

# Colorant & Additive Solutions for Appliances



# COLORANTS & ADDITIVES FOR MOLDED-IN APPEAL AND PERFORMANCE

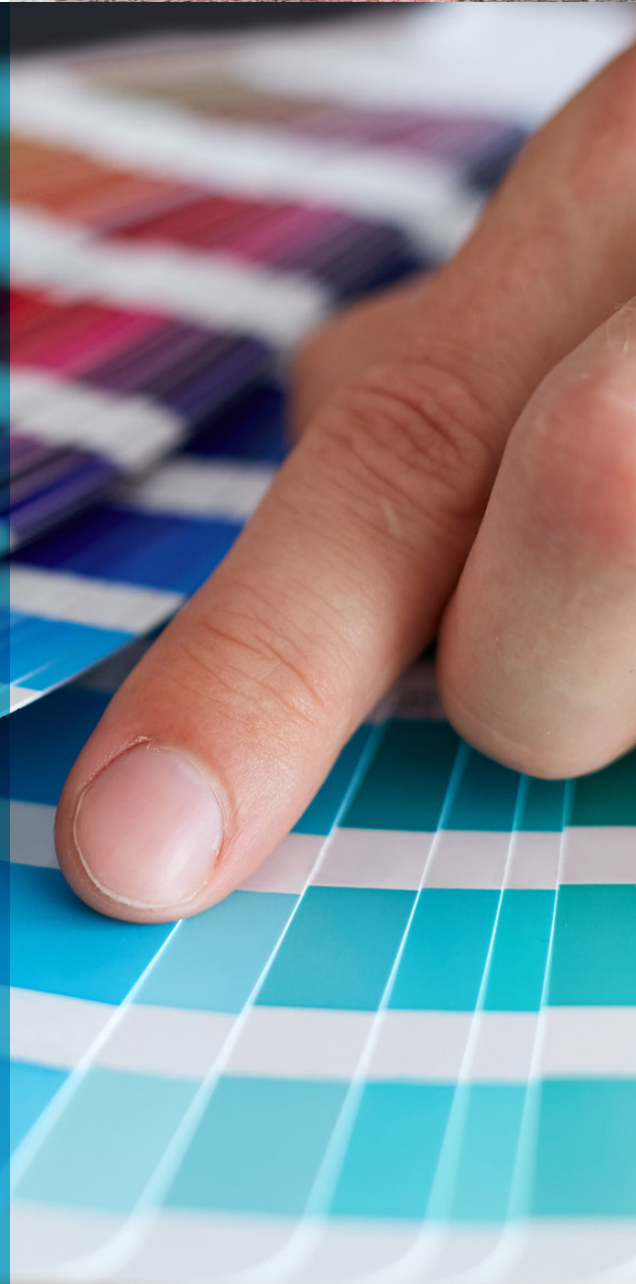
There are several advantages to incorporating colorants and performance additives in the form of masterbatches (concentrates) during the molding of plastic parts. Since color or performance is embedded in the polymer, dents and scratches will not strip them away as they would for painted and coated parts. Masterbatches also offer much flexibility. They provide branding opportunities with high-quality colors and exact matches. Only the required quantities of masterbatches and base resins need to be stored which reduces the risk of slow-moving stocks. Color adaptations are possible and color changes can be easily carried out during production. We also offer highly loaded color concentrates to help optimize color usage, improve color tolerance and opacity performance, and support the use of post-consumer recycled materials.



## COLOR AND EFFECTS

### Color Matching

Whichever color our customers want for their plastic parts, our color matching experts will strive to develop a corresponding color masterbatch in the relevant polymer grade. Relying on material knowledge and state-of-the-art equipment, key elements such as polymer properties, surface finish, and regulatory compliance are carefully considered in the masterbatch formulation to fulfill both the application and the customers' specific requirements.





## Color Harmony

If you are aiming for a homogeneous look, we can develop specific colorants so that different components of your appliance are the same color no matter which polymer types and grades they are made from. These include high-temperature, engineering and recycled polymers. In addition to color matching across different polymers, we can also match in plastic the color of other materials used in the appliance (e.g., painted parts) or in other products to achieve a homogeneous look across all product line items. Our color matching experts will consider material properties, technical requirements, and regulatory requirements when developing the color concentrates.



## Special Effects

Avient offers a variety of special effect options. Pearlescence, iridescence, fluorescence, glow-in-the-dark, sparkles or effects that mimic natural materials (e.g., wood, granite) can help differentiate the appliance on the shelf. Others, such as glossy metallic paint effects, do not only help increase appeal but offer more sustainable, VOC-free alternatives to paint and coatings. Since maintaining a good melt flow can sometimes be challenging with effect pigments, our team of material experts from Avient Design can provide support to reduce new product design errors by linking design with manufacturability and to speed up the design process.



