



# **COLORANT CHROMATICS™**

**Colors and compounds for  
high-temperature polymers**

# COLORANT CHROMATICS™

With over 40 years of leadership in the industry, we specialize in developing all types of fluoropolymers, including fully and partially fluorinated grades as well as high-temperature polymers.

**We are the world's leading specialist in the enhancement of high-performance polymers.** We supply fluoropolymer and high-temperature thermoplastics-based colorant and additive concentrates and compounds, dispersed pigments for coloring PTFE, functional additives such as laser marking, foaming agents, conductive, antistatic, radiopaque, reinforced, and cross-linked grades, as well as a full range of printing, striping, and marking inks.

## **We can help you:**

- Increase production throughput
- Reduce waste and scrap materials
- Reduce inventory
- Match your exact specification
- Fast-track to steady-state-production
- Gain productivity
- Become more competitive
- Enhance durability without compromising safety
- Support sustainability goals

## **A COMPLETE PRODUCT PORTFOLIO**

### **A full range of Colorant Chromatics technologies includes:**

- Color and/or additive concentrates
- Specialty compounds including conductive, carbon fiber, CNT, filled, glass, carbon, minerals
- Additive concentrates including specialty compounds such as UV, acid scavengers, lubricants/mold release, and foaming agents
- Pigment dispersions
- Inks and additives for processors of high-performance plastics and fluoropolymers



# FLUOROPOLYMERS

Colorant Chromatics has extensive experience in selecting the best pigments and additives for optimal performance under demanding circumstances.

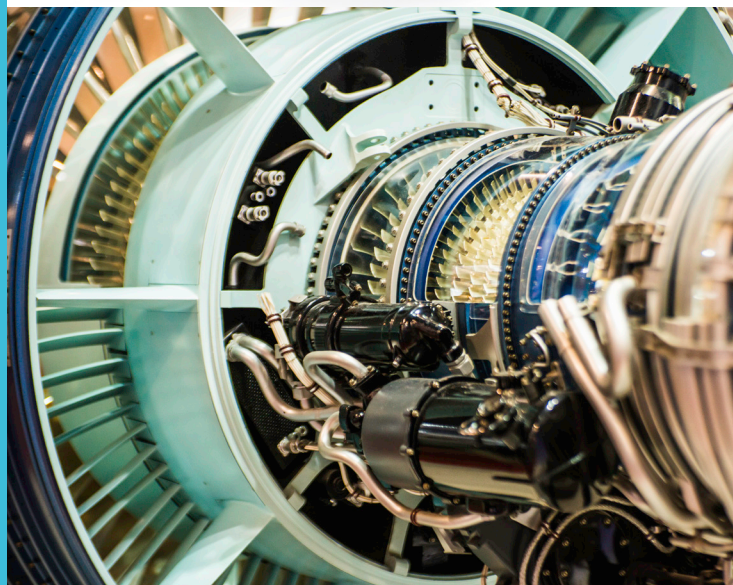
**Major fluoropolymers (FP) processed include:**  
FEP, ETFE, PFA, PVDF, ECTFE, PTFE, and ECA



# HIGH-TEMPERATURE SOLUTIONS/ INJECTION MOLDING

Minimum order quantities for color concentrates and compounds for high-performance polymers are as low as 10 lbs. (5kg), enabling you to manage inventory better and order only what you need. Or, let us design your compound to meet your application's specifications.

**High-temperature polymers (HTP) processed include:** LCP, PEEK, PAEK, PEKEKK, PEI, PES, PSU, PPSU, and PPS





# MARKETS & APPLICATIONS

**Colorant Chromatics supplies its full range to processors of:**

- Wire & cable
- Hoses, pipes, fittings, & tubing
- Injection molded parts
- Fibers & monofilaments
- Films & tapes
- Stock shapes

**Processors are using high-temperature polymers and fluoropolymers in particular when one or more of the following properties is required.**

