SCAN-PAC

FMSI 14939

TELEPHONE (203) 452-1877
FAX (203) 452-7951

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

588 MONROE TURNPIKE

MONROE, CT 06468

June 3, 1996

Mr. Stephen Dwornik
225 Charleston Court #5
Schaumburg, IL 60193

Dear MR. Dwornik:

Please refer to the enclosed fax from SCAN-PAC Manufacturing concerning your request for a friction wear plate used on railroad passenger cars.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

G. N. Laycock
Executive Director

GNL:ld

FMSI 14940

SCAN-PAC

NON-ASBESTOS FRICTION MATERIAL

FIRST IN QUALITY GATKE® PRODUCTS DIVISION

NON•ASBESTOS PHENOLIC BEARING MATERIAL

9950 N. PORT WASHINGTON RD
MEQUON, WI 53092
PHONE: (414) 241-3890
FAX : (414) 241-8478

DATE: 6/3/96
TO: G. LAYCOCK
FMSI
FROM: DALE STEIN
SUBJECT: FAX 5/31/96

MR LAYCOCK,

WE DO HAVE INFORMATION ON REQUEST THAT YOU SENT. WILL HAVE OUR REP IN LAKE FOREST, IL CONTACT HIM.

FOR YOUR INFORMATION SCAN-PAC PURCHASED THE ASSETS OF GATKE IN JULY 1992

REGARDS
Dale

TELEPHONE (203) 452-1877

FAX (203) 452-7951

FRICTION MATERIALS STANDARDS INSTITUTE, INC.
588 MONROE TURNPIKE
MONROE, CT 06468

*** FAX***FAX***FAX***

TO: S. SCANDRETT

COMPANY: SCAN PAC

FROM: G. LAYCOCK

DATE: 5/31/96

NUMBER OF PAGES: 2 (Including Cover)

MESSAGE:

DO YOU HAVE ANY INFORMATION ON THE FOLLOWING REQUEST?
FRICTION WEAR PLATE FOR RAILROAD CAR

PLEASE ADVISE
G. LAYCOCK

FMSI 14942

Stephen Dwornik
225 Charleston Court #5
Schaumburg, Illinois 60193

May 13, 1996

Friction Materials Standards Institute
588 Monroe Turnpike
Monroe, Conneticut
06468

Attention: Director of Quality Standards

I am trying to find material specifications for a friction wear plate used on railroad passenger cars. The dimensions on this part call for a 16-1/2" O.D., 4" I.D. with a 3/4" thickness. The application for this part is in the center bowl of the truck assembly.

The original manufacturer of this part was the Gatke Corporation, who is no longer in business. Their part number for this was 352223110. Your assistance would be greatly appreciated. Thank you.

Respectfully,

Stephen Dwornik

Stephen Dwornik

SCAN-PAC

NON-ASBESTOS FRICTION MATERIAL

FIRST IN QUALITY GATKE® PRODUCTS DIVISION

NON•ASBESTOS PHENOLIC BEARING MATERIAL

9950 N. PORT WASHINGTON RD
MEQUON, WI 53092
PHONE: (414) 241-3890
FAX : (414) 241-8478

DATE: 6/3/96
TO: G. LAYCOCK
FMSI
FROM: DALE STEIN
SUBJECT: FAX 5/31/96

MR LAYCOCK,

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REGARDS
Dale

Stephen Dwornik
225 Charleston Court #5
Schaumburg, Illinois 60193

May 13, 1996

Friction Materials Standards Institute
588 Monroe Turnpike
Monroe, Conneticut
06468

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Respectfully,

Stephen Dwornik

Stephen Dwornik

TELEPHONE (203) 452-1877
FAX (203) 452-7951

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

588 MONROE TURNPIKE
MONROE, CT 06468

December 17, 1990

Mr. Skip Scandrett
Scan-Pac Mfg., Inc.
9950 No. Port Washington Road
Mequon, WI 53092

Dear Mr. Skip Scandrett:

The Institute is asking for your help concerning Clutch Facing Information. This letter is being sent to all Members who deal with clutch facings.

During my tenure with the Institute (slightly less than 2 years), the Institute has made over 100 disc brake lining and shoe assignments, over thirty drum brake lining and shoe assignments and one (1) clutch facing assignment. In all instances the information which generated the assignments was submitted by Members.

We have reviewed the specifications which we received from MVMA for Ford and Mercury passenger cars over the past three years and have partial information on some clutch facings but not enough information to make an assignment.

1989-90	Taurus SHO - Clutch manufacturer Valeo OE facing is steel backed made by Valeo Size: 235 x 155 x 3.35 16 holes
1991	Taurus SHO - Industry Articles say there is a new clutch for 1991 but have no information on it.
1989-91	Thunderbird Super Coupe - Clutch manufacture LUK OE facing is made by Valeo F202 material Size: 280 x 198 x 3.45 16 holes
1989	Probe GT
1990-91	Probe LX & GT - Clutch manufacturer Daikin OE facing is Valeo - "semi-mold" Size: 240 x 160 x 3.5 32 holes

1991 Escort LX (probably Mazda also)
1991 Tracer (all except LTS) - Clutch manufacturer Daikin
OE facing is made by Nihon Valqua - molded material
Size: 200 x 130 x 3.8 (pressure plate side)16 holes
200 x 130 x 3.5 (fly wheel side) 16 holes

1991 Escort GT
1991 Tracer LTS - Clutch manufacturer Daikin
OE facing is made by Nihon Valqua - molded material
Size: 215 x 150 x 3.8 (pressure plate side)16 holes
215 x 150 x 3.5 (fly wheel side) 16 holes

1991 Capri 1.6L - Clutch manufacturer Daikin
OE facing is made by Valqua - "semi-mold" material
Size: 200 x 132 x 3.5 16 holes

1991 Capri 1.6L Turbo - Clutch manufacturer Daikin
OE facing is made by Valqua - "semi-mold" material
Size: 225 x 160 x 3.5 (pressure plate side)16 holes
225 x 160 x 4.1 (fly wheel side) 16 holes

The information from MVMA listings above along with hole specifications and locations could be used to generate an FMSI assignment. We would prefer a drawing or sketch showing OD, ID, thickness, hole size and location. The above missing information is for Ford passenger cars only. We will be reviewing General Motors and Chrysler information when it is received.

Another area that the Institute receives almost no information is Imports and these make up almost 30% of the U.S. vehicle sales. The Institute desperately needs your assistance to obtain information in this area. Many of you may be making and distributing certain applications using your own p/n designation. An FMSI assignment of a part number will give the part nation wide (in fact world wide) distribution.

Again the Institute is asking for your participation, support and help with clutch facing information. Thank you.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

G. N. Laycock
Executive Director

GNL:ld

FRICTION MATERIALS STANDARDS INSTITUTE, 588 MONROE TURNPIKE, MONROE, CT 06468

Lori 4/19/90
Change Scan-Pac Billing
from $2100/yr to $2600/yr

Friction Materials Standards Institute
588 Monroe Turnpike
Monroe, CT 06468

Gentlemen:

In response to BULLETIN NO. 961 of March 21, 1990 concerning the declaration of categories to be used in determining the annual fee, our company is engaged as follows:

Category	We sell to the United States replacement market
Disc Brake Linings or Pads (All)	
Drum Brake Linings - Under 3/4" Nominal Thickness	X
Brake Blocks - 3/4" Nominal Thickness and Over	X
Clutch Facings (All)	X

Please affix an "X" in the square to the right of the category or categories in which your company is engaged.

Signature: [signature]

Company: Scan-Pac Mfg., Inc

Date: 3/29/90

Please return declaration to the Institute Office no later than April 6, 1990.

FMSI 14948

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac Manufacturing Co.
500 Blue Sky Parkway
Lexington, KY 40505

Attn: Cynthia Fountain

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
10-28-82	10-28-82	1st Class	Cynthia Phone		Net	004057

QUANTITY	DESCRIPTION	PRICE	AMOUNT
20 Prints	Two Prints (Long and Short) of each FMSI Number: 2006TT, 2027, 2035, 2089T, 2089AT, 2091T, 2125, 2139TT, 2140BT, 2140T 2006T is only available undrilled There is no 2139AT - sent 2139TT		

Jimmy Seals

Sandy Replies 10/86
Cindy

Item # NV-R75 ©Wheeler Group Inc.

PACKING LIST

FMSI 14949

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

~~[illegible] PARAMUS NEW JERSEY 07652 • PHONE (201) 845-8440~~

588 Monroe Turnpike, Monroe, CT 06468

SOLD TO

Scan-Pac Manufacturing, Inc.
Attn: Dale
9950 No. Port Washington Road
Mequon, WI 53092

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
12-20-89	12-20-89	1st Class	Sandy		Net	005869

QUANTITY	DESCRIPTION	PRICE	AMOUNT
8 Prints	FMSI 4624, 4643, 4678A, 4686, 4688, 4880, 7103 & 7104	$1.00ea	$8.00
	PLEASE NOTE: NEW ADDRESS		

Item # NV-R75 ©Wheeler Group Inc.

FMSI 14950

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

EAST 210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac Manufacturing Co.
(Attn.: Sandy)
500 Blue Sky Parkway
Lexington, KY 40505

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B	TERMS	INVOICE NO.
01-25-89	01-25-89	1st Class	Sandy 1/25		No Charge	0001261

QUANTITY	DESCRIPTION	PRICE	AMOUNT
4 Prints	FMSI 4656(2), 4657(2)	No Charge	

ITEM #NWR72 © WHEELER GROUP INC.

TRIPLICATE COPY

FMSI 14951

SCAN-PAC

9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092

PURCHASE ORDER

DATE 2/22/88

This order number must appear on all correspondence, invoices, packages and shipping papers.

№ 1198

TO

Tweedle Litho Company
24000 Harper Ave.
St. Clair Shores MI 48080

Ship to:

[X] Scan Pac Mfg., Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

[ ] Scan Pac Mfg., Inc.
500 Blue Sky Parkway
Lexington, Ky. 40511

INVOICE TO SCAN-PAC MFG., INC.
9950 N. PORT WASHINGTON ROAD
MEQUON, WISCONSIN 53092

SHIP VIA	F.O.B.	TERMS	DELIVERY REQUIRED
Best Way			

QUANTITY	DESCRIPTION	PRICE	AMOUNT
25 ea	Automotive Data Book		

Paid 6/14/88

B

Kentucky Sellers Permit Nos.
67706

Wisconsin Sellers Permit Nos.
201865

[ ] Taxable [ ] Exempt

SCAN-PAC

FMSI 14952

BY: Anne E. Riemeyer

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac Mfg. Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
06-01-88	05-05-88	UPS	1198	Detroit, MI	Net	005431

QUANTITY	DESCRIPTION	PRICE	AMOUNT
25	1988 Automotive Data Books	$1.16	$29.00
	UPS Charges		3.42
	Total:		$32.42
	Order was placed on Tweddle Litho Co.		

B

Item # NV-R75 ©Wheeler Group Inc.

FMSI 14953

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

February 22,1988

E.W. Drislane
Friction Materials Standard Institute, Inc.
Bergen Mall Office
E. 210 Route 4
Paramus NJ 07652

Dear Mr. Drislane,

Sorry about the misunderstanding regarding the Automotive Data Books. Please disregard my original order and replace it with this order 1198.

We look forward to receiving our new Data books.

Regards

Anne Rismeyer
Scan-Pac Mfg.,Inc.

THE BRAKE LINING OF THE FUTURE IS HERE TODAY
THE COMPLETE LINE · EXCLUSIVELY NON-ASBESTOS
MOLDED & WOVEN ROLL LINING · BLOCKS · FACINGS AND SEGMENTS
FLAT SHEET · CUSTOM MOLDED & FABRICATED PARTS · EEL-SLIP®

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092

PURCHASE ORDER

DATE 2/16/88

This order number must appear on all correspondence, invoices, packages and shipping papers.

№ 1194

TO Tweddle Litho Company
24000 Harper Ave
St. Clair Shores MI 48080

Ship to:

☒ Scan Pac Mfg., Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

☐ Scan Pac Mfg., Inc.
500 Blue Sky Parkway
Lexington, Ky. 40511

INVOICE TO SCAN-PAC MFG., INC.
9950 N. PORT WASHINGTON ROAD
MEQUON WISCONSIN 53092

SHIP VIA	F.O.B.	TERMS	DELIVERY REQUIRED
UPS if possible			

QUANTITY	DESCRIPTION	PRICE	AMOUNT
25 ea	Automotive Data Book		
	No cover, no punch, no glue, no trim		

Kentucky Sellers Permit Nos
67706

Wisconsin Sellers Permit Nos.
201865

☐ Taxable ☐ Exempt

SCAN-PAC

BY: Anne Riemeyer

FMSI 14955

TELEPHONE (201) 845-0440

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

BERGEN MALL OFFICE CENTER
E. 210 ROUTE 4
PARAMUS, N. J. 07652

February 19, 1988

Ms. Anne Rismeyer
Scan Pac Mfg. Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

Dear Ms. Rismeyer:

This is with reference to your Purchase Order No. 1194, copy attached, for 25 copies of our 1988 Automotive Data Book.

I'm afraid my BULLETIN NO. 911 announcing the printing of the 1988 Automotive Data Book may have been misleading. Where I referred to Members wishing to order without cover to state "No Cover, no punch, no glue, no trim," I was only considering substantial orders (those of 1,000 copies and over) where some wished to have their own professionally printed cover glued in place. When we fill this type order, the printer sends signatures of 8 or 16 pages all on one sheet, folded for another printer to glue into a special cover. That printer then places these folded signatures in place inside the new cover, and glues, punches, trims, etc.

