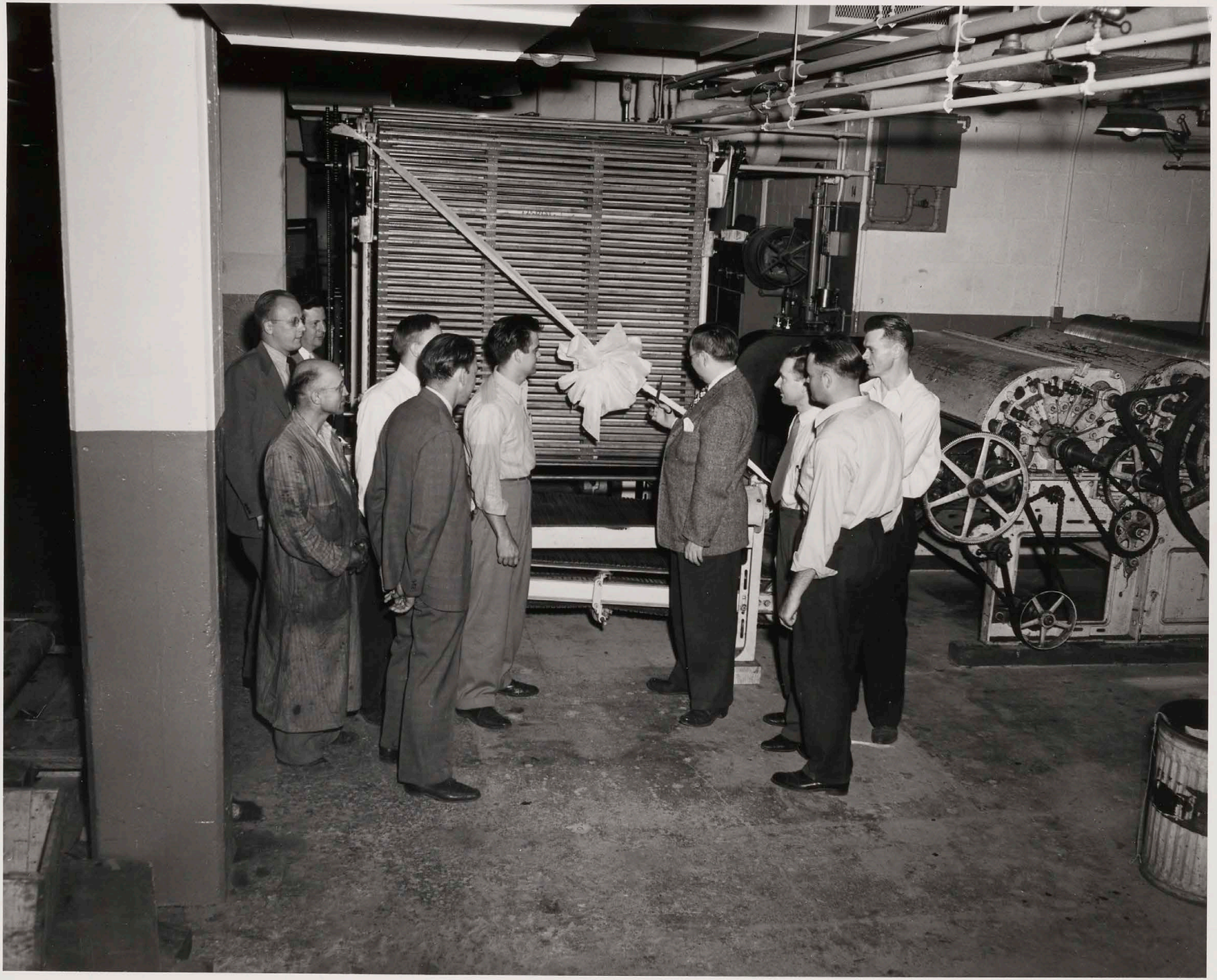
Alvin W. Boese Papers.

Version 3
August 20, 2018



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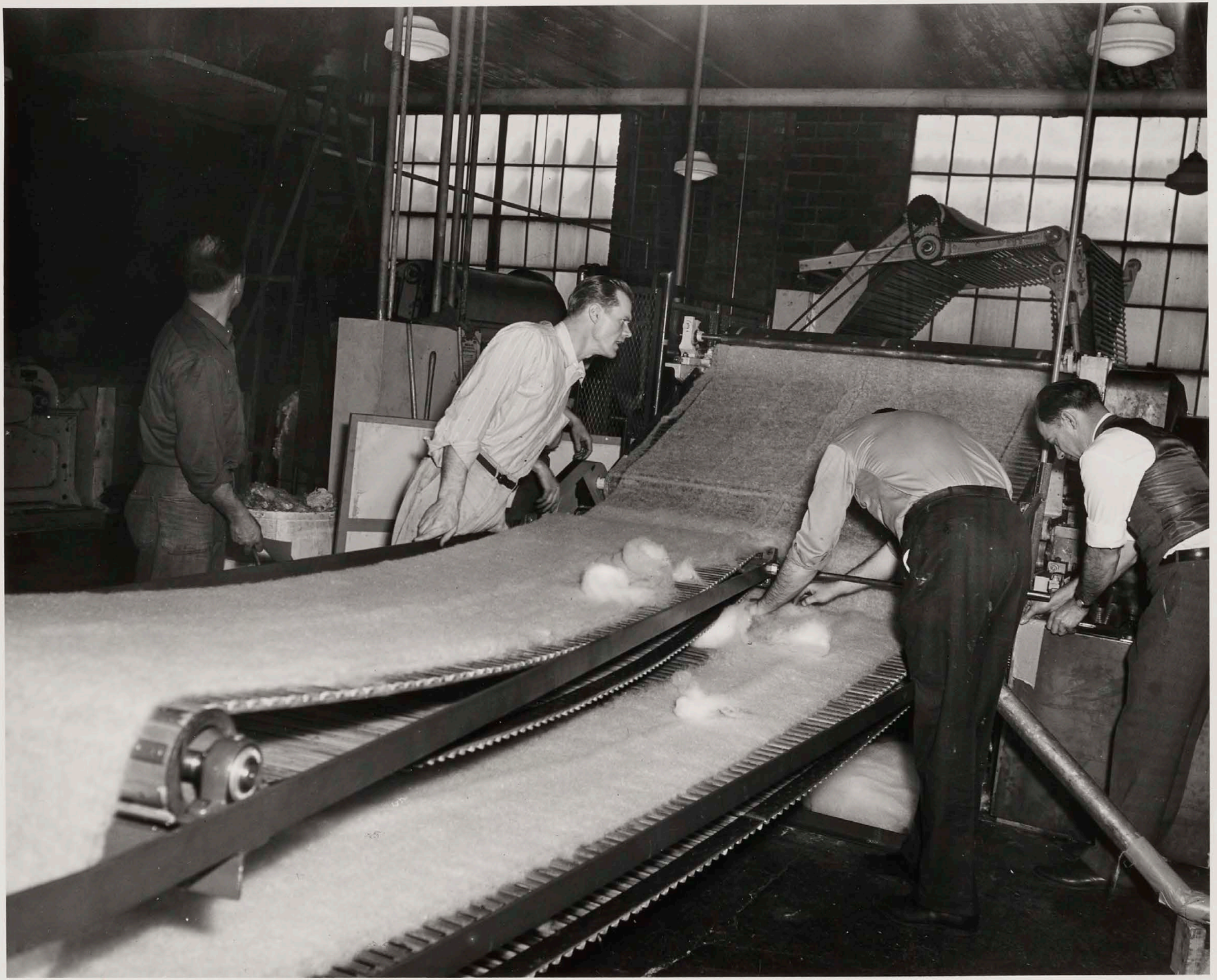

1944-45

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MINNESOTA MINING & MANUFACTURING COMPANY

THE ATTACHED CHECK IS IN PAYMENT OF ACCOUNT AS SHOWN BELOW

INVOICE DATE	AMOUNT	DEDUCTIONS	REMITTANCE
Per agreement			1.00

INVOICE DATE	AMOUNT	DEDUCTIONS	REMITTANCE
For your Records			

PAYEE SHOULD DETACH AND RETAIN THIS STATEMENT

(6) It is further agreed by and between the parties hereto that this Agreement is executed, delivered and accepted as a substitute in toto for a certain agreement relating to inventions, which was executed and delivered by me to said Company on the 28 day of Oct., 1943, as of the date of said last mentioned agreement. (This paragraph to be crossed out if no previous agreement was signed by employee).

Signed and sealed at St. Paul (City), Minn. (State),

this 10 day of Sept., A. D. 1945.

Alvin W Boese (SEAL)
Employee's name

Birchwood, White Bear, Minn
Employee's home address

This instrument was on the day above written signed by the above-named employee in our presence, and we have signed our names hereto as witnesses in his presence and in the presence of each other.

Ralph J. Oas residing at 1133 Ripley St Paul, Minn

E. F. Michl residing at Birchwood, White Bear, Minn

Approved by the aforesaid Minnesota Mining & Manufacturing Company at ________ (City), ________ (State), this ____ day of ________, A. D. 19__.

MINNESOTA MINING & MANUFACTURING COMPANY

BY R. P. Carlton
President or Vice President

ATTEST:

John L. Connolly
Secretary

JWB.

4 453

AGREEMENT

WHEREAS, Minnesota Mining & Manufacturing Company, a corporation of Delaware, with its principal office at Saint Paul, Minnesota, is a manufacturer of coated abrasives (i. e. sandpaper, abrasive discs, abrasive belts, etc.), adhesive tapes (especially pressure-sensitive adhesive tapes), colored roofing granules, rubber cements, and certain other products, and has accumulated much valuable information in respect thereto not generally known, including technology, manufacturing procedures, formulae, machines, trade-secrets and/or know-how and/or uses or adaptations thereof; and

WHEREAS I am desirous of gaining and/or maintaining employment with said Minnesota Mining & Manufacturing Company, as a necessary incident of which I expect to acquire much of said information, in confidence, from said Company and/or from its agents, employees or records;

NOW, THEREFORE, IN CONSIDERATION of One Dollar, the receipt whereof by me is hereby acknowledged, and of my employment and/or continued employment, and the payment of salary to me therefor, by said Minnesota Mining & Manufacturing Company during such time as may be mutually agreeable to myself and that Company:

(1) I hereby assign and agree to assign to said Company, all my rights to inventions, improvements and ideas which during the period of my employment by said Company or its predecessor (Minnesota Mining & Manufacturing Company, a Minnesota Corporation) and during a period of two (2) years after the termination of my said employment hereunder, have been or may be made or conceived by me either solely or jointly with others, (including, but not limited to, all my right, title and interest in and to all applications for Letters Patent of the United States and countries or jurisdictions foreign thereto, which I may have filed heretofore or which I may file hereafter, during the period of my said employment or within two (2) years thereafter, and any Letters Patent which have been or may hereafter be issued thereon,) relating to abrasives, adhesives, adhesive tape, rubber cements, roofing granules, beaded signs or reflector sheet material, pigments, synthetic resins and Beater Treatment, Fibre Spinning, Mistlon, Gaskets and/or packing material,* and the production thereof, and to any other subject matter with which my work during said period of my said employment may have been or may be concerned.

(2) I further agree that I will, without charge to said Company, (except the continued payment of my salary during the term of my employment), but at its expense, execute, acknowledge and deliver all such further papers, including applications for patents, and that I will perform such other acts as I lawfully may, as may be necessary or advantageous in the opinion of said Company or its Counsel, among other things to obtain or maintain patents for said inventions in any and all countries, and to vest title to said patents, inventions, improvements and ideas, whether patentable or not, in said Company; and

(3) I agree that records of research, technical data and the like, prepared by me or which comes into my possession during my employment by said Company are, and remain the property of said Company and, if and when my employment by said Company shall terminate, said records, technical data, etc., shall be left with said Company, as a part of its property, secret information and/or records.

(4) I further agree that I will not divulge to others any information I may obtain during the course of my employment relating to the formulas, processes, methods, machines, manufactures, compositions, trade-secrets, ideas, improvements or inventions belonging to said Company, whether developed by me or not, without first obtaining written permission from said Company so to do. In no event shall I enter the employ of, or act in a consulting capacity for, or otherwise directly or indirectly perform services for any person, firm or corporation engaged in, or about to become engaged in the manufacture and/or sale of coated abrasives, adhesive tape, rubber cements, roofing granules, reflex reflector sheeting or Beater Treatment, Fibre Spinning, Mistlon, Gaskets and/or packing material* within one (1) year from the date of termination of my employment by or with said Minnesota Mining & Manufacturing Company.

(5) I agree that all of my obligations under this contract shall inure to the benefit of Minnesota Mining & Manufacturing Company, its successors and assigns.

**Blank to be appropriately filled in or else crossed out to suit individual case.*

(OVER)

1950 RW – 42# average (150 denier yarn)
TS – 30# average

Fastness – six fast colors added – 15 hrs.
balance from basic dyes – 5 hrs.

1951 RW – 45# average
TS – 32# average
Burgundy added
Fastness – nine more fast colors added – 15 hrs.
balance from basics – 5 hrs.

1952 RW – 47# average
TS – 35# average

Fastness – hot dyed Red + Green introduced – 40 hrs.
Better Tones from basics – 5 hrs.
balance fast colors – 15 hrs.

1953 RW – 50# average
TS – 38# average
Seven new colors added
Fastness – 10 fast colors – 15 hrs.
1 basic color – 5 hrs.
11 hot colors – 15 hrs. to 60 hrs.

1954 RW – 50# average (300 denier yarn)
TS – 38# average
Silver added
Fastness – all hot colors – fastness from 15 hrs to 60 hrs.

1955 Estimate RW – 47# average
TS – 38# average
Blacks added
Fastness – all hot colors – fastness from 15 hrs. to 60 hrs.

"Mistletoe"	1946	2½ ply	25# RW	TS - 7.5# average
	1947	✓ (2" mortise)	✓	TS - 9# average
	1948 - 1949		35# RW (Derailyed + waxed)	TS - 11.5# average

Jacolaine

Newfibers

Brooking

wide band

twin

ribbon

others

Trying to find volume item

narrow decorette   new item 1955

1 lab fruits ~~[illegible]~~ new products
develop & ~~[illegible]~~
2 establish & maintain
3 improve lab products

Ashcan

Making problem end of 1954 –

Color matching
New colors developed from various ideas
tested in laboratory with papers
Lite fastness – clean colors – true shades
working toward exact matching

Raw materials
Quality
development – lab. (conception of product) certain qualities in original product
establish · lab & sales what is wanted what competition have
Maintain or Control · Lab · sales · production (improved cost)
& improve

we establish or these factors as for a quality ribbon
· Fryability
· tensile & knot tie
· correct color
· long color life
· crush resistant

New products

Diversification of products

Our continuing battle shear & tensile flocked patterns

1949

at this point lab functions as production as well as research

50 sewing machine bobbins 10¢ fine tooth comb. March 1st

8" production May.

14" " Sept.

several hundred thousand yds
~~750,000~~ yds.

DIVISIONS WHICH USE AND/OR SELL NON-WOVENS

1. AC & S Division - Adhesive Reinforced Web

   We have been sent literature and are expecting samples. Received

2. Coated Abrasives and Related Products Div. - Polishing Web

   We are expecting both literature and samples. Received

3. Electro-Production Div. - Spacer Web. splice bit (P-3 Spacer Tape)

   Have received nothing here

4. DM & S Division - Fibermat Products

   Have received literature

5. Printing Products Division - Dampner Roll Cover

   Have received both

6. Nuclear Products Dept. - Anti-static Web Wipe

   Have received both.

