

Epoxy Powder Coating

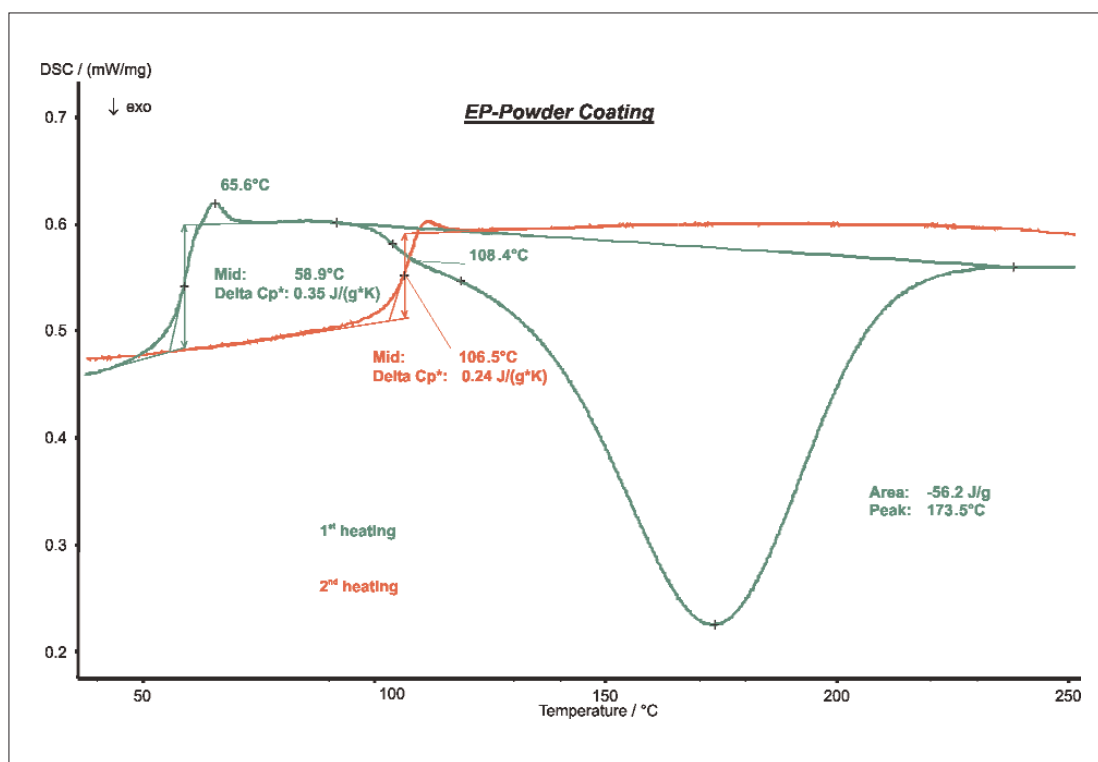
AS-144-2007

Powder coatings are dry types of coating which are applied as a free-flowing, dry powder. The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form. The coating is typically applied electrostatically and is then cured under heat to allow it to flow and form a "skin." The powder may be a thermoplastic or thermoset polymer. It is usually used to create a hard finish that is tougher than conventional paint. Powder coatings are mainly used for coating of metals, such as "white goods", aluminum extrusions, and automotive and motorcycle parts. The most common polymers used are polyester, epoxy or acrylics. During production, the polymer granules are mixed with hardener, pigments and other powder ingredients. The mixture is heated in an extruder, rolled flat, broken into small chips and then milled to make a fine powder.

Test Conditions:

Temperature range: 0 ... 270°C (twice)
Heating rate: 20 K/min
Atmosphere: Nitrogen (20 ml/min)

Sample mass: 9.04 mg
Crucible: Al, pierced lid



Results:

The endothermic step detected at 59°C during the first heating indicates the glass transition of the powder coating before curing. The exothermal effect between 90 and 240°C results from curing of the sample. It occurs in at least two steps because a shoulder was detected at 108°C, additionally to the peak at 173°C. In the second heating, the glass transition is shifted to 107°C and the step in specific heat is smaller than in the first heating (0.24 J/(g*K) to 0.35 J/(g*K)) which is due to cross-linking of the material.