For your order of 25 copies, it would be simpler for all parties to take the catalogs with cover, and then tear the cover off if you wish to distribute it in a binder or other folder type arrangement.

For an order of 25 copies, the printer is unable to provide you with the signatures (No cover, no punch, no glue, no trim) without an extra charge. If shipped this way, they are ordinarily shipped on a skid by truck.

Could you please review this order, and advise of any special needs. As I noted, with this quantity, it would be simple to just tear off our covers (punched or unpunched). Please let me know how you wish your catalogs finished. Thank you.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

TELEPHONE (201) 845-0440

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

BERGEN MALL OFFICE CENTER
E. 210 ROUTE 4
PARAMUS, N. J. 07652

April 11, 1986

Mr. Henry A. Scandrett
Scan-Pac Mfg., Inc.
9950 N. Port Washington Rd.,
Mequon, WI 53092

Dear Mr. Scandrett:

I'm following up on our annual fee billing that was made on January 1, 1986. We're starting to gather the Budget and Treasurer Report Information, and I noticed that we had not as yet received payment on these billings.

The billing was Invoice 4848 in amount of $1,275.00 as billed on January 1. A copy of the Invoice is enclosed.

Could you please make payment on this billing so that I can have this account clean before I start preparing the financial reports. Thanks.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

EWD/dr
Enc.

To:

Friction Materials Standards Institute
East 210 Route 4
Paramus, NJ 07652

SCAN-PAC
FRICTION MATERIAL
9950 N. PORT WASHINGTON RD.
MEQUON, WI 53092
PHONE (414) 241-3890

SUBJECT: Order of 1986 Automotive Data Book

DATE: 2/11/86

Reply Message

MESSAGE

Would you please send us 25 Automotive Data Books - punched.

Thank you.

Scan-Pac Mfg., Inc.
9950 North Port Washington Road
Mequon, WI 50392

REPLY

SIGNED Jean L. Landeck

DATE

Pd 2/20/86

Tw 2/17

(5)

SIGNED

RECIPIENT

FMSI 14958

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac Manufacturing Co.
9950 North Port Washington Road
Mequon, WI 53092

SHIPPED TO

Same

Attn.: Jean L. Landaal

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
05-23-86	05-06-86	UPS	Landaal 2/11/86	Detroit	Net	004927

QUANTITY	DESCRIPTION	PRICE	AMOUNT
25	1986 Automotive Data Books with 5 hole punch	$.958	$23.95
	UPS Charges		3.65
	Total		$27.60
	Order per Jean L. Landaal Message of 2/11/86		

5

Item # NV-R75 ©Wheeler Group Inc.

FMSI 14959

To:

Friction Materials Standards
East 210 Route 4
Paramus, NJ 07652

SCAN-PAC
FRICTION MATERIAL
9950 N. PORT WASHINGTON RD.
MEQUON, WI 53092
PHONE (414) 241-3890

SUBJECT: 1984 Automotive Data Books

DATE: 2/17/84

Reply Message

MESSAGE

Gentlemen:

We would like to place an order for fifty (50) catalogs, punched.

Send to: Scan-Pac Mfg., Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

Thank you.

SIGNED Jean L. Landock

DATE

REPLY

R

SIGNED

RECIPIENT

FMSI 14960

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac, Inc.
9950 North Port Washington Road
Mequon, WI 53092

Attn.: Jean Landaal

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
06-28-84	06-01-84	United Parcel	Landaal	Detroit, MI	Net	004452

QUANTITY	DESCRIPTION	PRICE	AMOUNT
50	1984 Automotive Data Books with 5 hole punching	$.92	$46.00
	United Parcel Charges		4.92
	Total		$50.92

R

Item # NV-R75 ©Wheeler Group Inc.

FMSI 14961

To:

Friction Materials Standards
E-210 Route 4
Paramus, NJ 07652

SCAN-PAC
FRICTION MATERIAL
9950 N. PORT WASHINGTON RD.
MEQUON, WI 53092
PHONE (414) 241-3890

SUBJECT: Catalogs

DATE: 6/7/83

Reply Message

MESSAGE

Gentlemen:

Please enter our order for 50 1983 Brake Block Identification catalogs with 5 hold punching. Send to the above address. Thank you.

REPLY

SIGNED Jean L. Landaal

DATE

Payment rec'd 9/15/83

(H)

SIGNED

RECIPIENT

FMSI 14962

FMSI 14963

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Scan-Pac Manufacturing
9950 N. Port Washington Road
Mequon, WI 53092

Attn.: Jean Landaal

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
08-12-83	08-11-83	Parcel Post	Jean Landaal	Paramus	Net	004267

QUANTITY	DESCRIPTION	PRICE	AMOUNT
50 copies	1983 Brake Block Identification Catalog with 5 hole punch	$.278	$13.90
	Parcel Post Charges		3.46
	Total		$17.36

H

Item # NV-P75 ©Wheeler Group Inc.

FMSI 14964

To:

Friction Materials Standards
E.210 Route 4
Paramus, NJ 07652

SCAN-PAC
FRICTION MATERIAL
9950 N. PORT WASHINGTON RD.
MEQUON, WI 53092
PHONE (414) 241-3890

SUBJECT: Catalog order

DATE: 3/5/82

Reply Message

MESSAGE

Please send us twenty-five (25) Basic Catalogs punched.

Thank you.

Jean Landaal

PC 3/20/82

REPLY

SIGNED

DATE March 8, 1982

We assume this order is for the new 1982 Automotive Data Books, which will be available in May 1982. We have entered your order accordingly.

If it is for the already published 1981 Automotive Data Book, please advise.

E. W. Drislane

SIGNED

RECIPIENT

INVOICE

FRICTION MATERIALS STANDARDS INSTITUTE

E-210 ROUTE 4 • PARAMUS, NEW JERSEY 07652 • PHONE (201) 845-0440

SOLD TO

Sean-Pac Mfg. Co.
9950 N. Port Washington Road
Maquon, WI 53092

Attn.: Jean Landaal

SHIPPED TO

Same

DATE	DATE SHIPPED	SHIPPED VIA	YOUR ORDER NO.	F.O.B.	TERMS	INVOICE NO.
08-09-82	08-09-82	Parcel Post	Jean Landaal	Paramus	Net	004004

QUANTITY	DESCRIPTION	PRICE	AMOUNT
25	1982 Automotive Data Book with 5 hole punch	$784/M	$18.35
	Parcel Post Charges		4.45
	Total		$22.80
	(Ordered by Jean Landall Memo of March 5, 1982)		

Item # NV-R75 © Wheeler Group Inc.

FMSI 14967

SCAN-PAC

TELEPHONE (201) 845-0440

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

BERGEN MALL OFFICE CENTER
E. 210 ROUTE 4
PARAMUS, N. J. 07652

November 16, 1982

Mr. H. A. Scandrett
Scan-Pac Manufacturing, Inc.
9950 N. Port Washington Road
Mequon, WI 53092

Subject: Annual Fee Billing

Rec'd check 11/22

Dear Mr. Scandrett:

The fee billing for the first half of this fiscal year (July 1, 1982 to December 31, 1982) was mailed on July 1, 1982. We have not as yet received payment from Scan-Pac for this billing.

As we are nearing the end of this fee billing period, it is now considered past due. Would you please review this billing and clear it up. We have enclosed copies of both your account balance with the Institute and that invoice. If you have already remitted, would you kindly send us a replacement check.

Thank you.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

EWD/e

SCAN PAC

September 26, 1979

Ms. Cynthia Fountain
Scan-Pac Mfg. Co., Inc.
500 Blue Sky Parkway
Lexington, KY. 40505

Dear Ms. Fountain:

There is no print #4646E. Therefore we are enclosing a copy of print #4646.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

EWD/lmc
Enc.

E. W. Drislane
Executive Director

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

Cwa

September 3, 1981

Friction Materials Standards Institute, INC
E 210 Route 4
Paramus, N.J. 07652

ATTN: Mr. E.W. Drislane

Dear Mr. Drislane,

Would you please send us a copy of the Commissions Working Group recommendations referred to on page 9 of the minutes of the Annual Membership Meeting.

Yours very truly,

H.A. Scandrett

HAS:esl

THE FIRST IN NON-ASBESTOS ORGANIC BRAKE LINING TO COMPLEMENT OUR ASBESTOS LINE

MOLDED ROLL LINING · MOLDED BLOCKS · MOLDED FLAT SHEET
MOLDED FACINGS AND FACING SEGMENTS · 50 EEL SLIP

September 8, 1981

Mr. H. A. Scandrett
Scan-Pac Manufacturing Company
9950 N. Port Washington Road
Mequon, WI 53092

Dear Mr. Scandrett:

Per your September 3, 1981 letter, I am enclosing a copy of the Working Group Recommendations for the Commission of the European Communities. These are the papers referred to on Page 9 of the minutes of the Annual Membership Meeting.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

EWD/erc
Enc:

E. W. Drislane
Executive Director

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

February 11, 1981

Friction Material Standards Institute, Inc.
E. 210 Route 4
Paramus, N. J. 07652

Subject: Automotive Data Book
Tweddle Litho Company

Gentlemem:

Would you please send us twenty-five copies of the Automotive Data Books, and invoice us for the same .

Very truly yours,
Scan- Pac Mfg., Inc.

Gladys W. Suckow

Gladys W. Suckow

GWS/gs

Shipped # 3631
Rec'd 5/22/81
Payment rec'd 6/20/81

K

THE FIRST IN NON-ASBESTOS ORGANIC BRAKE LINING TO COMPLEMENT OUR ASBESTOS LINE

MOLDED ROLL LINING · MOLDED BLOCKS · MOLDED FLAT SHEET
MOLDED FACINGS AND FACING SEGMENTS · 50 EEL SLIP

SCAN-PAC

RICHMOND DIVISION FOUR MILE RICHMOND, KY 40475 (606) ~~624-2977~~ 269-8802

February 6, 1979

Miss Emily R. Collins
Friction Mat'ls Standards Inst.,Inc.
E 210 Route 4
Paramus, NJ 07652

Dear Emily,

Regarding your letter dated February 1, 1979 concerning our address change and Mr. R. G. Johnson's address.

Please disregard the above address on our letter head. Your records are correct in showing our company located at 500 Blue Sky Parkway in Lexington, Kentucky. Our company moved here in October 1978.

Mr. Johnson's address should never have been Mequon, WI and you are correct in having him listed at our Lexington location.

Please note that any future correspondence may be directed to me. Patty Watson is no longer with our company.

Thank you.

Sincerely

Cindy

Cynthia Fountain

CF/cf

Changed - my records - 1
Change - Mr. D + Laura's

OK ERW
2/14/79

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

FMSI 14973

February 1, 1979

Miss Patty Watson
Scan-Pac Mfg. Co., Inc.
500 Blue Sky Parkway
Lexington, KY. 40505

Subject: Change of address

Dear Patty:

Could you please help me on the above subject matter.

On my records I show you at the above address. Also, for some strange reason I changed Mr. R. G. Johnson to that address. I can find no authorization for this change. Would you please let me know if Mr. Johnson is still at Mequon, WI. or has he been transferred to Lexington, KY.

Thank you for any help you can give me.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

ERC/erc

Emily R. Collins

MAILING LIST CHANGE

Member Scan Pac Date 11/7/78

This change effects the following lists:

General Bulletins - Active	( )	Foreign Shoe Bulletins	( )
General Bulletins - Regional	( )	Delegates & Alternates	( )
General Bulletins - Licensees	( )	Annual Fee Billing	( )
Data Book Bulletins	(X)	Regular Billing	( )
Shoe Bulletins	( )		

Change List As Follows:
The Richmond KY plant has moved to:
Scan Pac Mfg & Sales
500 Blue Sky Parkway
Lexington, KY 40505

Source of Change: Patty Watson, Scan Pac, 11/7/78

	Name	Date
Requested by:	Gene	11/7
Rolodex Files (Both) Changed:	—	—
Addressograph Plate Changed:	—	—
Address/Telephone Directory Changed:	—	—
Mailing Lists	EPC	1/3/79

* Patty Watson is the only one I use this address for. It does not appear any place else
EPC 11/13/78

FMSI 14975

SCAN-PAC

MAY 11 1979

MR DALE STEIN CALLED RE MAN BUS 10260
(NO INFORMATION ON SIZE)

FMSI 14976

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

May 17, 1978

FRICTION MATERIALS STANDARDS INSTITUTE
East 210 Route 4
Paramus, New Jersey 07652

NO SUCH NUMBER

Dear Emily:

Please send a copy of the print for Part No. 1254-CD.

Also, please send me the latest FMSI Catelog on Brake Blocks and Brake Lining (Disc Pads).

Thank you very much for your cooperation with me.

Sincerely,

Scan-Pac Manufacturing Co.

Patty

Patty Watson

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

May 24, 1978

Scan-Pac Mfg. Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

Attention: Miss Patty Watson

Dear Miss Watson:

This is to reply to your letter of May 17, 1978. As you will note we do not have a print for FMSI 1254C. There is no such release.

In your second paragraph you requested a copy of the latest FMSI catalog on brake blocks and brake linings (disc pads). We are enclosing the following catalogs:

1975 Brake Block Identification Catalog
1978 Brake Shoe Identification Catalog
1978 Supplement to the 1977 Automotive Data Book

We had also published a "1977 Automotive Data Book" but we are completely out of these particular catalogs. The enclosed are the latest catalogs that we have in the area you indicated.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

E. W. Drislane
Executive Director

EWD/lmc
Encs.

