

# Bean Fiber Glass

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Jaffrey Historical Society

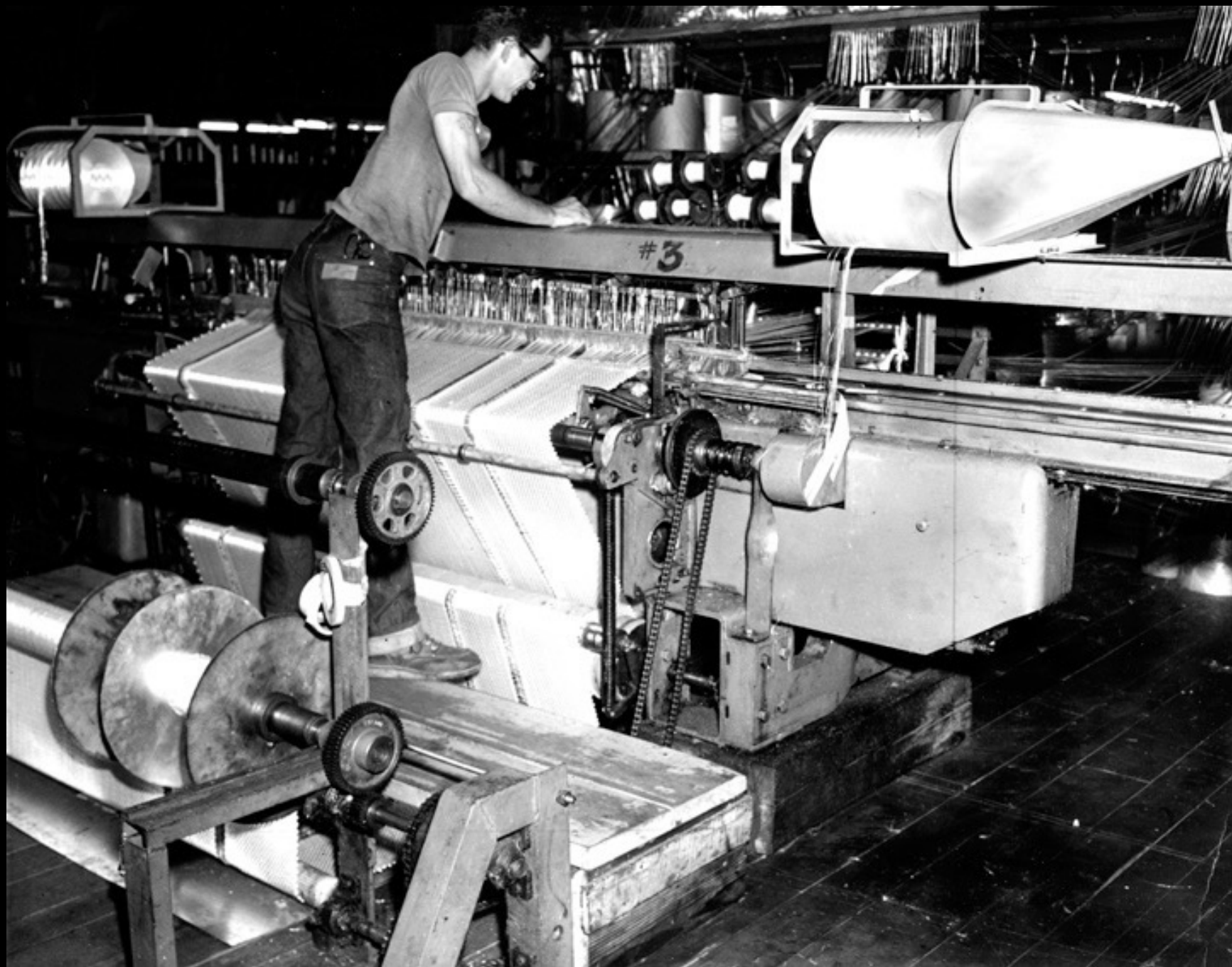
April 9, 2015

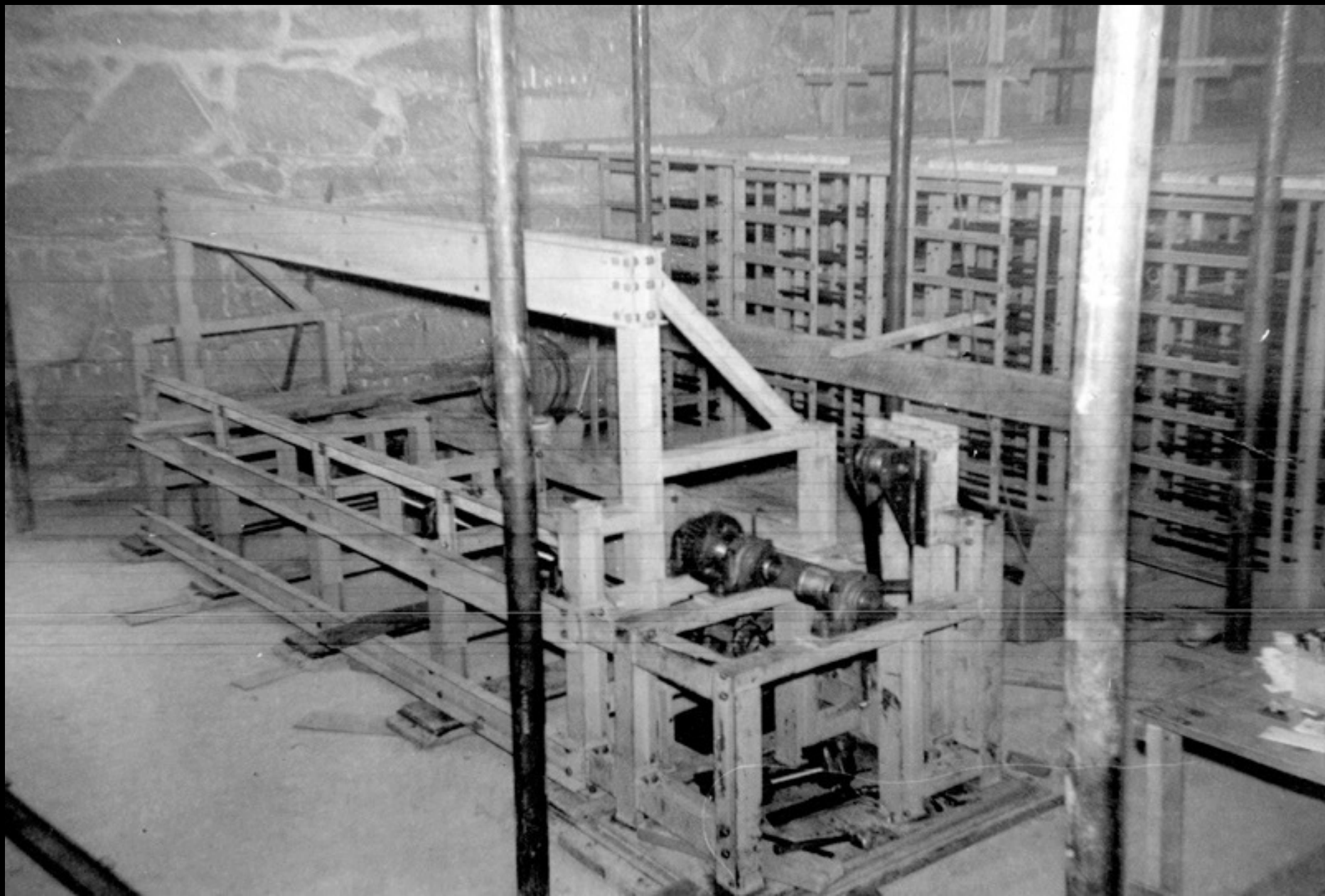
















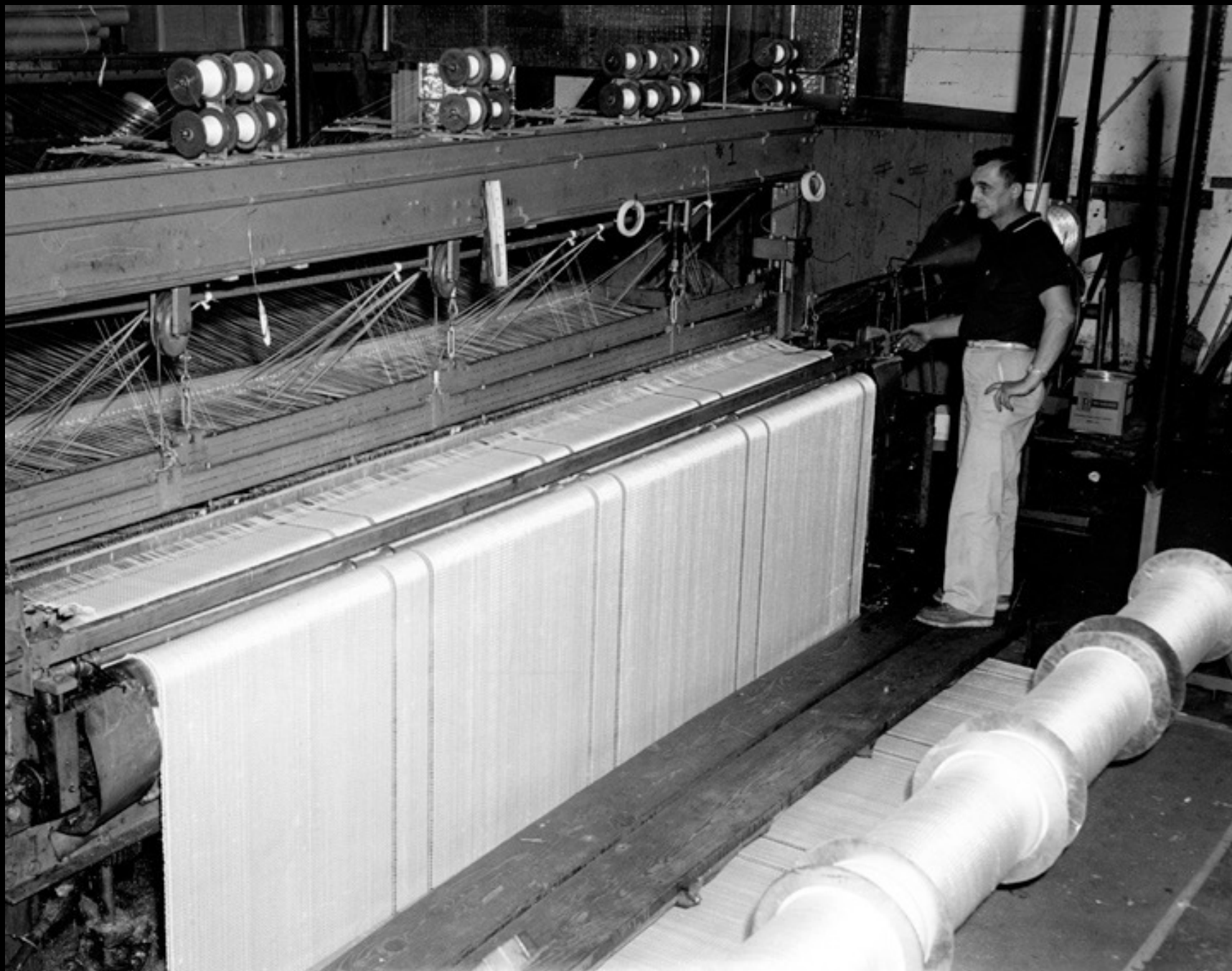






















# VECTORPLY<sup>®</sup>

HIGH PERFORMANCE COMPOSITES

BEAN FIBER GLASS

A DIVISION OF INTERPLASTIC CORPORATION



BEAN

# VECTORPLY<sup>®</sup>

## NON WOVEN COMPOSITES

VECTORPLY non woven fabrics or composites represent the latest in high performance, production grade laminate reinforcements. They provide: (1) higher strength to weight (2) better drape and mold conformity (3) faster wet out (4) smoother laminate finish and, (5) higher glass to resin ratio.

In VECTORPLY non woven composites the various layers of warp and weft strands lie closely packed in straight, parallel lines in separate planes and are stitched together (fig 1). The fibers are not interwoven as in conventional woven fabrics and therefore have not suffered the abrasion of weaving and do not have the crimp of woven fibers. This usually results in an increase in laminate tensile and flexural strength of 15% with no increase in weight.