## Color Development & Trends

In addition to an extensive color library to choose from, we also provide collaborative design services at our ColorWorks™ design and technology centers. Customers are guided through a color development process at the earliest stages of their product development to establish high-impact colors for their brands, helping accelerate time to market. Services include a focus on aesthetics, functionality, feasibility assessment, and project coordination.

Every year, ColorWorks issues ColorForward™; a color prognosticator tool that provides insights into the societal trends influencing consumers in the coming year, translated into colors likely to be more prominent. Brand owners and marketers can draw inspiration from this tool to develop appliances that will be more attractive to consumers.

# PERFORMANCE

## UL94 Compliance

Appliances are part of the electrical products requiring UL94 compliance to be deemed safe for certain markets. We offer a wide range of color concentrates for different polymer grades, from standard to engineering polymers, that fulfill the vertical burning (V-0; V-1; V-2) and horizontal burning (HB) tests. This helps manufacturers and brand owners speed up the UL94 listing of their appliances.

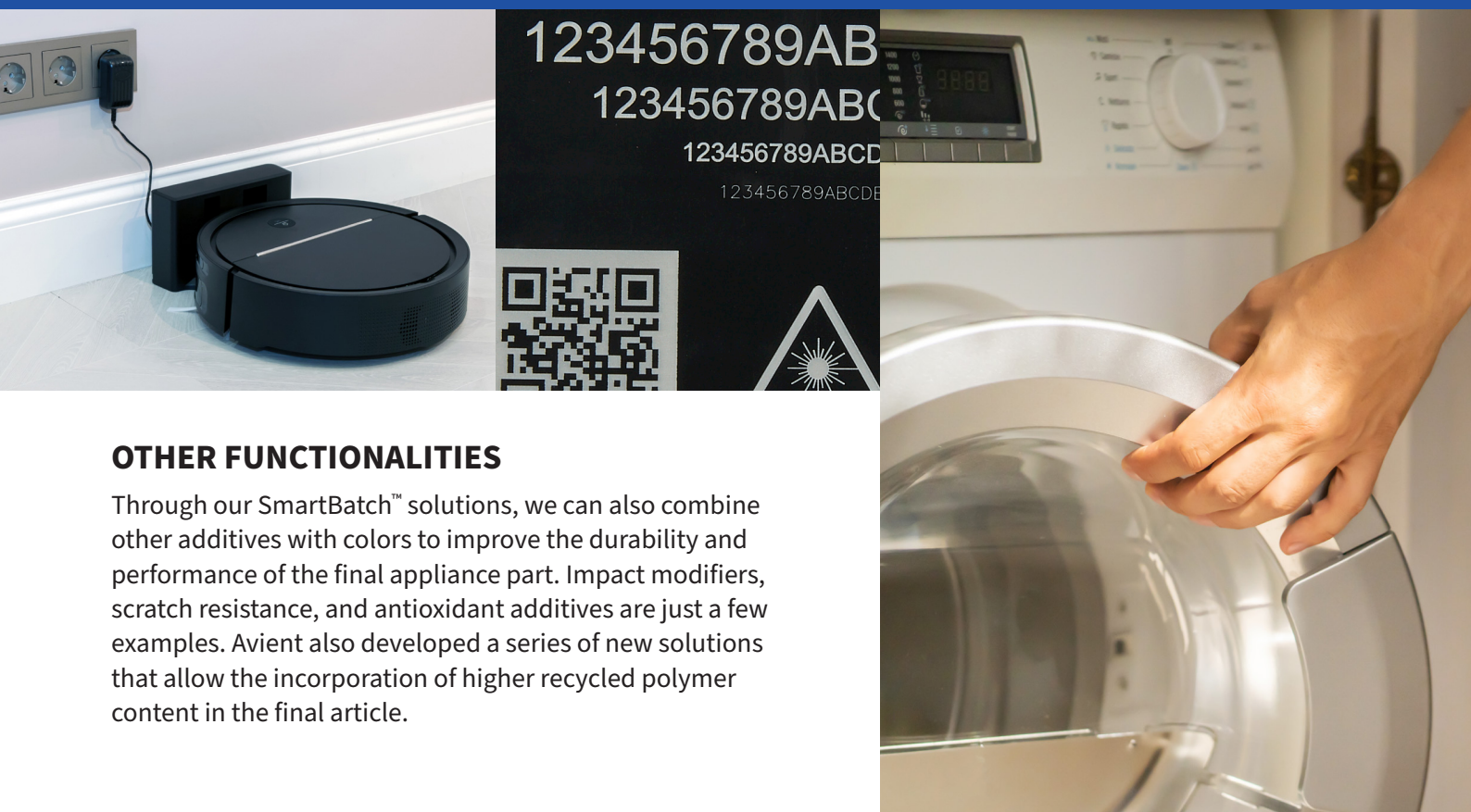
## UV Stability

Exposure to sunlight can cause yellowing and brittleness. Incorporating UV stability helps prolong the service life and aesthetics of appliances. Our light stabilizer additives have high additive loadings for increased efficiency. They are developed taking into consideration application requirements and regulatory compliance (e.g., UL94 HB rating, food contact approval, toys). For added convenience, they can be combined with color but also with other additives, such as flame retardants, antistatic or laser marking additives, into a single combination masterbatch.