**For high-temperature polymers:**

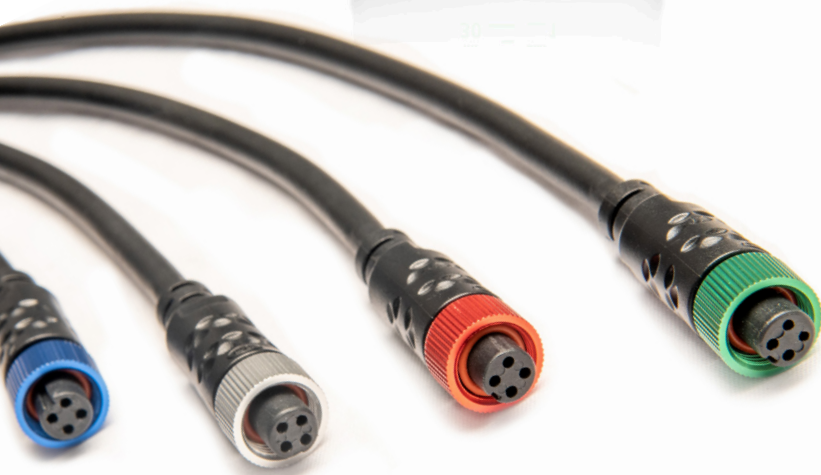
- Permanent service temperature  $>150^{\circ}\text{C}$
- Biocompatibility
- Good insulator
- Good barrier properties
- Chemical resistance
- Flame retardancy
- Transparency

**For fluoropolymers:**

- Outstanding chemical resistance
- Low friction (non-sticking)
- Excellent weatherability
- Excellent barrier properties
- Flame retardancy
- Temperature resistance (up to  $260^{\circ}\text{C}$ )
- Dielectric properties

**Our customers supply products to the following industries:**

- **Aircraft & aerospace:** wire and cable systems, films, tapes, molded parts, interior components, connectors, tubes & hoses
- **Automotive & trucks:** wire & cable systems, tubes, fuel hoses
- **Chemical industry:** wire & cable, pipes & fittings, pump housing
- **Consumer:** infant bottles, trays
- **Medical devices:** molded parts for dental and surgical tools, catheters, tubing for cardioscopy, pacemakers
- **Electrical & electronics:** wire & cable systems, molded parts, tapes
- **Communication:** plenum cables, connectors
- **Textiles:** fibers, fabrics
- **Construction & architecture:** films, pipes & fittings



# COLOR CONCENTRATES & PRECOLORED SOLUTIONS

**Colorant Chromatics** color and additive or pre-colored concentrates are offered in various strengths and in different viscosities of carrier resins to suit the manufacturing process. They are available in a standard line of colors, as well as Pantone® and RAL matches. We also offer compounds and special services such as custom color design or combination concentrates containing color and additive and pre-colored solutions.

Colorant Chromatics color concentrates and pre-colored solutions are based on resins from the world's leading suppliers. Contact us about your application needs, and we will collaborate with you to formulate the best solution for your challenges.

## COLORS

- 10 standard colors in various concentrate strengths
- Pre-colored products
- Heavy metal-free colors
- Special color design upon request using Pantone® or RAL color standards
- Customized pigment loadings can be provided to address specialized coloration needs
- Laser printable colors are available together with metallic effects

Color concentrate selection must take into account the following extrusion design requirements for the following typical applications:

### PRIMARY WIRE INSULATION

- Desired opacity or translucency of the insulation
- Wall thickness
- Conductor size and color
- Line speeds
- Processor screw design
- Insulation electrical requirements
- FDA compliance
- Biocompatible

### WIRE & CABLE JACKETING

- Desired opacity or translucency
- Wall thickness
- Processor screw design
- Laser markability

### FILM, TUBING, & PROFILE SHAPES

- Desired opacity or translucency
- Wall thickness
- Extrusion dwell time and processing temperatures

### INJECTION MOLDING

- Desired opacity or translucency
- Part size and wall thickness

**FP concentrates and pre-colored solutions for:**  
PFA, FEP, ECA, ETFE, ECTFE, PTFE, and PVDF

**HTP concentrates and pre-colored solutions for:**  
PEI, PES, PSU, PPSU, PPS, LCP, PEEK, PAEK, and PEKEKK



# SPECIALTY COMPOUNDS

Colorant Chromatics specialty compounds offer property enhancements such as:

- Mechanical strength
- Static dissipation
- X-ray opacity
- Electrical performance
- Low dielectric performance
- Mold release
- Laser marking
- Transcend™ Premier Healthcare Colorants (biocompatible)

Value-added solutions include:

## RADIATION CROSS-LINKABLE COMPOUNDS

By blending a combination of special additives, high-temperature functional compounds can be cross-linked when exposed to electron beam radiation. Colorant Chromatics cross-linked formulations offer reliability and consistent quality for the high-end aerospace industry. Improved cut-through resistance, increased continuous use temperature, abrasion resistance, and mechanical toughness are all features of this product range.