Varying the weight of fiber in any direction can give special unidirectional composites with fibers aligned in the direction of greatest loads.

The stitch pattern in any VECTORPLY non woven can be "trico" as shown in style VW0910 (pg 4) or "chain stitch" as shown in style V24 below. Chain stitch rows can be spaced from  $\frac{1}{4}$ " to 2" apart.

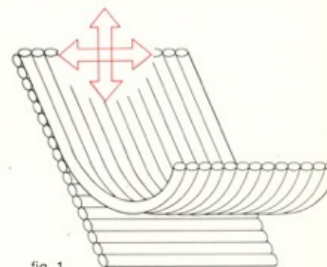


fig. 1

### STYLE V24

A balanced VECTORPLY non woven composite with 12 oz (per sq yd) in both warp and weft directions, this fabric gives a smooth, surface and wets out rapidly. Both 12 oz layers are stitch-bonded together with a 7 gage chain stitch as shown in the photo. (Available also in a trico stitch — as shown in style VW0910, pg 4.)

Weight 24 oz per sq yd  
Thickness .040"

### STYLE V18

A balanced VECTORPLY non woven composite with 9 oz (per sq yd) in both warp and weft, this fabric is a lighter version of V24. Shown here is a fine, 14 gage warp which is available in all fabrics, but not commonly used. Most common, and shown in all other VECTORPLY non wovens, is the 7 gage stitch which drapes more readily and wets out rapidly.

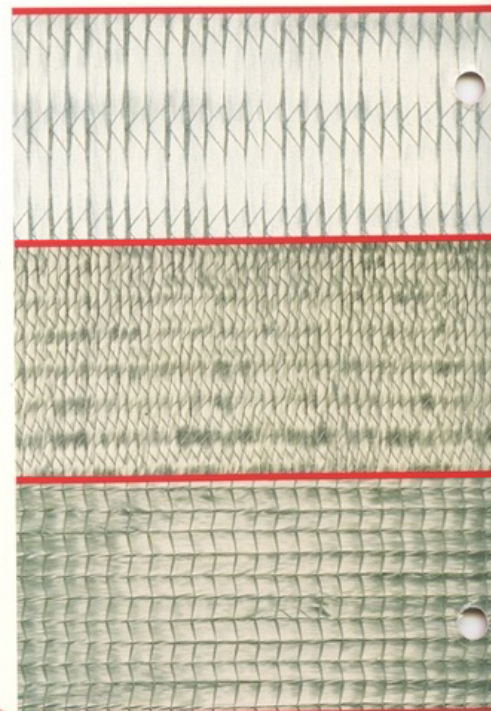
Weight 18 oz per sq yd  
Thickness .030"

### STYLE VF18

A unidirectional VECTORPLY with fibers running in the weft or horizontal direction only (in photo the vertical lines are stitches). This fabric is used where added laminate strength is needed in the weft direction. In narrow widths this grade is often used in mandrel wrapping, or in pultrusion to give additional fibers in the weft direction. It is available in weights from 30 oz to 12 oz (per sq yd).

Weight 18 oz per sq yd  
Thickness .030"

photos are full scale



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## NON WOVEN — DOUBLE BIAS COMPOSITES

VECTORPLY double bias fabrics or composites provide some of the most drapeable, non woven reinforcements available today. In each of the two layers of double bias VECTORPLY the fibers lie closely packed in straight, parallel lines at 45° to the zero axis and are stitchbonded together (fig 2).

In structures where maximum loads do not occur along the 0° - 90° axis, VECTORPLY fabrics can be laid in the mold along the zero axis for ease of handling but with the fibers oriented along the +45° and -45° axes. This construction is often used to resist high torsional stress.

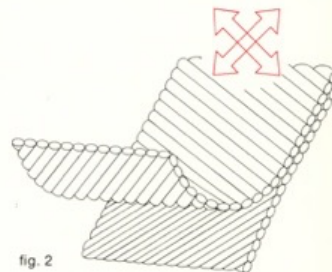


fig. 2

### STYLE VX24

A balanced VECTORPLY double bias composite with 12 oz (per sq yd) in each of the two layers, this fabric is used where fiber orientation at 45° on each side of the main axis is desired. Both layers are stitchbonded together at the same time during production. In applications where maximum loads are mostly torsional, this aligns the fibers for optimum strength along the 45° axis.

Weight 24 oz per sq yd  
Thickness .040"

### STYLE VX18

A balanced VECTORPLY double bias composite with 9 oz (per sq yd) in each of the two layers, this fabric, like that above, is used where 45° fiber orientation is desired but where lighter weight and better drape is needed. It is often used in conjunction with standard non wovens to add strength in the 45° axes and make the laminate more isotropic.

Weight 18 oz per sq yd  
Thickness .030"

### STYLE VX12

A light weight, balanced VECTORPLY double bias composite with 6 oz (per sq yd) in each of the two layers, this fabric is used where small amounts of 45° fiber orientation are desired. It is often used in conjunction with other light weight woven or non woven fabrics in high performance laminates requiring high strength-to-weight ratios.

Weight 12 oz per sq yd  
Thickness .020"

photos are full scale

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## NON WOVEN + MAT COMPOSITES

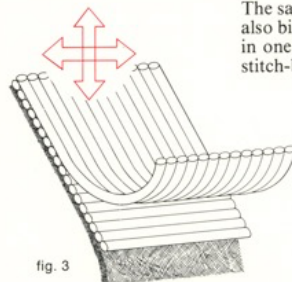


fig. 3

The same threads that stitch non woven fabrics together can also bind them to chopped fiber mat, thus making two fabrics in one. Any of the non woven VECTORPLY fabrics can be stitch-bonded to any available mat.

This method of joining produces VECTORPLY + MAT composites which drape and wet out well, possess high dry strength for handling during impregnation, and which hold together when fully wet out. They can be wet out with less resin; pattern cut without fraying; handled in large pieces without wrinkling or pulling apart; and they give quick laminate buildup.