7. Industrial Specialties - Scochply

   Received both.

Other Divisions Bringing their Own

1. Industrial Tape
2. Commercial Tape and Gift Wrap Div.

? Divisions

Building Service and Cleaning Products Div.
Duplicating Products Division - Press Pad on 209
Paper Products Division - Empor
Consumer Products Division

NON-WOVENS WITH TRADEMARKS

Aseptex

Carnival

Coban

Decorette
Empor

Fibremat

Filtron

Insta-Lok

Iso-Drape

Lacelon

Littmann -
ECG Gel Pads

Magic Bow

Micropore

Microdon

Mistlon

Rescue

Sasheen

Scotch-Brite

Scotchply

Steri-Strip

Vetrap

MEDICAL PRODUCTS MADE WITH NON-WOVENS

Micropore
Coban
Iso-Drape
1800 Mask
Steri-Strip
Microdon
Micropad
Opticlude
Filtron
Vetrap

card with p

1 Ribbon making

Acetate

Fashion brand ribbon is made from acetate staple fiber, Viscose staple fiber and continuous filament acetate yarn

The process briefly is as follows

If you will look at this card you will see small tufts of fibers that resemble cotton or wool.

1 Acetate fiber

This fiber is thermoplastic or softens with heat and is the adhesive which holds the ribbon together

This fiber is relatively weak

2 Viscose fiber

This fiber or the backing is not thermo; and is relatively strong. It gives strength and toughness as well as dyability to ribbon

3 [redacted] Mistlon

This is the backing for ribbon which is formed on a garnett machine & heat pressed

A garnette machine is composed of large rollers with upright teeth that comb and mix the fibers and produces then at the end of the machine in a fuzzy sheet.

This sheet is passed over a heated roll which softens the acetate fibres and unifies the web.

4 Acetate filament

That threads of course form the satiny surface as well as give body and tensile strength to the ribbon

The yarn comes on huge spools 60 in. width and each spool contains 480 threads 27,500 yds long

4 spools or beams are mounted on a rack the yarns aligned and position in comb & form a smooth surface and this yarn bed as we call it is passed over a hot roll with the

2

previously formed backing. The acetate fibers in the backing are again softened and bond the yarns to the backing.

This web then passes into a dye and finishing solution is dried and then wound up ready for the slitter

The material is then slit to width using heated knives which seal the edges ~~of~~ and shields applied & packed

90% acetate
10% Viscose

History evolution of product

In 1940 the ~~author~~ was assigned the project in in the tape laboratory of making synthetic papers. After a years work it was determined that ~~paper~~ the properties of synthetic fibers would not allow ~~making equipment would not meet the demands of the properties~~ unified webs to be formed by the conventional methods used for natural fibers ~~[illegible]~~.

A machine made of revolving brushes was developed which did a fair job of forming fibrous sheets which were than sprayed with adhesive to bond. It was slow & cumbersome.

Than we found that the problem of dry spreading fibers was not new. In fact the textile industry was based on equipment such as we needed the development of which was superior to ours several thousand years ago.

We bought a small sample card and from this we 10" piece of equipment our production dyelations

Various sheeted products were evaluated without finding any of exciting need. Than in 1944 webs were slit into narrow strips for some purpose and the that of ribbon developed.

Here you see the 1st marked ribbon 200 rolls. The design was drawn by myself obviously no artist and hand cut from a rubber roll and printed on a make shift piece of lab. equipment.

In the begining of 1945 the war on its way to end and raw materials loosening up and we decided on a trial ribbon

tensile 3.5 lbs.

Laboratory responsibility + function in Division

I would like to start out first outlining the general function and responsibilities of a laboratory.

A laboratory has three main functions which of course can be broken down into infinite detail

we work with sales much to help make their practicable — between sales + production

1. Develope new products

2 Establish and maintain quality

3. Improve established products + reduce cost waste

You can see from these functions that the laboratory has responsibilities to both sales and manufacture

New products you need

Quality of course is determined by competition and the the demands put to you. In this function the ribbon will meet the demands of the market by your bringing back to us quality problems and improvement suggestions

New products

A group in the laboratory is continually working on new products.

We have set part of our course to broaden the department into industrial uses.

A series of new non woven products which show great promise in the electrical field because of their properties and also indicate many other industrial uses such as coated fabrics.

I will pass this card which will show you examples.

Muslin products

Several new lines of ribbon are in a preliminary stage of development & show promise and may be ready for testing this year.

We intend to have two embossed patterns ready for testing this year -

These samples illustrate the pattern
They will be in various color combinations

Printed designs

Cost of new designs & products

(Ribbon is living color design continually changing subtractions addition changes will continue)

Better surfacing characteristics of fabrics

leaders Embossed we donot know any other ribbon which has embossed

Xmas everyday

narrow decorette
problem in winding

Lab + Eng Factory

Raw material saving 10%

waste reduced 35%
Factory down time 25%
new products

narrow down methods
pilot

your increase in sales will speed up lab work by
increased staff.

1957

less variation color

By developing a product you start with certain qualities — It is put on market and analyzed

Quality — Improved silver Brown

1 Establish what good quality is.

(a) By testing for known applications

(b) Comparing with competitors

(c) Your comments received from your accounts as to what they want & expect a rubber to do.

2 Maintain quality

Quality Control

Raw materials

. Continually looking for new & better dyes that will give us better fastness to light & gas & crocking better & cleaner colors and to reduce the variation in color.

Slight changes in color are made from time to time to better match current papers and follow the style trends

We continually scan the current papers and competative ribbons

. Also we follow colors thru the fashion fields including French & Italian color forecasts

We continually seek to improve our fiber quality and reduce costs. Also we try to keep the qualities of our ribbon superior to any competition

[redacted]

All dyes are checked for color depth & uniformity on a spectrophotometer which is the most modern and up to date instrument for this work

All fibers are checked to our standards

[redacted]

Plant inspection

At least 4 inspections of ribbon take place

Operator
Making foreman
Quality supervisor
slitter operator & foreman
packer

Also a test roll from each 2000 yds of material comes to laboratory for check

physical qualities   Sashum

Caliper .006

Ten. 40 lbs per width

Knot tie 20 lbs per in width

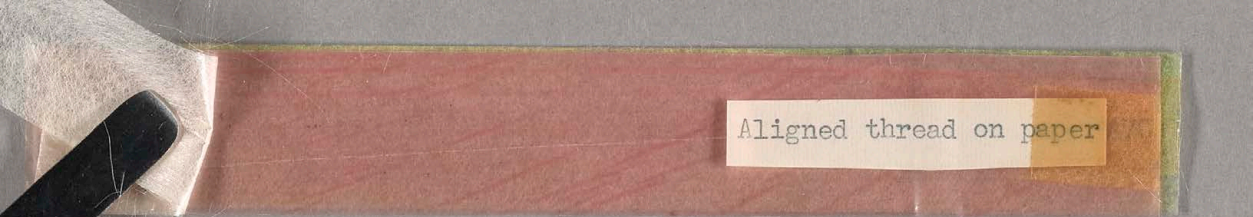
40 ends of yarn per 1" width

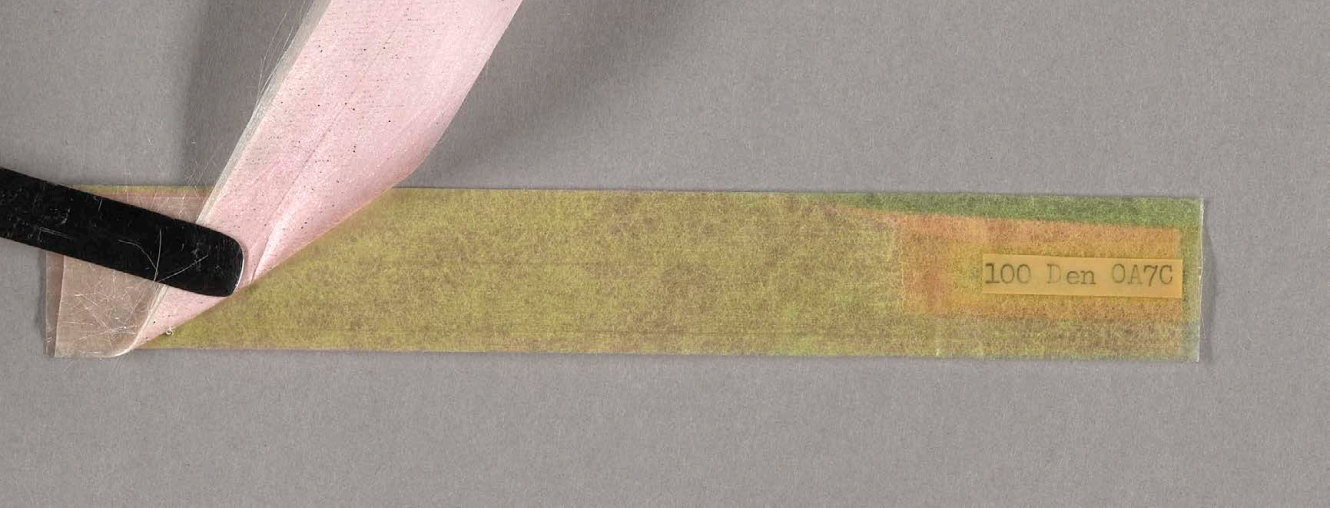
red

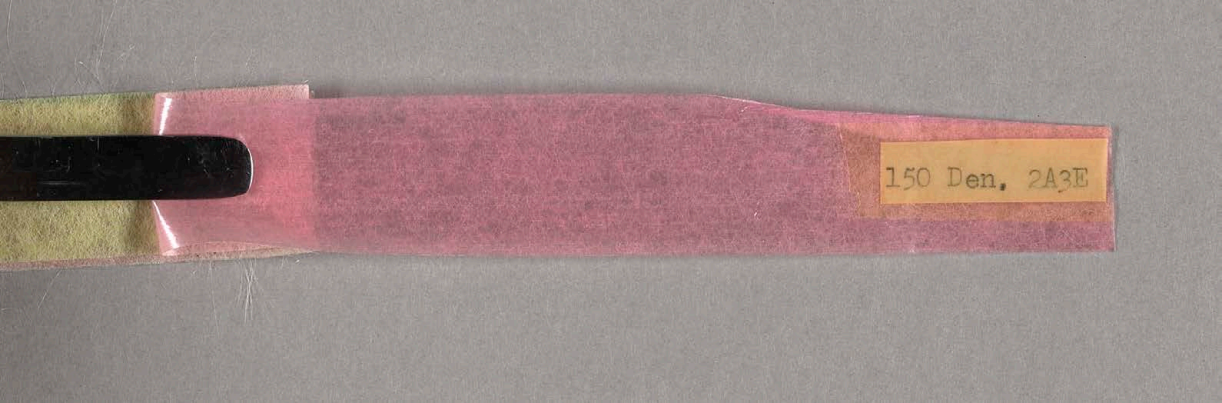
Narrow
decorette
same as 1/4" type tyl

lo sheen

Den. no resin CF297 Lot 1


Aligned thread on paper


100 Den 0A7C


150 Den. 2A3E

HF File copy

May 12, 1950

MR. ROBERT COULTER
Carpenter, Abbott, Coulter & Kinney
900 Fauquier Avenue
St. Paul 6, Minnesota

Dear Mr. Coulter:

Under CF 247 an experiment was set up to study and make a non-woven ribbon material which would have aligned threads laminated to a "Mistlon" backing. This construction was expected to result in a material of superior tensile strength and very high sheen when compared to "Mistlon" ribbon.

It was found that a material of this type has the following characteristic improvements over competetive products such as satin ribbon, Facil-Fab., etc.

1. A collapsible sideways structure so that is is possible to tie a small tight knot which will not slip.
2. A resiliant but crush-resistant "hand".
3. Non-puckering when looped or tied into a bow.
4. The non-slip surface contributed by the "Mistlon" on the back of the ribbon helps to hold the loops in place when tied into a decorative bow.

The idea of developing a unified structure through heat bonding evolved out of my Carfab report 58 in which the thought of aligning threads and heat bonding areas to make a ribbon without a backing was given.

Our process is briefly outlined below:

Tricot spools with 1000 ends are mounted one above the other on a rack. The yarn is 150 denier, low twist, bright acetate, 41 filament. A comb containing 15 dents to the inch is mounted in front of each Tricot beam. The tape holding the ends of threads on the spool is lifted from the spool, carrying the ends. The tape is carried beyond the comb and carefully dropped, the threads distributing themselves evenly without counting into the openings between the teeth. After the threads of both spools have been handled in this manner, they are counted into a single 15 dent per inch finishing comb as follows:

The threads from each beam are counted, starting from the end or side of the spool and comb. Spool 1. (lower spool) Three ends are placed in first dent and two in second, alternating until all threads are placed. Spool 2. The count used on spool one is reversed; that is, two are placed in first dent with three from spool 1, three in second dent with two from spool one, etc. This method of threading into the comb allows an even control of the tension across the spools. The space occupied by the threads in the final comb is approximately 26⅔ inches, or 75 threads per 1" width.

After the threads pass through the comb, they are carried over a series of smoothing or spreading bars to flatten and even them out. The threads pass over the first bar, break down sharply, and under the second. They break up sharply, and pass over a third bar. The fourth bar is mounted on a level with the third, the threads passing underneath. After the smoothing bar setup, the threads pass in a sheet over a 5" steel roll which is covered with a minimum of five layers of glass cloth. This roll is to hold the combined

thread and backing against the hot bonding drum, the temperature of which is about 385°F. The purpose of the glass cloth is to give a resilient non-sticking surface.

At this point, the "Mistlon" backing is brought down from a roll mounted over the drum and is passed onto the heated drum at the nip of the glass cloth covered roll over which the sheet of threads pass. The "Mistlon" backing and threads meet at this nip with the backing between the hot drum surface and the threads. The pressure between the glass covered roll and the bonding drum is regulated to press the threads against the backing to the point of bonding. The pressure is of a nature to insure complete contact of the combined threads and backing to the hot drum without being great enough to "film" the threads or to flatten out the fibers in the backing to the point where the Viscose fibers cut through the plasticized acetate fibers, thereby lowering the tensile strength and also making a brittle structure.

The heating-bonding drum has a diameter of approximately 20". The thread and backing combination pass around the underside of the drum for about two-thirds the distance, or about 40".

During this period while passing around the bonding drum, the backing becomes hot and a small amount of plasticizer boils off. This plasticizer as it seeps through the threads seems to cause a slight softening of the surface of the threads, and when the hot material is subjected to the pressure of the final press roll (after which point the fabric leaves the drum), a bonding of the thread to the backing takes place. After the web leaves the drum, an air jet cools it and it passes into a dip tank and through squeeze rolls. A Vinyl resin solution containing the dye is applied in the dip tank, the squeeze rolls removing the excess. The temperature of the dye tank is

maintained below 88°F. For drying, the material is festooned in an oven at about 150°F.

It then passes into an overhead duct for about 50 feet. After coming out of this duct, it is passed over and under two heated drums at about 165°F. to iron it out smoothly.

