Gem-Tone™

FDA APPROVED COLORANTS

Technical Data Sheets

DayGlo®

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WHAT ARE GEM-TONES

- **Gem-Tone™ Colorants (GC)**, are a new class of polymeric dyes available for use in clarified polypropylene. The materials are amorphous, resinous, high molecular weight dyestuffs.
- They are easily handled as a dry powder and incorporate well into polyolefins under normal processing conditions.
- They offer superior clarity, extraction and migration properties.
- They have received FDA approval.

WHY CHOOSE GEM-TONES

- They provide a method for delivering the advantages of dye coloration to polyolefins without the problems of migration or extraction.
- They have good clarity in clarified PP and demonstrate shrinkage typical of other polymeric dye systems.
- They do not scatter light to impart haze.
- GC melt in technology eliminates the need for high shear and high energy compounding techniques.
- They are easily dry-blended.

HOW TO USE GEM-TONES

- Use GC to produce unique packaging solutions with these bright, clean, transparent colors.
- They will add depth and dimension to any package.
- Use GC to create line extensions or re-energize an older brand.

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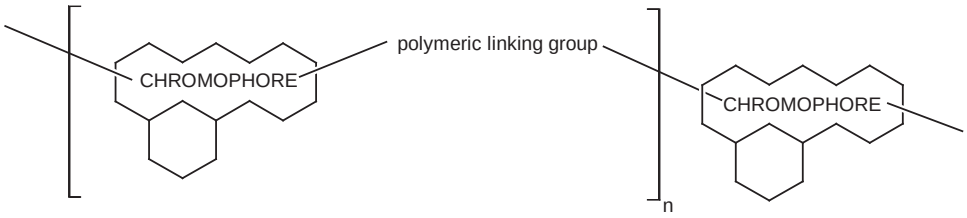
AVAILABLE PRODUCTS

GC17F	Citrine Yellow
GC18XPF	Emerald Green
GC19F	Sapphire Blue
GC19XPF	Sapphire Blue
GC26F	Crimson Red

The Gem-Tone™ colorants are solid, amorphous resinous materials of high molecular weight. They offer high tinctorial strength, with superior optical & migration properties. This unique technology has FDA approval allowing for worry free formulations.

GEM-TONE POLYMERIC STRUCTURE



PERFORMANCE

With DayGlo® polymeric colorant technology, you don't have to worry about warpage, haze or bleed caused by the color component. Proper crystallization of CPP parts is a critical factor for molders to ensure optimum clarity, uniform shrinkage & desired cycle time. Gem-Tone colorants do not alter the thermal behavior of the CPP part.

There are essentially no differences in thermal behavior of the colored and clear PP resins at 0.1% colorant level, indicating that GC colorants at this loading have virtually no effect on the crystallization behavior of the clarified PP. Higher loadings, though not tested, are not anticipated to affect crystallization behavior.

Unlike pigments or other insoluble colorants sometimes used in CPP parts, Gem-Tone colorants don't scatter light to impart haze. Gem-Tone Colorants provide a method for delivering the advantages of dye coloration to polyolefins without the problems of migration or extraction. As a dye based system, Gem-Tones give good clarity in clarified PP and demonstrate shrinkage typical of other polymeric dye systems. Finally, as an amorphous, resinous solid, the Gem-Tones are easy to handle and incorporate into polyolefins by typical processing techniques.

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GC17F Citrine Yellow

Gem-Tone GC17F Citrine Yellow is a rich, strong green shade yellow colorant intended for use in clarified polypropylene. Clean, haze free, non-warping color formulations can easily be achieved with the use of this colorant. No blooming or plateout problems will be seen with Gem-Tone colorants. These materials can be incorporated into polyolefin resins at levels as low as 0.05% and can be increased to higher levels to achieve your desired effect. Gem-Tone GC17F Citrine Yellow is FDA approved for use in PP at levels NTE 0.25%.