FMSI 14978

SCAN-PAC

9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

May 16, 1978

Friction Materials Standards Institute
East 210 Route 4
Paramus, New Jersey 07652

Dear Emily:

Please send the a copy print for part number 4398-AD.

Thank you.

Patty

Patty Watson
Scan-Pac Mfg. Co.
Richmond Division
North Estill & 4 Mile Ave
Richmond, Kentucky 40475

Shipper # 370
no charge

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

FMSI 14979

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

April 10, 1978

Friction Materials Standards Institute Inc.
E-210, Route 4
Paramus, New Jersey 07652

Dear Sir:

I received your FMSI News Bulletin today and am interested in the last item on the FMSI News Bulletin.

Please send the prints for the New Rockwell "Q Series" Brakes. The FMSI Numbers you have listed are #4514G, for the 6" and narrower widths, and the FMSI Numbers for 7" you list #4515G and for the 8 5/8" you list FMSI Number 4551E.

Please send the above FMSI Numbers and any other Prints that would be applicable.

Thank you.

Sincerely,

Scan-Pac Manufacturing Co.
Richmond Division

Patty Watson

Patty Watson

PS: Please send the Prints to:
Scan-Pac Manufacturing Co. Inc.
Richmond Division
North Estill & 4-Mile Ave.
Richmond, Kentucky 40475

Shipper # 350
+ Prints
pd 4/13/78

4514 G
4515 G
4551 E - Cam + Anchor

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

Scan Pac

December 1, 1977

Mr. Paul Vandenberg
Scan-Pac Mfg., Inc.
9950 N. Port Washington Rd.
Mequon, WI 53092

Dear Paul:

In line with your letter of November 23, 1977 we have forwarded under separate cover a copy of the OSHA proposed rulemaking as described in our Bulletin #612.

In reviewing my bulletin I noticed that there could be some confusion as to where one should write for a copy of these regulations. You were correct in writing us, as we have a master copy on file here.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

EWD/lmc

E. W. Drislane
Executive Director

FMSI 14981

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

Nov. 23, 1977

Friction Materials Standards Institute
E 210 Route 4
Pacamus, NJ 07652

ATTN: E.W. Drislane

Dear Ed,

On October 12 in your Bulletin No. 612, you indicated the full text of OSHA's proposed rulemaking was available as published in the Federal Register.

We would like a copy, but are not certain whether we order from you or someone else. Can you help us out"

Very truly yours,

Paul J. Vandenberg
Scan Pac Manufacturing

PJV/bjs

N.C.
Shipped per 311
post 11/28/77
4th Class

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

Scan Pac

May 11, 1977

Mr. Paul J. Vandenberg
Scan-Pac Mfg., Inc.
9950 N. Port Washington Road
Mequon, WI 53092

Dear Mr. Vandenberg:

This is to acknowledge your reservation form for you and Mrs. Vandenberg for arrival 6/18/77 and departure 6/23/77, and the registration fee for $20.

However, there is no fee required for Mrs. Vandenberg, and we are therefore returning $10 of that payment.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

EWD/erc
Enc:

E. W. Drislane
Executive Director

FMSI 14983

SCAN-PAC

RICHMOND DIVISION FOUR MILE RICHMOND, KY 40475 (606) 624-2977

May 2, 1977

Friction Materials Institute, Inc.
Bergen Mall Office Center
E-210 Route 4
Paramus, New Jersey 07652

Dear Mr. Drislane:

We received your F.M.S.I. Newsletter of April 25, 1977, advising you have additional copies of Brake Shoe and Brake Block identification catalogs.

We would appreciate very much in receiving these catalogs, but would only be interested in 3 or 4 copies each. If these catalogs can be forwarded "No Charge" we would be most greatful.

However, if the catalogs are for purchase only please advise minimum quantity and price per copy.

Thanking you in advance for your prompt attention and cooperation.

Sincerely,

Scan-Pac Manufacturing Co.
Richmond Division

C. D. Covington

CDC/mpw

Supply H 244
Rec'd 5/11/77
8 catalogs

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

Scan-Pac

July 7, 1976

Mr. H. A. Scandrett
Scan-Pac Manufacturing, Inc.
9950 N. Port Washington Road
Mequon, WI 53092

Dear Mr. Scandrett:

You may have received an institute bulletin asking input for our historical sales program.

Attached is a copy of the Accountants Report as rendered for December 31, 1975. Most manufacturers of automotive friction materials participate. You may notice that two manufacturers primarily concerned with industrial products (Gatke, Reddaway) do not participate.

Participation is entirely up to you. If you do participate, you receive copies of the summary report.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

EWD/erc
Encl

E. W. Drislane
Executive Director

FMSI 14985

Scan-Pac

July 1, 1976

Mr. H. A. Scandrett
Scan-Pac Manufacturing Inc.
9950 N. Port Washington Road
Mequon, WI. 53092

Dear Mr. Scandrett:

The Institute will be sending bulletins on various items relating to our industry to both you and Mr. Vandenberg, whom you indicated would serve as the Alternate for Scan-Pac. Some will concern asbestos, highway safety, catalogs, etc. It may be that some is not of interest. After you've received our bulletins you might wish to add or delete individuals on your mailing list. If so, please let me know.

Under separate cover I am forwarding copies of recent FMSI Catalogs. Copies are available at nominal cost. We have only a few copies each left of the following:

1976 Supplement to the 1975 Automotive Data Book
1975 Brake Block Identification Catalog
1974 Industrial Friction Material

If you wish copies, please let me know.

I realize that a lot of our work is for passenger cars and trucks, and these may not be of interest. However, some of your customers may be interested in the catalogs.

In another separate mailing, you will be receiving our invoice for 1/2 the annual fee. The annual fee is computed as $1,050 basic, plus $650 for one category, for a total of $1,700. The invoice will be for $850, as the fee from July 1, 1976 to December 31, 1976. (We bill the annual fee in two installments—at July 1, and January 1).

If you have any questions, concerning fees, bulletins, mailing lists, etc., please let me know.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

EWD/erc
cc-Mr. Vandenberg

FMSI 14986

June 22, 1976

Mr. H. A. Scandrett
Scan-Pac Manufacturing, Inc.
9950 N. Part Washington Road
Maquon, Wisconsin 53092

Dear Mr. Scandrett:

This is a follow-up on my June 2, 1976 letter and your application.

We did have the necessary 3/4 of the membership at our June 16, 1976 meeting, and they voted unanimously to accept your application. Scan-Pac Manufacturing, Inc. was elected an Active Member in the Institute.

Your membership will commence on July 1, 1976, the start of our fiscal year. I will be adding you to our mailing list and will contact you with more information just as soon as the paper-work gathered at our annual meeting is back under control.

I will look forward to meeting you sometime during this coming year.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

EWD/lmc

E. W. Drislane
Executive Director

FRICTION MATERIALS STANDARDS INSTITUTE, INC., E-210 ROUTE 4, PARAMUS, N.J. 07652

B U L L E T I N

N O. 5 7 0

June 4, 1976

APPLICATION FOR ACTIVE MEMBERSHIP--SCAN-PAC, INC.

The Institute is advising the membership at this time on the receipt of an application for Active Membership for Scan-Pac, Inc., of Mequon, Wisconsin. The application is now being reviewed by the Membership Committee.

Mr. H. A. Scandrett, President of Scan-Pac, is fairly well known in the industrial (non-automotive) friction materials area. Up until Johns-Manville went out of the friction materials business, he was a distributor of J-M products. Back in 1973, Scan-Pac purchased manufacturing equipment and technical assistance to finish sheeter stock purchased from J-M. The Scan-Pac operation is a manufacturing operation, using sheeter stock as its basic material. They roll, mold, cure, drill, grind and finish the material.

Over the past three years I have had correspondence with Scan-Pac and had talked with Mr. Scandrett about membership. An early stumbling block to Scan-Pac's membership was the cost to them. Based on earlier correspondence, I told them it might be three categories--brake linings, brake blocks and clutch facings. In going over this question, they would actually be charged for one category only--brake linings. Their blocks are essentially molded segments up to 1/2" thick and their facings are not used in markets "where the FMSI numbering system is available." (Snowmobiles, cranes, presses, etc.)

Actually, Scan-Pac does not use the FMSI numbers even in the brake lining category. I have reviewed their catalog--roll lining to 3/8" thick; molded "blocks" to 1/2" thick; molded facings 1/8" to 3/8" thick; molded flat sheets; and other non-friction material products. The catalog does not show any FMSI numbers. All applications are non-automotive.

This information is forwarded for background only. No action is being solicited form the membership at this time. However, if the Membership Committee and the Board of Directors recommend acceptance of this application, before the Annual Membership Meeting, and at least 75% of our membership is in attendance at the meeting, it may be put up for a vote at that time. If not, mail ballots will be used.

E. W. Drislane
Executive Director

FRICTION MATERIALS STANDARDS INSTITUTE, INC., E-210 ROUTE #4, PARAMUS, N.J. 07652

June 3, 1976

TO: Membership Committee (Greenan, Carrigan, Kelly)

SUBJECT: Application for Membership--Scan-Pac, Inc.

I have received an application for membership from Scan-Pac, Inc., Mequon, Wisconsin. A copy is enclosed for your review. The $1,000 initiation fee was received with the application. The application is in good form.

Mr. H. A. Scandrett is fairly well known in the industrial (non-automotive) friction materials area. Up until Johns-Manville went out of the friction materials business, he was a distributor of J-M products, as well as products manufactured by others. Back in 1973, Scan-Pac purchased manufacturing equipment and technical assistance to finish sheeter stock purchased from J-M.

The Scan-Pac operation is a manufacturing operation, using sheeter stock as its basic material. They roll, mold, cure, drill, grind and finish the material.

Over the past three years I have had correspondence with Scan-Pac and had talked with Mr. Scandrett about membership. An early stumbling block to Scan-Pac's membership was the cost to them. Based on earlier correspondence, I told them it might be three categories--brake linings, brake blocks and clutch facings. In going over this question, they would actually be charged for one category only--brake linings.

Their "blocks" are actually molded segments ranging in thickness from 1/8" to 1/2". They would not fall under our "block" category which is 3/4" nominal. As regards clutch facings, our category declaration states: "...sold to markets where the FMSI numbering system is available." Scan-Pac sells to specialty fields where we don't have FMSI numbers: snowmobiles, cranes, presses. Based on this more recent review, I advised Mr. Scandrett that he would report "brake linings" only as a category. A member needs one category to qualify for membership.

Actually, Scan-Pac does not use the FMSI numbers even in the brake lining category. I have reviewed their catalogs--roll lining to 3/8" thick; molded "blocks" to 1/2" thick; molded facings 1/8" to 3/8" thick; molded flat sheets; and other non-friction material products. The catalog does not show any FMSI numbers. All applications are non-automotive.

Would you please indicate on the attached ballot your recommendation on Scan-Pac's application to be an Active Member of the Institute.

E. W. Drislane
Executive Director

FRICTION MATERIALS STANDARDS INSTITUTE, INC., E-210 ROUTE #4, PARAMUS, N.J. 07652

June 3, 1976

TO: Membership Committee (Greenen, Carrigan, Kelly)

SUBJECT: Application for Membership--Scan-Pac, Inc.

I have received an application for membership from Scan-Pac, Inc., Mequon, Wisconsin. A copy is enclosed for your review. The $1,000 initiation fee was received with the application. The application is in good form.

Mr. H. A. Scandrett is fairly well known in the industrial (non-automotive) friction materials area. Up until Johns-Manville went out of the friction materials business, he was a distributor of J-M products, as well as products manufactured by others. Back in 1973, Scan-Pac purchased manufacturing equipment and technical assistance to finish sheeter stock purchased from J-M.

The Scan-Pac operation is a manufacturing operation, using sheeter stock as its basic material. They roll, mold, cure, drill, grind and finish the material.

Over the past three years I have had correspondence with Scan-Pac and had talked with Mr. Scandrett about membership. An early stumbling block to Scan-Pac's membership was the cost to them. Based on earlier correspondence, I told them it might be three categories--brake linings, brake blocks and clutch facings. In going over this question, they would actually be charged for one category only--brake linings.

Their "blocks" are actually molded segments ranging in thickness from 1/8" to 1/2". They would not fall under our "block" category which is 3/4" nominal. As regards clutch facings, our category declaration states: "...sold to markets where the FMSI numbering system is available." Scan-Pac sells to specialty fields where we don't have FMSI numbers: snowmobiles, cranes, presses. Based on this more recent review, I advised Mr. Scandrett that he would report "brake linings" only as a category. A member needs one category to qualify for membership.

Actually, Scan-Pac does not use the FMSI numbers even in the brake lining category. I have reviewed their catalogs--roll lining to 3/8" thick; molded "blocks" to 1/2" thick; molded facings 1/8" to 3/8" thick; molded flat sheets; and other non-friction material products. The catalog does not show any FMSI numbers. All applications are non-automotive.

Would you please indicate on the attached ballot your recommendation on Scan-Pac's application to be an Active Member of the Institute.

E. W. Drislane
Executive Director

APPLICATION FOR MEMBERSHIP

TO THE BOARD OF DIRECTORS OF
FRICTION MATERIALS STANDARDS INSTITUTE, INC.

