

Duocrome®

Iridescent Colors for Color Cosmetics and Personal Care
Products

Technical Information

November 2016

Duocrome® Iridescent Colors

Duocrome iridescent colors are lustrous pigments that produce a distinctive two-color look, creating striking effects in many cosmetics and personal care products. The interplay between background and highlight colors in Duocrome iridescent colors are truly unique and cannot be duplicated by any combination of interference pigments and conventional colorants.

These pigments contain titanium dioxide coated mica particles that are then coated with a thin layer of colored pigment. Light interference from the titanium dioxide layer produces a reflection color seen as a colored highlight, while the colored pigment imparts a background color by light absorption.

Duocrome Iridescent Colors – Typical Properties

DUOCROME GRADE*	ABSORPTION / REFLECTION COLOR	COLORANT COMPONENT	PARTICLE SIZE (µm) RANGE**	DENSITY (Kg/L)	APPROX. BULK DENSITY***	
					Lb/ft ³	g/100cm ³
YR 422C	gold / red	Iron Oxide	9 - 44µm	3.2	14	22.4
YG 822C	gold / green	Iron Oxide	8 - 45µm	3.3	16	25.6
RY 224C	red / gold	Carmine	9 - 45µm	3.0	13	20.3
RO 324C	red / orange	Carmine	9 - 45µm	3.0	12	19.2
RV 524C	red / violet	Carmine	9 - 45µm	3.0	14	22.4
RB 624C	red / blue	Carmine	9 - 45µm	3.0	14	22.4
BY 226C	blue / gold	Ferric Ferrocyanide	10 - 44µm	3.0	15	24.0
BR 426C	blue / red	Ferric Ferrocyanide	9 - 45µm	3.0	15	24.0
BV 526C	blue / violet	Ferric Ferrocyanide	9 - 45µm	3.1	19	30.3
BG 826C	blue / green	Ferric Ferrocyanide	8 - 44µm	3.3	18	28.8
GY 227C	green / gold	Iron Oxide & Ferric Ferrocyanide	9 - 44µm	3.1	14	23.2

* Please refer to individual product specification sheets for certifiable product specifications

** The particle size results will vary depending on the light scattering instrument used. The values listed (as % by weight) are the results using a Malvern Mastersizer

*** Determined by Scott viscometer

Duocrome® Sparkle Colors

Duocrome Sparkle Colors are intense and lustrous pigments that add a high degree of shimmer and two tone color to a broad range of cosmetics and personal care products. Their large particle size makes them particularly well suited for dynamic, sparkly effects.

Duocrome Sparkle Colors – Typical Properties

DUOCROME SPARKLE GRADE*	ABSORPTION / REFLECTION COLOR	COLORANT COMPONENT	PARTICLE SIZE (µm) RANGE**	DENSITY (Kg/L)	APPROX. BULK DENSITY***	
					Lb/ft ³	g/100cm ³
Sparkle RY 224J	red / gold	Carmine	21 - 77µm	3.1	22	35.7

* Please refer to individual product specification sheets for certifiable product specifications

** The particle size results will vary depending on the light scattering instrument used. The values listed (as % by weight) are the results using a Malvern Mastersizer

*** Determined by Scott viscometer

Applications

Formulating Guidelines

Duocrome BR, BG, BY, BV, and GY grades contain ferric ferrocyanide, which fades in alkaline media and is stable in slightly acid media. The color stability of these grades should be tested in all potential formulations. They should not be sterilized with ethylene oxide, which reacts with ferric ferrocyanide.

Ferric ferrocyanide and chromium oxide green is not FDA approved for use in lipsticks, mouthwashes, dentifrices, and other products that are potentially subject to ingestion.

Duocrome grades containing carmine should not be heated above 120°C and may be susceptible to fading over time upon exposure to light. If these grades are added to products packaged in transparent containers, the packaging material should contain UV absorbers to extend product shelf life.

All other Duocrome pigments are chemically stable under conditions normally encountered in cosmetic and personal care formulation production and use. However, all grades should be tested in potential formulations before commercialization in order to determine if performance will be acceptable.

Since regulations change over time, we recommend that appropriate use of each colorant be confirmed against each region's current cosmetic regulations.

Physical and Chemical Properties

Solubility

With the exception of carmine, all components found in Duocrome pigments are inorganic and are therefore insoluble in water.

pH

The pH of these products is measured by adding 4 grams of the pigment into 96 mL of water. This value can be found on the specification sheet.

Specifications

For product specifications, refer to the respective specification sheet (separate document) for each Duocrome product.

The color additive components in the products identified in this data sheet meet the applicable FDA (21 CFR Part 73), EU Cosmetic Regulation EC/1223/2009 (Annex IV, including EC-231-2012 requirements), Japan MHW, Korean Cosmetics Colorants Standard, and China's Cosmetic Safety and Technical Standard (2015 version) specifications and purity requirements.

Microbial status for Duocrome products:

Total aerobic bacteria	100 CFU/g max.
Yeast & mold	100 CFU/g max.
Gram-negative bacteria	absent in 10g
E. coli	absent in 10g
Pseudomonas aeruginosa	absent in 10g
Staphylococcus aureus	absent in 10g

Storage

Duocrome pigments have storage stability of at least 10 years from the date of manufacture, provided that they are stored in unopened original containers, protected from light, and under normal conditions of temperature and humidity.

Safety Data Sheet

A Safety Data Sheet for each product is available.