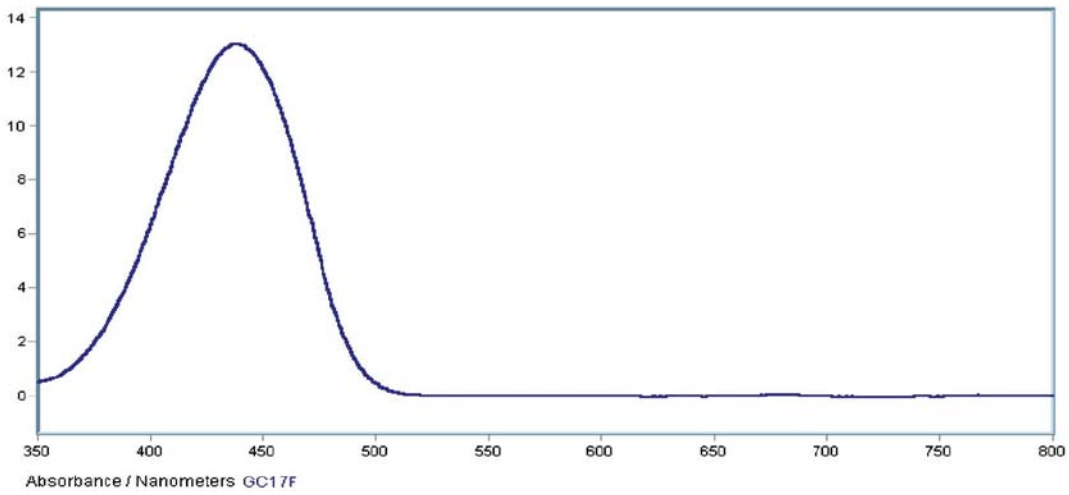
PROPERTIES

Minimum processing temperature	177°C (350°F)
Mean particle size range	20-80µ
Heat stability	288°C (550°F)
Softening point	85–95°C (185–203°F)
Tg Typical	78°C (172°F)
Dec.Temp.	275°C (527°F)
Oil Absorption	50g/100g pigment
Bulk density	32 lbs./cu. ft.
Specific gravity	1.2

SPECTRAL DATA

λmax = 439 nm
Abs. = 13,000

GC17F UV SPECTRA



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GC18XPF Emerald Green

Gem-Tone GC18XPF Emerald Green is a transparent green colorant intended for use in clarified polypropylene. Clean, haze free, non-halogenated, non-warping color formulations can easily be achieved with the use of this colorant. No blooming or plateout problems will be exhibited with Gem-Tone colorants. GC18XPF Emerald Green is FDA approved for use in PP and has recommended use @ 1% LDR (NTE 9%).

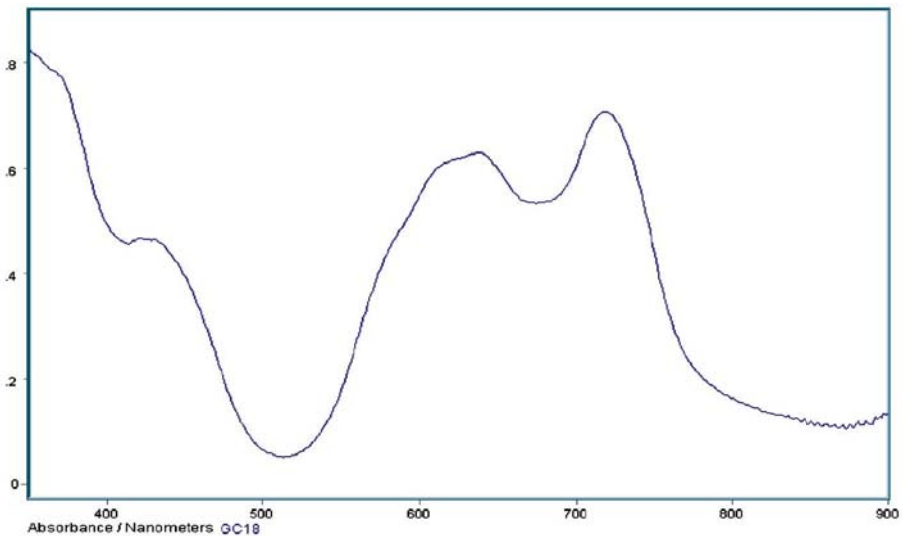
PROPERTIES

Minimum processing temperature	177°C (350°F)
Particle size range	75-85 pellets/gram
Heat stability	288°C (550°F)
Crystalline melt	124°C (255°F)
Dec. Temp. (TGA)	439°C (822°F)
Bulk density	31 lbs./cu. ft.
Specific gravity	0.93

SPECTRAL DATA

λmax = 637 nm	λmax = 718 nm
Abs. = 842	Abs. = 945

GC18XPF UV SPECTRA



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GC19F Sapphire Blue

Gem-Tone GC19F Sapphire Blue is a rich blue colorant intended for use in clarified polypropylene. Clean, haze free, non-warping color formulations can easily be achieved with the use of this colorant. No blooming, migration or plateout problems will be seen with Gem-Tone colorants. These materials can be incorporated into polyolefin resins at levels as low as 0.05% and can be increased to higher levels to achieve your desired effect. Gem-Tone GC19F Sapphire Blue is FDA approved for use in PP at levels NTE 0.1%.

