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TECHNICAL BULLETIN

ORIENTED POLYPROPYLENE FOR WINDOW CARTONS

Multi-Plastics, Inc. CWF 5000 oriented polypropylene films are widely used on window boxes. They offer excellent clarity, durability, dimensional stability and substantial savings over other films, such as acetate, polyester, cellophane, etc.

Infrequently a complaint is heard about wrinkling of OPP windows. The problem always seems to be associated with residual solvent, and it is not specific to any particular brand of OPP.

Here is some information, which will help you to understand and control this rather rare problems.

What causes OPP film to wrinkle?

OPP film has excellent resistance to oils, grease, chemicals, and many solvents. Aliphatic and aromatic hydrocarbon solvents, however, if allowed to remain in contact with OPP film for prolonged periods, can be absorbed by the film. These solvents act as a plasticizer or softener within the oriented film and cause it to relax and expand. The result is buckled and wrinkled film in the case of window cartons.

How can wrinkles be prevented?

1. Use adhesives designed for OPP film. Most box manufacturers use water-based adhesives, and we have yet to see a wrinkle problem caused by adhesives. But it is good practice to use adhesives designed for OPP.
2. Use printing inks designed for compatibility with OPP windows. Most window cartons are printed on sheet fed litho presses, which are not equipped with force drying ovens. Knowing this, the ink manufacturer can avoid the use of potentially troublesome solvents.

Likewise the ink supplier can instruct the box manufacturer on proper procedures for thinning the ink if required. Slow evaporating hydrocarbon solvents, like Magee 535, should be avoided. Rather, the ink supplier would probably suggest using a low viscosity drying oil for thinning.

3. Allow the window cartons to air-dry thoroughly before they are packaged for shipment. Wrinkling, to the best of our knowledge, has never occurred in window cartons stacked on an open pallet. In this situation, any retained solvent can escape to the atmosphere.

After packaging for shipment, residual solvent in the board stock cannot escape – it is confined within the shipping container. If the printed cartons are not properly dried, the OPP windows are subjected to a hydrocarbon solvent-rich atmosphere, which can induce wrinkling (particularly if the shipping container is in a warm room or hot truck).

Is there a simple test to predict if wrinkling might be a problem?

Yes. Before packaging the window cartons for shipment, pull a representative sample(s) from well within the stacked cartons. Place a couple 4x6 inch pieces of printed board stock in a clean pint jar (fold or cut the board into smaller pieces).

Place a piece of the OPP film over the mouth of the jar and draw it smooth (like a drumhead). Apply the lid to seal the jar.

Allow the jar to stand in a warm spot (70 – 120⁰F) for at least 18-24 hours. Then, remove the lid and check the film for distortion or wrinkling.

If the film is wrinkled or distorted, the window cartons should be allowed to air dry longer before packaging.