Further Product Ranges

Bi-Lite® Bismuth Oxychloride/Mica Pigments
Cellini® Colors
Chione™ Pigments
Chroma-Lite® Colors
Cloisonné® Colors
Duocrome® Iridescent Colors
Flamenco® Pearlescent and Iridescent Pigments
Gemtone® Colors
Mearlite® and Bijou® Ultra Bismuth Oxychloride Pigments
Mearlmica® Specialty Performance Mica
Mearlmica® SVA Treated Performance Mica
MultiReflections™ Iridescent Pigments
Pearl-Glo® Bismuth Oxychloride Pigments
Reflecks™ Pearlescent and Iridescent Pigments and Colors
Reflecks™ Dimensions Pearlescent and Iridescent Pigments and Colors
Reflecks™ MultiDimensions Color Changing Pigments
Timica® Luster Pigments

Appendix – Duocrome Product Compositions

Table 1: Duocrome Iridescent Colors

Colorant	By Weight	CI No.	CAS No.	EINECS No.
Duocrome YR 422C - INCI Name: Mica (and) Titanium Dioxide (and) Iron Oxides				
Mica	45 – 61 %	77019	12001-26-2	310-127-6
TiO ₂	36 – 50 %	77891	13463-67-7	236-675-5
Fe ₂ O ₃	3 – 5 %	77491	1309-37-1	215-168-2
Duocrome YG 822C - INCI Name: Mica (and) Titanium Dioxide (and) Iron Oxides				
Mica	33 – 51 %	77019	12001-26-2	310-127-6
TiO ₂	46 – 60 %	77891	13463-67-7	236-675-5
Fe ₂ O ₃	3 – 7 %	77491	1309-37-1	215-168-2
Duocrome RY 224C - INCI Name: Mica (and) Titanium Dioxide (and) Carmine				
Mica	55 – 68 %	77019	12001-26-2	310-127-6
TiO ₂	31 – 42 %	77891	13463-67-7	236-675-5
Carmine	1 – 3 %	75470	1390-65-4	215-724-4
Duocrome RO 324C - INCI Name: Mica (and) Titanium Dioxide (and) Carmine				
Mica	51 – 67 %	77019	12001-26-2	310-127-6
TiO ₂	32 – 48 %	77891	13463-67-7	236-675-5
Carmine	1 – 3 %	75470	1390-65-4	215-724-4
Duocrome RV 524C - INCI Name: Mica (and) Titanium Dioxide (and) Carmine				
Mica	47 – 61 %	77019	12001-26-2	310-127-6
TiO ₂	38 – 50 %	77891	13463-67-7	236-675-5
Carmine	1 – 3 %	75470	1390-65-4	215-724-4
Duocrome RB 624C - INCI Name: Mica (and) Titanium Dioxide (and) Carmine				
Mica	45 – 59 %	77019	12001-26-2	310-127-6
TiO ₂	40 – 52 %	77891	13463-67-7	236-675-5
Carmine	1 – 3 %	75470	1390-65-4	215-724-4
Duocrome BY 226C - INCI Name: Mica (and) Titanium Dioxide (and) Ferric Ferrocyanide				
Mica	54 – 68 %	77019	12001-26-2	310-127-6
TiO ₂	31 – 42 %	77891	13463-67-7	236-675-5
Fe ₄ [Fe(CN) ₆] ₃	1 – 4 %	77510	14038-43-8	237-875-5
Duocrome BR 426C - INCI Name: Mica (and) Titanium Dioxide (and) Ferric Ferrocyanide				
Mica	46 – 64 %	77019	12001-26-2	310-127-6
TiO ₂	35 – 50 %	77891	13463-67-7	236-675-5
Fe ₄ [Fe(CN) ₆] ₃	1 – 4 %	77510	14038-43-8	237-875-5
Duocrome BV 526C - INCI Name: Mica (and) Titanium Dioxide (and) Ferric Ferrocyanide				
Mica	46 – 59 %	77019	12001-26-2	310-127-6
TiO ₂	38 – 50 %	77891	13463-67-7	236-675-5
Fe ₄ [Fe(CN) ₆] ₃	1 – 4 %	77510	14038-43-8	237-875-5
Duocrome BG 826C - INCI Name: Mica (and) Titanium Dioxide (and) Ferric Ferrocyanide				
Mica	36 – 53 %	77019	12001-26-2	310-127-6
TiO ₂	46 – 60 %	77891	13463-67-7	236-675-5
Fe ₄ [Fe(CN) ₆] ₃	1 – 4 %	77510	14038-43-8	237-875-5
Duocrome GY 227C - INCI Name: Mica (and) Titanium Dioxide (and) Iron Oxides (and) Ferric Ferrocyanide				
Mica	49.5 – 66.5 %	77019	12001-26-2	310-127-6
TiO ₂	30 – 41 %	77891	13463-67-7	236-675-5
Fe ₂ O ₃	3 – 7 %	77491	1309-37-1	215-168-2
Fe ₄ [Fe(CN) ₆] ₃	0.5 – 2.5 %	77510	14038-43-8	237-875-5

Table 2: Duochrome Sparkle Colors

Colorant	By Weight	CI No.	CAS No.	EINECS No.
Duochrome Sparkle RY 224J - INCI Name: Mica (and) Titanium Dioxide (and) Carmine				
Mica	70 – 82 %	77019	12001-26-2	310-127-6
TiO ₂	16 – 26 %	77891	13463-67-7	236-675-5
Carmine	2 – 4 %	75470	1390-65-4	215-724-4

Product Range

Product	PRD-No.
Duochrome BG 826C	30322266
Duochrome BR 426C	30322267
Duochrome BV 526C	30322268
Duochrome BY 226C	30322269
Duochrome GY 227C	30322270
Duochrome RB 624C	30322271
Duochrome RO 324C	30322272
Duochrome RV 524C	30322273
Duochrome RY 224C	30322274
Duochrome Sparkle RY 224J	30322287
Duochrome YG 822C	30322288
Duochrome YR 422C	30322289
Duochrome BG 826C	30322290
Duochrome BR 426C	30322291

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