The finished material is then wound into jumbo rolls for slitting.

Our preferred backing is a carded web made from a mixture of plasticized acetate rayon staple fiber (in a proportion of 60%) and viscose rayon staple (40%). (This fiber mixture gives a satisfactory bond while retaining workability in the finished ribbon due to the free movement of the viscose fibers.) The acetate fibers are 3 denier, 1½" staple Plasteca produced by Tennessee Eastman Corporation. The viscose fibers are 1½ denier, 2" staple Avisco produced by American Viscose Company.

Briefly, the backing is formed as follows: The acetate and viscose fibers are weighed in correct proportions and laid in layers on a canvas apron. The apron carries the sandwich of fibers into a picker where opening and blending takes place. From the picker, the fiber mixture is elevated to the feed hopper of the garnet machine. The garnetting and unifying of the web is identical to the old "Mistlon" process except that the bond is somewhat lighter.

The viscose fibers are used in the backing to give crossvise strength and to keep the fabric from becoming too crisp in the subsequent unifying process when the threads are applied with additional heat and pressure. The softer press of the backing material also aids in preventing a harsh, stiff "hand" in the unified fabric and preserves its true ribbon quality.

Several variations of backings could be used in our heat bonding method of unification. For example, a paper made from mixtures of acetate fibers with viscose or other filler fibers might be employed. This material could

be treated with an alcohol solution of a plasticizer for acetate, dried, and then substituted for our regular backing. Another possibility is that a non-thermoplastic cloth or paper might be impregnated with either a plasticizer or high boiling solvent for acetate and unified to the aligned threads by heat and pressure.

Some form of cementing of the threads to the backing material would be another method of manufacturing this ribbon product. For example, plasticizer or solvent might be used as a cold bonding agent on a woven fabric, a non-woven fabric, or a paper backing to hold the threads. Numerous resin preparations also would suggest themselves for this purpose.

However, the preferred backing, as described above, produces a ribbon with many advantages, the greatest of which is the cloth-like texture due to free movement of viscose fibers in the acetate lattice.

The selection of thread used is governed by two main factors; quality in the finished web and economics.

The yarn used in our process is manufactured by the American Viscose Company and is described as follows: 150 denier, 41 filament, low twist acetate yarn. As a matter of comparison, I am attaching a sample of ribbon made with 100 denier thread and one made with 150 denier thread. The actual weights of the ribbons are approximately 36.5 lbs. per ream for the 100 denier and 43.5 per ream for the 150 denier. You will note the general flimsiness of the 100 denier as compared with the 150 denier. For the purpose of ribbon or decorative fabric, this is undesirable. On the other hand, there may be uses such as wire or cable windings where the lighter denier would give lower caliper material which would reduce bulk and hence be desirable.

From a process viewpoint, the variation in denier size of the aligned threads or the weight of the backing is not a problem, the choice being one of quality or economics in the final product.

By arranging combs and Tricot spools both above and below the "Mistlon", a sheet of threads can be applied to both sides of the backing which then acts as a core.

The temperature and pressure at the bonding drum can have a tremendous effect on the quality and properties of the material produced, notwithstanding the importance of the backing weight and thread size. That is, a high pressure and high temperature would make a hard smooth sheet approaching a film. A low pressure and temperature would be the reverse and give a soft textile-like material, loosely bonded. Either could be useful for particular purposes. In other words, we use relatively narrow ranges of temperature and pressure to produce ribbon stock material with the desired texture. The temperature range we use for ribbon stock is from 385°F. to 395°F. The pressures are:

Initial press roll (per inch of width) 2# to 6.2#
Final press roll (per inch of width) 3.5# to 8#

It was determined that a material having a combined weight of raw materials between 40 and 50 pounds per ream of 320 square yards gave ribbon material of satisfactory quality. This range of weights was chosen after making, examining, and testing a series of experimental ribbon runs using varied thread and backing weights. We decided on a backing weight of from 12 to 14 pounds and an aligned thread weight of 28 to 36 pounds. Dye and resin add approximately one pound per ream to the weight of the finished material.

Alcohol soluble dyes were chosen to color this material because of their brilliance and ease of handling. Very early in our work, it was noticed that the dye solutions had a tendency to loosen the threads from the ribbon backing. To prevent this, an alcohol soluble resin was added to the dye solutions. In addition to preventing loosening of the threads during dyeing, the resin in solution produces bonding between adjacent or overlapping threads and imparts some water-repellancy to the material.

After you have had a chance to study this report, we will be glad to cover any points raised and to secure whatever additional information is needed to prepare a patent application.

Very truly yours,

AWB:dj

A. W. Boese

cc: Dr. B. J. Oakes
Mr. B. E. Frank

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS, INC.

October 16, 1951

Mr. Alvin Boese
Minnesota Mining and Manufacturing Company
St. Paul, Minnesota

Dear Al:

During my recent pleasant visit with you, we discussed the proposition that I presented to you concerning the delivering of a paper regarding your development of Mistlon, to the American Association of Textile Technologists.

As I told you, we of the Association would be most pleased to have you present this talk, and I am sure that you and your company would certainly benefit by presenting a technical discussion concerning your product to the leading textile technologists of the textile industry.

If you could review this whole development, beginning with the birth of the idea through to the technical problems and end use applications, such a presentation would be of deep interest to all of us.

With kind personal regards,

Sincerely yours,

George

George H. Hotte
President

GHH/ehh

23.22
30.77
53.99

81.8
53.99
27.19

TELEPHONE
JUdson 6-2626

CABLE ADDRESS
LUSTFIBRES, NEW YORK

LUSTRE FIBRES, INC.

600 FIFTH AVENUE

NEW YORK 20, N. Y.

RD/mvd/56 February 20, 1952.

Mr. A. W. Boese
Minnesota Mining & Manufacturing Co.
900 Fauquier Avenue
St. Paul 6,
Minn.

Dear Mr. Boese,

Our friends in England who, as you probably know, are about to launch non-woven fabrics into the British market are interested in hearing about the present policy of American manufacturers of non-woven fabrics as regards publicity, and have asked me to ascertain what sort of advertising is being done on non-woven fabrics at the present time.

I cannot recall having seen recently any advertisements in the trade papers in regard to non-woven fabrics, but it is possible that I have missed them. I wonder whether it will be possible for you to let me have a copy of any advertising matter which you have issued recently.

If you have not done any advertising it will be interesting to know why not, and what form of publicity, if any, has been and is being used.

I would appreciate any help you can give.

Yours very truly,

LUSTRE FIBRES, INC.

R. Dunford

Textile Daily Record, May 9, 1952

Bonded Fabric Due Shortly In New Effects, AATT Told

Bonded fabrics in striped, printed and embossed effects are expected to be ready shortly, A. W. Boese, Minnesota Mining & Manufacturing Co., told the May meeting of the American Association of Textile Technologists last night at the Builders Club.

Use of bonded fabric in narrow widths, either twisted or in ribbon form, by fabric designers for texture or decorative effects also was suggested as a possibility by Mr. Boese, who traced the 15-year history of this industry and outlined the various methods of manufacture and dyeing and the properties of the resulting fabrics and various end-products.

The wide range of variation easily possible in production of the fabric to meet specific end uses was emphasized by Mr. Boese, who showed numerous samples to illustrate his points.

Garment Use Foreseen.

Ribbon material is to be made wider than the present 1½-inch widths shortly and will embody the effects mentioned above, the speaker noted. While none of these goods are presently being used in garments except as diapers or costuming, he foresaw such a possibility if new high-strength fibers were used with improved spreading to increase cross-strength.

Dye Method Told.

Discussing the dyeing of the materials, Mr. Boese continued:

"Our first really successful continuous method of dyeing and finishing this material was to run two or three jumbo rolls at a time, with the webs stacked, through a cold aqueous-dye solution containing a mixture of direct dyes, dispersed acetate dyes and wetting agents. Excess dye liquor was removed by a set of squeeze rolls, and the webs were then run through an enclosed flue with an atmosphere of steam and air at about 180 degrees F. Following the steaming operation, the material was subjected to two washes, a squeeze to remove as much wash water as possible, and drying by means of hot air.

"During these processes, light to moderate tension was maintained on the webs, and after drying, the layers were separated to produce individual jumbos again. By this process we dyed much of our early "Mistion" brand ribbon and all of our lightweight window display materials.

"We found that uniquely decorative fabrics could be produced by introducing various materials, for colored or metallic flecks directly into the garment operation, thereby getting relatively even distribution with just enough variation to produce a custom effect.

Effects of Stretching.

"Soon after we started the pad-steam method of dying outlined above, it was observed that greater tension applied to the material stretched it in the machine, or longitudinal, direction and at the same time reduced its width. The result was a material of higher weight and greatly improved strength and sheen. Apparently the network of bonded acetate fibers was stretched in length and reduced in width, allowing the viscose fibers to slip within the network and become better aligned. This improved alignment of the viscose fibers resulted in the increased strength and better sheen.

"The fabric we marketed as ribbon made by this process weighed approximately 11 pounds per 100 square yards. Tensile strength was 10-13 pounds per 1-inch width LW. This type of fabric has very good drape and many other interesting properties. If the fabric is pulled in a tranverse direction it will stretch some 30 to 35 per cent without fiber separation.

To Resume Output Soon.

"By applying tension longitudinally, the fibers assume their previous relationship, and the web does not show any disruption. At the present time we are not manufacturing this type of fabric, but we plan to resume activity in marketing these fabrics again in the near future. They have shown desirable qualities for such uses as drapery materials, place mats, napkins, aisle cloths for weddings, display fabrics and many others."

The speaker added that much of the ribbon material dyed by this method was also made water- or flame-resistant by padding the washing and drying.

Bonded Fabric Due Shortly In New Effects, AATT Told

Bonded fabrics in striped, printed and embossed effects are expected to be ready shortly, A. W. Boese, Minnesota Mining & Manufacturing Co., told the May meeting of the American Association of Textile Technologists last night at the Builders Club.

"Use of bonded fabric in narrow widths, either twisted or in ribbon form, by fabric designers for texture or decorative effects also was suggested as a possibility by Mr. Boese, who traced the 15-year history of this industry and outlined the various methods of manufacture and dyeing and the properties of the resulting fabrics and various end-products.

The wide range of variation easily possible in production of the fabric to meet specific end uses was emphasized by Mr. Boese, who showed numerous samples to illustrate his points.

Garment Use Foreseen.

Ribbon material is to be made wider than the present 1½-inch widths shortly and will embody the effects mentioned above, the speaker noted. While none of these goods are presently being used in garments except as diapers or costuming, he foresaw such a possibility if new high-strength fibers were used with improved spreading to increase cross-strength.

Dye Method Told.

Discussing the dyeing of the materials, Mr. Boese continued:

"Our first really successful continuous method of dyeing and finishing this material was to run two or three jumbo rolls at a time, with the webs stacked, through a cold aqueous-dye solution containing a mixture of direct dyes, dispersed acetate dyes and wetting agents. Excess dye liquor was removed by a set of squeeze rolls, and the webs were then run through an enclosed flue with an atmosphere of steam and air at about 180 degrees F. Following the steaming operation, the material was subjected to two washes, a squeeze to remove as much wash water as possible, and drying by means of hot air.

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"By applying tension longitudinally, the fibers assume their previous relationship, and the web does not show any disruption. At the present time we are not manufacturing this type of fabric, but we plan to resume activity in marketing these fabrics again in the near future. They have shown desirable qualities for such uses as drapery materials, place mats, napkins, aisle cloths for weddings, display fabrics and many others."

The speaker added that much of the ribbon material dyed by this method was also made water- or flame-resistant by padding the washing and drying.

Textile Daily
Record
May 9 - 1951

W. C. SCHILLING, PRESIDENT
E.L. FITZGERALD, GENL. MANAGER
JOHN ROSS, FACTORY MANAGER

"OUR 41ST YEAR"

DIANA MANUFACTURING CO.

FOUNDED IN 1911

GREEN BAY, WISCONSIN

SANITARY NAPKINS

- COMFIES
- DOWNIES
- QUEENS • MEDIX • MAYFAIR • • HOSPITAL PADS • • CUSTOMER'S PRIVATE BRANDS •

June 16, 1952.

Minnesota Mining & Mfg. Co.,
900 Fauquier Ave.,
St. Paul 6, Minn.

Gentlemen:

I understand that your Mr. Boese recently made an address in New York on Non-woven Fabrics.

I would like to secure a copy of this address and am wondering if you could give me any information as to where I might secure a copy of the same.

Your cooperation would be appreciated.

Yours very truly,

John L. Ross

John L. Ross,
Factory Manager.

JLR:BH

July 21, 1952

Mr. John L. Ross, Factory Manager
Diana Manufacturing Company
Green Bay, Wisconsin

Dear Mr. Ross:

Thank you for your letter of June 16 referring to my paper on Non-woven Fabrics. The delay in answering is caused by not having copies available at the time; however, I am now sending you a copy of the paper and hope you will find it interesting.

Please give my regards to Mr. Schilling, you may recall that I visited him several years ago.

Yours very truly,
MINNESOTA MINING & MANUFACTURING COMPANY

AWB:jm

A. W. Boese, Products Manager
Satin Ribbon Laboratory

August 27, 1952

Mr. Gerald K. Lake, Sales Manager
Burlington Mills
Empire State Building
350 Fifth Avenue
New York 1, New York

Dear Mr. Lake:

This is in answer to your letter of July 24. I am sorry I did not have the opportunity to get in touch with you in New York, and hope that on my next trip we will be able to get together at least for a few minutes.

With regard to your problem of using synthetic fabrics for abrasive backings, I have discussed this with Mr. George Netherly, Director of Research of our Abrasive Division, and he will be most happy to co-operate with you. I would suggest that you write Mr. Netherly directly on this matter, and I will turn your letter of July 24 over to him for whatever comments he may care to make on this question.

With best personal regards.

MINNESOTA MINING & MANUFACTURING COMPANY

A. W. Boese, Products Manager
Satin Ribbon Laboratory

AWB:jm
cc: C. C. March
G. P. Netherly

July 21, 1952

Mr. Gerard K. Lake, Sales Manager
Burlington Mills
Empire State Building
350 Fifth Avenue
New York 1, New York

Dear Gerard:

I enjoyed receiving your letter of May 22 and the splendid introduction you gave me at the A.A.T.T. meeting. I have passed on to Dr. Sohl your regards, which he returns.

I plan on spending a busy week in New York from July 21, but will at least call and say "Hello".

Best personal regards.

MINNESOTA MINING & MANUFACTURING COMPANY

AWB:jm

A. W. Boese, Products Manager
Satin Ribbon Laboratory

Bur-Mil QUALITY T. M. REG.

Burlington Mills

CORPORATION OF NEW YORK

EMPIRE STATE BUILDING, 350 FIFTH AVENUE, NEW YORK 1, N. Y.

INDUSTRIAL AND DIVERSIFIED FABRICS DIVISION

LONGACRE 4-5000

May 22, 1952

Mr. A. W. Boese, Products Manager
Minnesota Mining and Manufacturing Company
900 Fauquier Avenue
St. Paul 6, Minnesota

Dear Mr. Boese:

It was certainly a privilege to introduce you at the last meeting of the A.A.T.T. I enjoyed the question and answer period enormously because, in fact, I knew almost nothing of the subject and, thanks to you, got a real education.

