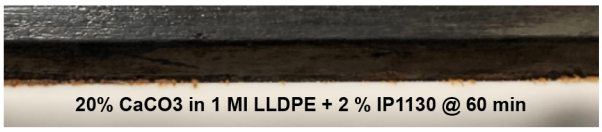


REDUCTION OF DIE LIP BUILD-UP

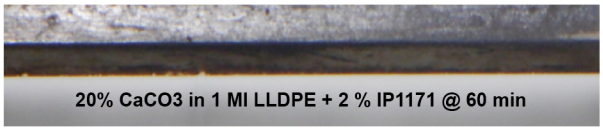
- Die build up tests performed on slit die using a 20% CaCO3 blend in LLDPE – this blend facilitates quick die buildup



- Conventional PFAS containing IP1130 PPA MB reduces die build up

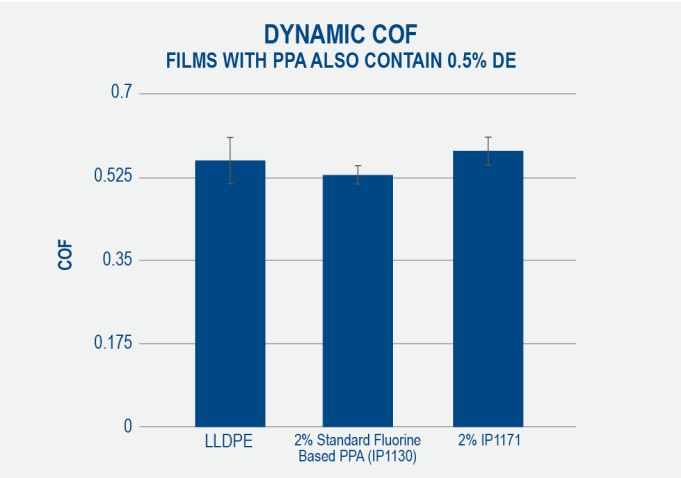


- PFAS Free PPA MB IP1171 provides improved performance with less die build up



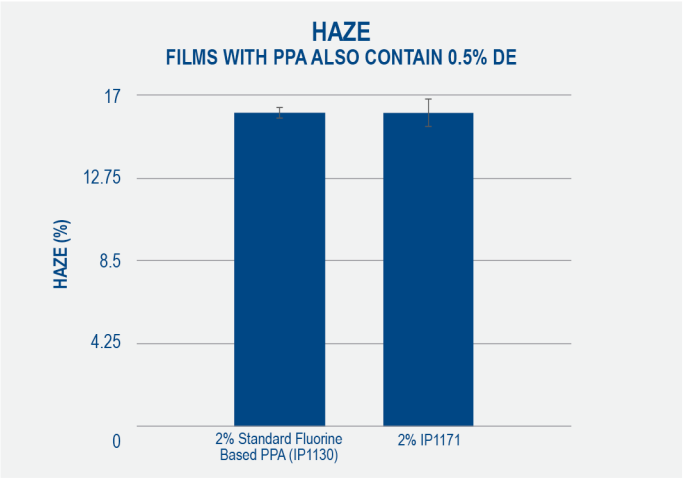
COEFFICIENT OF FRICTION – SLIP PROPERTIES

High friction between layers of polymer films, or films and converting equipment can limit production rates or hang up downstream processing. Slip additives help to reduce COF, however their performance can be negatively affected by other additives in the film. Fluorine based PPAs typically have minimal effect on COF, similar minimal effect on COF is noted with Ingenia IP1171 PFAS free PPA MB.



CONTACT CLARITY – HAZE OF FILMS

The haziness of consumer goods flexible packaging is another critical parameter that needs to be evaluated with any combination of additives in a polymer system. Process aids can negatively affect haze, especially if underdosed or overdosed. Underdosing does not remove melt fracture, while overdosing causes die buildup and release onto the film, often showing as gels. Ingenia's IP1171 PFAS free PPA performs similarly to fluorine based PPA MBs, ensuring high clarity films can be made while avoiding the use of fluorine based PPA MB.



Ingenia's IP1171 PFAS free PPA MB has broad regulatory approval for use in food packaging films and is the obvious choice to replace fluorine based PPA MBs for film extrusion, providing excellent melt fracture and die lip buildup avoidance with minimal impact on film COF and haze.

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