## ELECTRICAL CONDUCTIVE & ANTISTATIC COMPOUNDS

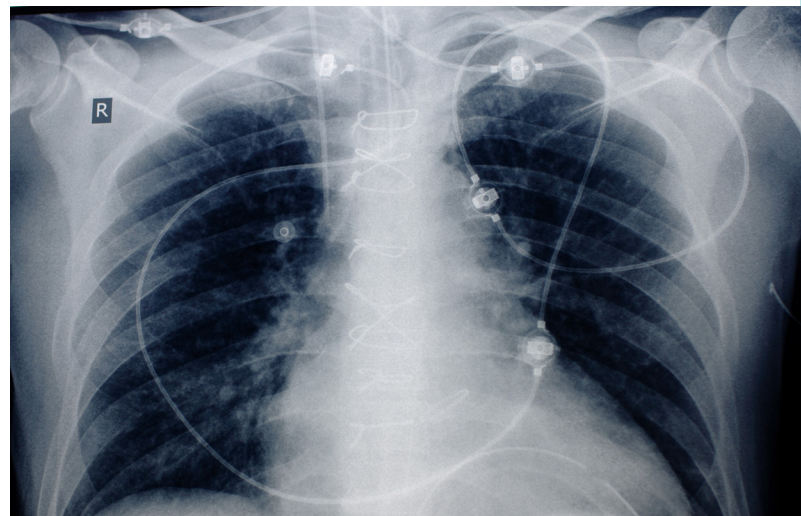
Where static dissipation and controlled conductivity are critical, Colorant Chromatics functional compounds can meet the requirements of high-temperature applications, such as wire and cable and injection molded parts for the petroleum and chemical processing industries. Controlled dispersion and high-quality carbon black materials enable you to achieve optimal performance for high-temperature extrusion and molding processes. Processing aids can be used to achieve an improved surface finish, expanded heat processing window, elimination of die drool, and higher line speeds.

## FIBER REINFORCED COMPOUNDS

Colorant Chromatics reinforced high-temperature polymer and fluoropolymer functional compounds can be further modified for specific color, mechanical, or physical properties.

Carbon/Graphite Fiber compounds can help you increase the mechanical strength of your injection molded parts with increased flex modulus. Glass fiber and glass beads formulations are typically used for injection molding processes where improved dimensional stability is required.

Titanate Fiber Compounds can increase mechanical strength while gaining chemical inertness and excellent cryogenic impact resistance.



## X-RAY OPAQUE COMPOUNDS

Colorant Chromatics X-Ray Opaque functional compounds contain various fillers such as barium sulfate and bismuthtrioxide that are visible upon exposure to X-Ray (radiopaque). These compounds offer a combination of chemical inertness, high-temperature stability that supports sterilization processes, and excellent low-friction properties inherent in fluoropolymers.

**FP compounds for:** PFA, FEP, ECA, ETFE, ECTFE, PTFE, and PVDF

**HTP compounds for:** PEI, PES, PSU, PPSU, PPS, LCP, PEEK, PAEK, and PEKEKK



# ADDITIVE CONCENTRATE FORMULATIONS



**Colorant Chromatics additive solutions can provide your solutions with additional functionality such as:**

- Improved lubricity
- Lightweighting through foaming, by both physical and chemical foaming
- Heat reduction through SiteCool™ infra-red absorption technologies for roofing applications
- Laser marking solutions or other added value properties

## **NON-PFAS MOLD RELEASE ADDITIVES**

Colorant Chromatics™ Evoluscend™ is a non-PFAS\* high-temperature polymer mold release additive developed to boost production efficiency and product quality for manufacturers.

This formulation is created for high-pressure injection molding and is integrated directly into plastic materials. It works by migrating to the surface during molding to facilitate a smooth demolding experience.

Evoluscend can help improve final product quality by preventing mold damage and contamination. It can also help increase overall productivity by improving demolding times.