Since that time I have switched my job from developing functional fabrics for Pepperell over to selling them for Burlington. However, while the difference between a Director of Research and a Sales Manager would appear to be notable, actually the chief difference between my old job and my new one is a difference of scope and emphasis.

I haven't found my way around this Division at Burlington Mills as yet, but I have a hunch that over the next year we are going to have a lot of problems in common and certainly hope to see you in the Twin Cities before the year is out.

If there is anything that you or your colleagues think that Burlington can do in the way of developing functional industrial fabrics from any of the new fibres, I know that you won't hesitate to drop me a line. I understand that Burlington and Minnesota Mining are already working together on the use of your metalizing process on nylon shoe fabrics. I hope that this can be expanded so that instead of Minnesota Mining serving us, we can serve Minnesota.

Please give my regards to Dr. Sohl.

Very sincerely yours,

Gerard K. Lake

GKL:lk

Gerard K. Lake

WHO has joined Burlington Mills Corp. (N. Y.) as sales manager of the Industrial and Diversified Fabrics Division, as noted.

September 17, 1952

Mr. A. A. Macdonald
Lustre Fibres, Incorporated
600 Fifth Avenue
New York 20, New York

Dear Mr. Macdonald:

Thank you for your letter of September 12 and the sample of Maroon spun dyed staple. We are very interested in this material.

A purchase requistion is on the way for 25 pounds each of Maroon, Black, and Brown 55 for trial evaluation runs.

Yours very truly,
MINNESOTA MINING & MANUFACTURING COMPANY

AWB:jm

A. W. Boese
Satin Ribbon Laboratory

Minnesota Mining & Manufacturing Company

INTER-OFFICE CORRESPONDENCE

HASTINGS, PLANT # 10

Subject: Technical Topics

December 15, 1952

MR. A. W. BOESE

We certainly want to compliment you on your article in Technical Topics. A mighty fine piece of work.

Congratulations.

W. J. McNamara

elr

Minnesota Mining & Manufacturing Company

INTER-OFFICE CORRESPONDENCE
ST. PAUL, MINNESOTA

Subject: Raw Material Committee
For The Ribbon Division

November 13, 1953

A. W. BOESE
D. J. DAVID
F. W. FISHER
H. H. HALLGREN
W. H. KAYE
L. MIELKE

Effective immediately I would like to set up a Raw Material Committee for the Ribbon Division and I am asking the people to whom this letter is addressed if they will serve on this committee.

I would appreciate it if Mr. Al Boese would be the Chairman of this Committee and suggest that Mr. Boese call a meeting at least once a month. Will Mr. Boese please appoint a Secretary to record minutes of each meeting, and I would appreciate getting a copy of your minutes.

I will sincerely appreciate your serving on this Committee and giving Mr. Boese your cooperation.

Thank you very much.

BAR

A. H. Redpath

/gr

cc: L. W. Brown - Fairmont

November 22, 1954

T. P. O'BRIEN - CINCINNATI

Dear Tom:

Attached is the schedule of our 1955 Ribbon Sales Meetings, which will be held for all of your salesmen Wednesday, January 12th at the Gibson Hotel. Please advise all of your men to arrive in Cincinnati not later than 6 PM Tuesday, January 11th.

Please make all of the necessary hotel reservations for your salesmen, as well as the following personnel from St. Paul:

Messrs. A. W. Boese, C. A. Parsons, C. E. Poole, A. H. Redpath

All necessary equipment for this meeting will be furnished by St. Paul, with the exception of a 16 mm. projector and projectionese, which you will have to rent. This machine and operator should be available on Wednesday, January 12th at 10 AM.

Please invite the Cincinnati Branch Office Manager and any other branch personnel that you think necessary to attend this meeting.

Please arrange for a meeting room and also make reservations for breakfast and lunch for Wednesday, January 12th.

The material necessary for the meeting will be forwarded to the Gibson Hotel, marked for your attention.

If you have any questions or comments, please advise.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

P. S. Please make arrangements to have a photograph made of the salesmen sometime during the meeting.

cc: A. W. Boese - 27-1, C. A. Parsons, A. H. Redpath

November 22, 1954

R. N. CANDY - RIDGEFIELD

Dear Russ:

Attached is a schedule for our 1955 Ribbon Sales Meetings, which will be held for your salesmen in New York City, Park Sheraton Hotel, on Friday, January 14th. Please advise all of your salesmen to attend this meeting and they should arrive in New York on Thursday evening, January 13th not later than 6 PM.

Please make all of the necessary hotel reservations for your salesmen, also for the following St. Paul personnel:

Messrs. A. W. Boese, C. A. Parsons, C. E. Poole, A. H. Redpath

Please arrange for a meeting room and reservations for breakfast and lunch for Friday, January 14th.

All necessary material for this meeting will be furnished from St. Paul and sent to your attention at the Park Sheraton Hotel. You will have to arrange to rent a 16 mm. projector and operator for this machine. This equipment should be available at 10 AM Friday, January 14th.

You may invite the New York Branch Office Manager and other branch personnel you think necessary for this meeting.

The Cellophane Tape Sales Manager should also be invited, as well as Mr. E. R. McLeod.

If you have any questions or comments, please advise.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

P. S. Please make arrangements to have a photograph made of the salesmen sometime during the meeting.

cc: A. W. Boese - 27-1, C. A. Parsons, A. H. Redpath

November 22, 1954

B. E. BELL - DALLAS

Dear Ben:

Attached is a schedule of our 1955 Ribbon Sales Meetings. You will note that we plan to have all of your salesmen meet at the Western Village Hotel, Tulsa, Oklahoma on Monday, January 10th.

We suggest that you notify your men to arrive at Tulsa on Sunday evening, January 9th, not later than 6 PM.

Please make reservations for all of your men, also for the following personnel from St. Paul:

Messrs. A. W. Boese, C. A. Parsons, C. E. Poole, A. H. Redpath

Please arrange for a meeting room and reservations for breakfast and lunch on January 10th.

All equipment necessary for the meeting will be furnished by St. Paul and sent to your attention at the Western Village Hotel, Tulsa, Oklahoma. We would like you to procure a 16 mm. projector and projectioness to run this machine. This should be available at 10 AM, Monday, January 10th. This item can be rented for the time that we would like to use it.

If you desire to invite Mr. O. F. Richardson and our Mr. J. H. Addison to attend this meeting, you may do so.

We will forward you an outline of the sales meeting for each of your salesmen at a later date and this information should be furnished to them at the time of the meeting.

If you have any questions or comments, please advise.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

cc: Please make arrangements to have a photograph made of the salesmen sometime during the meeting.

A. W. Boese - 27-1, C. A. Parsons, A. H. Redpath

November 22, 1954

E. L. HAMMOND - ST. PAUL

Dear Gene:

Attached is a schedule of our 1955 Ribbon Sales Meetings and you will note that we plan to have one meeting for all of your men in your division. This meeting will be held on Friday, January 7th at the Sheraton Hotel, Chicago, Illinois. We would like you to handle all hotel reservations, including personnel from St. Paul, which is as follows:

Messrs. A. W. Boese, C. A. Parsons, C. E. Poole, A. H. Redpath

Please advise all of your salesmen to be in Chicago on Thursday evening, January 6th, not later than 6 PM. You still have one tape salesman - Montana - and we suggest that he attend this meeting, however, you should get clearance with Bob May before making definite arrangements.

Mr. E. C. Nelson and any other personnel you think necessary from Chicago should also attend this meeting. If you desire to invite Mr. R. T. Lowe to this meeting, you may do so. Please include Mr. H. F. D'Haene in your plans, as he has agreed to make the transfer to Milwaukee, effective January 1st. You should notify him regarding the Chicago Sales Meeting.

Please make arrangements for a meeting room and also for breakfast and lunch on January 7th.

All equipment, such as samples will be furnished from St. Paul and sent to your attention at the Sheraton Hotel. The only item that you will have to make arrangements to furnish is a 16 mm projector and projectioness to run this machine. The projector can be rented for the time we would like to use it, and should be on hand not later than 10 AM on the morning of the meeting.

If you have any questions or any comments, please advise.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

P. S. Please make arrangements to have a photograph made of the salesmen sometime during the meeting.

cc: A. W. Boese - 21-1 - C. A. Parsons - A. H. Redpath

November 22, 1954

H. B. LA GRANDEUR - SAN FRANCISCO

Dear Bud:

Attached is our schedule for our 1955 Ribbon Sales Meetings, which will be held for all of your salesmen in your division at the Sir Francis Drake Hotel, San Francisco, California on Friday, January 21st. Please advise all of your salesmen to arrive in San Francisco on Thursday evening, January 20th not later than 6 PM.

The two Cellophane Tape Salesmen in Arizona should be invited to this meeting through Mr. H. R. Long. Also we suggest that you invite the San Francisco Cellophane Tape Sales Manager, branch Office Manager and any other branch personnel in San Francisco which you think necessary.

Please make all necessary hotel reservations for your salesmen, as well as for the following personnel from St. Paul:

Messrs. A. W. Boese, T. E. Phillips, C. E. Poole, A. H. Redpath

Please make arrangements for a meeting room and also reservations for breakfast and lunch on January 21st.

All necessary equipment will be furnished from St. Paul for this meeting and sent to the Sir Francis Drake Hotel marked for your attention. You will have to procure a 16 mm. projector and operator on a rental basis. This machine should be available at 10 AM, January 21st.

If Mr. Child accepts the San Antonio Ribbon Territory, he should attend Mr. Bell's Sales Meeting, which will be held at Tulsa, Oklahoma on Monday, January 10th.

If you have any questions or comments, please advise.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

P. S. The reason we are having your meeting on Friday, January 21st is because of the California Gift Show, which will start Sunday, January 23rd. Mr. Anderson should make arrangements to leave the meeting Friday evening in order that he can set up the show on Saturday, January 22nd. You will

go to Los Angeles with us on Tuesday evening, January 25th.

Please make arrangements to have a photograph made of the salesmen sometime during the meeting.

cc: A. W. Boese, T. E. Phillips, A. H. Redpath

SCHEDULE

1955 RIBBON SALES MEETINGS

CHICAGO BRANCH ST. PAUL BRANCH	Friday, January 7th Sheraton Hotel	9:00 A. M. Chicago, Illinois
DALLAS BRANCH ST. LOUIS BRANCH	Monday, January 10th Western Village Hotel	9:00 A. M. Tulsa, Oklahoma
CINCINNATI BRANCH ATLANTA BRANCH	Wednesday, January 12th Gibson Hotel	9:00 A. M. Cincinnati, Ohio
NEW YORK BRANCH BOSTON BRANCH PHILADELPHIA BRANCH BUFFALO BRANCH	Friday, January 14th Park Sheraton Hotel	9:00 A. M. New York City
SAN FRANCISCO BRANCH SEATTLE BRANCH LOS ANGELES BRANCH	Friday, January 21st Sir Francis Drake Hotel	9:00 A. M. San Francisco

The meeting room should be available to set up the day before the meeting.

cc: A. W. Boese
Shirley Clevenger
Adele McCollom
C. A. Parsons
T. E. Phillips
C. E. Poole
A. H. Redpath

96
22
74
22

December 10, 1954

M E M O R A N D U M

The following change has been made in the date of the January Sales Meeting which will be held in Chicago:

Leave St. Paul	Friday, January 7th	2:35 PM
Arrive Chicago	" " "	4:30 PM

Northwest Airlines Flight #414

The Chicago Sales Meeting will be held Saturday, January 8th, beginning at 9:00 AM at the Sheraton Hotel.

I am making the necessary hotel reservations and airline arrangements with the Traffic Department and you will be notified regarding these flight schedules and hotels within a few days.

Regarding the West Coast trip, all parties will have the same schedule, with the exception of Mr. T. E. Phillips.

If you have any questions or comments, please advise.

Yours very truly,

CEP

C. E. Poole
Sales Manager
Ribbon Division

bjg

cc: Paul Bard
A. W. Boese
Shirley Clevenger
Adele McCollom
C. A. Parsons
T. E. Phillips
A. H. Redpath

Minnesota Mining & Manufacturing Company

INTER-OFFICE CORRESPONDENCE
ST. PAUL, MINNESOTA

Subject:

December 20, 1954

PERSONAL

MR. A. W. BOESE

Dear Al:

We are drawing to a close of the first year of operation of the Ribbon Division as a vertical product division of 3M Company.

I am very gratified with the progress that has been made in the first year and I must take time to write you and tell you how much I appreciate your large contribution to our success in this first year. I am so pleased with your own efforts to make this division a success, but I am also pleased with the attitude of ~~the~~ complete teamwork on the part of all our people in the Ribbon Division in Sales, Production, Research, Advertising, Engineering and Accounting. Had it not been for your complete cooperation and support, along with all the other nice people in the Ribbon Division we could not have made it.

Since real progress was made in 1954 I am sure that we have pleased management, but you can be assured they will be looking to us to continue to progress and show greater profits in 1955. I know that I can count on your help to meet our various targets and budgets and swell the profits so we can all say the Ribbon Division is doing their part to make 3M a profitable organization for its stockholders and all of its employees.

I wish you and yours a very Merry Christmas and a Happy and Prosperous New Year.

Sincerely.

Al

A. H. Redpath

/gr

December 21, 1954

PAUL BARD - 42-2W
A. W. BOESE - 17-1
C. A. PARSONS - 42-2W
T. E. PHILLIPS - 42-2W
A. H. REDPATH - 42-2W

Attached is a copy of the itinerary and flight schedule, regarding the sales meetings that will be held during the month of January. I suggest that you make a copy of this itinerary that fits your portion of the trip and issue to all parties concerned.

All hotel and transportation reservations have been made and I will advise you at a later date as to the cost of your transportation ticket.

If you have any questions or comments, please contact me.

