



## BRILLIANT TONER SERIES TONERS FOR PRINTING INKS BSTS SERIES

Brilliant® fluorescent soluble toners are high-strength, transparent colorants. They are suitable for flexographic and gravure printing inks used on flexible packaging papers, films, and foils, and UV-cure inks. Fluorescent inks made with these Brilliant® fluorescent soluble printing toners are excellent for gift wraps, label stocks, tissue coating, corrugated containers, plastics, glass, metal, wood and other specialty coatings.

All BSTS series Brilliant® fluorescent soluble toners dissolve easily in lacquer solvents, using high-speed mixers. They perform well for indoor applications, but should not be used on products exposed to direct sunlight.

The BSTS series of Brilliant® fluorescent colors may be used with most flexographic ink binders, including nitrocellulose, cellulose acetate butyrate, acrylics, ketone resins, and maleic resins. High-solids-content starting point formulations may be prepared as shown. Polyamide resins, because of their limited compatibility, have been blended with more compatible modifiers such as Ketjenflex 8 and Santicizer 141. Waxes and/or polyethylene dispersion additives at two percent based on total solids may be incorporated to improve mar-, rub-, water-, and slip-resistance. A formula for an unmodified gloss solution follows. Stir with a cowles-type disperser at high speeds to achieve a clear solution:

### Physical and Chemical Properties

<b>Form</b>	granular powder
<b>Melting Point</b>	73 - 76°C
<b>Solubility</b>	
Ethyl acetate	excellent
Isopropyl acetate	excellent
N-propyl acetate	excellent
2-Nitropropane	excellent
Diethylene glycol	excellent
Dipropylene glycol	excellent
Monochlorobenzene	good
Orthodichlorobenzene	good
Ethylene glycol monoethyl ether	use as cosolvent
Ethanol	use as cosolvent
Isopropanol	use as cosolvent
Propylene glycol	use as cosolvent
Ethylene glycol	nonsolvent



### Resin & Plasticizer Compatibility

Ketjenflex 8 (Axcitive)	excellent
Santicizer 141 (Monsanto)	excellent
Polyamide	limited

### Film-former compatibility

SS™ nitrocellulose (Hercules)	excellent
Ethyl cellulose (Hercules)	excellent
Alcohol-soluble butyrate (Eastman)	excellent

### Light stability

Indoors	good
Outdoors	poor

### BSTS Series Starting Point Formulations<sup>1</sup>

#### Formulation A

#### Unmodified Gloss Solution      Percent by Weight

Brilliant® BSTS soluble toner	45.0
Denatured ethyl alcohol	33.0
Ethyl acetate	<u>22.0</u>
<b>Total</b>	<b>100.0</b>

Viscosity (cps);  
Brookfield, No. 1 spindle      20

#### Formulation B

#### Nitrocellulose Modification      Percent by Weight

Brilliant® BSTS soluble toner	36.3
SS nitrocellulose	4.2
Ketjenflex 8 (Axcitive)	2.1
Denatured ethyl alcohol	37.3
Ethyl acetate	<u>20.1</u>
<b>Total</b>	<b>100.0</b>

Viscosity (cps);  
Brookfield, No. 1 spindle      110



<u>Formulation C</u>	
<u>Polyamide Modification</u>	<u>Percent by Weight</u>
Brilliant® BSTS soluble toner	35.0
Alcohol-soluble polyamide resin (Versamid 750)	3.5
SS nitrocellulose, 1/4 sec.	3.5
Denatured ethyl alcohol	40.0
Ethyl acetate	<u>18.0</u>
<b>Total</b>	<b>100.0</b>

Viscosity (cps); Brookfield, No. 1 spindle	105
---	-----

<u>Formulation D</u>	
<u>Alcohol-Soluble Butyrate Modification</u>	<u>Percent by Weight</u>
Brilliant® BSTS soluble toner	34.0
Alcohol-soluble butyrate	6.0
Denatured ethyl alcohol	39.0
Ethyl acetate	<u>21.0</u>
<b>Total</b>	<b>100.0</b>