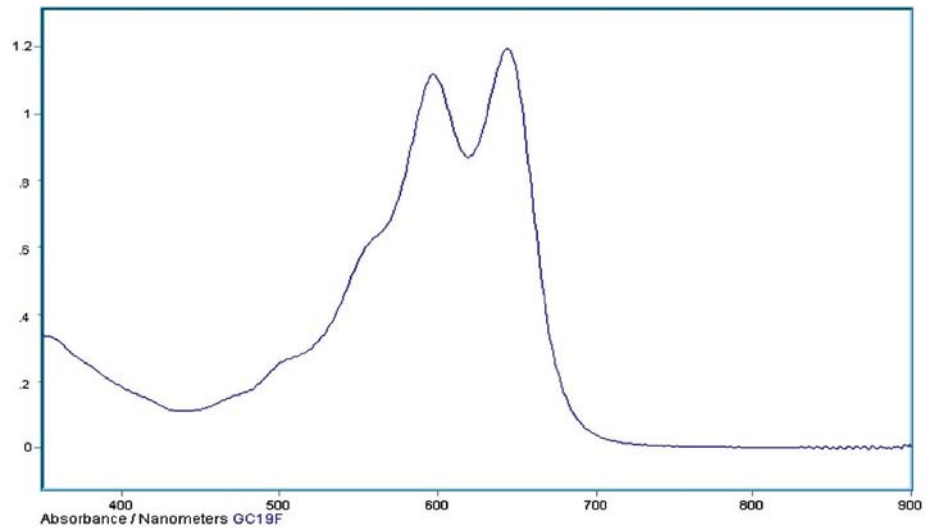
PROPERTIES

Minimum processing temperature	177°C (350°F)
Mean particle size range	20-80µ
Heat stability	260°C (500°F)
Softening point	110–135°C (230–275°F)
Tg Typical	103°C (217°F)
Dec.Temp.	315°C (599°F)
Oil Absorption	46g/100g pigment
Bulk density	28 lbs./cu. ft.
Specific gravity	1.2

SPECTRAL DATA

λmax = 596 nm	λmax = 644 nm
Abs. = 21,000	Abs. = 23,000

GC19F UV SPECTRA



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GC19XPF Sapphire Blue

Gem-Tone GC19XPF Sapphire Blue is a transparent colorant (prill form) intended for use in clarified polypropylene. Clean, haze free, non-halogenated, non-warping color formulations can easily be achieved with the use of this colorant. No blooming or plateout problems will be exhibited with Gem-Tone colorants. GC19XPF Sapphire Blue is FDA approved for use in PP and has recommended use @ 1% LDR (NTE 9%).