Yours very truly,

C. E. Poole
Sales Manager
Ribbon Division

bjg

Attach/

ITINERARY - - - - - - - C. E. POOLE

SUNDAY, JANUARY 2 to FRIDAY, JANUARY 7	St. Paul Office Enroute Chicago in Evening	
SATURDAY, JANUARY 8 to SUNDAY, JANUARY 9	Chicago Enroute Tulsa in Evening	SHERATON HOTEL
MONDAY, JANUARY 10 to TUESDAY, JANUARY 11	Tulsa, Oklahoma Enroute Cincinnati	WESTERN VILLAGE HOTEL
WEDNESDAY, JANUARY 12 to THURSDAY, JANUARY 13	Cincinnati Enroute New York City	TERRACE PLAZA HOTEL
FRIDAY, JANUARY 14 to SATURDAY, JANUARY 15	New York City Enroute St. Paul	PARK SHERATON HOTEL
SUNDAY, JANUARY 16 to WEDNESDAY, JANUARY 19	St. Paul Office St. Paul Office	
THURSDAY, JANUARY 20 to SATURDAY, JANUARY 22	San Francisco Enroute Los Angeles Evening	SIR FRANCIS DRAKE HOTEL
SUNDAY, JANUARY 23 to THURSDAY, JANUARY 27	Los Angeles	STATLER HOTEL
FRIDAY, JANUARY 28	Enroute St. Paul	
SATURDAY, JANUARY 29	St. Paul Office	

FLIGHT SCHEDULE

1/7/55	Leave St. Paul	NWA	Flt. #414 at 2:35 PM	Arrive Chicago	4:30 PM
1/9/55	Leave Chicago	AA	Flt. #477 at 10:55 AM	Arrive Tulsa	3:01 PM
1/11/55	Leave Tulsa	AA	Flt. #420 at 12:15 AM	Arrive Cincinnati	6:25 PM
1/13/55	Leave Cincinnati	TWA	Flt. #446 at 10:30 AM	Arrive N. Y. C.	12:50 PM
1/15/55	Leave N. Y. C.	NWA	Flt. #1 at 9:00 AM	Arrive St. Paul	1:35 PM
1/20/55	Leave St. Paul	WAL	Flt. #37 at 7:00 AM	Arrive San Fran UAL - Flt. #205	 2:55 PM
1/22/55	Leave San Fran	WAL	Flt. #601 at 7:30 AM	Arrive Los Angeles	9:10 PM
1/28/55	Leave Los Angeles	WAL	Flt. #60 at 7:45 AM	Arrive St. Paul	4:35 PM

Form 354-F

REQUEST FOR ADVANCE
TRAVEL AUTHORIZATION

DATE January 3, 1955

A. AUTHORITY TO TRAVEL ON COMPANY BUSINESS IS HEREBY REQUESTED.

1. DATE OF DEPARTURE January 7, 1955 DATE OF RETURN January 17, 1955

2. REASON FOR TRIP AND/OR TRAVEL ADVANCE - BRIEFLY STATED

Attend sales meetings

3. ITINERARY - IN GENERAL TERMS

DATE	FROM	TO
Jan. 7	St. Paul	Chicago
Jan. 9	Chicago	Tulsa
Jan. 11	Tulsa	Cincinnati
Jan. 13	Cincinnati	New York
Jan. 15	New York	St. Paul

4. MODE OF TRAVEL Plane

B. ADVANCE FUNDS REQUIRED (IF NONE, SO STATE) . . . . . $ 525.00

AMOUNT OF OUTSTANDING TRAVEL ADVANCE FUNDS $ _____

AMOUNT OF OUTSTANDING AND UNPAID TRAVEL EXPENSES $ _____

C. IN ST. PAUL, OBTAIN CASH FROM THE CASHIER, BLDG. 42-4W. IF YOU PREFER A CHECK, INDICATE BELOW THE ADDRESS TO WHICH IT SHOULD BE SENT.

D. IT IS UNDERSTOOD AND AGREED THAT TEMPORARY TRAVEL ADVANCE HEREIN AUTHORIZED WILL BE REPAID IMMEDIATELY ON COMPLETION OF THE TRIP FOR WHICH AUTHORIZED.

REQUESTED BY A. W. Boese

DEPARTMENT Ribbon Laboratory (3118)

TRAVEL AUTHORIZED
TEMPORARY ADVANCE APPROVED

DEPARTMENT HEAD _____ DATE _____ DIVISION HEAD _____ DATE _____

PERMANENT ADVANCE APPROVED

DEPARTMENT HEAD OR SALES MANAGER _____ DATE _____ DIVISION HEAD _____ DATE _____

MO.	CONTROL	MAIN ACCT.	SUB A/C	CLASS CODE PROJECT OR JOB.NO.	AMOUNT	
	5	6720				

BRANCH USE ONLY

WORKING FUND

CK. # _____

DATE _____

AUTHORIZED BY THE TREASURER

DATE _____

READ INSTRUCTIONS ON REVERSE

INSTRUCTIONS

1. ANY TRAVEL FOR WHICH REIMBURSEMENT IS TO BE MADE BY THE COMPANY SHOULD BE AUTHORIZED BY THE USE OF THIS FORM PRIOR TO ANY EXPENSE HAVING BEEN INCURRED.

2. SUBMIT THIS FORM TO THE APPROPRIATE DEPARTMENT HEAD FOR APPROVAL. HE IN TURN WILL FORWARD IT TO THE DIVISION HEAD OR HIS DESIGNATED REPRESENTATIVE, WHO WILL AFTER APPROVAL FORWARD IT TO THE ACCOUNTS PAYABLE DEPARTMENT FOR PROCESSING IF AN ADVANCE IS REQUIRED.

3. SALES MANAGERS WILL USE THIS FORM IN APPLYING FOR PERMANENT ADVANCES FOR NEW SALESMEN OR FOR INCREASES TO EXISTING ADVANCES. PERTINENT PARTS OF THE APPLICATION WILL BE FILLED IN AND THE NAME OF THE SALESMAN FOR WHOM THE ADVANCE IS REQUESTED SHOULD BE ENTERED IN THE "REQUESTED BY" SPACE. THE SALES MANAGER WILL SIGN AND FORWARD TO HIS DIVISION HEAD OR GENERAL SALES MANAGER FOR HANDLING.

4. APPLICATION FOR TEMPORARY TRAVEL ADVANCES FOR EMPLOYEES BEING TRANSFERRED TO A NEW LOCATION SHALL ALSO BE MADE ON THIS FORM.

5. A. IF A CHECK IS DESIRED RATHER THAN CASH, THE ADDRESS SHOWN IN THE SPACE PROVIDED SHOULD BE THE DEPARTMENT, BRANCH OR OTHER ADDRESS TO WHICH THE CHECK IS TO BE SENT. THE PROMISSORY NOTE WHICH WILL ACCOMPANY THE CHECK SHOULD BE SIGNED AND RETURNED IMMEDIATELY TO THE ACCOUNTS PAYABLE DEPARTMENT.

   B. IN THE CASE OF ADVANCES REQUESTED FROM THE FIELD, SHOW IN THE SPACE PROVIDED IN PARAGRAPH "C" THE NAME OF THE BRANCH TO WHICH THE CHECK IS TO BE MAILED.

6. BRANCH OFFICE MANAGERS ARE REQUESTED TO FILL IN THE WORKING FUND CHECK NUMBER AND DATE IN THE SPACE PROVIDED. THIS FORM, PROPERLY APPROVED, TOGETHER WITH THE SIGNED PROMISSORY NOTE COVERING THE ADVANCE SHOULD BE SENT TO THE ACCOUNTS PAYABLE DEPARTMENT THE DAY THE TRANSACTION IS COMPLETED.

7. WHEN ST. PAUL APPROVAL IS REQUIRED, THE TREASURER'S DEPARTMENT SHOULD BE CONTACTED.

ONLY THE ORIGINAL OF THIS FORM NEED BE SUBMITTED TO THE ACCOUNTS PAYABLE DEPARTMENT.

Form 354-F+

A. H. Boice

SALES MEETING
1955 Program

9:00 AM — Mr. C. E. Poole called meeting to order - informal discussion. Reason for meeting - Review '54 and present '55 line.

9:05 AM A. Introduce Mr. A. H. Redpath and turn meeting over to him.

9:30 AM B. Mr. C. E. Poole - Work Habits & Planning

1. Successful formula - working with jobber salesmen. (Pass out item quota)
Absolute minimum ten calls per day - 22 working days per month equals 220 calls minimum per month. Plan work month ahead

Total average calls in 1953 - 198 per month
Total average calls in 1954 - 164 per month
Total average calls in 1955 - 240 per month

More money if proper increase is shown by territory - in pattern.

Review all items on Average per man on "Pink Sheet" 1953 vs. 1954

2. Jobber Sales Meetings - Need more - Give physical samples to good jobber salesmen - Sell management - point out profit to them.

10:00 AM 3. Show Film - "The Salesman"

10:30 AM COFFEE BREAK

10:45 AM 4. Personal appearance
5. Company car
6. Equipment

11:00 AM C. Salesmen Total Territory Quota for 1955 - Discuss increase expected.

D. Products - Discuss one at a time - How do we obtain increase on each item. Spun Ribbon - "LACELON" - "DECORETTE". Explain "Star Salesman" program. (Messrs. C. A. Parson and T. E. Phillips)

1. "LACELON"- Salesman's Quota - Sales have decreased

a. New uses and markets - gift wrap - bakeries.
b. Regain and increase business in florists.
c. Show "LACELON" on every call.
d. Broken cartons allowed to good jobbers.
e. Demonstrate puff bow - and glitter kit.
f. Prices remain same.

2. "DECORETTE" - Salesman's Quota - Sales have decreased.

   a. Discuss new uses combined with "LACELON" 3/8" and 7/8".
   b. Show on every call.
   c. Show new color line 7/8".
   d. Show 3/8" width and uses - industrial potential.
   e. Talk about 200 yard roll 7/8".
   f. Prices remain same.

3. "DECORETTE" Small Rolls - Sales Quota - Fair increase.

   a. Solid pack - Will be some assorted in "SASHEEN" Deals.
   b. Reason for no gold or silver.
   c. Need more space on retailers shelves.
   d. Assortable with other displays.
   e. Prices remain same.

12:00 Noon — LUNCH

1:00 PM
Mr. C. E. Poole

4. "SASHEEN" - Salesman's Quota - Small increase in '54.

   a. 100 yard rolls - 25 colors - discuss new colors.
   b. 250 yard rolls - gaining in popularity.
   c. Tie in with S-10 Bow Tyer for increased sales.
   d. Sample good jobber salesmen.
   e. Prices remain same on 100 yard an 250 yard rolls.

5. "SASHEEN" Small Rolls - Salesman's Quota - Excellent Increase '54.

   a. Discuss new discount structure - 50-20-----6 doz. - 50% to retailer.
   b. Three assortments in line - #281, #500 and #600.
   c. Floor Stands - "FS" 1 and "FS" 2.
   d. Gift Paper - open stock - own designs - Rolls, cutter box- Prices, retail and wholesale.
   e. New markets to concentrate on, such as Home Auto Chains, Group II variety, Drug Chains - Rack Jobbers.

Mr. C. A. Parsons
Mr. T. E. Phillips

6. Chain Store Package Line - Very poor Sales in Group II.

   a. Concentrate on Group II - expect large increase in '55.
   b. C. A. Parsons to explain line - discounts - order forms.

Mr. A. H. Redpath

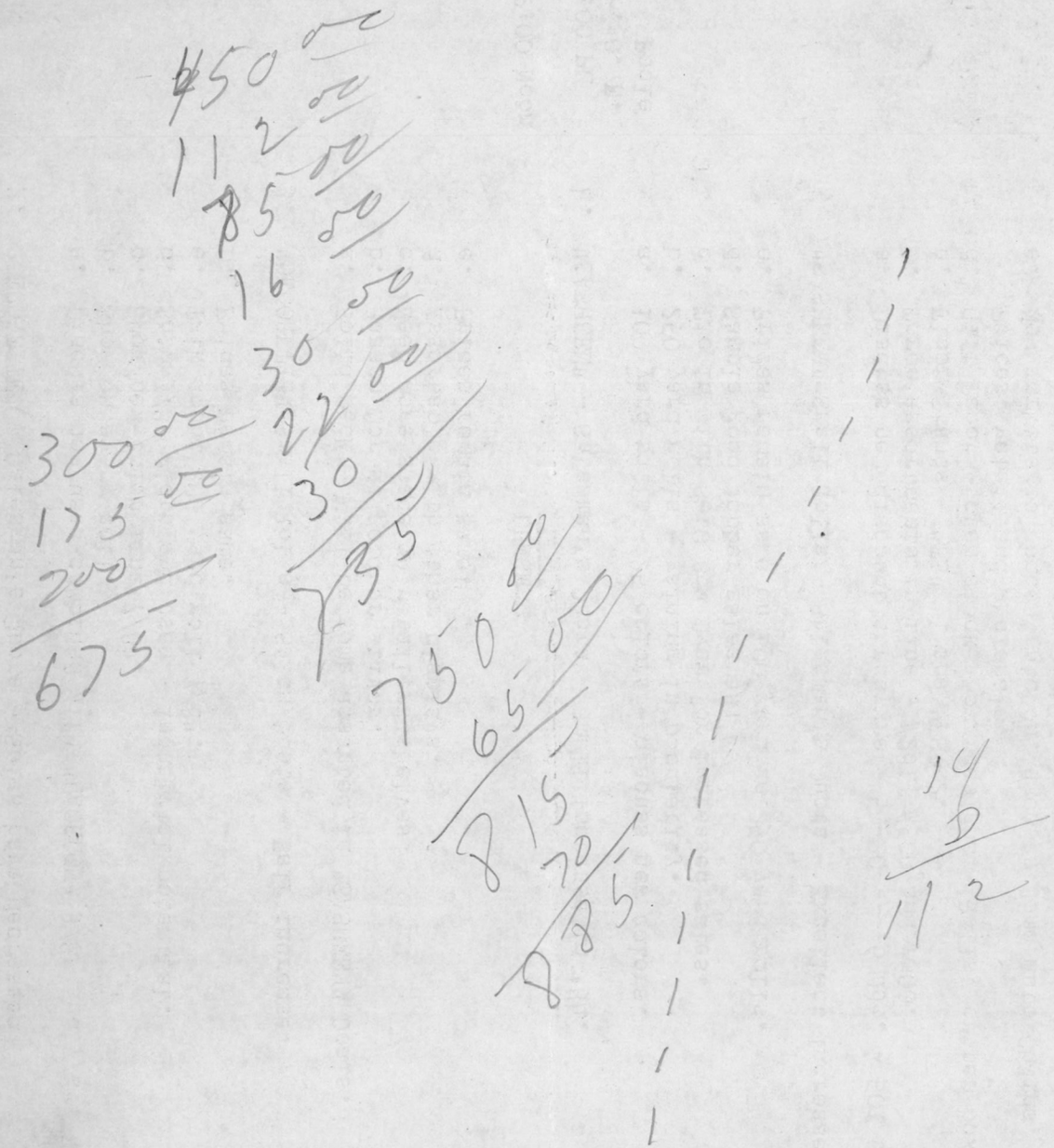
7. House Accounts

   a. Sales Managers' responsibility.
   b. Greeting card manufacturers and distributors -(Omaha Card Mart).
   c. Dennison - American Greeting, Hallmark, Gibson, Treasure Masters, Facile.
   d. Commercial Stationers - (discontinued).

Mr. C. E. Poole

8. Accessory Items - Sales Quota

   a. Will be covered by Merchandising in detail.
   b. These tools are to help you get increased sales. Show on every call.



9. Gift Shows and Conventions

a. 12 Shows - Spring and Fall - List attached.
b. 2 National Jewelry Shows - Chicago and New York City.
c. New York Stationery Show - Department Store Buyers.
d. National Commercial Stationery Convention - Chicago.
e. Super Market Convention - Cleveland.
f. Paper Trades Convention - New York and Chicago.
g. National Toy Show - New York City

NOTE: One (1) roll of 3" White "LACELON" will be offered as Free Goods with a 25 roll order at all Gift Shows. 3M Branch will ship against copy of 3M order.

10. Demonstrations and Demonstrators

a. Review 1954 operation.
b. Method of hiring - 3M employment.
c. Any need for demonstrators for Spring Promotions.
d. Effective use - Key account stores - make arrangements early - Hallmark and Chicago Printed String copying.

11. Competition

a. Chicago Printed String - (Have C. A. Parsons show Bow Tyer attachment). Discuss CPS Wholesale Co - Rippl-Tie Products Co.
b. Facile Corporation - Strong in Variety Chains - Wholesale Division.
c. Burlington - Woven goods increased in price.
d. Hallmark - Making own curling ribbon.
e. Other card companies and competitors - (Dennison).

