

Substance for Success.



Technical Information PVC-TI 3

Air Release Additives

PVC Plastisol Applications

Surface Defects

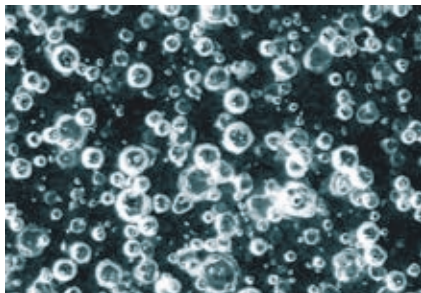
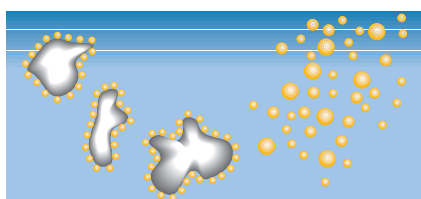
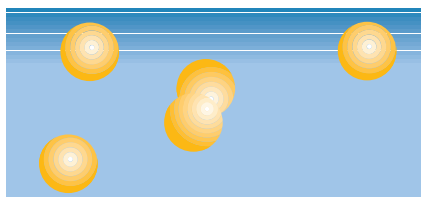


figure 1

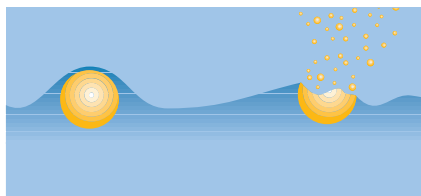
Air Release Additives Work in Three Steps



step 1



step 2



step 3

figure 2

Why Use Air Release Additives?

- Air entrapment is unavoidable during production and processing of PVC plastisols (figure 1).
- Interfacially active substances, e.g. residual emulsifiers, stabilize air bubbles.
- Air release can be inhibited by high viscosity, pseudoplasticity or thixotropy.
- Air bubbles are detrimental to:
 - transparency
 - color strength
 - print definition
 - substrate wetting
 - mechanical properties, such as tensile strength and elongation
 - contact drum gelling.

How do they work?

1. Displacement of air from PVC resin, filler, pigment and reinforcement

By reducing the interfacial tension between plasticizer, PVC resin, pigment, filler and reinforcement, the trapped air is displaced into the plasticizer (figure 2).

2. Smaller bubbles accumulate to form larger bubbles

Substances which stabilize the bubbles are displaced by the air release additive. Smaller bubbles accumulate to form larger bubbles, which, due to higher buoyancy rise faster to the surface (Stoke's Law).

3. Bubbles burst on the surface

Substances which stabilize the bubbles are displaced by the air release additive, the bubbles burst.

What are the Differences?

BYK-3155, the most universal of the BYK air release additives, is in compliance with the requirements of the Plastics Directive EU-Dir 2002/72/EC as amended. BYK-3155 is compliant with numerous sections of the US Code of Federal Regulations title 21 (FDA). BYK-3105 and BYK-3160 meet the fogging requirements (DIN 75201).

Remarks

To achieve a further improvement in defoaming, we suggest using a combination of an air release additive and a defoamer (e.g. BYK-067A).

Compatibility

Effectiveness

excellent

poor

high

slight

PVC/Plasticizer Dependency

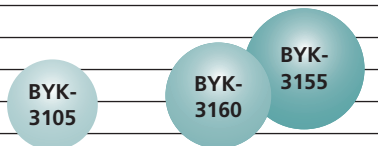


figure 3

Objectives of our air release additive development:

- universal usage
- high effectiveness
- reduced PVC/plasticizer dependency

Test Methods

Vacuum Deaeration

1. Vacuum deaeration

Mix air into PVC plastisol. Put the beaker into a desiccator. Pull full vacuum without stirring until the foam reaches the top of the beaker. Cut vacuum (1 cycle). Record number of cycles and time for full plastisol deaeration (figure 4).

2. Self deaeration

Mix air into PVC plastisol. Store plastisol for a defined time and then apply it by doctor blade. The plastisol is gelled and checked visually for bubbles (figure 5).

3. Huff test

A metal ring with several holes of different diameter is completely submerged into the plastisol. Lift ring from plastisol. Record the time in which the plastisol covering the holes burst open.

4. Syringe test

A defined quantity of air is injected into the totally deaerated plastisol. Record the time it takes for the air bubble to reach the surface and the time it takes the bubble to break.



Using a Dispermat for 30 seconds



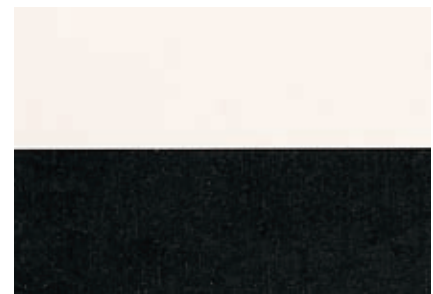
Using a vacuum directly after stirring

figure 4

Self Deaeration Effect



Without Air Release Additive



With Air Release Additive

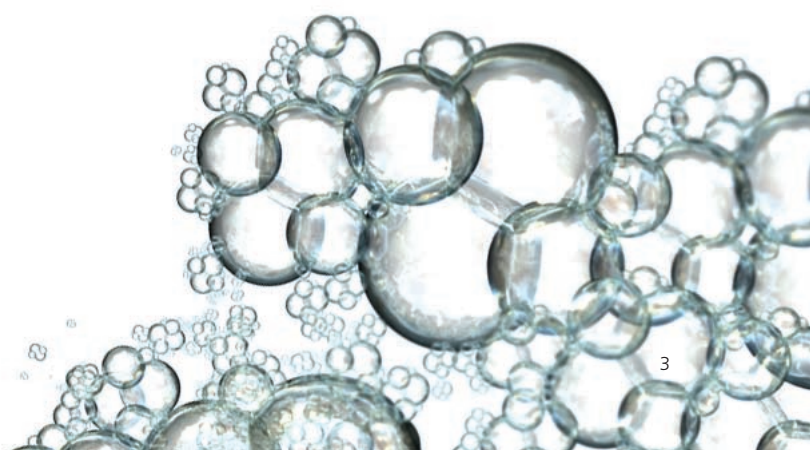
figure 5

Application Fields

	Unfilled Plastisols	Filled Plastisols	Foamed Plastisols	Low fogging Plastisols	BBP/Mesamoll containing Plastisols
BYK-3105	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BYK-3155	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BYK-3160	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Recommended Suitable

figure 6



Products and Applications

BYK Additives

Additives are used during the production of coatings, printing inks and plastics to optimize the production process and to improve the quality of the final product.

Product Range Additives

- Additives to improve surface slip, leveling and substrate wetting
- Adhesion promoters
- Defoamers and air release agents
- Foam stabilizers
- Processing additives
- Rheological additives
- UV-absorbers
- Viscosity depressants
- Waxes
- Wetting and dispersing additives for pigments and extenders

Application Areas

- Ambient curing resins (FRP)
- Architectural coatings
- Automotive OEM
- Automotive refinishes
- Can coatings
- Coil coatings
- Color masterbatches
- Industrial coatings
- Leather coatings
- Marine paints
- Molding compounds
- Paper coatings
- Pigment concentrates
- Polyurethane foams
- Powder coatings
- Printing inks
- Protective coatings
- PVC plastisols
- Thermoplastics
- Wood and furniture coatings

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