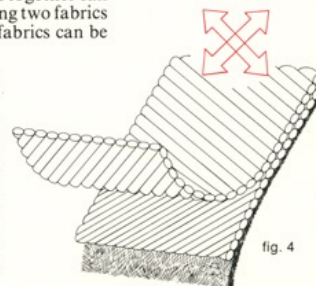


fig. 4

### STYLE V2410

Style #V2410 is a 24 oz per sq yd VECTORPLY stitchbonded to 1 oz (per sq ft) mat (fig 3). This fabric provides a smooth laminate surface, high flexural and impact strength, fast wet out and build up, and good drape. Available also in trico stitch. (Shown with chain stitch.)

Weight 33 oz per sq yd  
Thickness .057"

### STYLE VW0910

Style #VW0910 is a combination of 9 oz (per sq yd) unidirectional VECTORPLY stitchbonded to 1 oz (per sq ft) mat. This unidirectional composite provides high flexural strength in the warp or zero axis only, but high interlaminar bonding and impact strength in all directions. This product is also available with the unidirectional fibers in the weft or 90° axis (see style #VF18 - pg 2) and with any weight of mat.

Weight 18 oz per sq yd  
Thickness .030"

### STYLE VX1808

Style #VX1808 is an 18 oz per sq yd double bias VECTORPLY stitchbonded (trico stitch) to ¼ oz (per sq ft) mat (fig 4). The double bias fibers are aligned at 45° on each side of the zero axis, giving a fabric which drapes well, wets out rapidly, provides fast build up, and gives high flexural and impact strength. Any weight VECTORPLY can be stitchbonded to any weight of mat.

Weight 24 oz per sq yd  
Thickness .043"

photos are full scale

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## NON WOVEN — TRIAXIAL COMPOSITES

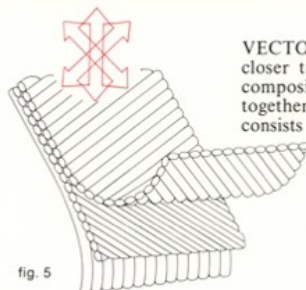


fig. 5

VECTORPLY triaxial composites represent one step closer to the ideal isotropic reinforcing fabric. In this composite, three separate layers of fibers are stitchbonded together at the same time during production. Each layer consists of straight, parallel fibers and each layer is oriented at a different angle.

Shown here are composites whose first two layers are at  $+45^\circ$  and  $-45^\circ$  to the zero axis, and whose third layer is either along the zero axis or at  $90^\circ$  to it. In special fabrics, the weights of each layer and their angles can be varied.

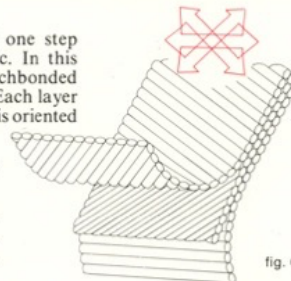


fig. 6

### STYLE TW34

In style #TW-34 triaxial VECTORPLY each of three layers contains 11+ oz per sq yd of straight, parallel, non woven fibers. Two of the layers are oriented at  $+45^\circ$  and  $-45^\circ$  to the zero axis and the third layer lies along the zero axis (fig 5). All three layers are stitchbonded together at one time, eliminating excess stitch yarn.

Weight 34 oz per sq yd  
Thickness .062"

### STYLE TW18

In style #TW-18 triaxial VECTORPLY each of three layers contains 6 oz per sq yd of straight, parallel, non woven fibers. Similar to style #TW-34 above, but only half the weight, two of the layers lie at  $+45^\circ$  and  $-45^\circ$  to the zero axis (fig 5). Weights may be varied along any of the 3 axes to produce special, unbalanced triaxial composites.

Weight 18 oz per sq yd  
Thickness .030"

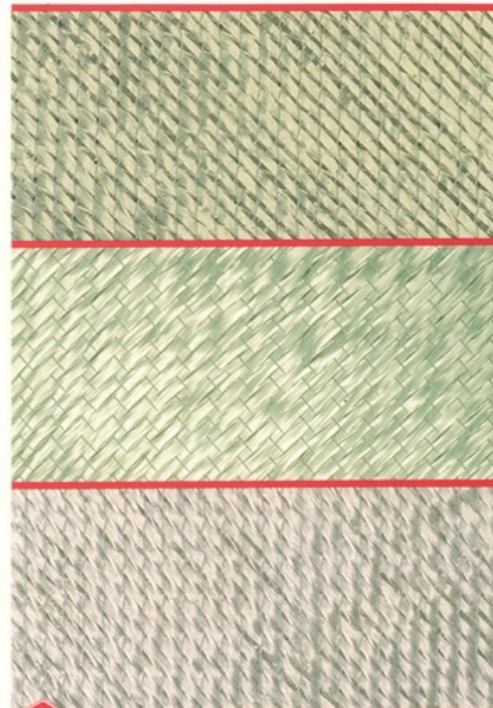
### STYLE TF36

Style #TF-36 triaxial VECTORPLY is similar to style #TW-34 above except that the third layer of fibers lies at  $90^\circ$  to the zero axis (fig 6).

Shown on this page are standard triaxial fabrics. Special fabrics may be had by varying the weights along each axis or the angles at which these axes are oriented.

Weight 36 oz per sq yd  
Thickness .062"

photos are full scale



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## WOVEN ROVING

During the past 30 years, hundreds of thousands of boats, large and small, have been made using fiber glass WOVEN ROVING. Most of these boats are still in use—proof not only of the high flexural strength of WOVEN ROVING laminates, but also of their high fatigue strength in hulls subjected to thousands of stress reversals in the wave-tossed oceans of the world.

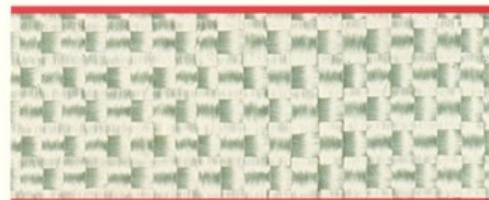
When properly woven, under close tension control, low profile WOVEN ROVING fabrics contain almost no "weave crimp." Their flat, ribbon-like strands provide a uniform glass distribution locked in place across the entire fabric. Bean Fiber Glass pioneered the production of this type fabric and continues to produce the best available.

### STYLE

3

This is the standard 24 oz WOVEN ROVING used throughout the FRP industry. It conforms to military specification MIL-C-19663. It handles easily, wets out rapidly, and provides high tensile and flexural strength in laminates. Our unique weaving process using low tension and no weft "beat" produces a "low profile" fabric with a flat, uniform surface.