3:00 PM E. A. H. Redpath - Advertising - (as listed on agenda)

3:15 PM F. A. W. Boese (Introduce) - Laboratory Report - (as listed on agenda)

3:30 PM G. C. A. Parsons - Merchandising - (as listed on agenda)

4:30 PM H. Paul Bard - Introduction - Administrator of Sales Development for Ribbon, Tape and Allied Products. Mr. Bard is a psychologist, formerly worked in our Personnel Department conducting multiphasic tests and evaluating salesmen in the field - (Present duties). (As listed on agenda)

5:00 PM I. Film - "LET'S GROW"

5:30 PM J. Messrs. A. H. Redpath and C. E. Poole - Closing remarks.

5:40 PM K. Comments by Sales Manager

DINNER

7:00 PM Interview individual Salesmen

3
20
110
51
16
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32
65
419

~~Chicago~~
St Paul Div.

SALES MEETING

1955 PROGRAM - RIBBON DIVISION

_____SALESMAN

A. Opening remarks by Mr. A. H. Redpath -

1. Review of 1954 Sales
2. General discussion of expectations in 1955
3. Branch distribution for 1955

B. Work Habits and Planning - C. E. Poole

1. Jobber Training Program
2. Jobber Sales Meetings (Film - "The Salesman")
3. Personal appearance
4. Company car
5. Equipment
6. Work Planning - (eliminate hop-scotching territory)

C. Salesman Territory Sales Quota for 1955 - C. E. Poole

Total 1955 Quota $_____
Total 1954 Sales _____ (December figure estimated)
Increase $_____ = _____%

D. Products - Across the board selling - C. E. Poole

1. "LACELON" - 50-yard rolls
   1955 Quota $_____
   1954 Sales _____ (December figure estimated)
   Increase $_____ = _____%

   Discuss new ways and methods of increasing the sale on this item

2. "DECORETTE" 7/8" x 50 yard and 200 yard rolls - 3/8" x 50 yard rolls

   1955 Quote $_____
   1954 Sales _____ (December figure estimated)
   Increase $_____ = _____%

   Discuss industrial uses for 3/8". Tie in with 7/8" and "LACELON"

3. "DECORETTE" Small Rolls

   1955 Quota $_____
   1954 Sales _____ (December figure estimated
   Increase $_____ = _____%

4. "SASHEEN" 100 yard and 250 yard rolls

1955 Quota $_____
1954 Sales _____ (December figure estimated)
Increase _____ = _____%

5. "SASHEEN" Small Rolls

1955 Quota $_____
1954 Sales _____(December figure estimated)
Increase $_____ = _____%

6. Chain Store Package Line _____% Nat'l increase over 1954.
Group II Chains - Show 1955 samples and brochure. Expect large increase on these items to Group II Chains.

7. House Accounts - Converters, etc.

8. Accessory Items

1955 Quota $_____
1954 Sales _____ (December figure estimated)
Increase $_____ = _____%

E. Advertising - A. H. Redpath

1. New point of sales piece (to replace S-CE palette easel)
2. TV advertising program
3. "Vogue" Magazine advertising program
4. Trade paper advertising program (floor stand: drug & grocery)
5. Color cards
6. Floor Stand brochure

F. Laboratory Report - A. W. Boese

1. Quality
2. New Products
3. Lab Factory Operation

G. Merchandising - C. A. Parsons - T. E. Phillips

1. Floor Stands - Large - Small
2. Gift Paper - Resale only
3. Deal No. 500 and No. 600
4. S-2 and S-6 Ribbon Racks
5. S-10 Bow Tyer
6. Attachment for CPS Bpw Tyer
7. Permanent Wood Floor Stand
8. Other accessories - (S-4 Shears - Racks)
9. Discontinued items (260-261-300-40--270-271)
10. Prices and discounts (new resale discount and quantity brackets)
11. Commercial stationers

(continued next page)

G. Merchandising - C. A. Parsons - T. E. Phillips (continued)

12. Packaging - Cello overwrap - paper & ribbon
13. New Colors - "SASHEEN" (Polka Dot, Black Shadowstripe) "DECORETTE" (all colors)
14. "DECORETTE" - 200 yard roll
15. "LACELON" - Acetate Band
16. "DECORETTE" - Code number discontinued
17. Ribbon Contracts - Consumer: 100 yard - 250 yard - 500 yard (3/8" "DECORETTE") Wholesaler Contract
18. Demonstrations - Spring - Fall
19. New order forms - Salesmen - branch - chain line
20. Free offer "LACELON" at Spring Gift Shows
21. Close-out price on discontinued items

H. "Do it Through Others" - Paul Bard

I. SLIDE FILM - "LET'S GROW"

J. Closing remarks by C. E. Poole and A. H. Redpath.

K. Comments by Ribbon Supervisor

L. Interview individual salesman

- END OF MEETING -

1955 SPRING GIFT SHOWS

"3M" will have their own exhibit in the following shows:

Southeastern Gift Show	Atlanta	January 16-19
California Gift Show	Los Angeles	January 23-28
Chicago Gift Show	Chicago	Jan 31 - Feb 11
Western Gift Show	San Francisco	February 3-6
Allied Gift Show	Dallas	February 20-25
Buffalo Gift Show	Buffalo	Jan 30 - Feb 2
Detroit Gift Show	Detroit	March 6- 10
Denver Gift Show	Denver	March 4 - 8
N. W. Gift Show	Minneapolis	March 20 -23
New York Gift Show	New York City	February 21-25
New York Stationery Show	New York City	May 15 - 20
Nat'l Toy Show	New York	March 7- 16

Listed below are other gift shows and if you can arrange to participate with a jobber, it will be in order - Samples may be furnished at no charge, but should be returned to branch stock after show is over.

Miami Gift Show	McAllister Hotel, Miami, Fla.	Jan 9-11
Wisconsin State Gift Show	City Auditorium - Milwaukee, Wisc.	Jan 16-18
Washington Gift Show	Willard Hotel, Washington, D. C.	Jan 23-26
Parker House Gift Show	Parker House, Boston, Mass.	Jan 23-27
Syracuse Gift Show	Hotel Onondoga, Syracuse, N. Y.	Feb 6-9
Albany Gift Show	The Sheraton Ten Eyck, Albany, N. Y.	Feb 13-16
Louisville Gift Show	Seelboch Hotel, Louisville, Ky.	Feb 13-15
Portland Gift Show	Public Auditorium, Portland, Ore.	Feb 13-16
Cincinnati Gift Show	Netherland Plaza Hotel, Cinci, Ohio	Feb 20-23
Seattle Gift Show	Civic Auditorium, Seattle, Ore.	Feb 20-24
Minneapolis - St. Paul Gift Show	City Auditorium, Minneapolis, Minn.	Feb 20-22
Inland Empire Gift Show	Davenport Hotel, Spokane, Washington	Feb 27 - March 1
Omaha Gift Show	Paxton Hotel, Omaha, Nebr.	Feb 27 - March 1
Ohio State Gift Show	Hotel Deshler, Hilton, Columbus	Feb 27 - March 2
Boston Gift Show	Hotel Statler, Boston, Mass.	March 7-11
Heart of America Gift Show	Continental Hotel, K. C., Mo.	March 13-15
St. Louis Gift Show	Statler Hotel, St. Louis, Mo.	March 20-22
Salt Lake City Gift Show	Hotel Utah, Salt Lake City, U.	March 27-29
Indianapolis Gift Show	Claypool Hotel, Indianapolis, Ind.	March 27-30
Philadelphia Gift Show	Ben Franklin Hotel, Philadelphia, Pa.	March 27-30
Pittsburgh Gift Show	Wm. Penn Hotel, Pittsburgh, Pa.	March 27-30

1955 COLOR LINE

ORDER OF COLORS APPEARING ON SALESMEN'S ORDER BOOKS, BRANCH ORDER FORMS AND COLOR CARDS

1. "SASHEEN" Brand Ribbon

White	Better Times	Nile Green
Pastel Yellow	Burgundy	Emerald Green
Goldenrod	Purple	Gold
Pastel Pink	Royal Blue	Copper
Light Rose	Pastel Blue	Brown
Orchid	Turquoise	Black
Red	Aqua	Silver
Old Rose	Chartreuse	*Polka Dot
		*Shadostripe (white)

* Available in No. 3 and No. 5. widths only in 100 and 250-yard rolls.

All of the above colors are available in Catalog 265 and 275. Catalog 285 contains all colors except Black and Polka Dot and Shadostripe. Catalog 286 consists of White, Pastel Pink, Red, Pastel Blue, Emerald Green and Gold.

2. "LACELON"

Pastel Pink	Pastel Yellow	Red
Pastel Blue	Nile Green	*Silver
White	Orchid	*Silver-Gold

*three-inch only.

3. "DECORETTE" 7/8" x 50-Yard

Pastel Pink	Orchid	Red
Pastel Blue	Pastel Stripe	Emerald Green
White	Red on White	Royal Blue
Pastel Yellow	Holiday Stripe	Silver
Nile Green	Christmas Stripe	Silver-Gold

4. "DECORETTE" 7/8" x 200-Yard

Same as above.

5. "DECORETTE" 3/8" x 500-yard

Pastel Pink	Pastel Yellow	Red on White
Pastel Blue	Nile Green	Red
White	Pastel Stripe	Emerald Green
		Gold

6. "DECORETTE" Display No. 296

Same as for "DECORETTE" 7/8" x 50-Yard except for Silver and Silver-Gold.

Minnesota Mining & Manufacturing Company

INTER-OFFICE CORRESPONDENCE
ST. PAUL, MINNESOTA

February 16, 1955 **Subject:**

A. W. BOESE

Field Report on Trip to
Irvington Varnish and Anderson Machine Works

January 19 and 20

I contacted Paul Hedrick and displayed samples of Polyester Webs - Run #76 and Run #78.

Run #76 is a 50/50 blend of drawn/undrawn Dacron fiber heat bonded to produce a 30-pound non-woven web. 6.5# of Plaskon #920 polyester resin was added to the web in emulsion form giving a finished web weight of 36.5 pounds per ream. After curing the web for two hours at 330°F, the tensile increased from four pounds to 16 pounds in lineal direction and from one pound to six pounds in across the web.

Run #78 is a 75/25 blend of drawn/undrawn Dacron having an untreated weight of 24.5 pounds; after treating with the polyester emulsion, the finished weight is 35 pounds indicating an emulsion add-on weight of 30%. The finished web tensile of this sample is 19 pounds in the lineal direction and four pounds crosswise.

Paul Hedrick introduced me to Mr. Merrill Mays who is responsible for developing a line of Irvington reinforced vinyl sheeting. Merrill coated a hand sample of run #78 and observed strength characteristics of the coated web (did not use testing equipment but observed the differential in lineal and cross tear by hand). He commented that the cross tear was undesirably lower than the lineal tear. This, he felt, was objectionable. I inquired as to what his minimum tear strength requirement was and received an answer that he is presently working with 5-1/2 oz. nylon cloth which provides a finished tear strength of 90 pounds also a 2 oz. nylon with a finished tear strength of 20 pounds. Merrill stated that there might be uses for coated fabrics with lower tear strengths but felt that cross and lineal tear should be close to equal. This latter point is subject to the argument that if the cross tear is brought up to the required minimum for the use, it should not be harmful to exceed the minimum in the lengthwise direction.

I was introduced to Mr. George Vreeland and Mr. Harold Landfield who described immediate interest and enthusiasm in Polyester Web for replacement of cotton cambric in varnish cambric, for use as an insulating media in coil wrapping, as a base material for preparing laminates to be used as an insulating media in printed circuits

Mr. Vreeland coated a sample of run #76 with a black, bais cambric varnish; this involved dipping the web in a pan of varnish and allowing the excess to drain off by holding the web in a vertical position above the pan. The web was then placed in an oven at 330°F to cure the varnish. It was necessary to dip and cure this web three successive times in order to build up the caliper to the desired 12-14 mils. The web, prior to and after coating, appeared smooth and relatively fuzz-free; however, when it was subjected to the 330° curing temperature, small wrinkles appeared. These wrinkles also appeared in a piece of uncoated web which was subjected to 330°F. I believe these wrinkles were created during our hot can curing of the emulsion and is something we will have to eliminate.

The sample coated had electrical properties similar to those of cotton varnish cambric (insulation of 1000 to 1100 volts per mil). The cross tear strength was 220 grams and the average tensile was 24 pounds. George Vreeland stated that the cross tear desirably should be 350 grams and tensile 30 pounds. It is thought that possibly the addition of the polyester emulsion in relatively large quantities (30%) caused the web to be too well unified thus reducing tear strength.

George Vreeland offered the following information relative to electrical insulation:

Class A insulation will stand up under continuous operation at 85°C, with a hot spot of 105°C.

Class B insulation will stand up under continuous operation at 105°c, with hot spot of 130°C.

Class H insulation will run continuously at 175°-180°C.

Cotton cambric is classified as a Class A insulator. Mr. Vreeland stated that he was certain the Polyester Web would meet Class B specifications. This would serve as a selling advantage in Class A uses which represent the large volume use of insulation. Irvington sells a small volume of Class B insulation which uses woven glass at 46 cents per square yard.

Mr. Vreeland showed me samples of our Polyester Web which, when impregnated with epoxy resin, would be used as a base for printed circuits. The test which he had performed was encouraging; however, considerable heat warping was encountered. It was felt that a 100% drawn fiber web might eliminate this problem.

I contacted Jim Anderson of the Irvington Cap Seal Division who described a desire to obtain 1/2" thick batts of fiber (cotton or viscose) rather loosely bonded to be used as a sound deadener.

Conclusions:

The Ribbon Laboratory will prepare samples of a calendered, 50/50 (drawn/undrawn), 30 pound web and present to Mr. Vreeland. We will also attempt to prepare a web treated with a polyester resin and eliminate the tendency of puckering or wrinkling when these webs are subjected to heat. In both samples care will be taken to eliminate fuzz from the surface of the web.

There is a great deal of interest at Irvington on the potential use of our Polyester Web in several electrical insulation applications. Mr. Paul Hedrick stated that this is their No. 1 development project at Irvington.

January 21

Contacted Mr. Gerald Anderson, Jr. of the Anderson Machine Shop, Inc. in Needham Heights, Mass. to look at their waste fiber staple cutter. The complete machine with conveyor belt feed sells for $4200. The cutting head alone is priced at $3600. The machine appeared to be well designed with needle bearings being used on all cutting and score rolls. No undrawn "Dacron" waste was available; however, he cut samples of Nylon and viscose for me on which the machine appeared to do an excellent job. If this machine proves suitable for our use it would seem wise to pay $4200 for the complete machine. Ten weeks delivery was described.

Mr. Anderson consented to cut additional fiber for our experimental use until we could more clearly define our program and its requirements.

Don David

Donald J. David, Chief Chemist
Ribbon Laboratory

jz

cc: W. M. Westberg

IRVINGTON VARNISH & INSULATOR COMPANY

IRVINGTON, 11, NEW JERSEY, U.S.A.

March 10, 1955

To: Mr. Alvin W. Boese - Ribbon Laboratory 27-1
3-M, St. Paul, Minnesota

CC: Mr. F. A. Shoemaker
Mr. W. H. Moebius

Subject:

Dear Al:

The Navy has requested us to make a silicone rubber tape which will be less expensive than our silicone rubber glass cloth tape and in addition they would like to have more heat resistance so that they could increase the temperature in the burn-out test.