Gentlemen:

The undersigned hereby applies for membership in the FRICTION MATERIALS STANDARDS INSTITUTE, INC., as an Active Member, and certifies to the following:

1. Name of Applicant: Scan Pac Manufacturing Inc.
2. State of Incorporation: Wisconsin
3. Principal Office: 9950 N. Port Washington Rd., Meguon, WI
4. Date of Incorporation: March 8, 1973
5. Length of time dealing with friction materials: Approximately 10 years
6. Do you manufacture friction materials from the basic materials or do you buy partially finished products from other companies: Purchase raw sheeter stock from Johns Manville
7. Type of friction materials manufactured, and approximate annual capacity of plant: Industrial roll goods, brake lining and facings, Eel Slip. Estimated Capacity $ 8-10 million
8. State approximate amount of said materials manufactured in commercial quantities: 1-1/2 - 3 million
9. Is the distribution of your product national, international or local or in how many states: International and National
10. Do you list the materials you manufacture in catalogs or in some other form; if so, will you furnish us with a copy of same: Yes
11. Reference as to financial strength in relation to operations: ratio of sales to net worth is 4 to 1
12. Is plant owned by applicant or leased: leased

FMSI 14991

The undersigned hereby acknowledges receipt of a copy of the Constitution and By-Laws of the Institute and agrees that, if elected to membership, it will accept and be bound by the said Constitution and By-Laws, together with any amendments that may from time to time be made thereto.

The undersigned hereby designates H.A. Scandrett as its delegate and Paul Vandenberg as its alternate delegate, to represent it at any meeting of the membership.

Scan-Pac Manufacturing Inc.

BY

SCAN-PAC
9950 N. PORT WASHINGTON ROAD MEQUON WI. 53092 (414) 241-3890

May 27, 1976

Mr. E.W. Drislane
Friction Materials Standards Institute, Inc.
Bergen Mall Office Center
E. 210 Route 4
Paramus, N.J. 07652

Dear Mr. Drislane,

Thank you for your letter of May 25, 1976. We are pleased that the fee situation has been clarified, which enables us to apply for membership in the Institute, based on paying the Basic fee plus one category, (Brake Lining).

Attached is our application and our check for $ 1000.00. We look forward to meeting you in the near future.

Sincerely,

H.A. Scandrett

HAS/bjs

MOLDED ROLL LINING • MOLDED BLOCKS • MOLDED FLAT SHEET STOCK • MOLDED FACINGS AND FACING SEGMENTS • 50 EEL-SLIP

(S)
Scan-Pac

FRICTION MATERIALS STANDARDS INSTITUTE, INC.
BERGEN MALL OFFICE CENTER
E. 210 ROUTE 4
PARAMUS, N. J. 07652

May 25, 1976

Mr. H. A. Scandrett
Scan-Pac, Inc.
9950 North Port Washington Road
Mequon, Wisconsin 53092

Dear Mr. Scandrett:

I had a recent conversation with John Moore of Reddaway. He indicated that he had talked with you and the possibility of Scan-Pac joining the Institute was discussed.

In our conversation, John indicated that you--if a member--would only fall into one category (annual fee of $1,700), whereas I had indicated in 1975 that you would be in three categories (annual fee of $3,000). Based on the information he gave me, you would only declare one category, and your annual fee would be $1,700.

Basic Fee	$1,050
One Category (Brake Linings)	650
Total	$1,700

You would not declare brake blocks, as you sell only a limited volume. As I understand it, these are sold as an accomodation and they are not a significant item at Scan-Pac. Also, I understand that your clutch facings are sold for non-automotive use, where the FMSI does not provide services. These would not have to be declared. Your only category would be brake linings.

I'm enclosing a form which describes the category filing upon which our annual fees are based. This should help in defining the categories into which you fall. I do not feel that occasional or accomodation sales would automatically move you into a category. The purpose of the category filing is to base a fee schedule on areas which are significant or meaningful (significant to you in volume; significant to FMSI only if we provide information or services in that category).

Enclosed are:

1 copy - Definition of Category Filing
2 copies - Constitution and By-Laws
2 copies - Application Form

Were you to apply for membership, there would be a one time initiation fee of $1,000 to be sent with the application. The application would be reviewed by a Membership Committee, and then by the Board of Directors. After approval by our Board of Directors, your application would be voted on by the Membership. All this takes 6-10 weeks, and while I assume your application would be accepted, if it were not the $1,000 initiation fee would be returned to you. Assuming that you were to file an application soon and be accepted, your annual fee would probably start about October 1 (our 2nd quarter).

Our fiscal year runs July 1 to June 30. We would prorate the first year's dues by quarters. While the $1,700 fee for one category has been in effect for five years now and we expect it to hold for 1976-77, I can't give you any guarantees in that area. I am quite pleased that we have held the dues structure for many years, and I would try to hold it in the future.

I realize I gave you information on the Institute in earlier letters. I will not repeat that information. However, if you have some questions, please give me a call.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

EWD/lmc
Encs.
CC: J. Moore-Raddaway

TELEPHONE (201) 845-0440

FRICTION MATERIALS STANDARDS INSTITUTE, INC.
BERGEN MALL OFFICE CENTER
E. 210 ROUTE 4
PARAMUS, N. J. 07652

S
Scan Pac

March 21, 1975

Mr. H. A. Scandrett
Scan-Pac, Inc.
9950 North Port Washington Road
Mequon, Wisconsin 53092

Dear Mr. Scandrett:

This is to follow-up on our phone conversation of March 12, 1975.

As I believe I told you at that time, a Board of Directors meeting was scheduled for March 13, 1975 in Chicago, and I indicated I would bring the question of fees up at that time.

The Board of Directors reviewed the fee schedules with particular emphasis on the Scan-Pac products. While the Directors indicated sympathy with the feeling that the fee was too high for a manufacturer of your size, they felt they could not change the fee structure. It would affect definitions and fee structure through out the Membership. As you must know, I would very much like Scan-Pac to be a member, but it does not appear the fee formula will be changed in the forseeable future.

The only things I can think of are the definitions in "Explanation of Category Filing", copy attached.

Brake Lining: If your brake lining was going <u>only</u> to industrial or non automotive applications "where the FMSI numbering system is <u>not</u> available", perhaps it would not be declared.

Clutch Facings: If the clutch facing was going <u>only</u> to non-automotive applications "where the FMSI numbering system is <u>not</u> available," perhaps it would not be declared.

Brake Blocks: I understand you do not manufacture these but purchase and re-sell them. If some subsidiary or affiliate or other corporation (other than Scan-Pac, Inc.) handles this product line, perhaps Scan-Pac would not have to declare this category. Or, in the case of brake blocks, if Scan-Pac was handling brake blocks in small quantities as an accomadation to a customer, perhaps this category would not be declared.

In any event, a rule of reasonableness should be applied. A key sentence is: "If a member sells a certain product type, but only to a market where FMSI does not provide service he does not report that category." Example of such markets might be oil drilling rigs, machinery friction products, aircraft brakes, automatic transmissions, etc. We do supply services in the automotive and off highway construction areas.

I'm attaching two copies of our Constitution and By-Laws and application for Membership. The dues have remained unchanged over the past four years and we expect to hold the dues structure for the 1975-76 fiscal year.

There is a one time initation fee of $1,000 and an annual fee based on categories. The annual fee is $1,050 basic, plus $650 for each category. (Brake lining only $1,700; Brake linings and brake blocks $2,350; Brake lining, brake blocks and clutch facing $3,000).

I am enclosing also a recently published booklet on the Institute. If there are questions, please let me know.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

EWD/erc
Enclosure

E. W. Drislane
Executive Director

Phone 3/12/78 Elsie Sandrett, Sales
(414) 241-3890

3 Categories

Lumber for [illegible] use for 3/8" Thick
[illegible] for [illegible]
[illegible] for industrial use

Plywood 3/4" - for [illegible] not [illegible] but
for purchase and [illegible]
for non industrial use.

Chipboard flooring - [illegible] type - for
[illegible], [illegible], [illegible].

Possibilities: [illegible]
~~[illegible]~~ who [illegible]
[illegible], [illegible], [illegible],
where they are not used for
or highway [illegible] [illegible].

FMSI 14998

S

September 18, 1973

Mr. H. A. Scandrett
Scan-Pac, Inc.
9950 N. Port Washington Road
Mequon, Wisconsin #53092

Dear Mr. Scandrett:

This is a follow-up to my letter of March 30, 1973. I'm attaching a copy of that letter so that I wont repeat myself.

I recently talked with several members of the Institute (other manufacturers) as to whether you had been able to get into production of friction materials using the J-M sheeter stock. It was suggested I contact you again re extending an invitation to join the Institute. I called Mequon this morning and in your absence talked briefly with Mr. Dale Stein. It was suggested that I put my thoughts in writing.

The main item I'm trying to sell is Membership in the Institute. The copyrighted FMSI numbers in your literature, price sheets, and catalogs are usually of considerable help in marketing friction materials products. Our Catalogs are widely used in the industry and Members, of course, get quick access to prints of new brake linings and clutch facings. Of course, the copyrighted FMSI numbers or Catalogs can only be used with permission of the Institute.

I've enclosed copies of two new Catalogs not forwarded earlier:

1973 Automotive Data Book
1972 Brake Shoe Identification Catalog

Should you have any questions concerning Membership. please contact me.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE

E. W. Drislane
Executive Director

EWD/erc
Enclosure:

FMSI 14999

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

March 30, 1973

Mr. H. A. Scandrett, President
Scan-Pac, Inc.
9950 N. Part Washington Road
Mequon, Wisconsin 53092

Subject: Membership in the Friction Materials Standards Institute

Dear Mr. Scandrett:

We understand that Scan-Pac has purchased equipment from Johns-Manville for the production of friction materials. It is our understanding that your firm should be in full production in May 1973.

The Board of Directors has suggested that I contact you as regards possible membership,in the Friction Materials Standards Institute (Active Member). When you are in production, you should satisfy the main qualification for membership--a manufacturer of friction materials in commercial quantities. Some background on the Institute follows.

ACTIVITIES OF THE INSTITUTE

The Friction Materials Standards Institute publishes bulletins and catalogs concerning brake linings and clutch facings used primarily on over-the-road vehicles. Under separate cover, I am forwarding copies of some of the catalogs that have been published in recent years:

*1971 Automotive Data Book
1972 Supplement to the 1971 Automotive Data Book
1970 Brake Shoe Identification Catalog
*1971 Supplement to the 1970 Brake Shoe Identification Catalog
Brake Block Identification Catalog (1972 Edition)
Automotive Brake Diagnostics (Published 1973)

*1973 Issues to be published this year.

Bulletins are mailed to the members as soon as information is available on new releases by the vehicle manufacturers. In addition prints are available from the Institute Office to all members for $.75 per print. Every time we issue a new bulletin, several of the members order copies of the new prints released in those bulletins.

The members are entitled to by

The members are entitled to buy in volume any of the FMSI catalogs. The members feel that by having the Institute publish catalogs at much greater volume, they are able to save substantially on their catalog costs. Of course, if there are questions concerning new releases, the Institute tries to answer the member with the best information available.

The Institute also represents the brake lining manufacturers and clutch facing manufacturers with the Asbestos Information Association of North America. The Institute coordinated a response that was made to the Illinois Pollution Control Board which intended to prohibit the use of asbestos in brake linings sold in the State of Illinois. Our Asbestos Study Committee has given input to the Asbestos Information Association as regards asbestos problems in the friction materials business. We also have passed information on to our membership concerning the latest OSHA and EPA regulations as concerns asbestos. The Chairman of our Asbestos Study Committee is one of the industry representatives on the Advisory Board that debated the asbestos regulations before they were issued.

The Institute maintains a Brake Performance Study Committee which, when the original New York State Brake Lining Law was being written, helped draft a law that was reasonable to both industry and the public. We have been consulted with by the Vehicle Equipment Safety Commission when revisions were planned in the V-8 procedure. We have been inccontact with AAMVA concerning their certification requirements for brake lining and worked out a compromise with them on "grandfathering" existing brake lining certifications. We attempt to keep the industry posted on the progress of the various regulatory authorities as regards brake linings.

In addition, we maintain close liaison with NHTSA as concerns Federal standards on brake lining and brake systems. We have given input to the NHTSA as regards the new FMVSS #105a (Hydraulic Brake Systems) and FMVSS #121 (Air Brake Systems). We are in touch with those in the Department of Transportation who have been given the assignment to write a brake lining standard for the replacement market. While we have worked with the regulatory people, we have also kept our industry informed as to what was taking place and was likely to take place.

MEMBERSHIP

I am enclosing the following:

2 copies - Constitution and By-Laws
2 copies - Application Form
1 copy - Fee Formula

As a manufacturer of friction materials in commercial quantities, you should be eligible for membership as an Active Member. A question which is most likely to come first is: "How much would it cost?" Were you considering applying for membership, there is a $1,000 one-time initiation fee. (This would accompany your Application.) If, for some reason, you were to withdraw your Application, or the Institute were not to vote you into membership, this $1,000 would be returned. Other than this one-time fee, there is a regular annual fee which is based on the number of "categories" in which you might be involved. I have enclosed a copy of our Category Filing Declaration which all the members fill out every year. Our present dues structure is a basic fee of $1,050 annually, plus

$650 x the number of categories. For example, were you just in the brake lining business as such (according to our category definitions) the annual fee would be $1,700 per year ($1,050 + $650). Were you engaged in two categories, for example brake linings and brake blocks, the fee would be $2,350 per year. The fees mentioned are based on the current budget and we expect them to remain unchanged in the next fiscal year.

Were you interested, you should complete two copies of the Application Form and send them on to the Institute with the $1,000 initiation fee.

