

Information Note: Scoping Paper on Functional Coatings

Background

There is much confusion about what is a functional coating and what is not.

As in all industrial and commercial products, all layers in packaging or other applications have a function, because otherwise they would simply be removed for cost reasons. Therefore, defining a coating as functional is not detailed enough and can be misleading.

The Functional Coatings EuPIA Task Force (FCETF) is intending to clarify the definition of “Functional Coatings” for European functional coatings players members from EuPIA.

Overview

Printing inks and their direct related support formulations (overprint varnishes also called printing varnishes, and primers) are intended for decoration, visual/special effects and consumer interaction. Printing inks are dedicated to graphics and aesthetics.

Printing varnishes are protecting printing inks. Printing primers are enabling the printing of printing inks on substrate which are not directly receptive to the said inks.

As such both **printing varnishes (aka overprint varnishes) and printing primers focus on printing inks protection and enabler.**

Contrary to the above, **functional coatings focus on the substrate** on which they are transferred. Functional coatings are non-graphic surface layers applied to a substrate to impart or enhance technical performance characteristics, either protecting the substrate itself against water, oil and grease or changing some characteristics of the substrate such as gas barrier, hence then protecting food shelf life in packaging for instance or support the recyclability process. In general, they can alter or generate properties necessary for processing and end-use, that the substrate itself does not have sufficiently by itself.

Unlike printing inks and their related varnishes or primers, which are used to create or support visual or decorative effects, functional coatings are applied primarily to modify the substrate’s physical or chemical behavior for processing, end-use or recyclability.

Functional coatings can be for food and non-food packaging applications.

Functional coatings can be used in industrial or non-packaging applications.

What are functional coatings then in more details?

The functional coatings EuPIA task force (FCETF) will focus on liquid formulations included in the scope of related products within EuPIA ("Functional Coatings EuPIA Related Products or FCERP"). There could be other related products within EuPIA than functional coatings.

Functional Coatings EuPIA Related Products (FCERP) should have the following three characteristics to be a functional coating:

2. Liquid formulations usually including polymer resin and additives in a solvent. They may be pigmented but that doesn't make them a printing ink automatically (please refer to EuPIA Printing Inks definition).

Examples:

- Water-based suspension or dispersion
- Solvent-based suspension or dispersion
- UV curing formulations

1. Applied using a transfer method onto the surface of a substrate.

Examples:

- Printing technics: flexography, rotogravure, offset
- Wet coating technics: rod, blade, air blade or curtain coater.

3. Changing substrate features and adding technical functionality

Examples:

- Protecting paper & board substrate by bringing Water, Oil and Grease Resistance (WOGR)
- Improving shelf life of food packaging by bringing gas barrier capabilities (oxygen, moisture)
- Improving shelf life of food packaging by bringing light barrier capabilities (UV)
- Reduce moisture vapor transmission rate in building insulation panels.
- Anti-mist
- Anti-microbial, eg including bacteria, fungus.
- Fire-retardancy
- Anti-corrosion
- Anti-static, electrical conductivity
- Heat resistant coatings directly on substrate, not heat-resistant overprint varnishes.
- Anticurl
- Insulating, eg against heat/cold
- Self-healing
- Self-cleaning

Functional Coatings EuPIA Related Products (FCERP) are not

- **Main structural components** in the applications in scope. They are applied on a substrate using a transfer method. They are not extruded, injected, calendared or molded. That doesn't prevent that part of the chemistry in the formulation could not be used in other applications such as a

molding process. In the FCERP scope of applications they are not. FCERP are similar to a paint applied to a wall structure. They are not themselves structural.

Examples:

- PE pellets to make PE extruded film on paper is not in scope of the FCERP whilst PE water based suspension are in scope.
 - Acrylic resins based suspension are in scope of the FCERP and cannot be used in molding process or cannot be processed into a main structural component.
- **Sealing formulation** are not in scope of the FCERP which are tackled by FEICA instead. That doesn't mean that some formulations inside the FCERP scope could not have also a sealing feature. It means that the FCETF will not tackle them in regards of their sealing feature specifically. Heat seal coatings/adhesives are often not only printed in the sealing area but with full coverage (e.g. yoghurt lids, pharma blisters). The product safety of these Heat seal coatings/adhesives should be carefully checked, especially for direct food contact products
- Example:
- Water based formulation with Water, Oil and Grease Resistance (WOGR) and heat seal properties.
 - Solvent based formulation with heat seal properties
- **Printing inks as defined in the EuPIA definition.** FCERP are not including primers and printing varnishes to give specific functions such as ink adhesion, rub resistance, gloss/matt, slip/friction or durability/inks protection.
- Examples:
- If a clear formulation on top of the inks main function is one the above or to protect the inks decoration, then it should be considered as a printing inks.
 - If a clear formulation on top of the inks main function is to bring a gas barrier then it is in scope of the FCERP.
 - Thermochromic or light interfering inks used for primarily decoration (fluorescent, phosphorescent) are not in scope of the FCERP.
 - Metallic inks and all special effects inks are decoration and are part of printing inks and not in scope of the FCERP
 - Tactile, release/peel off, scratch off lacquers are decoration and as such are part from printing inks.
- **Security inks** are not included in scope of the FCERP. Security inks are overt, covert or forensic solutions to protect documents, packaging or products against counterfeiting
- **Active and intelligent packaging solutions** are not in scope of the FCERP.
- Examples:
- Preservation indicators
 - Oxygen scavengers

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All example lists should be understood as "including but not limited to"