Harry Moebius and I thought that if a combination asbestos fibers and glass fibers could be laid down in a non-woven mat and later impregnated with silicone rubber, we might have such a construction. As asbestos will not melt at the melting point of glass, we might have an insulation which would prevent the copper from flowing out of the conductor when Navy ships are hit with incendiary bombs.

If, by chance, you had considered making such a construction, we would certainly be interested in receiving samples.

I expect that George Vreeland will be seeing you this week and will tell you how pleased we are with the results on the oleoresinous coatings on the non-woven polyester web. We certainly feel enthusiastic about the future of this product.

Best regards,

Paul H.

Paul L. Hedrick
Technical Director
Coating Division

P.S.: The over-all thickness on the navy high temperature tape will probably be about 10-mils.

PLH:cp

FORM 2237-A

IMPORTANT

MESSAGE FOR YOU

FOR Al

FROM Harold Kinney

OF

PHONE EXT. 5105
5100

TELEPHONED	
CALLED TO SEE YOU	
WANTS TO SEE YOU	
PLEASE PHONE HIM	
WILL CALL AGAIN	
RETURNED YOUR CALL	

REMARKS Will check at Mr. Curtis

DATE 3/14/55 TIME 10:25

NAME OF PERSON RECEIVING MESSAGE

ANGELO M. PISARRA
PATENT ATTORNEY

MEMBER OF BAR
DISTRICT OF COLUMBIA
—
CHEMICAL ENGINEER

17 ACADEMY STREET
NEWARK 2, NEW JERSEY
—
MITCHELL 2-2857

March 8, 1955.

Carpenter, Abbott, Coulter & Kinney, Esqs.
900 Fauquier Avenue
Saint Paul 6, Minnesota

Attention Harold J. Kinney, Esq.

Dear Mr. Kinney:

Some time ago Paul Hedrick, Al Boese and I had a conference concerning the matted Dacron material which had been made by Al Boese. Since then I was advised by Roy Gavin that your office at St. Paul was preparing the patent application on that material, and Paul Hedrick on numerous occasions has spoken to me about that product.

Again on last Thursday he submitted samples of such material coated and impregnated with various compositions for cable wrapping purposes, and inquired of me as to our position patent-application-wise concerning them. In order to be in a position to answer his queries and possibly to aid you to include the various uses of such base materials, may I have a copy of that application even if it is only in pre-filing form. In whatever condition it is in, I should like a copy if this request meets with your approval.

With kind personal regards, I am

Cordially,

Angelo M. Pisarra

Angelo M. Pisarra

AMP/h

c. c. Roy Gavin - Irv.
Paul Hedrick - Irv.
Alvin W. Boese - St. Paul, Minn.

Form 3763

ALVIN W BOESE 27-1

Kindly return at your early convenience, indicating on the abstract the present status of this product. Please note due date for filing application, Jan 14, 1956

ABSTRACT OF FIRST SALE INVOICE

Date of order: JAN 5, 1955

Date of invoice: Jan 14, 1955

Product: 6 MIL PLAIN POLYESTER 36 0

Sold to: G.B LEWIS CO
WATERTOWN WIS

Disposition:

Record of mailing abstracts

2/4/55		
First mailing	3 months	1 month

January 17, 1955

HISTORY OF HEAT BONDED POLYESTER WEBS

I. 3/17/54
Meeting held in Mr. Boese's office with DuPont Industrial Sales Development Group.
Minutes published 4/1/54.
3M heat bonding technique described.
W. E. Hansen described that undrawn Dacron softened at a lower temperature than drawn Dacron.

II. 3/22/54 3M order #K-30724
50 pounds undrawn fiberstock type 4H - invoice #8500
50 pounds Dacron staple shrinkable - invoice #8501
50 pounds Dacron staple regular 3 denier - invoice #8449

Order received on 4/16/54 and paid on 3M voucher #34491.

III. Westberg pocket notebook
Made 50/50 drawn undrawn web - 6/11/54

IV. 3M notebook entry 9/14/54 covering work of 6/11/54
Notebook 4232, page 3.

V. 3M notebook entry 9/14/54 covering work of 6/11/54
Notebook 4232, page 4.
(bonding Orlon and glass fiber with undrawn Dacron)

VI. 3M notebook 4232, page 5 entry 9/14/54 covering experimental run on Profab Rando Web 50/50 and 25/75 undrawn and drawn Dacron.
Work accomplished 6/18/54.

VII. 3M notebook 4232, page 6 entry 9/14/54 heat bonding of webs prepared on 6/18/54. Samples taken by A. W. Boese to show Phil Walters of DuPont.

VIII. Stenographic record of lab assignment of experimental numbers 6/30/54 heat bonded Dacron Webs #496SR assigned to Walt Westberg. Report published 9/28/54 by A. W. Boese and Walt Westberg.
This report covers work accomplished June 11, 1954, June 17, 1954 and July 20, 1954.

IX. 7/2/54 Records of fiber runs on Rando Web machine - Herb Wegwerth.

Run #113 50/50 undrawn/drawn Dacron heat bonded later.
This work covered by Westberg notebook 4232, page 9 recorded 9/16/54.

X. 7/20/54 Experimental run at Fairmont
recorded in Westberg's notebook 4232, page 10 - 9/16/54

XI. 7/28/54 Heat bonded Dacron experiments attempt to make Dacron reinforced polyester laminate using undrawn Dacron as only source of polyester resin.
Recorded 3M notebook 4232, page 12 9/16/54.

XII. Notebook 4232 page 14, record of webs submitted to Joe Schurb - recorded 9/16/54. Webs submitted on 6/22/54, 7/22/54 and 7/28/54.

XIII. 8/30/54 Westberg letter to A. W. Boese
Summary of heat bonded Dacron project.

XIV. 9/2/54 Experimental production run at Fairmont
Recorded in notebook 4232, page 21 9/21/54

Donald J. David
Ribbon Laboratory

jz

Joe Schurb's notebook entry 6/29/54 Notebook 3524-37 use of Polyester webs in scotchply fabrication

Joe Shurb's notebook 3524-38 entry 7/12/54 discribing use of 1.7 oz Polyester heat bonded web for scotchply surfacing.

FORM 4933-A

CC: BYHOFFER, BOESE, KRAMER, REDPATH, REHFELD, RICHERSON, MAKING FOREMAN, QUALITY SUPERVISOR, CONVERTING FOREMAN, MAINTENANCE FOREMAN

WEEKLY PRODUCTION AND WASTE SUMMARY, FAIRMONT RIBBON MAKING & CONVERTING

DATE	MAKER: OUTPUT SQ. YDS.	MAKER: PERCENT DOWNTIME	MAKER: PERCENT WASTE	MAKER: OUTPUT SQ. YDS.	MAKER: PERCENT DOWNTIME	MAKER: PERCENT WASTE	CONVERTER: SLITTER WINDER OUTPUT SQ. YDS.	CONVERTER: PERCENT WASTE	CONVERTER: BLOCKER and Embossing OUTPUT SQ. YDS.	CONVERTER: PERCENT WASTE	CONVERTER: PACKING OUTPUT SQ. YDS.	CONVERTER: PERCENT WASTE	CONVERTER: SQUARE YD. SALVAGE	CONVERTER REG ONLY: WINDER OUTPUT SQ. YDS.	CONVERTER REG ONLY: PERCENT WASTE	CONVERTER ALL: PACKING OUTPUT SQ. YDS.	CONVERTER ALL: PERCENT WASTE	CONVERTER ALL: SALVAGE SQ. YDS.
	DECORETTE			GARNET			SASHEEN							DECORETTE				
4-18				71606	37.7	30.6	38596	7.4	4526	5.9	26270					81		
4-19				58607	49.7	30.2	29410	11.0	4419	5.6	35483							
4-20				52887	54.3	33.4	30390	11.8	4563	4.3	35627							
4-21				50590	54.5	26.0	29080	12.8	4582	7.6	32949							
4-22				74314	38.5	28.2	27768	10.5	4097	6.5	46277							
				* 7800														
WEEK				300204	48.1	29.7	155244	10.6	22187	6.0	176606					81		

DATE	LACELON			SASHEEN			STRIPED DECORETTE							LACELON				
4-18	650	86.1	61.6	44136	6.3	1.5	2020	5.9	889	11.1	10224			2694	18.9	1000		
4-19	13661	10.4	10.1	45681	6.7	-3.9	596	2.1	877	5.4	3006							
4-20	13179	10.6	2.5	44036	6.0	2.2	1132	15.7	870	11.5	1164							
4-21	12490	2.8	2.7	42792	12.9	6.9			669	23.0	5252			3786	9.4	917		
4-22	14139	1.3	4.9	37696	21.3	3.3	498	23.7	842	10.0	122			4437	6.9			
	* 650			* 351														
WEEK	53469	12.4	8.0	213990	10.8	2.3	4246	10.7	4147	12.1	19768			10917	11.0	1917		

DATE	STRIPED DECORETTE			S.DEC.WITH.METALLIC STRINGS			STRIPED DECORETTE WITH METALLIC STRINGS							BREAKDOWN OF SASHEEN MAKER WASTE		
														DATE	FILAMENT	BACKING
4-18											1458			4-18	- 2.25	3.71
4-19											219			4-19	- 4.32	0.38
4-20											73			4-20	- 2.45	4.65
4-21														4-21	0.16	6.71
4-22														4-22	- 1.61	4.87
WEEK											1750			WEEK	- 1.95	4.20

REMARKS:

* Scrapped

** Contains Garnett #3

Discussed with Dyll

ckd 5-2-55

FORM 4933-A

WEEKLY PRODUCTION AND WASTE SUMMARY, FAIRMONT RIBBON MAKING & CONVERTING

DATE	MAKER			MAKER			CONVERTER									CONVERTER					
							SLITTER WINDER			BLOCKER			PACKING			REG ONLY			ALL		
	OUTPUT SQ. YDS.	PERCENT DOWNTIME	PERCENT WASTE	OUTPUT SQ. YDS.	PERCENT DOWNTIME	PERCENT WASTE	OUTPUT SQ. YDS.	PERCENT WASTE	SQUARE YD. SALVAGE	OUTPUT SQ. YDS.	PERCENT WASTE		OUTPUT SQ. YDS.	PERCENT WASTE		WINDER OUTPUT SQ. YDS.	PERCENT WASTE	PACKING OUTPUT SQ. YDS.	PERCENT WASTE	SALVAGE SQ. YDS.	
	DECORETTE			GARNET			SASHEEN									DECORETTE					
4-18																					
4-19							2697	9.7													
4-20							175	20.5													
4-21																					
4-22							4211	7.6													
	Material made in Pilot Plant																				
WEEK							7083	8.8													

DATE	LACELON			SASHEEN			STRIPED DECORETTE							LACELON				
WEEK																		

DATE	STRIPED DECORETTE			S.DEC.WITH.METALLIC STRINGS			STRIPED DECORETTE WITH METALLIC STRINGS							BREAKDOWN OF SASHEEN MAKER WASTE		
															FILAMENT	BACKING
WEEK																

REMARKS:

FORM 490[illegible]3 CC: BYHOFFER, BOESE, KRAMER, REDPATH, REHFELD, RICHERSON, MAKING FOREMAN, QUALITY SUPERVISOR, CONVERTING FOREMAN, ROBERT HANSON

WEEKLY PRODUCTION AND WASTE SUMMARY, FAIRMONT RIBBON MAKING & CONVERTING

DATE	MAKER			MAKER			CONVERTER										CONVERTER							
																	REG ONLY			ALL				
	OUTPUT SQ. YDS.	PERCENT DOWNTIME	PERCENT WASTE	OUTPUT SQ. YDS.	PERCENT DOWNTIME	PERCENT WASTE	SLITTER WINDER OUTPUT SQ. YDS.	PERCENT WASTE	BLOCKER * OUTPUT SQ. YDS.	PERCENT WASTE	PACKING * * OUTPUT SQ. YDS.	PERCENT WASTE	SQUARE YD. SALVAGE				WINDER OUTPUT SQ. YDS.	PERCENT WASTE	PACKING OUTPUT SU. YDS.	PERCENT WASTE	$ALVAGE SQ. YDS.			
	3/8 DECORETTE			GARNETT			SASHEEN										LACELON							
8-1				71823	29.4	14.7	57110	9.5	3947	7.6	60913						4454	9.0	8371					
8-2				71714	29.6	13.3	49340	10.4	4476	7.9	93799						4729	8.7	1007					
8-3				53298	47.8	25.9	45372	11.4	5508	6.7	70221						----		708					
8-4				52432	48.5	27.7	51891	7.9	4441	7.1	62443						4504	9.2	219					
8-5				82439	19.1	14.7	38816	10.0	3897	6.0	47049						4038	9.3	800					
8-6				55883	18.2	14.2																		
8-7				56548	15.1	27.5																		
WEEK				444137	30.9	19.4	242529	9.8	22269	7.0	334425						17725	9.0	11105					

DATE	LACELON			SASHEEN			STRIPED DECORETTE										SASHEEN FOR HANKS AND LEVEL WOUND DRUMS							
8-1	----	36.2	35.8	43280	23.4	5.3	4921	6.5	1246	20.6	671													
8-2	6941	36.2	35.8	48406	16.7	10.5	5045	5.4	862	7.4	9785													
8-3	6073	17.0	-5.8	52721	5.5	-7.7	4129	4.2	871	8.7	25349													
8-4	7997	17.1	23.6	48535	16.8	2.7	4666	9.4	849	7.5	18037													
8-5	15102	----	0.7	53532	6.1	-13.0	4487	5.6	920	10.8	13065													
WEEK	36113	14.7	14.5	246474	13.7	-0.6	23248	6.3	4748	12.1	66907													

DATE	STRIPED DECORETTE			S.DEC.WITH.METALLIC STRINGS			STRIPED DECORETTE WITH METALLIC STRINGS										BREAKDOWN OF SASHEEN MAKER WASTE		
																	DATE	FILAMENT	BACKING
8-1	11724	25.9	19.6				---										8-1	- 0.41	5.67
8-2	16488	2.6	5.0				179	13.9									8-2	2.14	8.34
8-3	12047	26.4	29.2				295	13.0			4109						8-3	- 7.34	-0.40
8-4	15694	8.1	13.1				---				----						8-4	- 0.21	2.93
8-5	14882	12.5	20.6				---				468						8-5	- 7.25	-5.72
WEEK	70835	15.0	17.4				474	13.4			4577							- 2.69	2.13

REMARKS:

** Includes blocking, level winding and hanking

*** Includes packing and hanking packing

October 15, 1957 — Brassiere Preform Patent File

1. Bob Nebel (DuPont) suggested program (non woven bra cup) to Al Boese.

2. June 18, 1957 - Al sent Don David to talk with Bob Nebel - Mr. Schieman (Vassar Inc.) and other DuPont men in Chicago.

3. July 10-12, 1957 - Don suggested we start program. Al assigned to Pat Carey.

4. July 12, 1957 - Letter for Al Boese from Mr. Redpath asking laboratory to do work.

5. July 15, 1957 - Discussion between Walt Westberg and Pat to formulate program.

6. July 15, 1957 - Walt wrote up notes (LP 40).

   a. Molded
   b. Cool dry hand
   c. Shape retentian
   d. Washable
   e. Attractive look

7. July 18, 1957 - First samples made by Walt (5610-55) Viscose Fiber - laid on seive - bonded Rhoplex B-15. Suggested air desposition.