COPYRIGHT REGULATIONS

If you have seen the FMSI catalogs over the years, you will note that all FMS numbers and the contents of the catalogs are copyrighted. In order to use the copyright in one's catalogs, price lists, packaging, etc., a manufacturer must belong to the Institute. If, for example, you are a distributor, jobber, or other link in the distribution chain, ordinarily you would secure the right to use the copyrighted numbers from the member of the Institute who sells his lining to you. If, however, you are in the manufacture of friction materials, non member can give you the right to use the copyrighted numbers on the products you manufacture. He can only give you permission to use the FMS numbers on the products you purchase from him. Many manufacturers consider the FMS numbering system to be of considerable value in merchandising their products.

If you are not using the copyrighted FMS numbering system and have no intention of using it, there is no compelling need as such to join the Institute. However, there are several members of the Institute who now are in that position but feel that other benefits which the Institute gives them directly and which are generated indirectly by the Institute contacts with Washington, makes membership desirable.

As a matter of information, the Institute operates under a fiscal year (July 1 - June 30). I've enclosed a list of our membership. Your company would be in the "Active Member" classification.

Should you have any questions concerning membership, Copyrights, or Activities of the Institute, please give me a call.

Sincerely,

FRICTION MATERIALS STANDARDS INSTITUTE, INC.

EWD/lmc
Encs.

E. W. Drislane
Executive Director

W. A. Scandrett 9/13/73
Sam Pak
Lem Road
Menomonie Falls, Wisconsin 53051
(414) 255-2320

Stop at Neguam Wisconsin on 9/13/73
Dump JM's plastic material — bury up to 3/8"
carry FMSI number.
Neguam (414) 241-3890

Talked with Dale Stern 9/18 (formerly JM)

(S)

SCAN PAC 8/20/73

Per Bill Burton on 8/20/73:

Scan Pac was a bedding distributor.
Then they switched — early in '73 — to purchase
all JM sheeting material (from Warehouse)
Sheeting material for 3/8" thick

Bill Burton advises that the JM plant in Warehouse, Ill.
has been closed. — does not think that
JM can be providing Scan Pac with sheeting
stock. (JM wanted to buy sheeting)

FMSI 15004

Johns-Manville
Products Corporation

Greenwood Plaza
Denver, Colorado 80217
(303) 770-1000

3/1/73

February 26, 1973

Scan Pak

Dear Customer,

We are pleased to announce that an exclusive license to process Johns-Manville sheeter stock friction materials has been granted to Scan-Pac, Inc., Mequon, Wisconsin.

This agreement covers:

STYLE NUMBERS	PRODUCTS
200, 230, 240	Rigid Brake Blocks
200, 230, 240	Clutch Facings
200, 232, 242, HDM	Flexible Molded Lining
50, 52	EEL-SLIP Clutch Facings
50, 52	EEL-SLIP Doctor Blades
265P	Brake Linings and Clutch Facings
725	EEL-SLIP Products
Tru-Stop	Brake Lining
FLEET-TESTED	Brake Lining

Scan-Pac has purchased all equipment and technical assistance from Johns-Manville required to produce these materials. Scan-Pac will use Johns-Manville sheeter stock exclusively as the base material, therefore assuring that you will continue receiving finished product with the same excellent quality base material to which you are accustomed.

A long-time Johns-Manville distributor of friction materials, Scan-Pac's personnel have accumulated many years of friction material technical knowledge. Their production personnel also have many years of experience in related areas, such as cut gaskets.

As with any large move, there will be a period of a month or so when equipment will be down. Scan-Pac hopes to be in full production by May 15, 1973. Please immediately forward orders for any items required prior to that date directly to Scan-Pac. We and Scan-Pac will do our utmost to furnish your material by your required date.

Orders, requests for quotations, and information should be sent to:

Scan-Pac, Inc.
9950 N. Port Washington Road
Mequon, Wisconsin 53092

FMSI 15005

We appreciate the opportunity of having served you over the years, and we look forward to serving you further through our licensee.

Yours truly,

R. M. BILLINGS
DIVISION GENERAL MANAGER
INDUSTRIAL PRODUCTS DIVISION

As president of Scan-Pac, Inc., I look forward to a future relationship with you. Be assured that we will provide you with the same materials and service you have received from Johns-Manville in the past.

Please do not hesitate to contact us on any problem we may assist you with.

Yours truly,

H. A. SCANDRETT
PRESIDENT
SCAN-PAC, INC.

PLEASE NOTE WHETHER NAME, BUSINESS AND STREET ADDRESS CORRESPOND WITH YOUR INQUIRY

DUN & BRADSTREET BUSINESS INFORMATION REPORT

RATING INCREASED

©DUN & BRADSTREET, INC. STARTED RATING

50 85 04-802-8799 CD 32 OCT 27 1972
34 23 SCAN-PAC INDUSTRIAL SALES INC 1960 DD2
CUT-RITE DIE CUTTING DIV WHOL GASKETS & DIE CUTTING

9950 N PORT WASHINGTON RD
(MEQUON) THIENSVILLE WIS 53092
TEL 414 241-3890

HENRY A. SCANDRETT, PRES & TREAS
JOAN K. (MRS. H.) SCANDRETT, V PRES & SEC
DIRECTORS: The Officers and one vacancy

SUMMARY

PAYMENTS	PPT
SALES	$[illegible],000
WORTH	$47,800-E
EMPLOYS	12
RECORD	CLEAR
CONDITION	GOOD
TREND	UP

PAYMENTS

HC	OWE	P DUE	TERMS	OCT 6 1972	SOLD
500	500		1 10 30	Ppt	1 yr to 8-72
300	50		30	Ppt	2 yrs
200	1000			Ppt	Over 3 yrs to 8-72

FINANCE

On Jun 22 1972 Mr Scandrett, President submitted the following estimates:

Cash	$ 5,000	Accts Pay	$ 15,000
Accts Rec	30,000		
Current	35,000	Current	15,000
Fixt & Equip	27,800	CAPITAL STOCK	47,800
Total	62,800	Total	62,800

Annual sales $205,000, net income $8,700.
Signed Jun 22 1972 SCAN-PAC INDUSTRIAL SALES INC by Mr. Scandrett, President.

----0----

On Oct 27 1972 Joan Scandrett, Secretary referred to the above estimates dated Jun 22 1972 as still representative.

Mrs. Scandrett reported sales for the nine months ended Oct 1 1972 were up compared to the same period last year. Increase was attributed by management to economic climate improving.

Profit has been made and retained resulting in an increase in net worth. Retained profit has been used to improve working capital.

Total debt is moderate in relation to worth. Working funds are centered in accounts receivable and are adequate to finance operations. Collection of accounts receivable is prompt.

BANKING

Principal stated balances currently average $5,000.

HISTORY

Wisconsin corporation chartered Dec 29 1966 with authorized capital 1,200 shares NPV common stock. Corporation continued to succeed sole ownership started by Scandrett in 1960. Purchased Cut-Rite Die Cutting Co from Clarence Berg Jr. about Aug 1 1969. Purchase price undetermined.

HENRY SCANDRETT born 1913, married. Prior to Apr 1960 when he began this business, he was employed in the industrial sales line with concern he now represents as a manufacturer's representative. The business was started in Apr 1960 with capital derived from savings.

JOAN SCANDRETT is not commercially active.

In Aug 1967 this corporation moved from 5594 Hollywood Ave to 5630 N Lake Dr (Whitefish Bay) Milwaukee, Wis and in 1970 to 9950 Port Washington Rd., Mequon, Wis.

OPERATION

Operates as a manufacturers agent of gaskets and related items (50%).

(CONTINUED)

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Must check your schedule and agreement for your exclusive use on a basis for credit, insurance, marketing or other purposes. Approx DUN & BRADSTREET, INC does not guarantee the correctness of information shown nor be liable for any loss or damage.

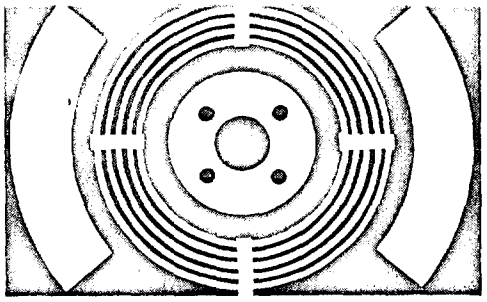
OPERATION (Cont'd) Represents Johns Manville Company, Manville, N.J., Reddaway Mfg Co., New York, N.Y. and Andrews Asbestors and Rubber Co of Chicago, Ill. Sells to industrial concerns throughout Wisconsin on commission basis, 400 accounts. Also does die cutting (50%) with sales to local industrial concerns. 12 employees including the officers. LOCATION: Leases 4,000 square feet for manufacturing and 2,400 square feet office space in a new one story steel and brick building in good condition. Premises are neat. Building owned by Henry and Joan Scandrett.
11-10 (356 226) B#1

SCAN-PAC
FRICTION MATERIALS

ENGINEERING AND
DESIGN DATA

- Asbestos Brake Blocks
- Roll Linings
- Clutch Facings
- Custom Parts
- Eel-Slip

FMSI 15009



Material Selection Chart

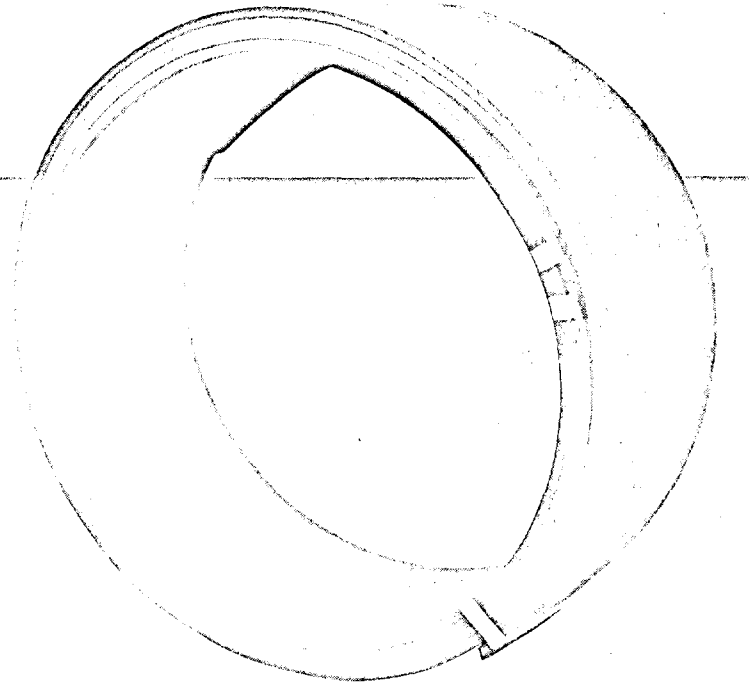
TO SELECT THE RIGHT MATERIAL FOR YOUR APPLICATION

STYLE NO.	200	202	230	232	240	242	265	725	HDM
Forms Available	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Roll Band Cone Seg Sheet Disc	Disc Band Cone Seg Sheet	Roll Band
Type Surface: G—Ground P—Plain	G	G	G	G	G	G	G P	G	G
STRUCTURE: R—Rigid Molded SF—Semi-Flexible F—Flexible	R	SF	R	SF	R	SF	F R	R	SF
Coefficient of Friction @350° F., 50 PSI, 10.5 Ft./Sec. See note 1.	.40 ±.07	.40 ±.07	.45 ±.07	.45 ±.07	.40 ±.07	.40 ±.07	.33 ±.07	.32 ±.07	.45 ±.07
THICKNESSES AVAILABLE	⅛ - ⅜	⅛ - ⅜	⅛ - ½	⅛ - ½	⅛ - ⅜	⅛ - ⅜	⅛ - ¼	⅛ - ⅜	⅛ - ½
TYPE SERVICE	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Max. Rubbing Speed Ft/Min. See note 2.	5000	5000	5000	5000	5000	5000	2500	2500	5000
Max. Drum Temp. ° F for **CONSTANT OPERATION:** See note 2.	500	500	500	500	500	500	400	350	500
MAX. PRESSURE—PSI See note 2.	100	100	100	100	100	100	100	100	100
RESISTANCE TO SHOCK E—Excellent G—Good M—Moderate	G	G	G	E	G	E	G	G	G
RATE OF WEAR E—Excellent G—Good M—Moderate	M	M	E	G	E	E	M	G	E
COMPRESSIVE STRENGTH—PSI	17160		14230		21580		19000	20400	
SHEAR STRENGTH—PSI	7590		9590		6360		7800	7200	
TENSILE STRENGTH—PSI	4220		3900		3960		4230		
MODULUS OF RUPTURE—PSI	5230		6720		8520		5400	10600	
SPECIFIC GRAVITY	1.87		1.90		2.11		1.69	1.92	

Note 1. — Friction values shown are for guide purposes only since values deviate with changes in temperature, pressure and speed. Practical design should include a 25 to 50 per cent safety factor.

Note 2. — Rubbing speed, drum temperature and pressure are directly related. Changing any one value will change the others. The values shown represent typical conditions, but are not the ultimate limits of the material.

MOLDED BRAKE LINING



- Semi-Flexible Roll Linings
- 10.5 Foot coils — two coils per package
- Thicknesses: 232-HDM 1/8"-1/2"
  All other 1/8"-3/8"
- Tolerances: Thickness +.002, −.020
  Width: 1" to 6" ±1/32"
  Over 6" ±1/16"
- For Internal or External application
- Available in Five Different Styles

No. 232 Lining is a Medium-high friction material containing zinc particles. It covers wide range of applications, features high heat resistance, and maintains a constant friction co-efficient over a wide temperature range. Recommended for Heavy duty service.

