

Technical Bulletin

HM & HMS SOLUBLE TONERS

DAY-GLO HM and HMS Soluble Toners are high strength, transparent fluorescent colorants designed for flexo and gravure application on flexible packaging papers, films, and foils. DAY-GLO HM Soluble Toners are standard strength, whereas the DAY-GLO HMS offer higher strength to give the inkmaker increased latitude in his formulations. Water washable and moisture set letterpress inks can also be made from these toners.

DAY-GLO Soluble Toners are transparent and should be printed on white stock or over a white ink to achieve the maximum daylight fluorescent brightness. In flexographic trial press runs, inks made with these toners have been run at speeds up to and exceeding 600 feet/minute. These tests were conducted on treated polyethylene using both a co-solvent polyamide white ink and a nitrocellulose modified alcohol soluble polyamide white to back the fluorescent inks. The formulations that were used for the fluorescent inks are included in this bulletin. Thorough testing of their suitability is advised before large scale commercial runs are attempted. Day-Glo Color Corp. technical personnel will be glad to discuss your applications and any special problems that may arise.

Available Colors:

HM-11	Aurora Pink*	HM-21	Corona Magenta*
HM-13	Rocket Red*	HM-35	Brightener
HM-14	Fire Orange*	HMS-30	Strong Corona Magenta*
HM-15	Blaze Orange*	HMS-34	Strong Saturn Yellow*

Physical Properties:

Form:	Granular Powder
Specific Gravity:	1.38
Softening Point:	90°C Min (Fisher-Johns Melting Point Apparatus)
General Solubility:	Soluble in some esters, ketones, glycols, glycol ethers and alcohol/ester blends. Insoluble in water, aliphatic and aromatic hydrocarbons.

Lightfastness:

Inks made from DAY-GLO HM and HMS Soluble Toners are intended for indoor uses only. They are not recommended for window use or outdoor exposure. Different modifying resins will have varying effects on the lightfastness of the finished product. Suitable tests should be conducted.

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Recommended Solvents:

HM 80% Ethyl Alcohol and 20% Ethyl, Isopropyl or N-Propyl Acetate
HMS 75% Ethyl Alcohol and 25% Ethyl, Isopropyl or N-Propyl Acetate

Ethyl Acetate	Acetone	Methyl Ethyl Ketone
Cellosolve ¹	Ethylene Glycol	Methyl Isobutyl Ketone
Diethylene Glycol	Propylene Glycol	2-Nitropropane

¹Union Carbide Co.

Other solvents or solvent blends may be acceptable, and their suitability should be thoroughly tested before production is attempted.

Compatible Modifying Resins:

SS Nitrocellulose	Hercules Inc.
RS Nitrocellulose	Hercules Inc.
Ethyl Cellulose N-4	Hercules Inc.
Cellulose Acetate Propionate (CAP-504-0.2)	Eastern Chemical Co.
Cellulose Acetate Butyrate (CAB-553-0.4)	Eastern Chemical Co.
Krumbhaar Resin K-1717-B	Lawter Chemicals Inc.
Pentalyn 255	Hercules Inc.
Elvacite 2043	E. I. duPont
Acryloid B-66	Rohm and Haas Co.
Butvar B-79	Monsanto Co.
VYNC	Union Carbide Co.

This list is provided to give the ink formulator a starting point. DAY-GLO HM and HMS Soluble Toners should be tested with each ink system used by the inkmaker to assure suitability. It should be noted that these toners are not compatible with polyamide resins but make excellent inks for printing treated polyethylene when modified with nitrocellulose or propionate resins.

Toxicity:

DAY-GLO HM and HMS Soluble Toners are non-toxic and contain no heavy metals or inorganic phosphors. Toxicity on typical HM and HMS samples has yielded the following results:

Acute Oral Toxicity LD₅₀ g/kg > 23.1
Acute Dermal Toxicity LD₅₀ g/kg > 10.2
Acute Dust Inhalation 3.0
Eye Irritation - mildly irritating

HM-35 Brightener

HM-35 Brightener is used to extend HMS Soluble Toner ink systems and yet will maintain brightness. Colorless in normal daylight, it glows vivid blue under ultraviolet light, making it useful as a tracer.

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HMS Soluble Toners:

HMS Soluble Toners are used where extra strength is desired or there is a need to reduce the amount of toner in an ink system. HM and HMS can be blended to give intermediate shades of color.

For example, Strong Yellow, HMS-34, when mixed with Aurora Pink, HM-11, produces very clean oranges with intermediate strength.

Recommended Starting Formulations:

The following formulations are recommended as a starting point for flexographic inks to be used in surface printing of treated polyethylene. Modification may be necessary for individual applications.

I. Propionate Modification

	<u>HM Ink</u>	<u>HMS Ink</u>
DAY-GLO HM or HMS Soluble Toner	35.0	35.0
Cellulose Acetate Propionate (CAP-504-0.2) ⁴	8.0	8.0
Krumbhaar Resin K-1717-B ⁵	2.0	2.0
Anhydrous Ethyl Alcohol	41.6	39.0
N-Propyl Acetate	10.4	13.0
Santicizer 141 ¹	1.0	1.0
Kemamide E ²	1.0	1.0
Polymist A-12 ³	<u>1.0</u>	<u>1.0</u>
	100.0	100.0

II. Nitrocellulose Modification

	<u>HM Ink</u>	<u>HMS Ink</u>
DAY-GLO HM or HMS Soluble Toner	35.0	35.0
1/4 Sec. SS Nitrocellulose (70% dry basis in Ethanol)	10.8	10.8
Anhydrous Ethyl Alcohol	41.0	38.4
N-Propyl Acetate	10.2	12.8
Santicizer 141 ¹	1.0	1.0
Kemamide E ²	1.0	1.0
Polymist A-12 ³	<u>1.0</u>	<u>1.0</u>
	100.0	100.0

¹Monsanto Co.

²Humko Chemical Div.

³Allied Signal Inc.

⁴Eastman Chemical Co.

⁵Lawter Chemicals Inc.

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