Importantly, this solution is manufactured without intentionally added fluoropolymers, fluoroelastomers, or any other pre- and poly-fluoroalkyl substances (PFAS), supporting customer's sustainability goals and regulatory compliance by offering an alternative to intentionally added PFAS materials.

Evoluscend is effective across a range of high-temperature polymers, including PEEK, PPSU, PES, PSU, PEI, LCP, and PPS, with a maximum service temperature exceeding 150°C.

\* Manufactured without intentionally added PFAS and without PTFE

## **CHEMICAL FOAMING ADDITIVES**

Colorant Chromatics chemical foaming solutions for fluoropolymer wire insulation can reduce part density while enhancing the stability and efficiency of the manufacturing process without the need to invest in additional equipment for physical foaming with blowing agents.

This advanced additive also enables customers to preserve electrical properties while reducing insulation thickness and raw material consumption through a consistent closed-cell structure. These chemical foaming solutions for fluoropolymer wire insulation are suitable for FEP and PFA polymers and are available globally.

## **LASER MARKING**

Driven by security and product traceability needs, laser marking of high-temperature polymers is becoming more common as processors strive to overcome the limitations of ink printing, hot stamping or other labeling processes. Laser marking additives are added to polymers, such as fluoropolymers, that do not readily absorb the wavelength of laser light.

## **PHYSICAL FOAM CONCENTRATES**

Colorant Chromatics Foam Concentrates for foam processes with blowing agents provide a concentrated level of nucleating agent to optimize the cell structure in a foamed resin. Foamed polymers provide enhanced electrical properties, reduced cable weight, and material cost savings.

## **SITECOOL™**

SiteCool is an additive solution for fluoropolymer roofing systems that reduces the transfer of heat into the interiors of architectural structures by absorbing infrared energy contained within the solar spectrum. Applied in fluoropolymer films, SiteCool additive solutions help reduce the amount of energy required to cool stadiums, shopping malls, and other large indoor facilities.

# DISPERSED PIGMENTS

## DISPERSIONS FOR PTFE COLORING

Dispersed pigments for coloring PTFE are created to add color to PTFE parts manufactured by the PTFE fine powder paste extrusion process. In order to extrude PTFE-insulated wire and tubing, a lubricant (normally naphtha) must be blended with the PTFE fine powder. Extrusion of colored PTFE insulation is done by incorporation of dispersed pigments in these same lubricants. These dispersions also contain additives, making both the pigment dispersion and the PTFE paste material more compatible.

To withstand the high temperatures of the sintering step in the PTFE process, Colorant Chromatics selects the appropriate heat-stable pigments.

- 10 standard colors
- All colors are heavy metal-free
- Special color matches can be done upon request using Pantone® or RAL color standards
- Customized pigment loadings can be provided to address specialized coloration needs
- Functional additives can be provided to address tailored properties

Let-down ratios and specific processing suggestions are provided in the product data sheet available from your Avient representative.

## APPLICATIONS

- PTFE wires & cables
- PTFE tubes
- PTFE tapes
- PTFE yarns
- PTFE dental floss thread

# PRINTING & STRIPING INKS

Colorant Chromatics inks are used for striping and offset printing of fluoropolymer and other high-temperature resin insulation.

Inks for: FEP, ETFE, PFA, ECTFE, PVdF, Polyimide, PTFE, PEEK

- 10 standard colors
- All colors are heavy metal free
- Other colors available upon request

## HIGH-TEMPERATURE PRINTING & STRIPING INKS

These are aqueous inks used for printing, striping, or top coating on high-temperature resins. They feature a high-temperature resin binder to hold the pigment in place after sintering and are sold as water dispersions. There are two families of high-temperature inks:

1. PTFE
2. FEP inks for printing, striping, or top coating on insulated wires or tubing. Because of the thermal similarities of the resins they can also be used on PFA substrates.

