BULLETIN VC-519A (Supersedes VC-519)

Ambergum™ 1221 water-soluble polymer powder

Use in Lithographic Fountain and Gumming Solutions

Ambergum 1221 water-soluble polymer powder is a low molecular weight, anionically charged water-soluble polymer prepared from cellulose. These properties bring the following benefits to lithographic fountain and plate solutions.

Benefits of Ambergum 1221 water-soluble polymer powder

- Ambergum 1221 water-soluble polymer powder solutions can be made at a high solids level to provide maximum desensitizing gum levels with minimum water use.
- Ambergum 1221 water-soluble polymer powder solutions are clean and residue free; filtration steps can be avoided and productivity can be increased.
- Ambergum 1221 water-soluble polymer powder is functional over a wide pH range, allowing its use in both acid and neutral fountain solutions.
- Ambergum 1221 water-soluble polymer powder has good adhesion and film-forming properties to keep image areas sharp and clean.

Ambergum 1221 water-soluble polymer powder has been evaluated as a replacement for gum arabic in both lithographic gumming and fountain solutions. This literature describes the tests we performed and the results we obtained.

Ambergum 1221 water-soluble polymer powder in Gumming Solutions

Lithographic gumming solutions are used to coat developed plates to protect them from oxidation, dirt, grease, and fingerprints during storage. The coating must perform these functions and must not interfere with the printing quality once the plate is in use. The trials that established the suitability of Ambergum 1221 water-soluble polymer powder solutions for gumming were conducted at the Hercules Incorporated corporate Printing Plant, New Castle, Delaware. Plates coated with Ambergum 1221 water-soluble polymer powder solutions showed no signs of oxidation after 5 weeks of storage. Printing quality was equivalent to that of the commercial control.

Experimental Details: Four aluminum plates were used in the trial. Two were coated with 14% solutions of Ambergum 1221 water-soluble polymer powder and two were coated with Enco[1] FPC. Prior to use in the printing process, one Ambergum water-soluble polymer powder and one Enco plate were stored for 2 weeks in the pressroom; the other set of plates was stored for 5 weeks. After storage, these plates were installed on the Davidson press 501 and used to print several thousand sheets of Mead Moistrite bond paper. The fountain solution used during printing was a combination of Rosos G7A-"V," water, and isopropanol.

(1) Azoplate Division of American Hoechst Corporation.
(2) Ambergum™ 1221 water-soluble polymer in Fountain Solutions

Fountain solutions are used in the lithographic process to replace gum solids that have been eroded from the printing plate during the printing cycle; thus, the non-image area is continually desensitized. Fountain solutions normally contain water and gum arabic and many contain some isopropanol. Trials to determine the efficacy of Ambergum™ 1221 water-soluble polymer powder as a gum arabic replacement were also conducted at the Hercules Printing Plant. Eight different fountain solutions were used in the trials (one solution on each of eight different days); 2,000 sheets were printed during the formal test. The experimental fountain solutions were used on the press for the remainder of the day while regular runs were printed. Each solution was evaluated for:

Printing quality
Scumming
Fountain solution required to keep the plate clean

Dilute fountain solutions were made that contained either gum arabic or Ambergum 1221 water-soluble polymer powder. The Ambergum water-soluble polymer powder was used at half the concentration of the gum arabic. Some solutions contained 25% isopropanol (this ingredient was added after the gums were dissolved). Minor ingredients were varied, so these formulations represent eight unique fountain solutions. Table I describes the formulations that were tested.

Table I

Formulation		**Viscosity, cps**
1 Base A, gum arabic, water	3.3	2.8
2 Base A, gum arabic, water, isopropanol	3.4	4.3
3 Base B, gum arabic, water	4.1	3.4
4 Base C, gum arabic, water	3.4	3.0
5 Base O, Ambergum 1221, water	3.6	3.3
6 Base O, Ambergum 1221, water, isopropanol	3.5	4.3
7 Base E, Ambergum 1221, water	2.4	2.8
8 Base F, Ambergum 1221, water	3.7	3.8

Results of the trials with these fountain solutions are summarized in Table II. The fountain solutions that contained Ambergum 1221 water-soluble polymer powder (numbers 5 through 8) performed as well as those that contained gum arabic. Scumming did not occur with any of these products. Minor variations in printing quality among the eight solutions can be ascribed to formulation variation.

Table II
Evaluation of Fountain Solutions —
2,000-Sheet Printing Trial

Formulation	**Printing Evaluations**
1	Good color, occasionally a slight amount of extra fountain solution needed
2	Very good quality
3	Color deep and solid; a little extra fountain solution needed
4	Very good; color dark and solid
5	Very good; color dark and solid
6	Very good
7	Good; a little extra fountain solution needed now and then
8	Color deep and solid; slight amount of extra fountain solution needed

Following the 2,000-sheet trial on Moistrite bond, the Printing Plant continued with its regular printing runs, using the fountain solutions just described. Printing continued throughout the day without incident.

These initial results were so promising that further work was carried out with Ambergum™ 1221 water-soluble polymer powder in both fountain solutions and gumming solutions. Details of this work are available in Ashland Specialty Chemical Bulletins VC-517 and VC-520.

Appendix

Materials and Equipment

Desensitizing gum:	Ambergum 1221 powder
Enco FPC:	A finisher, preservative and cleaner Azoplate Division of American Hoechst Corporation, Murray Hill, NJ 07971
Printing press:	Davidson 501
Printing plates: Azoplate	Subtractive negative-working presensitized aluminum offset plate from
Printing ink:	Spark-Dri Process Black SBK-1273C Seaboard Printing, Inc.
Ink reducer:	IPI Tac-Out Compound Inmont Corporation New York, NY 10036
Printing paper:	Mead Moistrite Bond % by 11-8M, SUB 16-lb
Cleaning solvent:	No. 2 Roll & Wash I.C. Compound Company Gardena, CA 90248