Weight 24 oz per sq yd  
Thickness .040"

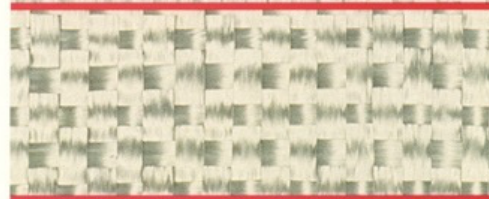


### STYLE

11

This is the standard 18 oz WOVEN ROVING. When properly woven in our special process, this fabric contains almost no "weave crimp," since all glass strands are in the form of flat ribbons, and interweave with very little deflection. Laminates properly made from this low profile WOVEN ROVING show no weave pattern in the gel coat.

Weight 18 oz per sq yd  
Thickness .030"



### STYLE

1109

This lightweight, fine weave WOVEN ROVING is often used in place of 10 oz cloth. Since it is made of fine roving instead of yarn, its fibers have never been twisted into yarn and their flexural strength is higher. These non twisted roving strands produce a very flat weave fabric which is fast wetting and drapeable, and gives high strength laminates.

Weight 10 oz per sq yd  
Thickness .017"



### STYLE

V1808-08

This unusual fabric with mat on both faces solves many laminating problems. It saves one complete lay up operation by providing an extra mat surface against a core or finished surface.

Available in many weight combinations, the most common consists of 3/4 oz mat on each side of an 18 oz non woven VECTORPLY. (see photo).

Weight 31 oz per sq yd  
Thickness .080"



## WOVMAT

### STYLE

1524

WOVMAT fabrics provide quick laminate build-up, as well as high strength. In most similar products, mat is bonded to woven roving thus creating a binder rich boundary layer. In our process, glass fibers are chopped onto one side of the woven roving and mat is formed resulting in a drapeable combination fabric with less binder content.

Use of WOVMAT is equivalent to cutting and handling two layers at once, thereby increasing efficiency. Any weight mat can be formed on any weight woven roving.

Weight 38 oz per sq yd  
Thickness .066"