HDM-4 Star is a Medium-high friction material, having the same advantages and construction as 232, but harder and more rigid resulting in improved initial wear. Recommended for Heavy duty service.

No. 242 Lining is a Medium friction material containing brass particles. It features excellent wear characteristics and stable friction for usual operating conditions. Recommended for Heavy duty service.

No. 202 Lining is a Medium friction material with virtually no metal content. Recommended for Moderate duty service.

No. 265 G Lining is a Medium friction material with no metal content. Recommended for Light duty service.

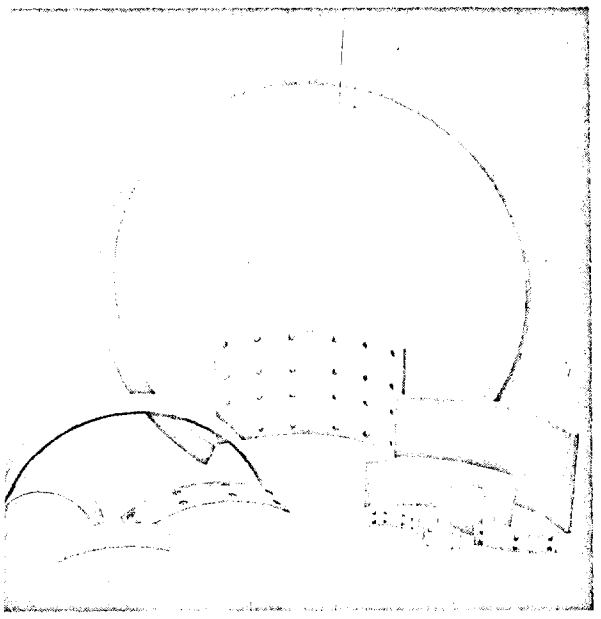
MINIMUM DIAMETERS OF ROLL LINING

To assist you in the use of roll stock for various brake applications, the following tables list the recommended minimum roll diameters to which the stock may be curved without cracking. Style numbers are listed according to available thicknesses.

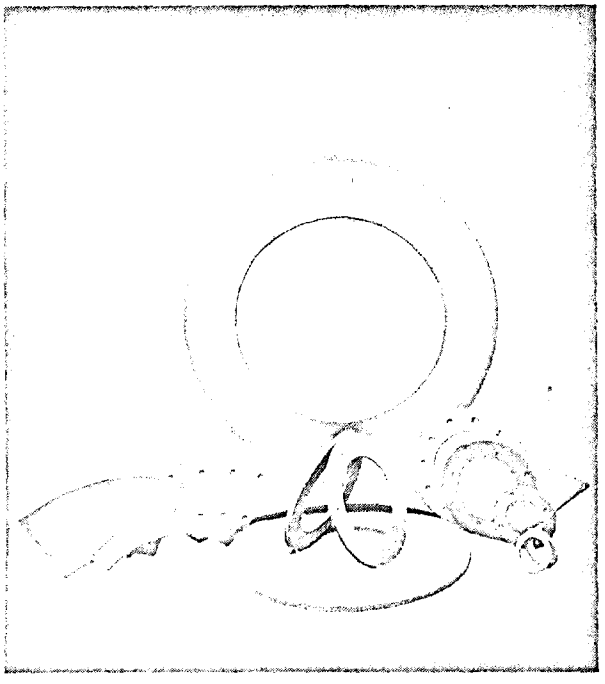
MINIMUM DIAMETERS TO WHICH INDUSTRIAL MOLDED COILS MAY BE CURVED

Thickness of Lining	Style				
	202	232	242	4 Star H.D.M.	265-G
1/8"	7"	7"	7"	—	5"
3/16"	9"	9"	9"	8"	7"
1/4"	11"	11"	11"	12"	10"
5/16"	13"	13"	13"	17"	—
3/8"	15"	15"	15"	20"	—

Note: Material suitable for use on smaller drum diameters available from factory when drum diameter is specified.



	SIZE	TEMP.	JIG
DRILLING TOLERANCES ON HOLE LOCATIONS DRILLED WITH TEMPORARY TEMPLATE OR PERMANENT JIG	Up to 12" O.D.	±1/32"	±1/64"
	12" to 18" O.D.	±3/64"	±1/32"
	18" and over	±5/64"	±3/64"



MOLDED BRAKE BLOCK

- Rigid molded block
- Thicknesses: 230-1/8"-1/2", All other 1/8"-3/8"
- Tolerances: Thickness: +.000, −.020
  Width 1" to 2" ±1/32"
  Over 2" ±1/16"
  Length: ±1/16"
  Radius: Up to 6" Long Arc ±1/16"
  6" to 12" Long Arc ±3/16"
  Over 12" Long Arc ±1/4"
- Available in Three Styles, Plain, or Drilled and Counterbored.

Style No. 230 is a rigid molded, Medium-high friction material containing zinc particles. It has high heat resistance and maintains a constant friction coefficient over a wide temperature range. It provides long, economical service on iron or steel drums under shock-load.

Style No. 240 is a rigid molded, Medium friction material containing brass particles. It features excellent wear characteristics and stable friction for usual operating conditions.

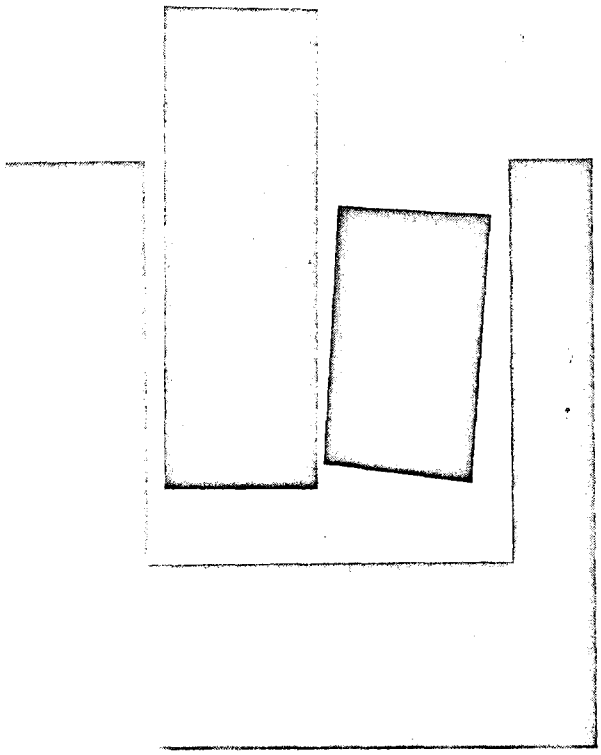
Style No. 200 is a rigid molded, Medium friction material with virtually no metal content.

MOLDED FRICTION FACINGS

- Rigid Molded Facings and Segments
- Thicknesses: 230-1/32"-1/2", All other 1/32"-3/8"
- Tolerances: Thickness: ±.010
  Diameters: OD to 12", ±1/32"
  OD over 12", ±1/16"
  ID to 12", +1/16", −0
  ID over 12", +1/8", −0
- Maximum size: 40" OD
- Available in Six Styles, Plain, or Drilled and Counterbored.

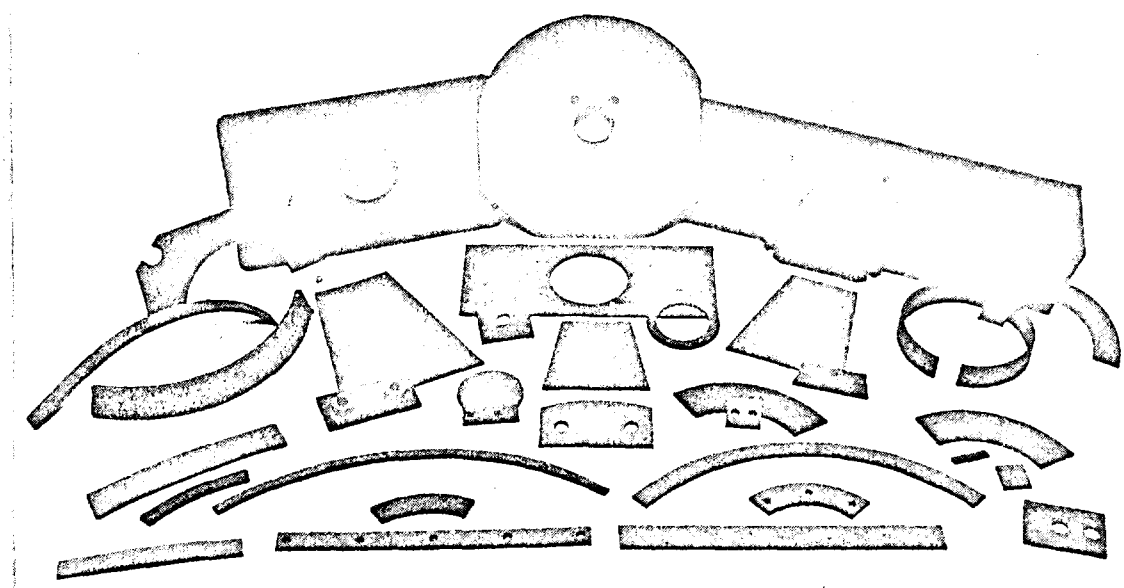
Style No.	Description	Thicknesses	Type Duty
200	Low Metal, ground	1/8" -3/8"	Medium
230	Zinc Particles, ground	1/8" -3/8"	Heavy
240	Brass Particles, ground	1/8" -3/8"	Heavy
265PR	No Metal, unground	1/32"-1/4"	Light
265GR	No Metal, ground	1/32"-1/4"	Light
725	No Metal, ground	1/32"-3/8"	Medium

MOLDED FLAT SHEETS



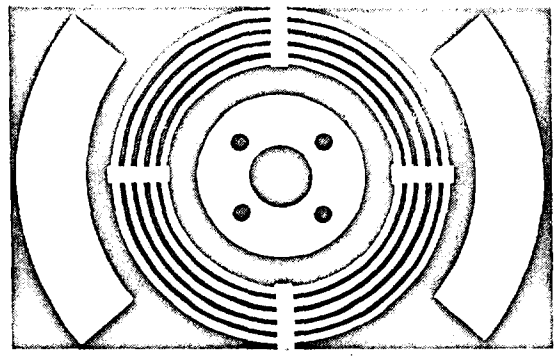
Style No.'s	Description	Thickness	Type Duty
200	Low Metal, rigid ground	3/16''-3/8''	Medium
202	Low Metal, semiflex ground	3/16''-3/8''	Medium
230	Zinc particles, rigid ground	1/8'' 1/2''	Heavy
232	Zinc particles, semiflex ground	1/8'' 1/2''	Heavy
240	Brass particles, rigid ground	1/8'' -3/8''	Heavy
242	Brass particles, semiflex ground	1/8'' -3/8''	Heavy
265P	No metal, flexible unground	1/32''-1/4''	Light
265G	No metal, flexible ground	1/32''-1/4''	Light
265PR	No metal, rigid unground	1/32''-1/4''	Light
265GR	No metal, rigid ground	1/32''-1/4''	Light
725	No metal, rigid ground	1/32''-3/8''	Medium

MOLDED CUSTOM PARTS



Pictured above are a few of the many custom parts currently manufactured. Virtually any size or shape is available in various thicknesses and styles.

Self Lubricating Bearings and Bushings



EEL-SLIP® PRODUCTS

Eel-Slip is engineered for use as a low-friction material which serves effectively without the usual lubrication. Impervious to moist or fluid conditions, Eel-Slip is a compound of asbestos fiber, graphite and rubber. The material is tough, yet readily machined, and has great rigidity, good tensile strength and considerable resistance to wear.

Two Types Available

Depending upon the application for which the Eel-Slip is intended, the material is manufactured by two distinct methods.

50 EEL-SLIP: In making 50, the asbestos fiber, graphite and rubber mixture are built-up by a felting process under great pressure to the proper thickness, then vulcanized. The resulting sheet stock may be plied together to form suitable slabs for further fabrication.

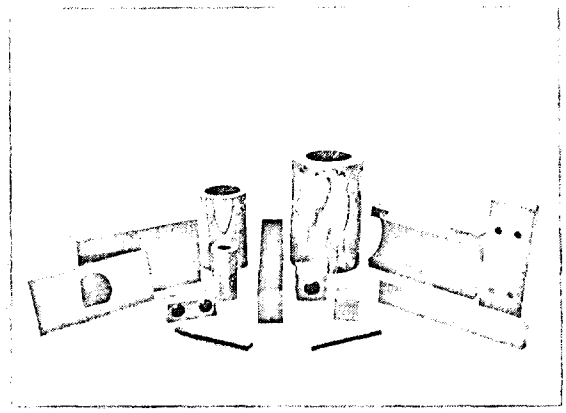
SIZES — Sheets are supplied in standard thicknesses of ⅛", 3/16", ¼", 5/16" and ⅜". By lamination, other thicknesses up to 4" are also possible. The material can be furnished 36" wide x 2" thick x 10-ft. long. Longer pieces are satisfactorily made by splicing. Heavier slab stock can be furnished 30" x 30" x 4" thick maximum.

52 EEL-SLIP: Practically the same compound is employed for this type, but it is made into very thin sheets, rolled tightly on a mandrel and vulcanized. This product is generally used for solid bearings.

SIZES — Bushing size limits are for I.D. (inside diameter) ⅝" to 9½"; and for O.D. (outside diameter) 1" to 10½". For size ⅝" I.D., these size limits apply; wall thickness 3/16" to ½", and length ¼ to 5". For sizes 1" to 3" I.D. wall thickness ¼" to 4¾", and length ¼" to 6". For sizes 3" to 9½" I.D. inclusive, wall thickness ½" to 3¾", and length 1" to 12".

