PHOSPHORESCENT PIGMENTS

The classic "glow in the dark" or phosphorescent pigments consist of very fine crystals of zinc sulfide doped with copper (ZnS:Cu). The glow is due to the unique properties of crystalline zinc sulfide. Copper is added to the zinc sulfide as an activator. This allows the crystals to absorb light and slowly emit it over time. This slow emission is called phosphorescence.

Products:

UMC Phosphorescent pigments, in addition to the natural colors, are available in a range of daylight fluorescent colors. All of UMC's phosphorescent materials are non-toxic and non-radioactive. Our product range is as follows:

Daylight Body Color	Product Code
Natural (Green emitting)	6SSU
Yellow	GSS 205/1
Orange-Yellow	GSS 207/1
Orange	GSS 305/1
Rose	GSS 507/1
Green	GSS 905/1
Blue	GSS 8B/1
Natural (Yellow emitting)	GSR
Orange (Orange emitting)	GSR 115/2

*The body colors of Standard Series and Heat Resistant Series are not exact matches.

6SSU is the basic phosphorescent pigment. This material has a light yellow (natural) body color and a yellowish green after glow. 6SSU is designed to give the brightest and longest after glow. Six colored phosphorescent pigments (the GSS Series) are also available. These are manufactured using a proprietary process which combines 6SSU with daylight fluorescent pigments. This results in a pigment with a distinct daylight body color and a variety of bright emission colors.

GSR is a recently introduced yellow emitting (glowing) pigment also consisting of very fine crystals of zinc sulfide. GSR is activated with small quantities of copper and manganese bound in the molecule, causing the "glow in the dark color" to shift to yellow. The major application of GSR is as a base pigment to effectively improve the "glow in the dark" emitting colors of yellow and orange daylight colored phosphorescent pigments. For example, GSR 115/2 Orange which has a bright orange after glow has been especially developed for Halloween. GSR 115/2 Orange is shaded with a heat resistant fluorescent pigment so it can be used for plastics as well as general ink or coating applications.

So how long does it glow?

After glow depends on the

- Particle size
- Excitation light source & intensity
- Pigment concentration & film thickness.

The glow from 6SSU will be perceptible to dark adapted eyes for four to ten hours after the removal of the light source.

The colored GSS Series pigments will not glow as brightly or for as long as 6SSU. The best performance is attained if the material is excited with a light source rich in UV. For example, black light will be roughly twice as effective as a standard tungsten filament incandescent lamp.

Applications:

UMC's phosphorescent pigments may be used in all types of paint, powder coatings, silkscreen inks, enamels and plastics.

Some typical applications are:

- Warning and exit signs
- Fire fighting & mining safety gear
- Silkscreen printing on textiles and posters
- Toys and novelties
- Paper and Film Coating
- Fishing Lures
- Craft paints

For optimum performance the following suggestions should be useful:

Paints & Inks:

- Use a transparent vehicle with neutral or alkaline pH.
- Plan on using at least 20% pigment loading.
- To minimize settling use a viscous vehicle.
- Apply a white base coat under the phosphorescent layer.
- Apply a clear overcoat containing a UV absorber (we recommend an oxalanilide type) to protect the pigment and improve gloss.
- All additives should be free of heavy metal compounds.

Plastics:

- UMC's pigments are compatible with acrylics, polyesters, epoxies, PVC, polypropylene and polyethylenes (HDPE, LDPE, etc.).
- Material can be cast, dipped, coated, extruded or molded.
- Use only clear plastics
- Plan on using 20% to 50% pigment loadings.

Although UMC's phosphorescent pigments are extremely stable, there are a number of things to avoid:

- Do not grind or mill the pigment. Breaking down the crystals will destroy the after glow.
- Avoid exposing the pigment to strong acids or heavy metal compounds. They will react and destroy the glow.
- These pigments are not recommended for prolonged outdoor applications. Sunlight and weather will cause the pigment to slowly decompose.

If you are looking for a phosphorescent pigment with excellent light and weather fastness, that has an afterglow 10 times brighter and longer (at equivalent loadings), please contact us and ask for ***LumiNova®*** (patented).

Physical properties

TYPE	CHEM COMP.	BODY COLOR	EMISSION COLOR	EMISSION PEAK (nm)	SPECIFIC GRATIVITY	AV. PART. SIZE (µm)	BRIGHTNESS OF AFTERGLOW (mcd/m^2)			
							1 min	3 min	5 min	10 min
6SSU	ZnS:Cu	Greenish	Green	529 ± 4	4.1	22 ± 3	300	95	55	25
GSR	Zns:Cu	Greenish	Yellow	520 & 570	4.1	22 ± 3	150	35	20	8
GB-U	ZnS:Cu	Greenish	Green	529 ± 4	4.1	13 ± 2	260	80	45	20

For further information, please contact:

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