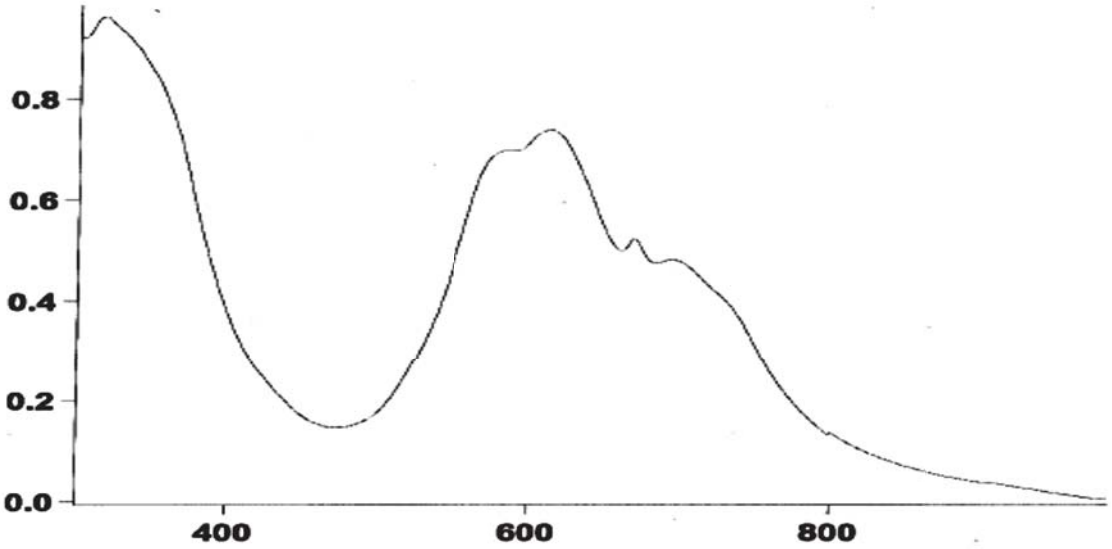
PROPERTIES

Minimum processing temperature	177°C (350°F)
Particle size range	75-85 pellets/gram
Heat stability	288°C (550°F)
Crystalline melt	124°C (255°F)
Dec. Temp. (TGA)	439°C (822°F)
Bulk density	31 lbs./cu. ft.
Specific gravity	0.93

SPECTRAL DATA

λmax = 612 nm

GC19XPF UV SPECTRA



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GC26F Crimson Red

Gem-Tone GC26F Crimson Red is a rich, strong blue shade red colorant intended for use in clarified polypropylene. Clean, haze free, non-warping color formulations can easily be achieved with the use of this colorant. No blooming or plateout problems will be seen with Gem-Tone colorants. These materials can be incorporated into polyolefin resins at levels as low as 0.05% and can be increased to higher levels to achieve your desired effect. Gem-Tone GC26F is FDA compliant for use in PP at levels NTE 0.15%.

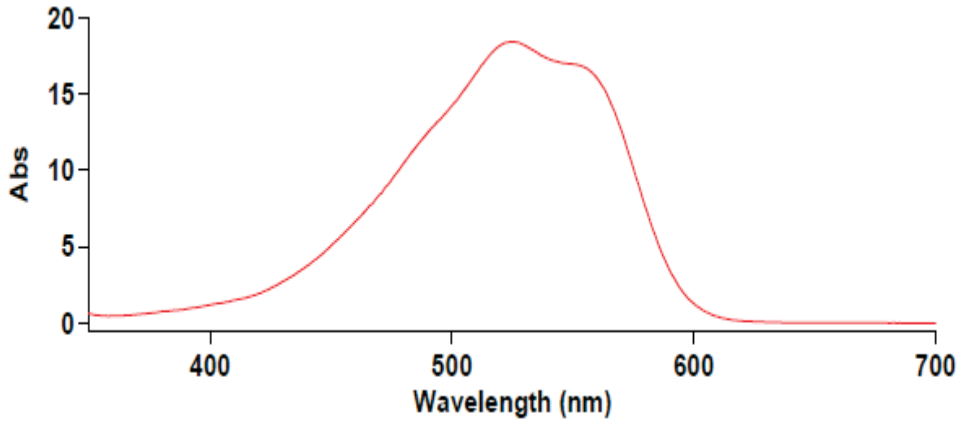
PROPERTIES

Minimum processing temperature	177°C (350°F)
Mean particle size range	20-80μ
Heat stability	288°C (550°F)
Softening point	85°C minimum (185°F)
Tg Typical	51°C (124°F)
Dec.Temp.	372°C (702°F)
Oil Absorption	53g/100g pigment
Bulk density	32 lbs./cu. ft.
Specific gravity	1.25

SPECTRAL DATA

λmax = 523 nm
Abs. = 17,000

GC26F UV SPECTRA



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Conditions of Use - 21 CFR 176.170 (c)

Condition of Use	Description
B	Boiling water sterilized.
C	Hot filled or pasteurized above 66°C (150°F).
D	Hot filled or pasteurized below 66°C (150°F).
E	Room temperature filled and stored (no thermal treatment in the container).
F	Refrigerated storage (no thermal treatment in the container).
G	Frozen storage (no thermal treatment in the container).
H	Frozen or refrigerated storage; ready prepared food intended to be reheated in container at time of use.
J	Cooking at temperatures exceeding 121°C (250°F).