

Pressure Mottling

Pressure mottling, also known as pressure marking or imprinting, is an uneven or irregular gloss pattern on the face of a coil sheet. It is generally caused by disparity in the gloss between the top and bottom surfaces of a coil. These gloss differences are then transferred with time and pressure to either surface causing the irregular pattern. Figure 1 shows two examples of pressure mottling.

Figures 2 and 3 illustrate how pressure mottling occurs. The gloss components in Figure 2 are under normal suspension within the topcoat and the direction is random throughout. When pressure mottling takes place, the gloss components are suppressed or flattened within the topcoat as seen in Figure 3. Only the components closest to the surface are affected, and this results in the variance in gloss across the strip.

The distortion is typically temporary and will dissipate with time and exposure to heat or ambient conditions. In extreme cases where heat and pressure have been excessive, the distortion is permanent and will not dissipate under ambient conditions.

We have identified several things that contribute to pressure mottling on a coil line and also apply to stacked sheets or parts:

- Major gloss difference between the top coat and the back coat
- Surface difference between the topcoat and the back coat as it relates to the glass transition temperature of the polymers used
- Differences in cross-linking densities between the topcoat and the back coat.
- High rewind tension
- Temperature (Coil wrapped too hot, wet, or subjected to conditions that allow condensation in the coil, etc.).

To eliminate pressure mottling that already exists, the strip may be heated. This works because the appearance is normally a flattening or changing of the smoothness of the coating surface. A small amount of applied heat allows the coating to expand to a stable condition, thereby eliminating the characteristic appearance of pressure mottling. Typically the heat generated during the forming process is usually sufficient. In all but the most severe cases, the coating will "recover" (expand) within a few days after the "pressure" is removed.

This Tool Kit is part of a series of educational aids developed by the members of the National Coil Coating Association. NCCA is a trade association of coil coaters and suppliers of raw materials and equipment used in the coil coating process. The association concentrates its efforts on providing educational resources and assisting its members in providing superior products and services to their customers. NCCA Tool Kits are informational tools and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their products and equipment.



Figure 1



Sample crossview showing gloss components in normal suspension

Figure 2



Sample crossview showing "suppressed" gloss components

Figure 3