Viscosity (cps); Brookfield, No. 1 spindle	115
---	-----

<u>Formulation E</u>	
<u>UV-Cure Concentrate</u>	<u>Percent by Weight</u>
Brilliant® BSTS soluble toner	35.0
Ethoxylated Trimethylol Propane Triacrylate (TMPTA)	<u>65.0</u>
<b>Total</b>	<b>100.0</b>

Viscosity (cps); Brookfield, No. 1 spindle	1000
---	------

Flexographic inks prepared with Brilliant® fluorescent soluble toners can be formulated with better cellophane tape resistant adhesion and crinkle resistance than a commercial control, as shown in Table I. Formulation 1 and 9, in particular, show substantial property improvement over both the commercial control and the other experimental ink formulations tested. The stir-in addition of 1 percent microcrystalline wax also has a beneficial effect on ink properties without loss of gloss. This improvement was most obvious in block and abrasion resistance. Moderate to poor performance usually improved to good performance.



**BRILLIANT® FLUORESCENT SOLUBLE TONERS IN FLEXOGRAPHIC INKS**

A) Various soluble toner formulations									
FORMULATION #	1	2	3	4	5	6	7	8	9
Brilliant® BSTS	35.0	36.3	35.0	36.3	36.3	35.0	35.0	-	35.0
Commercial control	-	-	-	-	-	-	-	100 <sup>a</sup>	-
SS nitrocellulose 1/4 sec.	3.0	-	-	4.2	8.4	3.5	2.0	-	6.0
Santicizer 141	8.0	2.1	-	2.1	4.2	-	1.0	-	8.0
Versamid 750	12.0	4.2	7.0	-	-	3.5	4.0	-	12.0
Ethyl acetate	12.6	17.2	17.4	17.2	15.3	17.4	17.4	-	22.9
Ethanol	29.4	40.2	40.6	40.2	35.8	40.6	40.6	-	53.4
Nonvolatile, %	50.2	42.6	42.0	42.6	34.8	42.0	42.0	53.3	44.3
Viscosity (sec) No. 2 Zahn cup	27.0	23.0	21.0	21.5	28.0	26.2	17.2	24.5	27.0

B) Film tests: 1-mil corona-treated polyethylene film/No. 3 Meyer rod drawdown										
Crinkle adhesion <sup>b</sup>		9	5	7	5	1	5	7	5	10
Block - 2 psi Face to Face % removal		10	30	50	90	100	20	50	25	0
Block - 2 psi Face to Back % removal		0	0	0	0	0	0	0	0	0
Cellophane tape <sup>b</sup>		10	8	7	5	2	4	7	7	10
Visual Gloss		E	G	E	E	E	E	E	E	E
Sutherland rub % removal after 120 cycles		20	20	--	40	--	30	--	50	--
Legend: E = Excellent G = Good										
<sup>a</sup> Composition unknown.										
<sup>b</sup> Complete removal of coating - 0 No removal of coating - 10										

**Test Procedures**

Please refer to Flexography Principles and Practices, Fourth Edition, 2nd printing, 1992 for updated test procedures. This book is published by the Foundation of Flexographic Technical Association, 900 Marconi Avenue, Ronkonkoma, New York 11779-7212.

**Storage**

When stored in a cool, dry environment, Brilliant® fluorescent BSTS soluble toners have an indefinite shelf life. Colorant containers should be kept closed to minimize contamination.

**Toxicity**

Test conducted through independent laboratories have found Brilliant® BSTS series fluorescent soluble toner to be "essentially non-toxic". A summary of test data is listed on the MSDS, which is available upon request. Good industrial hygiene and handling methods are essential in the use of all products whether or not they are determined to be hazardous.

**Important**

Brilliant Group, Inc. makes no warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose for this product. No statements or recommendations contained in the product brochure are to be construed as inducements to infringe any relevant patent, now or hereafter in existence. Under no circumstances shall Brilliant Group, Inc. be liable to incidental, consequential or other damages from alleged negligence, breach of warranty, strict liability or any other theory arising out of the use or handling of this product.