photos are full scale

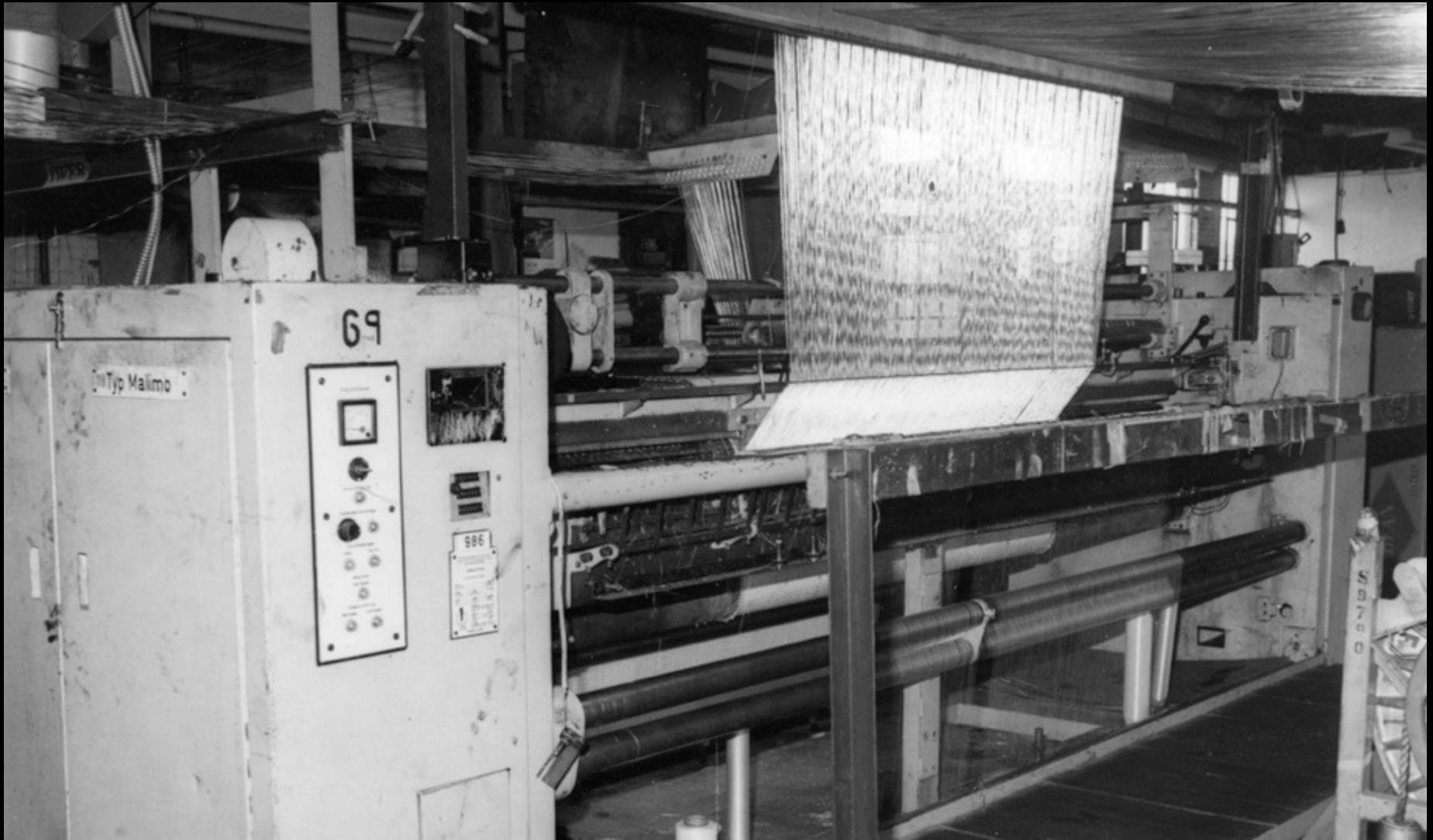
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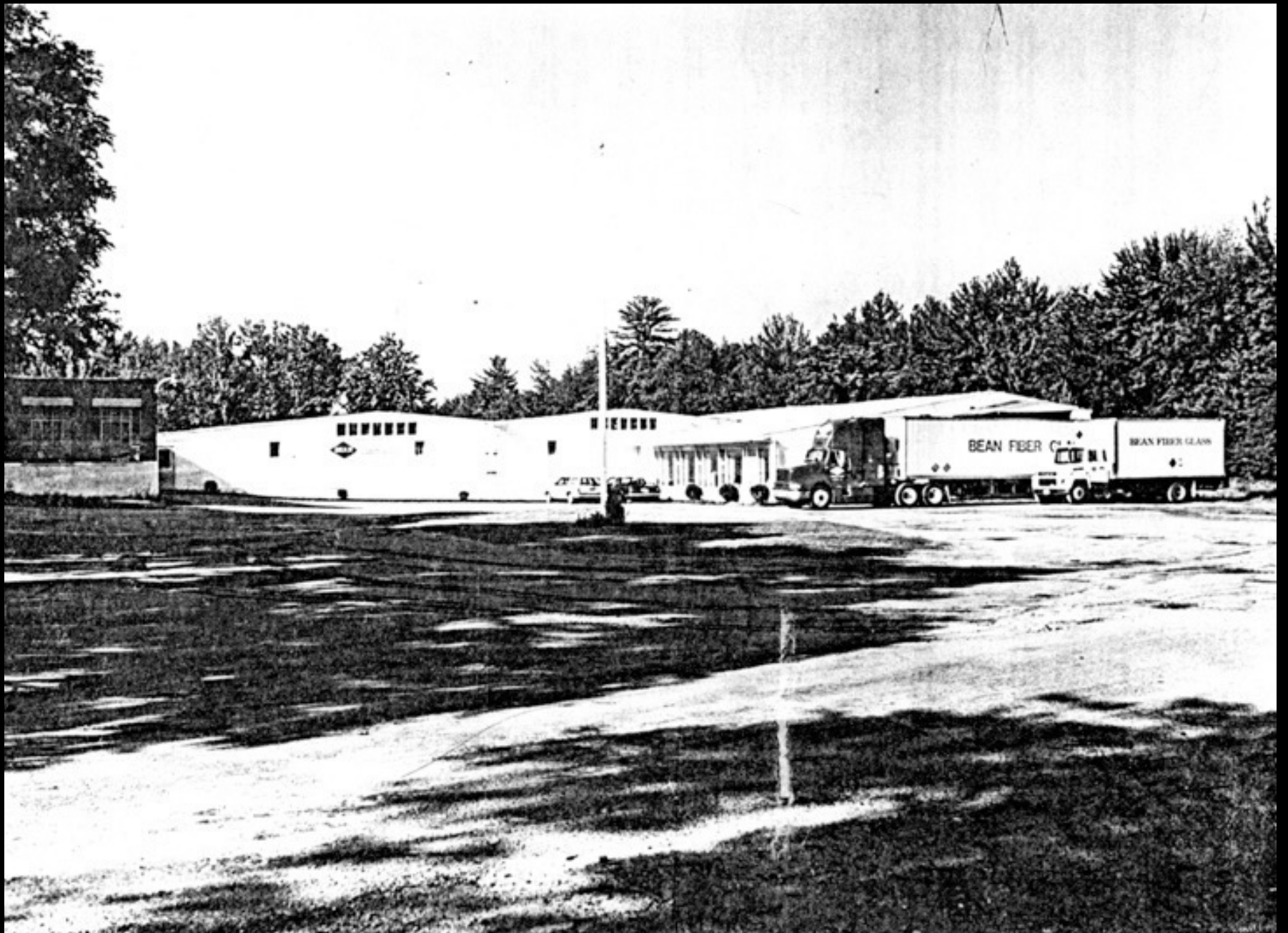
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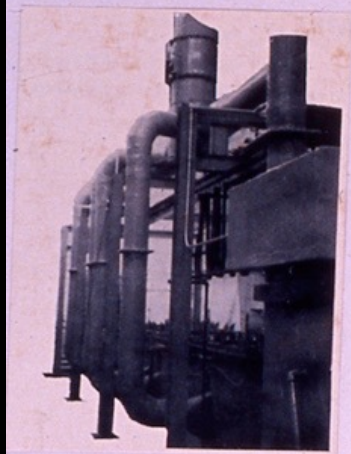
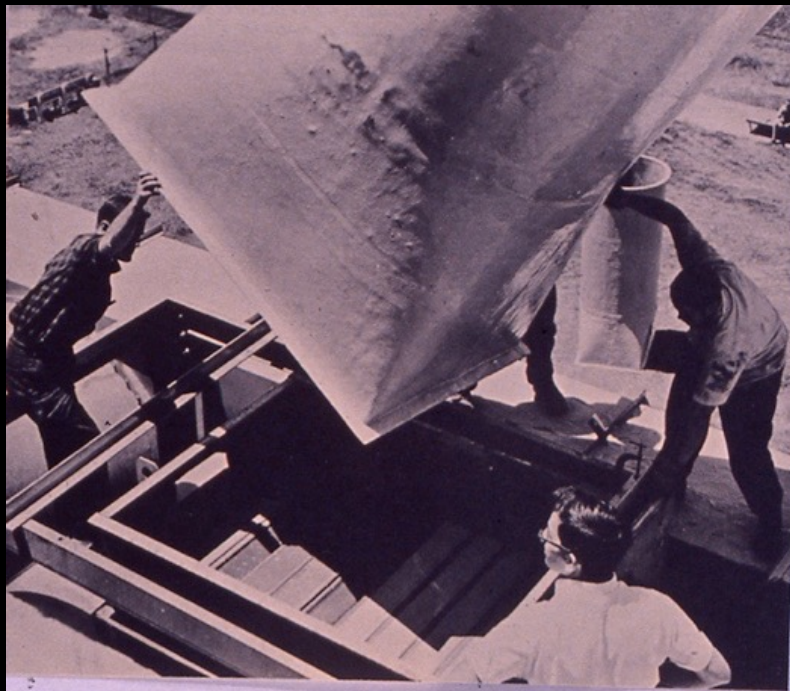
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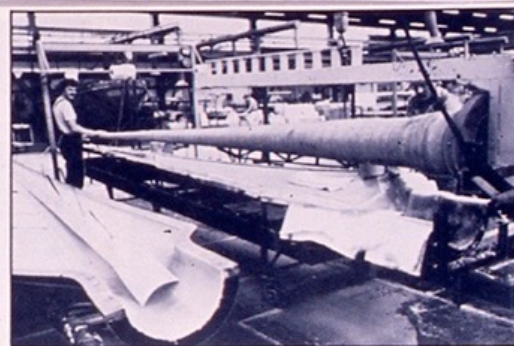