## LOW-TEMPERATURE PRINTING & STRIPING INKS

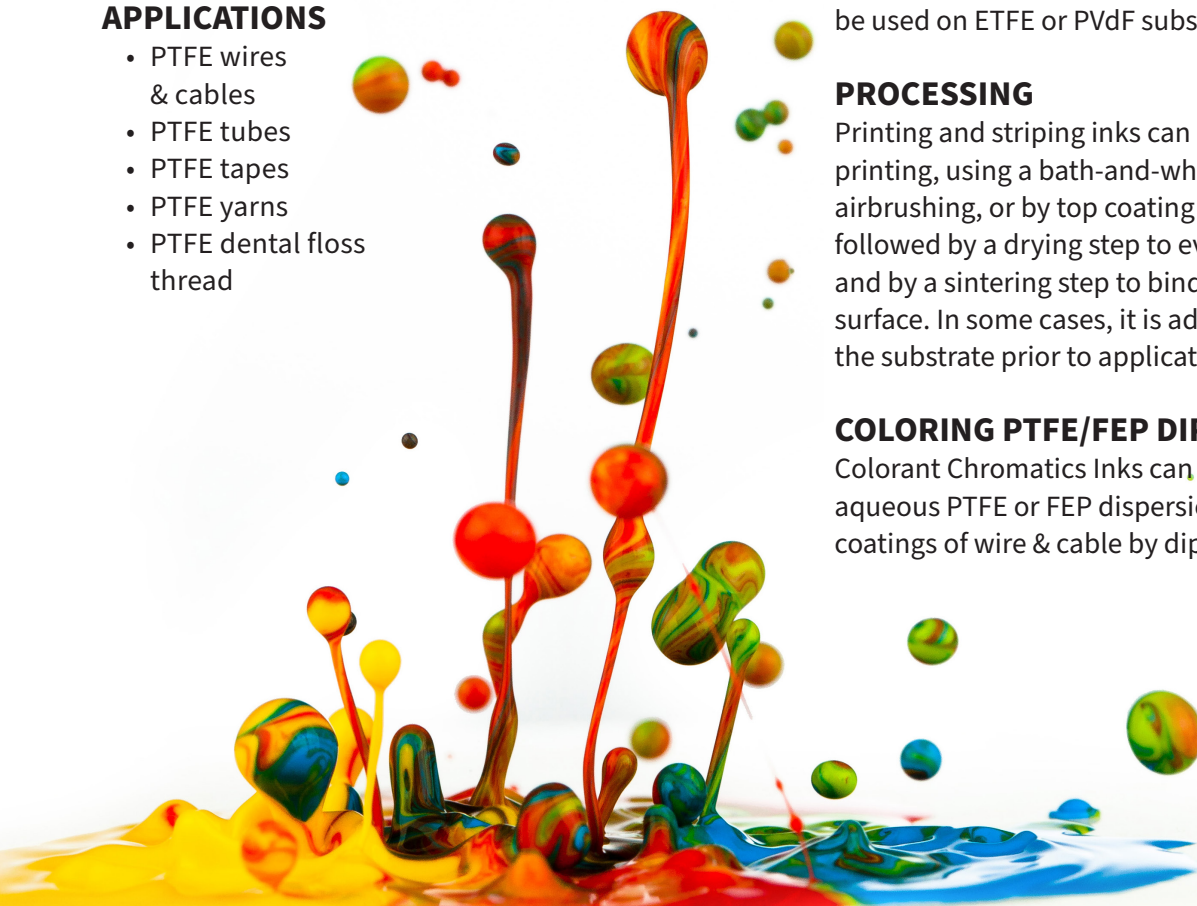
These are aqueous/alcoholic inks used for printing, striping or top coating on lower-temperature substrates. They feature a synthetic resin binder to hold the pigment in place after sintering. They should be used on ETFE or PVdF substrates.

## PROCESSING

Printing and striping inks can be applied via offset printing, using a bath-and-wheel process, by airbrushing, or by top coating on the substrate followed by a drying step to evaporate the water, and by a sintering step to bind the pigments to the surface. In some cases, it is advisable to pre-treat the substrate prior to application.

