

FERRO-PLAST s.r.l.

Atmer™ anti-fog

for performance you can clearly see



CRODA
Polymer Additives

At the heart of better plastics

Performance you can clearly see

Fogging in plastic films

Fogging is a term used to describe the formation of small discrete droplets of water on the surface of transparent plastic films. Fogging most commonly occurs when there is a temperature differential between the inside and the outside of an enclosed atmosphere causing localised cooling at the interface.

Fog formation in food wrapping film obscures the contents, significantly reducing the aesthetic quality of the packaged food. In agricultural films it can lead to reduced light transmission with consequent reduction in growth and crop yield. It can also cause damage to the plants due to burning from a 'lens' effect and from continuous water drip.

Atmer™ anti-fogging agents

Croda Polymer Additives produces a range of anti-fogging agents which can be incorporated into the polymer during the extrusion process. They migrate to the surface both raising the surface energy of the polymer and lowering the surface energy of any water droplets. This changes the interfacial tension between water and the polymer surface allowing the condensed water droplets to spread into a continuous and uniform transparent layer on the fabricated film.

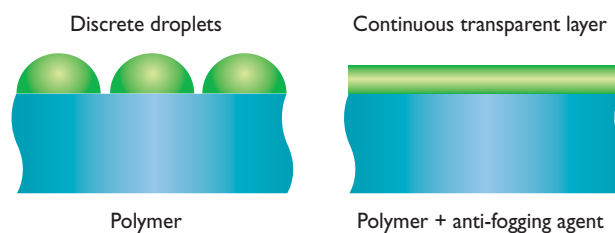


Figure 1: Polymer with and without anti-fogging agent

Product range

The Atmer range includes a wide variety of additives for use in both food wrap and agricultural films.

Atmer 7000 Series

In addition to the pure products below, Atmer anti-fogging agents can also be provided as concentrates in a range of polymers marketed as the Atmer 7000 series (see Atmer Additive Concentrates brochure). Concentrates of particular importance are Greenhouse Atmer 7301 and 7326 and Food Wrapping Atmer 7340.

Product	Description	Physical form at 25°C	Recommended uses
Anti-fog food wrap			
Atmer 100	Sorbitan ester	Liquid	PE, EVA food wrap films
Atmer 116	Ethoxylated sorbitan ester	Liquid	Food wrap in combination with Atmer 1010
Atmer 645*	Proprietary blend	Liquid	Outstanding in PE, EVA, PVC food wrap
Atmer 674*	Proprietary blend	Liquid	Outstanding in PE, EVA, PVC food wrap
Atmer 688**	Proprietary blend	Liquid	Laminated PE film
Atmer 1010**	Glycerol ester	Paste	Used with Atmer 116 for food wrap, imparts cling
Atmer 1440	Glycerol ester	Paste	Polyolefin food wrap
Anti-fog agricultural film			
Atmer 103	Sorbitan ester	Bead	LDPE, PVC agricultural film
Atmer 185	Glycerol ester	Powder	Long lasting properties especially in EVA agricultural film

* only available in USA due to regulatory reasons

** only available in USA

Applications

Food wrap films

By adding a suitable anti-fogging agent to food wrap film, condensed water droplets are spread into a thin continuous layer of water improving the transparency of the packaging and the durability of the contents. They also improve the presentation of the food to look more appealing to customers (eg. packs on supermarket shelves).

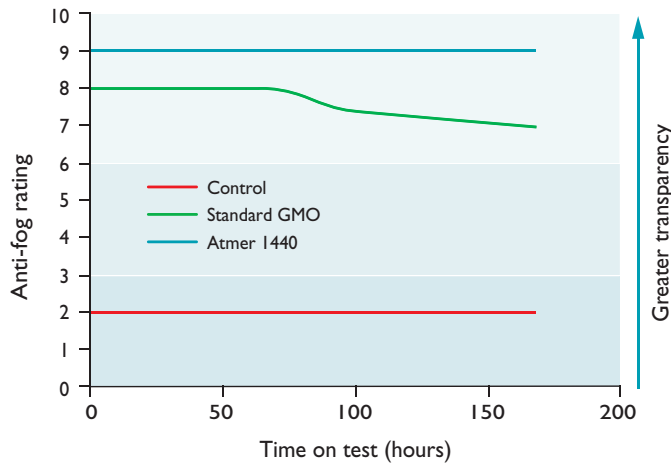


Figure 2: Superior anti-fog performance of Atmer 1440 - cold fog test LDPE film (50µm) 1% additive[†]