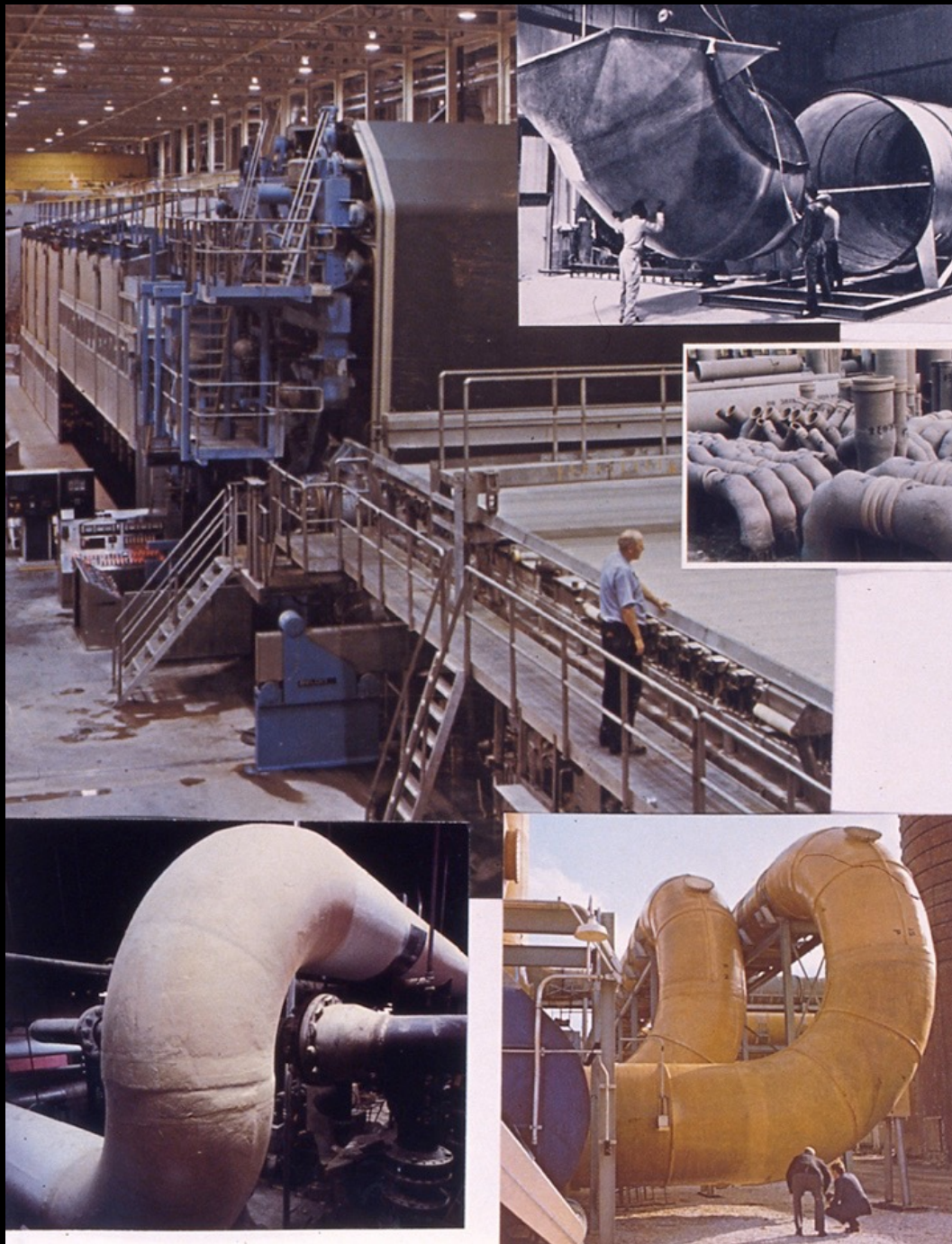


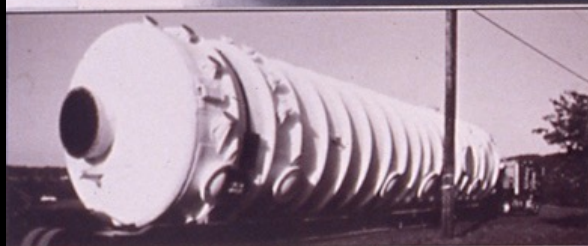
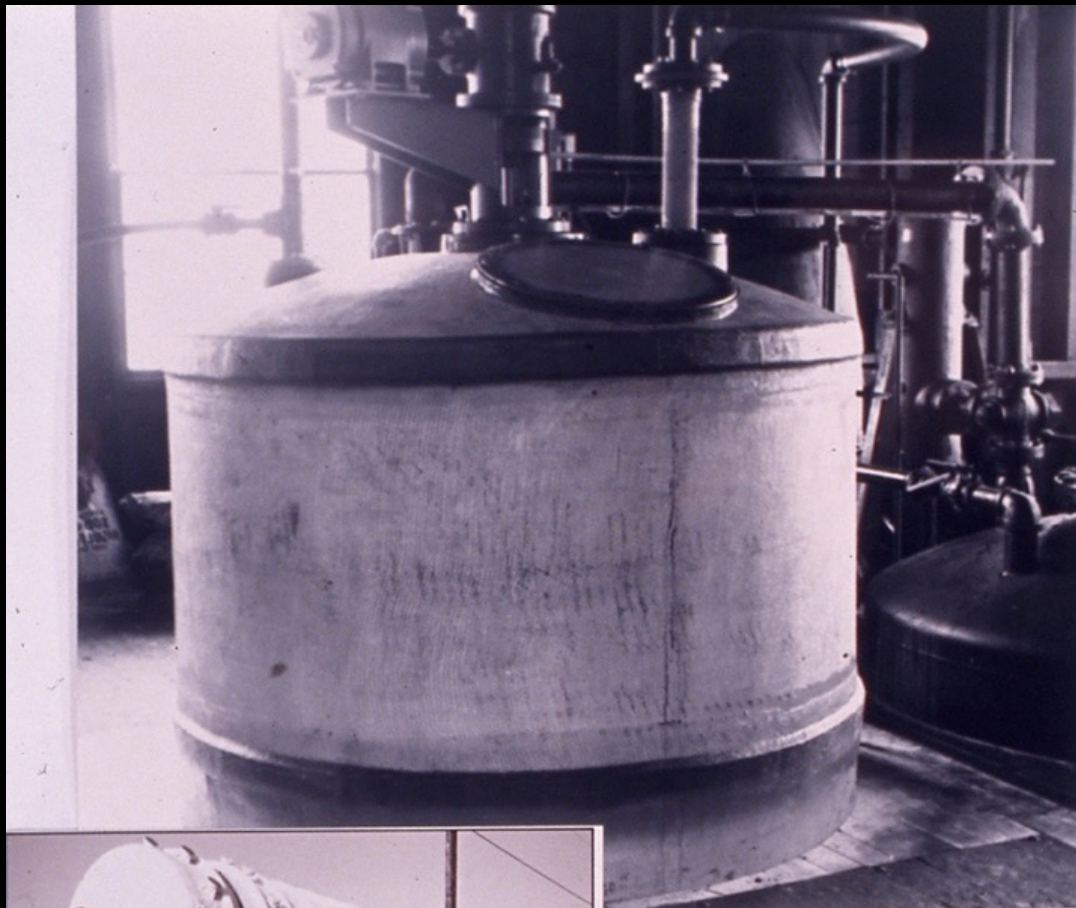