## COLORING PTFE/FEP DIP COATING

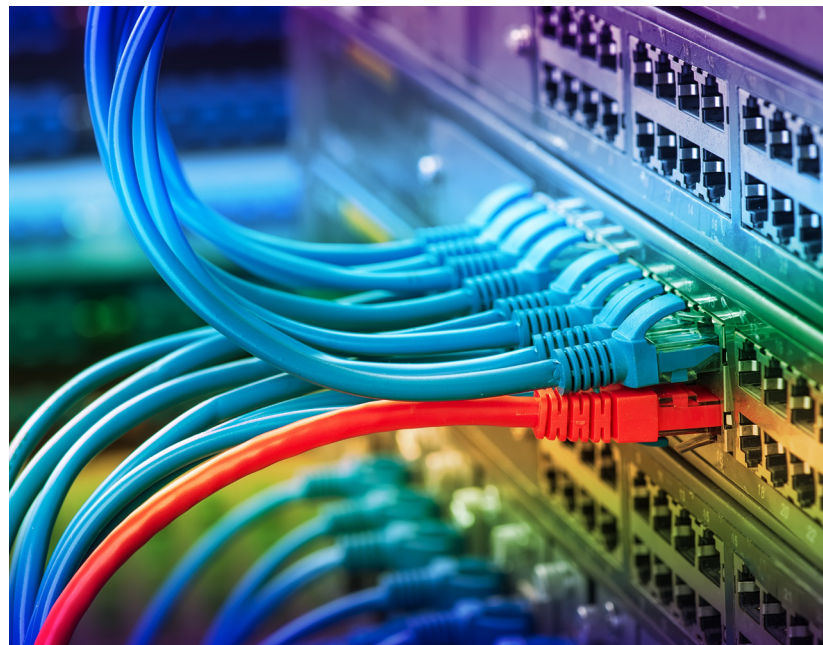
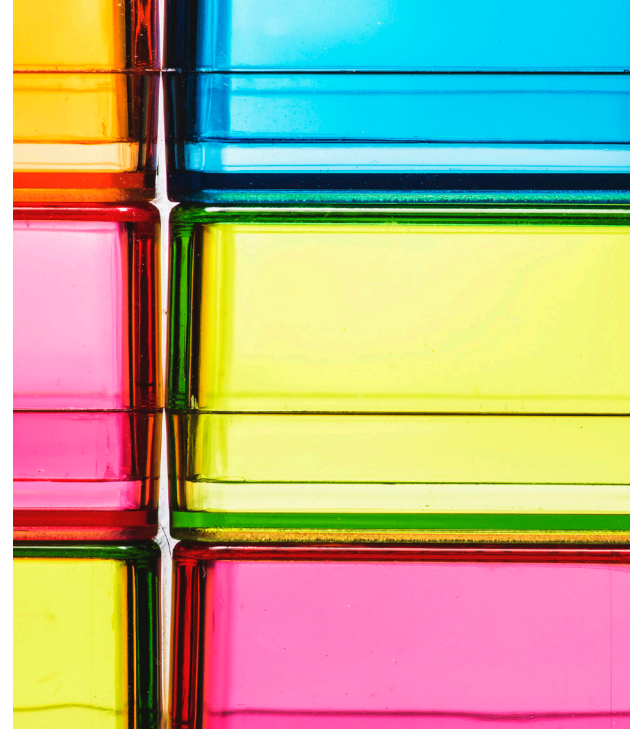
Colorant Chromatics Inks can also be used to color aqueous PTFE or FEP dispersions for full-coverage coatings of wire & cable by dip coating applications.





# LOW-NOISE DISPERSION (LND) COATINGS FOR PTFE & FEP

These are aqueous dispersions used to coat low-noise coaxial cables with dielectric cores of either PTFE or FEP. The dispersions function as shielding, which reduces the influence of outside radiation and RF noise in coaxial cables when they are in motion (e.g., EKG sensor cables). They can also be used as an antistatic coating on FEP or PTFE-impregnated glass cloth or as a resistance carrier for heating bands. They are applied by dip coating followed by sintering.



# PRODUCT STEWARDSHIP

At Avient we are focused on providing our customers with the highest levels of service and are dedicated to meeting their needs for regulatory support and global regulatory compliance. We continually monitor global regulations to stay current with the needs of our customers.