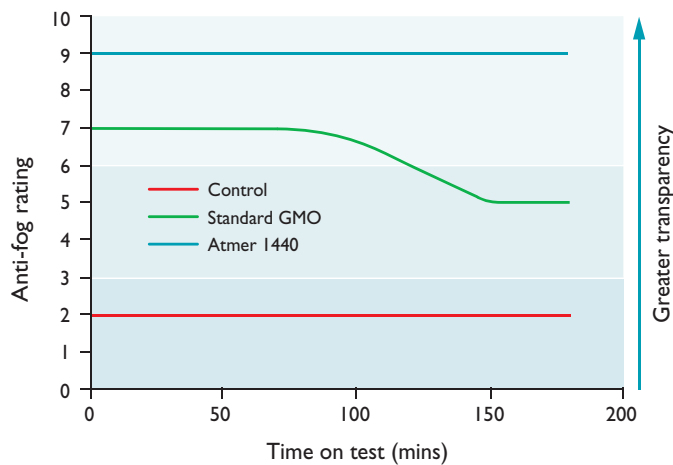


Figure 3: Superior anti-fog performance of Atmer 1440 - hot fog test LDPE film (50µm) 1% additive[†]

Performance rating of the anti-fog evaluation test

- 1 = Opaque layer of small fog droplets
- 3 = Opaque (or transparent) layer of large droplets
- 5 = Complete layer of large transparent droplets
- 7 = Randomly scattered or only large transparent droplets
- 9 = Transparent film having no visible water

Agricultural films

The use of an anti-fogging agent in agricultural film causes condensed water droplets to spread into a thin continuous layer of water, which in turn:

- Improves light transmission resulting in higher plant growth rates, higher crop yields per plant, and earlier crop maturity
- Reduces burning of plants and crop spoilage
- Reduces constant water dripping

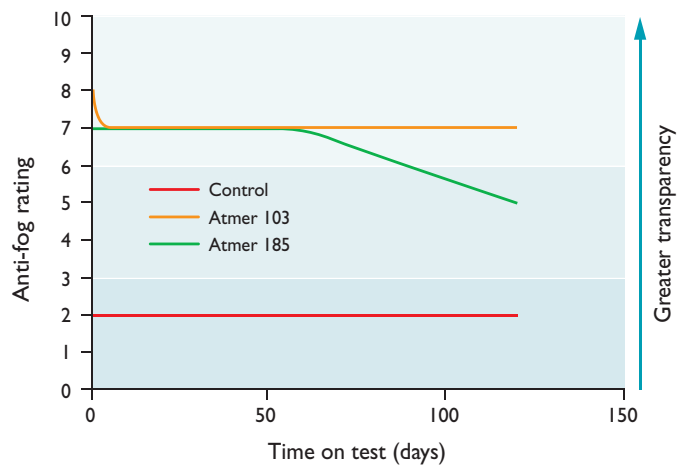


Figure 4: Comparative anti-fog performance of Atmer 103 & 185 - accelerated greenhouse test LDPE film (180µm) 2% additive[†]

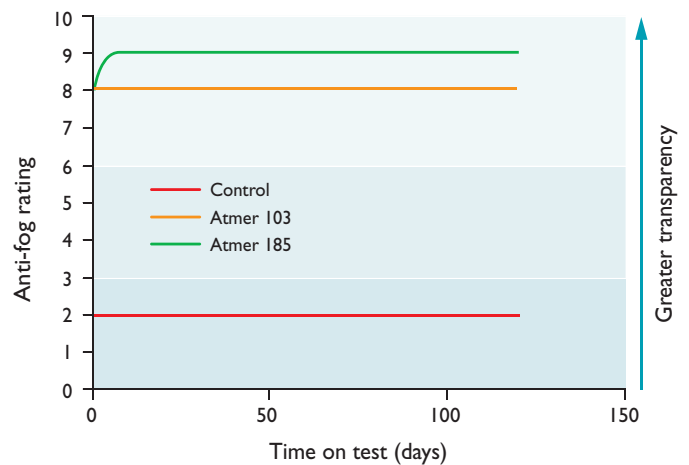


Figure 5: Comparative anti-fog performance of Atmer 103 & 185 - accelerated greenhouse test EVA film (4% VA, 180µm) 2% additive[†]

Recommended addition levels

The recommended level of addition for agricultural film lies between 1% and 5% and for food wrap film it lies between 0.5% and 4%, taking into consideration:

- Polymer type
- Thickness of film
- Processing conditions
- Temperature at which the film will be used
- Range of temperature variation
- Governmental regulations (particularly for food packaging)
- Useful life required for the effect
- Degree of risk of wash-off

[†] test methods available upon request

Technical partnership

Extensive technical assistance is offered to our customers, supported by our purpose-built plastics applications laboratory at our manufacturing site in the UK. With over 30 years' experience of additives for the plastics industry, our technical service team can offer you advice on selecting the most effective additive and dosage for your plastics application.

Quality standard

Croda offers various grades of anti-fogging agents that have been optimised for the demands of individual application areas. The Atmer range is subject to stringent quality control procedures during and after manufacture; SQC data on key variables can be provided on request.



Further information

Croda sales and distribution are coordinated through an extensive worldwide network of associates and agents. For details of your local representative please contact your nearest Croda regional office.

Visit our global website at www.croda.com/europe/pa

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