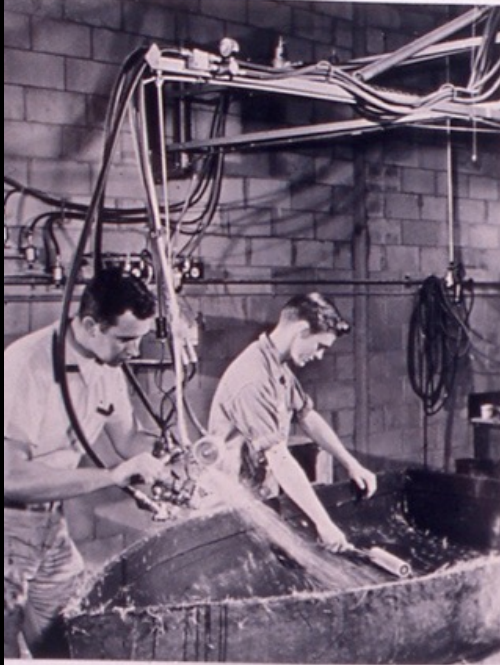




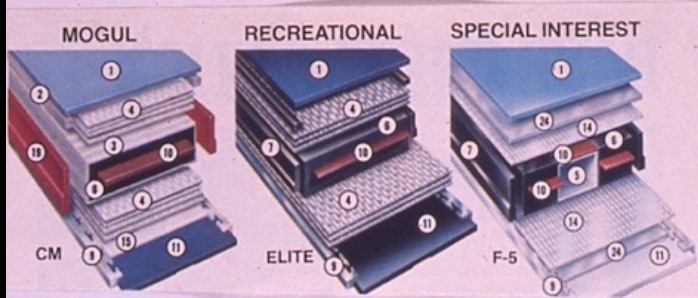


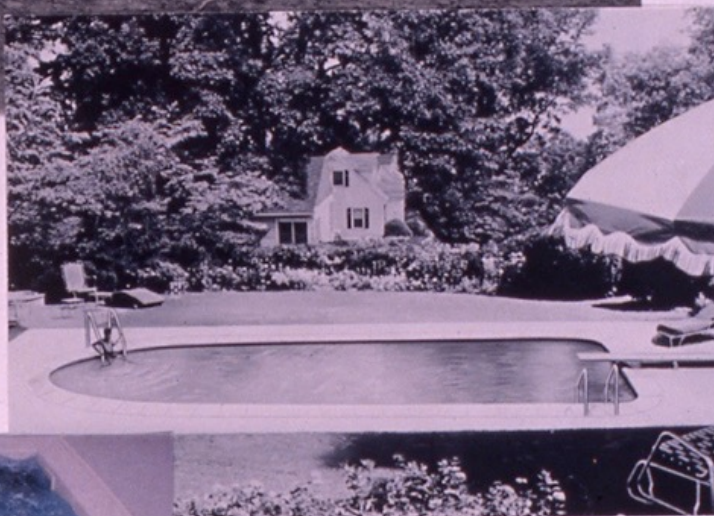
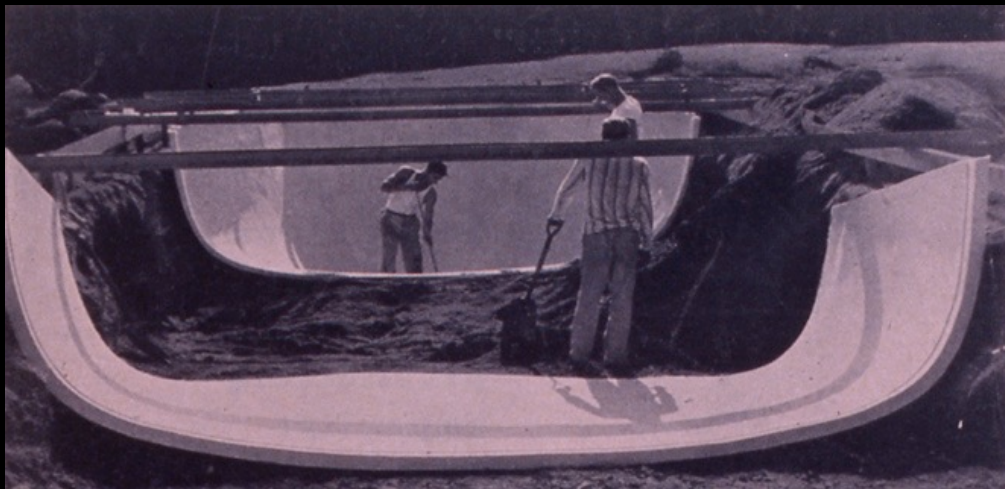


Hand Layup











The End