8. July 18, 1957 - Received bra samples from (Vassar) (letter).

9. July 24, 1957 - Walt suggested rubber latex for better washing (6821-03).

10. Suggested solvent activated bonding fiber (6821-04).

11. August 11, 1957 - Pat Carey suggested makeing matched molds for heat sealing into form. (6821-08)
    August 19, 1957 - Got cast forms.

12. Cross laid speeds with undrawn Dacron heat sealed - pointed out shrinkage factor - (6821-08).

13. August 20, 1957 - Heat bonded to form and resin treated - Westberg (6821-09)
    September 18, 1957 - Carey thought - see (6821-18).

14. August 23, 1957 - Made first acceptable samples for showing to Mr. Schieman. Carey suggested 15d Nylon (for stitch holding) (6821-10).

15. September 4, 1957 - Samples to Mr. Schieman for sewing into bra (6821-10) II & III.

16. September 9, 1957 - Vac forming of preform (6821-11) Vinyon was used here.

17. September 16, 1957 - Loft and preform of other articles (6821-14).

17a. September 20, 1957 - Letter from DuPont suggested foam as part of form.

18. Use of preformed rubber sheet for making preform web (Walt's idea) (6821-16).

19. October 3, 1957 - Cups to Schieman - Viscose - Vinyon (6821-25).

20. October 10, 1957 - Liquid metal for bonding preform also using screen or needles for making pattern. (Carey's idea).

21. Sew on patterns - heat seal pattern for decoration (6821-27).

22. Not bonding areas between cups (6821-17).

23. Multiple spraying of binder to reduce fuzzying & stiffness (6821-23).

24. October 15, 1957 - First report - Ribbon Report # 631 - by Westberg.

~~25 May 1958~~ - suggestion of net for decoration
25 - April 25 1958 - 7334-25 -
also David suggested net for strength
6821-9 (8-20-57

26 -

FORM 1726-E 11-30-54

COPIES FOR:

MESSRS:
BOESE
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RICHERSON
WALDEN
WESTBERG

RIBBON LABORATORY

LABORATORY REPORT

FILE #_____ # 631 DATE October 15, 1957

SUBJECT:

Molded Non-Woven Brassiere Cups

OBJECT

To develop a technique for molding non-woven brassiere cups embodying the following properties: comfort (seamless), durability, good appearance and economy.

CONCLUSION

Practical laboratory methods have been developed for molding heat-bonded non-woven brassiere cup preforms and for subsequent resin impregnation. Preliminary wash and wear data indicate satisfactory comfort and durability. Wrinkle resistance and better appearance are needed.

REPORT

Investigation of the brassiere manufacturing industry revealed that considerable hand labor involving cutting, fitting, and sewing goes into the making of a standard brassiere cup. It was thought that a non-woven substitute could be made which would eliminate most of this labor cost, also, offer the comfort of seamless construction.

Initial laboratory work has been directed along lines that would result in the making by 3M of the molded cups which would then be sold to the brassiere manufacturer for incorporation with the harness into finished garments. Various methods were tried first for forming and bonding the cups including the following: 1) heat drawing a thermo-plastic resin-bonded non-woven web over a mold, 2) air deposition of carded fibers on a porous screen mold through which suction is taken, followed by resin impregnation, and 3) heat bonding and molding with matched metal molds a fiber batt composed of thermo-plastic and non-thermo plastic fibers.

The first method did not show much promise. Not enough conformability was present in the webs tried. Air deposition of fibers could well be a practical way to make a formed cup. However, it seemed that a considerable amount of time could be spent developing and making equip-

Witnesseth that the foregoing record was typed and signed on or before _____, 19____ the date of affixing my seal and signature hereunto.
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ment using this technique, and also it was felt that it would be desirable to be able to make use of continuous flat webs that our present web forming equipment could make. Accordingly, the third method was investigated more thoroughly.

The molds were obtained from a plaster cast of the inside of a brassiere cup. They consisted of cast aluminum male and female matched molds with a ten mil spacing between molding surfaces to accommodate the web. Webs tried consisted of 50/50 undrawn Dacron/Viscose staple and 50/50 Plasteca/Viscose. The fiber batts were made on the laboratory garnet, and five to seven single weight webs were crossed 90° over each other to reach a ream weight of approximately sixty (60) pounds. The molds were pre-heated to bonding temperature; the trimmed batt was laid over the fremale mold cavity and the male mold engaged. It was noticed that during the time the male mold was moving into place the fiber batt (rather lofty and fluffy from the method of lay up) seemed to gather together and shrink where necessary to conform without wrinkles and fold overs. After a few seconds the molds were cooled with water and separated.

The cups thus formed were fairly well unified though bonding was uneven due to slight mismatches in the molds. Also, due to the rather high temperatures needed (400° + F.) the viscose fibers tended to brown somewhat. The heat-bonded cups were dipped by hand in a 10 per cent Rhoplex B-15 solution with 10 per cent (based on B-15) Rhonite R-2 added for maximum durability and workability. The cups were air dried and cured four minutes at 310° F. Samples of these cups were sewn into brassieres by the Hollywood-Maxwell Company, and are being evaluated in wash and wear tests. After three weeks of wearing and daily hand washing, the wearers report that generally the non-woven cups were more comfortable than the regular sewn bias-cotton cups. Some wrinkling occurs during washing and drying, but not more so than the cotton. The cups tended to fuzz up somewhat. Lack of a good white color seems to be another objection. Use of whiter fiber and pigments should help here.

Because the molds used above were not too well matched and difficult to align properly during use, it was decided to try other methods of forming and bonding. Vacuum forming on apparatus such as "Scotchlite's" sign applicator has proved to be a particularly effective and handy way of molding and heat bonding cups. The technique is as follows:

> Suction is taken on a perforated table. The heated male mold is placed on the table and the fiber batt laid over it. A roughened thin neoprene rubber blanket is pulled down tight over all to make a good seal at the edge of the table. The suction draws and stretches the rubber to fit closely and tightly over the mold. The batt is formed and bonded in this operation. Again, as in the matched mold process, if the batt is lofty and fluffy, the web conforms without wrinkles and fold overs. Webs that have been compacted too much usually fold over at the base of the cup where excess material tends to concentrate during the conforming process.

It was discovered that if extra heat were applied to the rubber blanket from the top while molding was taking place, any excess web that was pressed flat on the table next to the mold would be heat bonded also. If this heat were left off, only the web on the heated mold would bond. This phenomenon may be of importance for reducing waste in a possible production adaptation of the above process.

Cups formed with the vacuum bag technique were made from fluffy, cross laid batts of 50/50 3 denier Vinyon/1 1/2 and 3 denier viscose. The Vinyon served as a binding fiber of lower softening point (about 170°F.) than the plasteca and undrawn Dacron previously used. This lower bonding temperature is an advantage because it permits longer rubber blanket life.

As before, the cups were impregnated with a Rhoplex dispension. Cups were sprayed or dipped with various concentrations of resin. The resin content and speed of drying controlled the softness, resilience, and resistance to fuzzing of the cup surface.

Walter M. Westberg
Ribbon Laboratory

Patrick H. Carey
Ribbon Laboratory

js

The above technique can be extended to mold multiple units on the same table for increased production. Also, the process may be run upside down with the molds above and the rubber below.

The molded web can next be saturated with desired resins by dipping or spraying. The solvent or dispersant for the resin should be chosen so that the primary heat-sealed fiber bond is not destroyed and the molded shape altered.

Description of molded brassiere cup process

The web for the molded brassiere cup is composed of 40% 8.0 denier crimped viscose staple fiber, 40% binder fiber (undrawn Terylene, undrawn Dacron) 20% 3 denier or 6 denier crimped Dacron staple. The web is made on the Rando Webber and is 45 - 55#/ream. The web is vacuum molded as above over an electrically heated aluminum mold. For improved appearance and strength a loosely knit dacron net can be laminated to the outside of non-woven cup. The net is pre-formed somewhat by stretching over the hot mold. The molding process consists of placing the non-woven web on the mold and the pre-formed net over it. The frame is drawn down and the vacuum applied. A bonding time of ten to fifteen seconds is employed with a mold temperature of about 325°F. and a vacuum of 25 inches of mercury. The cup is removed from the mold, cooled and impregnated with water dispersed acrylic resin such as Rhoplex HA 159. A typical formulation:

500	~~H O H~~ water tap
120	HA 159
6.0	Rhonite R-2
9.0	Catalyst AC
1.0	Wetting agent GR-5
0.2	White dye

The cup is dried (containing about 35% resin solids) and cured 1 min. at 310°F., washed and bleached. The Rhonite R-2 is a modified urea formaldehyde resin which serves as a cross-linking agent for the Rhoplex, resulting in improved durability and washability.

Technical Information Agreement

Boese, Alvin W.
Employee's Name (Last, First, Middle)

Gift Wrap & Fabric Administration
Division/Subsidiary

27-1

The term EMPLOYER as used in this Agreement shall mean any of the following by which I have been, am, or may hereafter be employed: (i) Minnesota Mining and Manufacturing Company, a corporation of Delaware having its principal office in St. Paul, Minnesota, (ii) any of its existing subsidiaries, and (iii) any subsidiary which may be hereafter formed or acquired.

EMPLOYER is engaged in the development, manufacture and sale of a variety of products based upon experimental and inventive work, and has accumulated much information, not generally known, relating to EMPLOYER'S existing and contemplated products, manufacturing procedures, methods, machines, compositions, technology, formulas, trade secrets, know-how, research and development programs, and "Inventions" as hereafter defined; all of which is hereafter referred to as "Confidential Information."

The term "Inventions" means discoveries, improvements and ideas (regardless of whether or not patentable) relating to any part of the business or activities of EMPLOYER.

The term "Competitor" means any person, firm or organization (or division thereof) engaged in or about to become engaged in research on or the production and/or sale of any product with which my work for EMPLOYER has been directly concerned, or with respect to which I have acquired Confidential Information by reason of my work with EMPLOYER.

I am employed or desirous of being employed by EMPLOYER in such capacity that, whether or not engaged directly in manufacturing, sales, or research and development activities, by the nature of my duties I have or expect to become informed of Confidential Information and have or may contribute thereto.

In consideration of and as part of the terms of my employment and/or continued employment (as the case may be), and the payment of compensation to me therefor by EMPLOYER during such time as may be mutually agreeable to myself and EMPLOYER:

(1) With respect to all Inventions made or conceived by me (either solely or jointly with others) during the period of my employment by EMPLOYER; and with respect to Inventions made or conceived by me (either solely or jointly with others) within one (1) year after termination of such employment which are based upon Confidential Information to which I shall have had access:

(a) I agree to promptly and fully inform EMPLOYER in writing.

(b) I hereby assign and agree to assign to Minnesota Mining and Manufacturing Company or to such subsidiary corporation as it may designate, all of my rights to all such Inventions, and to all Applications for Letters Patent and Letters Patent granted thereupon covering all such Inventions.

(c) I agree, promptly upon request by EMPLOYER (without charge to EMPLOYER but at the sole expense of EMPLOYER) to execute, acknowledge and deliver to EMPLOYER such written instruments and do such other lawful acts as may be necessary in the opinion of EMPLOYER and/or its Counsel, to obtain and maintain Letters Patent and to vest the entire right, title and interest thereto in Minnesota Mining and Manufacturing Company or in such subsidiary corporation as it may designate.

(2) I agree that except as required in my duties to EMPLOYER, I will not at any time directly or indirectly use or disclose to others any Confidential Information without first obtaining the written consent of EMPLOYER to do so.

(3) I agree that records of Confidential Information prepared by me or which come into my possession during my employment by EMPLOYER, are and remain the property of EMPLOYER, and if and when my employment by EMPLOYER shall terminate, all such records and all copies thereof, shall be left with EMPLOYER.

(4) I agree that I will at no time hereafter assert any rights under any Invention as having been made or acquired by me prior to my employment by EMPLOYER, except as follows:*

*IF THERE ARE NO EXCEPTIONS LISTED, IT IS UNDERSTOOD THERE ARE NONE.

(5) In addition to the other provisions of this Agreement, I further agree that, if my employment with EMPLOYER has been directly connected with a commercial product of EMPLOYER, I will not for a period of two (2) years from the date of the termination of my employment, render services, directly or indirectly, to any Competitor, except that I may accept employment with a Competitor whose business is diversified, and which, as to part of its business, is not a Competitor, provided EMPLOYER shall receive, prior to my employment, reasonable assurance that I will not be expected or required to render services directly or indirectly to any part of such organization which is a Competitor, and/or, if my work for EMPLOYER has not been directly connected with a commercial product, I agree that I will not for such two (2) year period render services, directly or indirectly, to any person or organization wherein my duties would be directly related to the work assigned to me by EMPLOYER as evidenced by records of EMPLOYER, e.g. notebooks and reports; provided, however, that in the event I am unable to obtain employment consistent with my technical qualifications solely because of the provisions of this Paragraph 5 and not because of any restrictions otherwise imposed by law, the provisions of this Paragraph shall be binding upon me only for so long as EMPLOYER shall make payments to me equal to my monthly base pay at termination (exclusive of extra compensation or other employee benefits) for each month in which I shall notify EMPLOYER in writing setting forth my efforts to obtain such employment and advising that although I conscientiously sought such employment, I have been unable to obtain the same solely because of the provisions of this Paragraph 5.

EMPLOYER'S obligation to make or continue the monthly payments herein specified shall terminate upon my obtaining employment, and I will promptly give written notice of such employment to EMPLOYER.

EMPLOYER may at any time relieve itself of the obligation to make or continue the payments herein provided:

(a) By giving me written permission to accept available employment with a specific prospective employer, or

(b) By giving me a written release from all obligations under this Paragraph 5.

EMPLOYER'S obligation to make the monthly payments herein specified shall in no event continue for more than 24 months immediately following my termination of employment with EMPLOYER, and in no event shall EMPLOYER be liable, under this Agreement, or any action relating thereto, for any amount greater than the aggregate of said monthly payments.

All payments due me hereunder shall be made in accordance with EMPLOYER'S established regular procedures.

(6) I agree that all my obligations under this Agreement shall be binding upon my heirs, assigns, and legal representatives and all my rights hereunder may be asserted against Minnesota Mining and Manufacturing Company or any of its subsidiaries by whom I was at any time employed; all rights of EMPLOYER hereunder may be asserted by Minnesota Mining and Manufacturing Company or any of its subsidiaries by whom I was at any time employed.

(7) The law of the State of Minnesota shall govern this Agreement insofar as such law exists and can or will be applied in the jurisdiction where adjudication may be sought.

(8) It is understood that upon acceptance by EMPLOYER as above provided, this instrument supersedes any former written agreement heretofore executed by me relating generally to the subject matter of this Agreement.

(9) I agree the provisions of this Agreement shall be applicable commencing with the date of my employment with EMPLOYER.

Dated: 10/29/59

Alvin L. Breece *(Seal)*

Employee's Signature

803 Lincoln

Employee's Home Address

St. Paul, Minnesota

City *State*

Accepted for EMPLOYER this 30th *day of* October, 19 59.

W. A. Redpath

(Signature of Authorized Representative)

Title: General Manager, Gift Wrap & Fabric Div.