

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 created an excessive degree of marking/mottling, the distortion is permanent and will not dissipate under ambient conditions. In all cases, pressure mottling is an aesthetic issue and will not affect the long-term mechanical and durability performance of the coated metal system.

Several factors contribute to pressure mottling on a coil line, and these same factors apply to stacked sheets or parts:

- Major gloss difference between the topcoat and the back coat
- Glass transition temperatures of the polymers used in the topcoat and the back coat
- Differences in cross-linking densities between the topcoat and the back coat.
- High rewind tension
- Temperature (i.e., the coil is wrapped too hot, wet, or subjected to conditions that allow condensation in the coil, etc.).

NOTE: Pressure mottling is often heavier in the center of the strip due to the crown in the substrate and tension being higher in this area.

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 information 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.

To eliminate pressure mottling that already exists, the strip may be heated, which relieves the stresses with the mottled area and results in a smoothing effect. Typically the heat generated during the fabrication process or as the material is exposed to outdoor conditions is sufficient. In all but the most severe cases, the coating will "recover" (expand) within a few days after the "pressure" is removed.

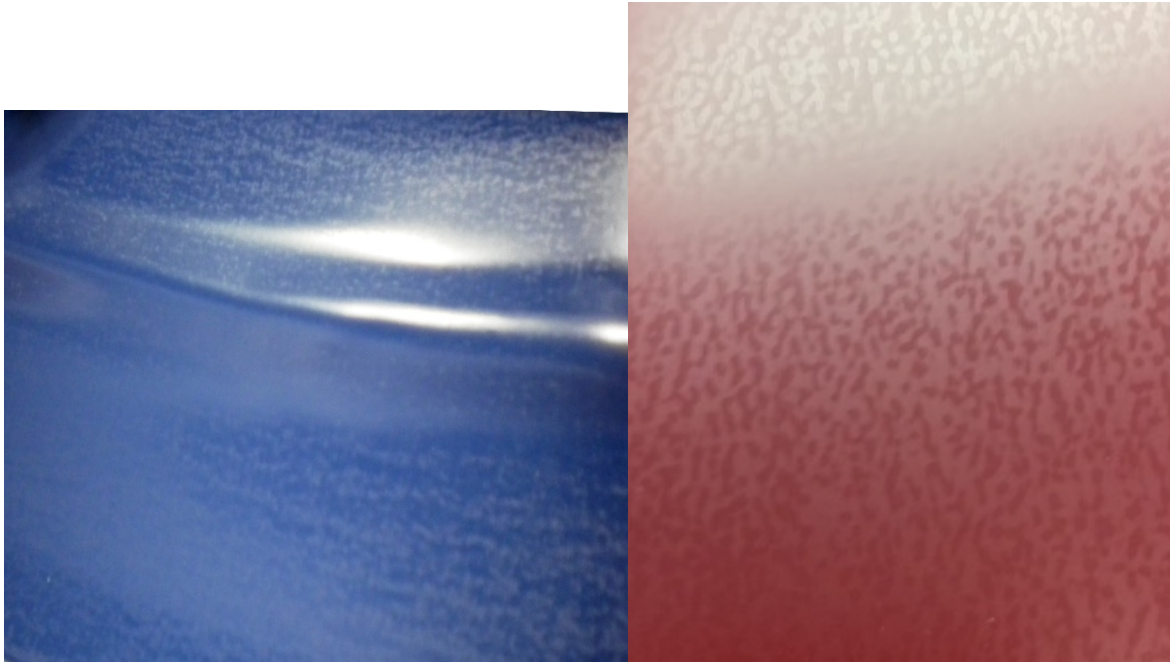


Figure 1



Sample crossview showing gloss components in normal suspension

Figure 2



Sample crossview showing
"suppressed" gloss components

Figure 3