Eel-Slip For Bearings

Where great mechanical strength is needed and the service is severe, 50 is a most desirable bearing material. Since 50 is a laminated stock, the bore should be at right angles to the laminations.



52 EEL-SLIP gives satisfactory results for medium or light service. 52 is not recommended for split bearings as there is a tendency for the two halves to open up and go out of round.

Since most plants have the necessary machine shop equipment, blanks of the most suitable type of material are ordered, and the bearing machined locally. The usual metal-working tools are entirely satisfactory; however, Carboloy-tip tools give the cleanest job.

Eel-Slip expands permanently when immersed in water, therefor, it is necessary to provide clearance for shaft in the bearing as indicated below:

BEARING CLEARANCES	
On shafts up to and including 2"	0.015" clearance on diameter
Over 2" and including 4"	0.030" clearance on diameter

For larger bearings, clearance will depend upon thickness of stock in bearing, operating conditions, etc.

NOTE: To effect maximum efficiency, it is desirable to provide water grooves. These are generally located in the bottom half of the bearings, although the location and size of the grooves depend to a great extent upon operating conditions.

CAUTION: Grease and oil should be kept away from Eel-Slip because they soften the product and reduce its wearing qualities.

EEL-SLIP PRODUCTS

Self Lubricating Bearings and Bushings

PERFORMANCE DATA

CHEMICAL RESISTANCE		
CHEMICAL	**Volume Swell %**	**Absorption %**
ACETIC ACID		
Concentrated	36	14
10%	4	2
2%	4	3
SULFURIC ACID		
Concentrated	131	121
30%	11	1
7%	4	−5
HYDROCHLORIC ACID		
Concentrated	3	−5
25%	2	−10
SODIUM HYDROXIDE		
50%	7	3
10%	1	3
5%	3	2
POTASSIUM CHROMATE		
Concentrated	2	2
5%	−2	2
ACETONE	4	6
METHYL ETHYL KETONE	3	5
ETHYL ALCOHOL	1	4
CARBON TETRACHLORIDE	10	15
XYLENE	10	7
GASOLINE	−1	3
DI METHYL FORMAMIDE	7	9
BENZENE	11	10
PYDRAUL F9	5	7
SKYDROL 7000	4	6
WATER	2	3

EEL-SLIP PHYSICAL PROPERTIES

EEL-SLIP PHYSICAL PROPERTIES	
PROPERTY	**50**
SPECIFIC GRAVITY Rockwell M ASTM-D-638	1.92
HARDNESS Rockwell M ASTM-D-638	55
TENSILE STRENGTH (psi) Rockwell M ASTM-D-638	11125 (1) 4270 (2)
SHEAR STRENGTH (psi) ASTM-D-732	7200
COEFFICIENT OF THERMAL EXPANSION (in/in/°F x 10^6) (up to 220°F)	3.40
IMPACT-CHARPY (ft-lb/in) ASTM-D-256	2.31
COMPRESSIVE STRENGTH (psi) ASTM-D-695	20400
FLEXURAL STRENGTH ASTM-D-790	
Modulus of Rupture (psi)	10600
Modulus of Elasticity (psi x 10^6)	1.90
THERMAL CONDUCTIVITY (BTU/hr sq ft (°F/in)	4.00
WATER ABSORPTION	1.5% by weight after 72 hours

Notes: (1) Longitudinal (2) Transverse

SCAN-PAC

FRICTION MATERIALS

ENGINEERING AND
DESIGN DATA

- Asbestos Brake Blocks
- Roll Linings
- Clutch Facings
- Custom Parts
- Eel-Slip

FMSI 15016

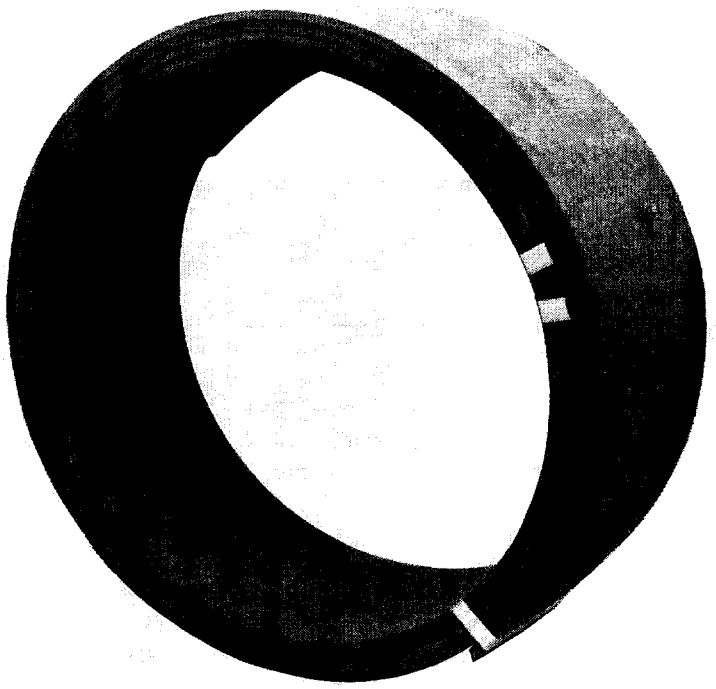
Material Selection Chart

TO SELECT THE RIGHT MATERIAL FOR YOUR APPLICATION

STYLE NO.	200	202	230	232	240	242	265	725	HDM
Forms Available	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Roll Band Cone Seg Sheet Disc	Disc Band Cone Seg Sheet	Roll Band
Type Surface: G—Ground P—Plain	G	G	G	G	G	G	G P	G	G
STRUCTURE: R—Rigid Molded SF—Semi-Flexible F—Flexible	R	SF	R	SF	R	SF	F R	R	SF
Coefficient of Friction @350° F., 50 PSI, 10.5 Ft./Sec. See note 1.	.40 ±.07	.40 ±.07	.45 ±.07	.45 ±.07	.40 ±.07	.40 ±.07	.33 ±.07	.32 ±.07	.45 ±.07
THICKNESSES AVAILABLE	1/8 - 3/8	1/8 - 3/8	1/8 - 1/2	1/8 - 1/2	1/8 - 3/8	1/8 - 3/8	1/8 - 1/4	1/8 - 3/8	1/8 - 1/2
TYPE SERVICE	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Max. Rubbing Speed Ft/Min. See note 2.	5000	5000	5000	5000	5000	5000	2500	2500	5000
Max. Drum Temp. ° F for **CONSTANT OPERATION:** See note 2.	500	500	500	500	500	500	400	350	500
MAX. PRESSURE—PSI See note 2.	100	100	100	100	100	100	100	100	100
RESISTANCE TO SHOCK E—Excellent G—Good M—Moderate	G	G	G	E	G	E	G	G	G
RATE OF WEAR E—Excellent G—Good M—Moderate	M	M	E	G	E	E	M	G	E
COMPRESSIVE STRENGTH—PSI	17160		14230		21580		19000	20400	
SHEAR STRENGTH—PSI	7590		9590		6360		7800	7200	
TENSILE STRENGTH—PSI	4220		3900		3960		4230		
MODULUS OF RUPTURE—PSI	5230		6720		8520		5400	10600	
SPECIFIC GRAVITY	1.87		1.90		2.11		1.69	1.92	

Note 1. — Friction values shown are for guide purposes only since values deviate with changes in temperature, pressure and speed. Practical design should include a 25 to 50 per cent safety factor.

Note 2. — Rubbing speed, drum temperature and pressure are directly related. Changing any one value will change the others. The values shown represent typical conditions, but are not the ultimate limits of the material.



MOLDED BRAKE LINING

- Semi-Flexible Roll Linings
- 10.5 Foot coils — two coils per package
- Thicknesses: 232-HDM 1/8"-1/2"
  All other 1/8"-3/8"
- Tolerances: Thickness +.002, −.020
  Width: 1" to 6" ±1/32"
  Over 6" ±1/16"
- For Internal or External application
- Available in Five Different Styles

No. 232 Lining is a Medium-high friction material containing zinc particles. It covers wide range of applications, features high heat resistance, and maintains a constant friction co-efficient over a wide temperature range. Recommended for Heavy duty service.

HDM-4 Star is a Medium-high friction material, having the same advantages and construction as 232, but harder and more rigid resulting in improved initial wear. Recommended for Heavy duty service.

No. 242 Lining is a Medium friction material containing brass particles. It features excellent wear characteristics and stable friction for usual operating conditions. Recommended for Heavy duty service.

No. 202 Lining is a Medium friction material with virtually no metal content. Recommended for Moderate duty service.

No. 265 G Lining is a Medium friction material with no metal content. Recommended for Light duty service.

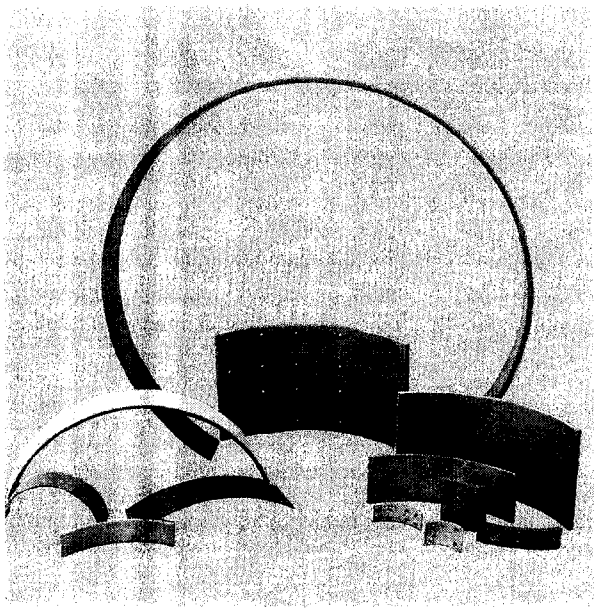
MINIMUM DIAMETERS OF ROLL LINING

To assist you in the use of roll stock for various brake applications, the following tables list the recommended minimum roll diameters to which the stock may be curved without cracking. Style numbers are listed according to available thicknesses.

MINIMUM DIAMETERS TO WHICH INDUSTRIAL MOLDED COILS MAY BE CURVED

Thickness of Lining	Style				
	202	232	242	4 Star H.D.M.	265-G
1/8"	7"	7"	7"	—	5"
3/16"	9"	9"	9"	8"	7"
1/4"	11"	11"	11"	12"	10"
5/16"	13"	13"	13"	17"	—
3/8"	15"	15"	15"	20"	—

Note: Material suitable for use on smaller drum diameters available from factory when drum diameter is specified.



MOLDED BRAKE BLOCK

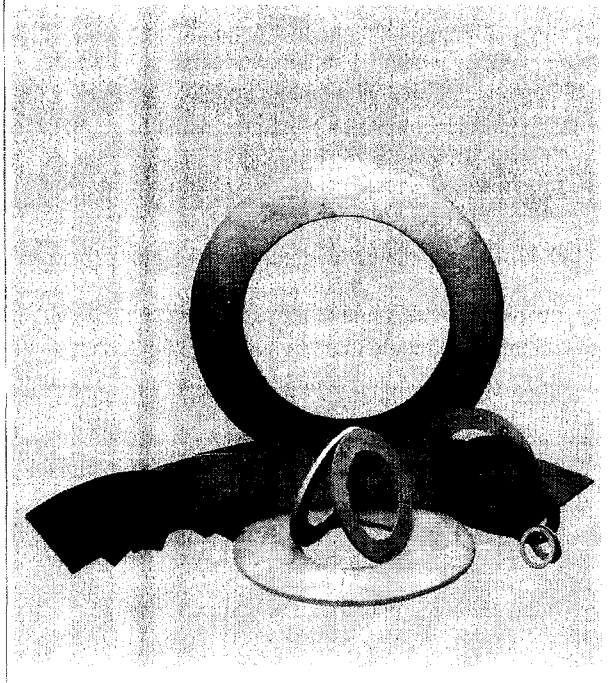
- **Rigid molded block**
- **Thicknesses: 230-1/8"-1/2", All other 1/8"-3/8"**
- Tolerances: Thickness: +.000, −.020
  Width 1" to 2" ±1/32"
  Over 2" ±1/16"
  Length: ±1/16"
  Radius: Up to 6" Long Arc ±1/16"
  6" to 12" Long Arc ±3/16"
  Over 12" Long Arc ±1/4"
- Available in Three Styles, Plain, or Drilled and Counterbored.

Style No. 230 is a rigid molded, Medium-high friction material containing zinc particles. It has high heat resistance and maintains a constant friction coefficient over a wide temperature range. It provides long, economical service on iron or steel drums under shock-load.

Style No. 240 is a rigid molded, Medium friction material containing brass particles. It features excellent wear characteristics and stable friction for usual operating conditions.

Style No. 200 is a rigid molded, Medium friction material with virtually no metal content.

