PPG Powder Coatings

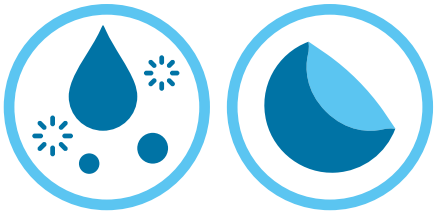
What is an on-line cure test?

An online cure test or end-of-line testing, is a real-time assessment method for monitoring the curing process of powder coatings during production and helps to ensure that the coatings achieve the desired properties and performance characteristics.

Film performance tests generally include physical tests, resistance tests and field tests. Specifically for thermoset powder coatings, on-line cure tests provide quick assessments that correlate the degree of chemical cure shortly after baking, indicating long-term performance. However, on-line testing should not replace initial product qualification (verification) or ongoing quality assurance processes, such as Production Part Approval Process (PPAP), daily quality control and periodic product/process validation).

Please be reminded that when handling solvents that may pose significant health and safety risks, it is essential to use appropriate personal protective equipment (PPE). Always adhere to the safety recommendations detailed in the relative Safety Data Sheets (SDS).

What are some commonly employed on-line cure tests?



Solvent rub testing

Adhesion testing

Adhesion and solvent rub testing are commonly used to detect undercured powder coating films or to confirm adequate curing. Adhesion testing is always destructive, while solvent rub testing can often be non-destructive, which is particularly important depending on the economic value of the coated part. Other less commonly used tests include impact resistance, flexibility and pencil hardness.

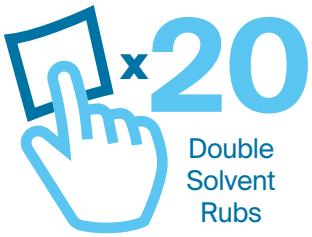
How is solvent rub testing conducted?

*ASTM D5402 (standard practice for assessing the solvent resistance of organic coatings using solvent rubs), along with other global standard test procedures, outlines methods for applying organic solvents to coating films to evaluate their resistance to exposure. Various application methods exist, including finger-applied cloth and cotton-tipped swabs, and multiple organic solvents can be used for testing.

Evaluation criteria determine whether solvent exposure significantly impacts the film's aesthetic or functional properties.

Is there a good "generic" recommendation for a solvent rub test solvent?

Given the multitude of powder product formulas and rub test variables, yes. A good starting point is to perform twenty double rubs using a 75/25 volume blend of 99% Isopropanol and Xylene. The primary failure criterion is color removal on the rubbing material. Note 99% technical grade isopropanol may also be labeled as 2-propanol.



Are there other solvents appropriate for "generic" use?

Methyl Ethyl Ketone (MEK) has been a common solvent for liquid paints, and online cure evaluations are sometimes referred to as MEK Double Rubs testing. However, MEK is aggressive toward most powder coating films. Acetone is similarly aggressive and can cause rapid film softening, even in fully cured films based on other physical properties. In contrast, straight 99% isopropanol is typically not aggressive enough to differentiate between films identified by other analytical tests as undercured or fully cured.

*PPG is restricted from distributing ASTM or other test methods to customers, but basic information in the form of PPG Powder Technical Lab work instructions may be suitable for sharing with customers who need assistance learning about the details of adhesion testing, solvent rub testing.

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