## **OUR CUSTOMER SUPPORT ACTIVITIES INCLUDE:**

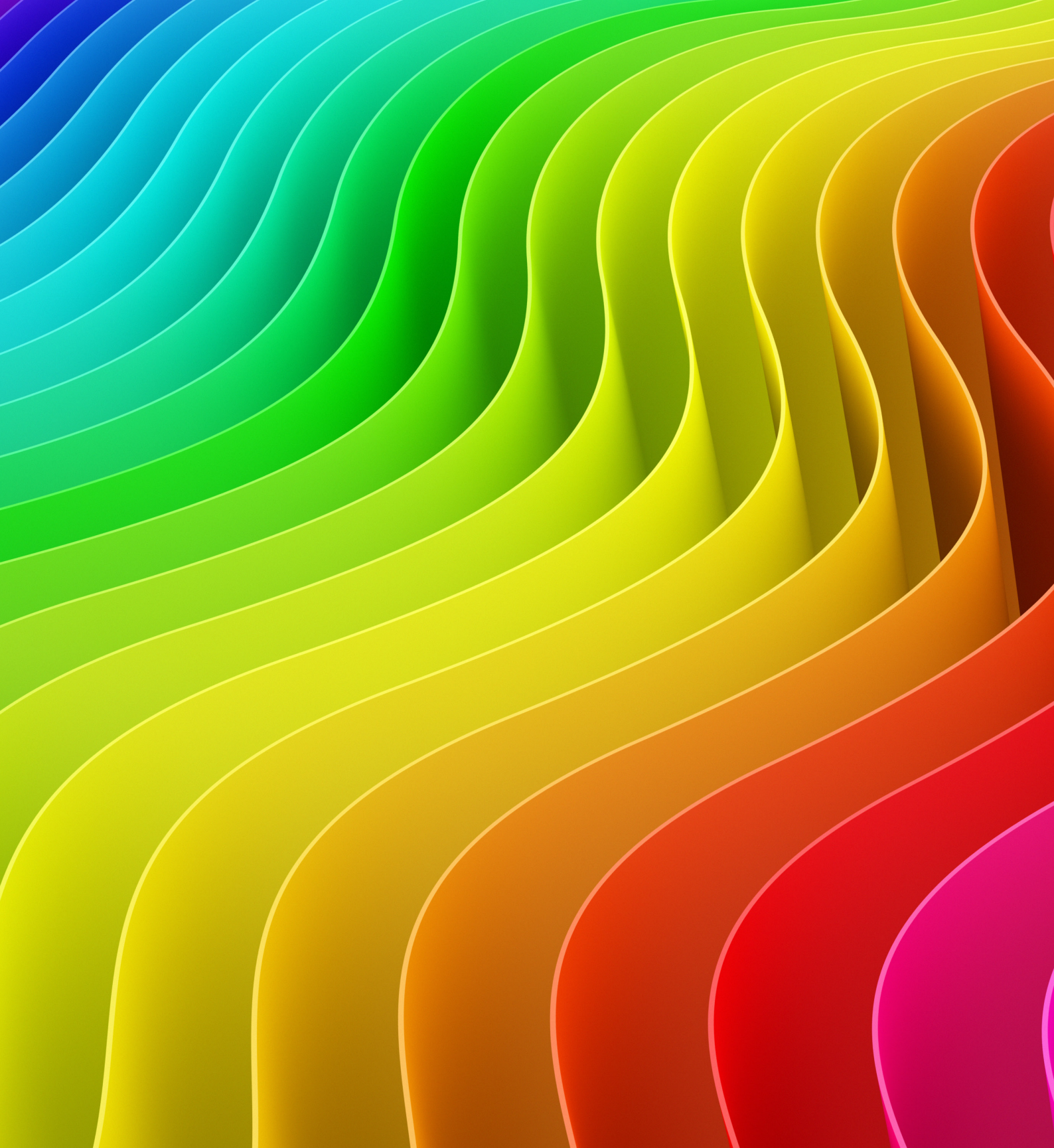
- Food and Drug Administration (FDA) compliance support
- Compliance with National Inventories
- Biocompatibility compliance
- REACH – European Legislation on Registration, Evaluation, Authorization and Restriction of Chemicals
- Restriction on Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) electronics compliance
- Data entry into the International Material Database System (IMDS)
- Hazardous communication, including safety data sheets (SDS) and labeling

## **GENERATING REGULATORY COMPLIANCE**

### **DOCUMENTATION INCLUDING:**

- California Proposition 65
- European Food Contact
- Individual Customer Restricted Substance lists
- Drug Master Files
- Medical Application Files
- Food and Drug Administration Certification
- Potable Water Certification

Contact us if you have questions or for specific information on your application's regulatory compliance requirements.



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