NEW PRODUCT MARKET DEVELOPMENT

**UNION CARBIDE PLASTICS COMPANY**

*Division of Union Carbide Corporation*

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**NEW PRODUCT DATA**

PRODUCT DESIGNATION VXKA-6112, SXKA-0121

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## BAKELITE Brand Fibrous Resins for Specialty Paper

### Introduction

The BAKELITE Brand fibrous resins are new physical forms of thermoplastics. The fibers are very irregular in structure with many fine fibrils extending out from the main fiber bundle. Diameters vary from 2 to 200 microns, and lengths range from very short to a maximum of 3/16 inch. Currently available resins include a vinyl copolymer, VXKA-6112, and a polystyrene, SXKA-0121.

The fibrous resins offer an attractive means for economically incorporating thermoplastic resins in paper.

1. Their structure is similar to cellulosic fiber.
2. They are easily incorporated in paper in existing equipment.
3. It is not necessary to lower the pH as with liquid resins.
4. There is good retention on the wire and little loss in white water.
5. The prices of the Fibrous Resins are relatively low.

The BAKELITE Brand Fibrous Resins appear to have application in the preparation of specialty papers, in laminates, and paper and pulp molding. There are also possibilities for their use as binders for non-woven textiles which can be produced on paper making equipment. Laboratory studies of these applications are reported in the following sections.

### Fibrous Resin Impregnated Paper

#### Paper Production

Stock was prepared by furnishing the fibrous resin together with one-tenth its weight of wood pulp to a hollander-type beater, and beating until the desired fiber size was obtained. The remainder of the wood pulp was added and beaten until the desired freeness was obtained. Initial beating time was about the same as that required to beat 100% wood pulp from 660 to 400 Canadian freeness under the same beater setting.

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The recommendations, test results, property values, and suggestions are offered herein as a guide in the use of these materials and are not a guarantee of their performance. The property values given are those to be expected in the product at the time of manufacture. These values are dependent upon using the testing methods as indicated. Properties more certain to be realized are measured with lesser frequency than those of universal where manufacturing operations are closely controlled. If applications require continual verification of a certain property or properties, requirements should be discussed with a Union Carbide Plastics Technical Representative. Union Carbide Plastics Company reserves the right to alter the formulation and to

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Press cycles for the fibrous resins give improved efficiency since the cure time is considerably lower. In laboratory runs, cure time for the fibrous resins was 6 minutes, compared with 20 minutes for the phenolics. There are further possibilities for shorter press cycles. The packs to be laminated could be heated outside the press and pressed between cold platens for extremely fast cycles, or it may prove possible to laminate by a continuous calendering operation.

Water absorption of the fibrous resin laminates is high compared with phenolic laminates. Surfacing both faces with 4-mil vinyl film reduces the value to about 5 per cent which approaches the phenolic values. Sizing agents, rosin for example, may improve this property.

## Fibrous Resin Paper Molding

Fibrous resin creped papers can be compression molded to form structures curved in three dimensions. Creped paper is necessary in order to obtain deep draws.

Low pressure molded items have a paper-like surface while those pressed at several thousand psi experience complete flow-out of resin and exhibit a hard glossy surface.

## Fibrous Resin Pulp Molding

While both vinyl and styrene fibrous resins have been evaluated for pulp molding, only the styrene is recommended for further test because of the temperatures, around 350°F., employed in this process. A two-step process has been found desirable. The pulp is first die dried under a pressure of 100 psi, then further pressed at 1250 psi. Results of one series of tests on the styrene resin in a slurry of unbleached kraft, rag and wood fibers are given below:

| | SXKA-0121, % | | | |
|---|---|---|---|---|
| | 0 | 9 | 25 | 50 |
| Flex. Strength, psi. | 3000 | 5400 | 7250 | 8900 |
| Tensile Str., psi. | 3800 | 6150 | 6400 | 4700 |
| Water Absorp., % | 90 | 76 | 37 | 10 |

## Fibrous Resin-Asbestos Papers and Laminates

Asbestos fibers have been combined with fibrous resins by conventional wet handsheet processes without difficulty. These sheets may be laminated directly to cardboard or wood without use of an adhesive, by a hot pressing operation.

Typical properties of SXKA-0121 laminates are as follows:

| | Flexural Strength psi x $10^3$ | M.O.E. psi x $10^6$ | Tensile Strength psi x $10^3$ | Water Absorption, % |
|---|---|---|---|---|
| Resin, 5%-C-1 Asbestos, 95% | - | - | 0.3 | 125 |
| Resin, 25%-C-1 Asbestos, 75% | 10.2 | 1.03 | 3.4 | 16 |
| Resin, 50%-C-1 Asbestos, 50% | 12.6 | 1.04 | 7.1 | 1.3 |