

T. I. P. #13

Mottling of Vinyl Film

DEFINED

Highly flexible vinyl film is accomplished with the addition of plasticizing oil. The surface of all these products is easily embossed by pressure. During processing and storage care must be taken to minimize uneven or high pressure. When enough pressure is exerted on the surface of these products they will very quickly become embossed and take on a dull appearance. Of course the pressure is never completely uniform so the appearance will be uneven although there are distinctive patterns which emerge depending on the type of product involved.

THE EFFECT ON VINYL FILMS

Graphic film becomes mottled if the pressure on the surface of the film in a given roll is too high. Various patterns of mottling make it seem as though several different things occur while in fact one is seeing a wide variety of ways pressure can be applied to a roll of film.

- A band of dullness along the machine direction usually an inch or couple of cm's wide and on one side or another indicates the material has a slight ridge or high caliper band at that point across the roll. These bands can come from the cast or coating process, indeed they can also develop when release liner is slightly thicker. In this case the effect will almost invariably occur no matter how lightly (loosely) the roll is wound during the converting processing for the "high spot" will carry all the pressure of the finished roll.
- A relatively uniform blotchy appearance usually getting heavier toward the core of a roll is caused by a roll wound using "taper-tension" method where pressure is reduced as the roll grows. This is a common winding method in high output production machines and results in a roll which doesn't tend to slip or lose form at the outer wraps while also avoiding extreme pressure at the core, but in sensitive materials (such as plasticized film) sometimes shows the higher level of core pressure by mottling towards the final ten percent of the footage.

NOTE: Both of the above patterns will occur in older films more frequently than fresh stocks due to the moisture expansion of release liner as they take on ambient humidity. Typically the pattern is bands along the outer two inches of the roll, due to the fact that rolls take on moisture along the cut edges rather than along the surface, which is protected by vinyl.

A narrow band extending across the web which repeats itself every seven to fifteen inches is caused from storage of a roll on its side outside of the supporting box. The pressure on the bottom of the roll where it rests on the shelf will telegraph all the way to the core, especially in full large roll. If a roll is used

repeatedly and returned to the shelf in a different position the bands will be multiplied.

CONTRAST IS THE KEY

As mottling is a function of plasticizer level and compressibility of film it will be almost identical no matter what color or surface finish is involved. "Why then, is mottling so evident in dark high gloss film?" The answer is that contrast is why mottling is apparent. If a film is matte finished to begin with or a light color, which reflects a lot of light then mottling, won't be apparent. However, mottling will occur at just as high a level as with dark, high gloss materials.

REMOVAL OF MOTTLING

Fortunately, mottling is easily removed. Except in severe cases mottling will fade and disappear within a short time: a couple of days in a shop, a couple of hours in sunshine and a couple of minutes under a heat gun. If one notices mottling in a roll and desires to correct it before cutting or printing then the roll can be loosened by releasing the paper tape, sliding the end of the vinyl back over the roll about ten inches and spinning the core until the entire roll has been taken off contact with the adjacent wrap. This relieves any built-up pressure and will result in a uniform surface within a couple of days.