## Laser Marking & Laser Welding

Our laser marking concentrates provide fast, precise and permanent markings for alphanumeric characters, barcode information and/or aesthetic solutions. They contain non-halogen and non-antimony additives and don't alter mechanical properties. Options for black, white and color markings are available on opaque but also transparent plastics. Like all of our additive solutions, our laser marking solutions can be combined with color for more flexibility and efficiency.

In order to meet new design constraints and improve recyclability, laser welding masterbatches can also be provided for various polymers and colors, including black and dark colors.



## OTHER FUNCTIONALITIES

Through our SmartBatch™ solutions, we can also combine other additives with colors to improve the durability and performance of the final appliance part. Impact modifiers, scratch resistance, and antioxidant additives are just a few examples. Avient also developed a series of new solutions that allow the incorporation of higher recycled polymer content in the final article.

# SUSTAINABILITY

A growing number of consumers are looking into the sustainability of appliances not only from the angle of energy consumption but also in terms of materials used to manufacture them. Using recycled materials is one way to attract eco-conscious consumers, but also to prepare for possible future legislation as governing bodies are looking to reduce carbon emissions. Our goal is to help customers achieve their recycling targets more efficiently with limited influence on the appearance of their appliances and no compromise on performance and regulatory compliance.

## Recycled Content & Recyclability

We offer color concentrates that use post-consumer recycled (PCR) polypropylene (PP) and polystyrene (PS) as carrier resin. Custom concentrates are developed in our color matching labs to match the target color in the recycled polymer batch used by the plastic converter. Functional additives can be added to enhance the mechanical properties of the recycled plastics but also to provide the same performance enhancement as virgin polymers. Regulatory compliance is also considered, including UL94 and Waste Electrical & Electronic Equipment (WEEE).

## Sortable Black Colorants

Black plastic can be challenging to detect by infrared sensors during the sorting process resulting in the plastic being directed to waste instead of the relevant recycled polymer stream. This is mainly

due to carbon black content. We offer near-infrared (NIR) black and dark colorants for polypropylene and polyester that help detect and sort the plastic into the relevant polymer stream. These colorants originally developed for black packaging can be used for the black and dark coloration of appliance plastic parts to ensure they are recycled and not wasted.

## Recyclability Assessment at CycleWorks™

Our Cycleworks™ Innovation Center specializes in testing and evaluating recycling solutions. It serves as a collaboration platform to develop with customers and other value chain partners recycling-friendly additive and colorant systems and to help solve fundamental issues in mechanical recycling. Recycling trials taking into consideration standard recycling protocols can be run to provide a real-world recyclability evaluation.





# REGULATORY SUPPORT AND PRODUCT SAFETY

Avient's color and additive manufacturing sites comply with ISO standards such as ISO 9001:2015 QMS, ISO 14001:2015 Environmental Management System and ISO 45001:2018\*. For our masterbatches and ready-to-use formulations going into electrical and electronic applications, we can develop formulations to comply with and provide the following declarations as needed on a product-specific basis:

- Food contact according to Reg. (EU) 10/2011, FDA (USA), GB9685-2016 (China)
- Heavy metal declaration as per Dir. 94/62/EC and CONEG
- Declaration against RoHS (2011/65/EU and amendments)
- REACH (Reg. (EC) 1907/2006 and amendments)
- UL94 file for MB (QM QS.E73454) and formulations (QM QS.E103015)
- "Toys declaration" Directive 2009/48/EC
- Waste Electrical & Electronic Equipment (WEEE)

\* Contact us for more detailed information about our ISO certifications.





1.844.4AVIENT  
[www.avient.com](http://www.avient.com)



Copyright © 2022, Avient Corporation. Avient makes no representations, guarantees, or warranties of any kind with respect to the information contained in this document about its accuracy, suitability for particular applications, or the results obtained or obtainable using the information. Some of the information arises from laboratory work with small-scale equipment which may not provide a reliable indication of performance or properties obtained or obtainable on larger-scale equipment. Values reported as "typical" or stated without a range do not state minimum or maximum properties; consult your sales representative for property ranges and min/max specifications. Processing conditions can cause material properties to shift from the values stated in the information. Avient makes no warranties or guarantees respecting suitability of either Avient's products or the information for your process or end-use application. You have the responsibility to conduct full-scale end-product performance testing to determine suitability in your application, and you assume all risk and liability arising from your use of the information and/or use or handling of any product. AVIENT MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, either with respect to the information or products reflected by the information. This literature shall NOT operate as permission, recommendation, or inducement to practice any patented invention without permission of the patent owner.