	SIZE	TEMP.	JIG
DRILLING TOLERANCES ON HOLE LOCATIONS DRILLED WITH TEMPORARY TEMPLATE OR PERMANENT JIG	Up to 12" O.D.	±1/32"	±1/64"
	12" to 18" O.D.	±3/64"	±1/32"
	18" and over	±5/64"	±3/64"

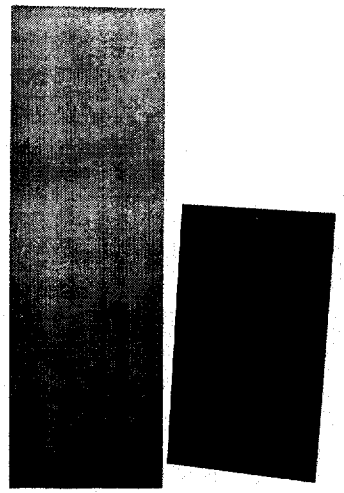


MOLDED FRICTION FACINGS

- **Rigid Molded Facings and Segments**
- **Thicknesses: 230-1/32"-1/2", All other 1/32"-3/8"**
- Tolerances: Thickness: ±.010
  Diameters: OD to 12", ±1/32"
  OD over 12", ±1/16"
  ID to 12", +1/16", −0
  ID over 12", +1/8", −0
- Maximum size: 40" OD
- Available in Six Styles, Plain, or Drilled and Counterbored.

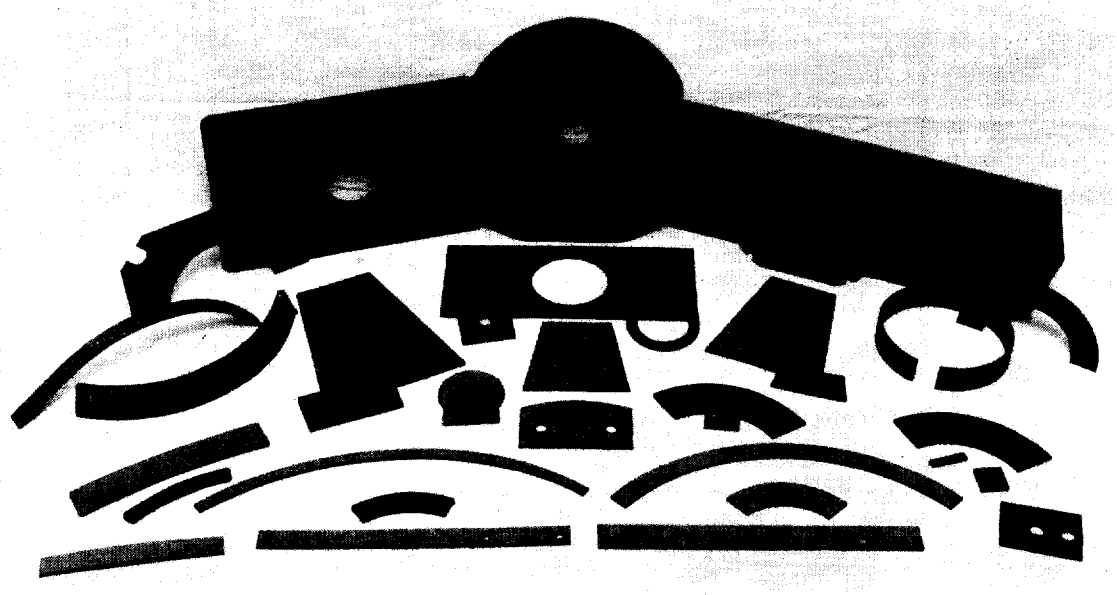
Style No.	Description	Thicknesses	Type Duty
200	Low Metal, ground	1/8" -3/8"	Medium
230	Zinc Particles, ground	1/8" -3/8"	Heavy
240	Brass Particles, ground	1/8" -3/8"	Heavy
265PR	No Metal, unground	1/32"-1/4"	Light
265GR	No Metal, ground	1/32"-1/4"	Light
725	No Metal, ground	1/32"-3/8"	Medium

MOLDED FLAT SHEETS



Style No.'s	Description	Thickness	Type Duty
200	Low Metal, rigid ground	3/16''-3/8''	Medium
202	Low Metal, semiflex ground	3/16''-3/8''	Medium
230	Zinc particles, rigid ground	1/8'' 1/2''	Heavy
232	Zinc particles, semiflex ground	1/8'' 1/2''	Heavy
240	Brass particles, rigid ground	1/8'' -3/8''	Heavy
242	Brass particles, semiflex ground	1/8'' -3/8''	Heavy
265P	No metal, flexible unground	1/32''-1/4''	Light
265G	No metal, flexible ground	1/32''-1/4''	Light
265PR	No metal, rigid unground	1/32''-1/4''	Light
265GR	No metal, rigid ground	1/32''-1/4''	Light
725	No metal, rigid ground	1/32''-3/8''	Medium

MOLDED CUSTOM PARTS



Pictured above are a few of the many custom parts currently manufactured. Virtually any size or shape is available in various thicknesses and styles.

EEL-SLIP® PRODUCTS

Eel-Slip is engineered for use as a low-friction material which serves effectively without the usual lubrication. Impervious to moist or fluid conditions, Eel-Slip is a compound of asbestos fiber, graphite and rubber. The material is tough, yet readily machined, and has great rigidity, good tensile strength and considerable resistance to wear.

Two Types Available

Depending upon the application for which the Eel-Slip is intended, the material is manufactured by two distinct methods.

50 EEL-SLIP: In making 50, the asbestos fiber, graphite and rubber mixture are built-up by a felting process under great pressure to the proper thickness, then vulcanized. The resulting sheet stock may be plied together to form suitable slabs for further fabrication.

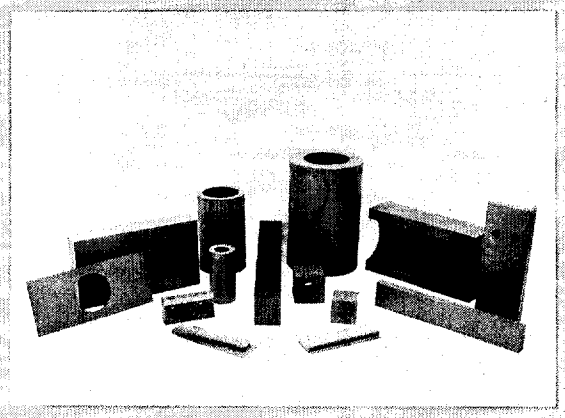
SIZES — Sheets are supplied in standard thicknesses of 1/8", 3/16", 1/4", 5/16" and 3/8". By lamination, other thicknesses up to 4" are also possible. The material can be furnished 36" wide x 2" thick x 10-ft. long. Longer pieces are satisfactorily made by splicing. Heavier slab stock can be furnished 30" x 30" x 4" thick maximum.

52 EEL-SLIP: Practically the same compound is employed for this type, but it is made into very thin sheets, rolled tightly on a mandrel and vulcanized. This product is generally used for solid bearings.

SIZES — Bushing size limits are for I.D. (inside diameter) 5/8" to 9½"; and for O.D. (outside diameter) 1" to 10½". For size 5/8" I.D., these size limits apply; wall thickness 3/16" to ½", and length ¼ to 5". For sizes 1" to 3" I.D. wall thickness ¼" to 4¾", and length ¼" to 6". For sizes 3" to 9½" I.D. inclusive, wall thickness ½" to 3¾", and length 1" to 12".

Eel-Slip For Bearings

Where great mechanical strength is needed and the service is severe, 50 is a most desirable bearing material. Since 50 is a laminated stock, the bore should be at right angles to the laminations.



52 EEL-SLIP gives satisfactory results for medium or light service. 52 is not recommended for split bearings as there is a tendency for the two halves to open up and go out of round.

Since most plants have the necessary machine shop equipment, blanks of the most suitable type of material are ordered, and the bearing machined locally. The usual metal-working tools are entirely satisfactory; however, Carboloy-tip tools give the cleanest job.

Eel-Slip expands permanently when immersed in water, therefor, it is necessary to provide clearance for shaft in the bearing as indicated below:

BEARING CLEARANCES	
On shafts up to and including 2"	0.015" clearance on diameter
Over 2" and including 4"	0.030" clearance on diameter

For larger bearings, clearance will depend upon thickness of stock in bearing, operating conditions, etc.

NOTE: To effect maximum efficiency, it is desirable to provide water grooves. These are generally located in the bottom half of the bearings, although the location and size of the grooves depend to a great extent upon operating conditions.

CAUTION: Grease and oil should be kept away from Eel-Slip because they soften the product and reduce its wearing qualities.

EEL-SLIP PRODUCTS

Self Lubricating Bearings and Bushings

PERFORMANCE DATA

CHEMICAL RESISTANCE		
CHEMICAL	**Volume Swell %**	**Absorption %**
ACETIC ACID		
Concentrated	36	14
10%	4	2
2%	4	3
SULFURIC ACID		
Concentrated	131	121
30%	11	1
7%	4	−5
HYDROCHLORIC ACID		
Concentrated	3	−5
25%	2	−10
SODIUM HYDROXIDE		
50%	7	3
10%	1	3
5%	3	2
POTASSIUM CHROMATE		
Concentrated	2	2
5%	−2	2
ACETONE	4	6
METHYL ETHYL KETONE	3	5
ETHYL ALCOHOL	1	4
CARBON TETRACHLORIDE	10	15
XYLENE	10	7
GASOLINE	−1	3
DI METHYL FORMAMIDE	7	9
BENZENE	11	10
PYDRAUL F9	5	7
SKYDROL 7000	4	6
WATER	2	3

EEL-SLIP PHYSICAL PROPERTIES

EEL-SLIP PHYSICAL PROPERTIES	
PROPERTY	**50**
SPECIFIC GRAVITY Rockwell M ASTM-D-638	1.92
HARDNESS Rockwell M ASTM-D-638	55
TENSILE STRENGTH (psi) Rockwell M ASTM-D-638	11125 (1) 4270 (2)
SHEAR STRENGTH (psi) ASTM-D-732	7200
COEFFICIENT OF THERMAL EXPANSION (in/in/°F x 10^6) (up to 220°F)	3.40
IMPACT-CHARPY (ft-lb/in) ASTM-D-256	2.31
COMPRESSIVE STRENGTH (psi) ASTM-D-695	20400
FLEXURAL STRENGTH ASTM-D-790	
Modulus of Rupture (psi)	10600
Modulus of Elasticity (psi x 10^6)	1.90
THERMAL CONDUCTIVITY (BTU/hr sq ft (°F/in)	4.00
WATER ABSORPTION	1.5% by weight after 72 hours

Notes: (1) Longitudinal (2) Transverse

FMSI 15022

DESIGN FACTORS

Brake and Clutch Mechanisms

In any brake or clutch system the common objective is to rapidly convert the kinetic energy of the moving member into heat and to dissipate the generated heat as quickly as possible. This conversion is generally accomplished by bringing a friction material into contact with the moving member in such a manner as to either retard the free rotation of the mating part (the function of a brake) or to impart motion to connecting parts (the function of a clutch).

As an approach to design problems associated with these mechanisms, it is necessary to determine the amount of torque and resultant horsepower capacity of the clutch or brake. This data determines the work imposed on both the unit and the friction material itself.

Coefficient of Friction for brakes and clutches varies widely depending upon the finish of the surfaces, pressure, rubbing speed, surface temperatures and the materials used. The frictional values shown herein are representative of dynamic action under constant load — constant rubbing speed conditions; hence they are to be used as a guide for calculation purposes.

The following basic formulas are suggested:

TORQUE = to determine the amount of stopping power.

$$T = N \times f \times P \times r$$

Where: T = Torque in foot, lbs.
N = Number of friction surfaces.
f = Coefficient of friction of friction material.
P = total effective pressure on lining, lbs.
r = radius of brake or radius of gyration of disc., ft.

Where: Radius of gyration (in feet) for clutch disc is determined by the factor $\frac{.7071\sqrt{R_o^2 + R_i^2}}{12}$
where "R_o" = outside radius (in inches).
and "R_i" = inside radius (in inches).

The design value for "P" will vary since most friction materials can withstand extremely high unit pressures beyond the general range of those used in actual service. Normal brake and clutch designs stay within 200 psi.

It is suggested that a suitable safety factor be included in the above computation so as to compensate for normal mechanical losses within the system which might be caused by the frequency and severity of engagements, variation in temperatures during the operating cycle and related changes in coefficient of friction values caused by these conditions. For light service a safety factor of 25% is suggested, and in cases where applications are severe, causing high temperatures, a greater safety factor, approaching 50%, is suggested.

HORSEPOWER = rate of doing work or absorbing energy.

$$HP = \frac{2\pi \text{rpm} \times T}{33{,}000} = \frac{\text{rpm} \times T}{5250}$$

Where: HP = horsepower { IHP = 33,000 ft.lbs./min. or 550 ft.lbs./sec.
rpm = speed, revolutions per minute
T = torque in foot lbs.

A practical use of the horsepower formula is to aid in determining the friction material surface area that must be provided for normal life expectancy. The general rule of thumb for a friction device operating dry and continuous is to allow 1 hp. per 5 square inches of friction material surface area.

If operating conditions are not severe, that is, infrequent applications-low temperature the friction surface area can be reduced for a given horsepower rating; under severe conditions, allow greater area. Friction material life can also be extended by reducing unit pressure (resulting in lower torque and lower HP) as well as by increasing the lining surface area.

Another means of classifying brake or clutch capacity is to determine the "pv" factor, where p = unit pressure in lbs. per square inch and "v" = velocity in feet per second.

The "pv" factor is a means of estimating rate of heat generation, but does not take into consideration the rate at which heat is dissipated. The latter is the final criteria on useful performance, and various means are employed in basic design to improve heat dissipating characteristics. Such methods as segmenting or grooving the friction surface, introducing air flow over the friction surface by external sources, and providing air scoop on the hub or drum, are frequently used to augment the dissipation of heat.

The force analysis of band type brakes and shoe type internal brakes, both of which involve self-wrapping or servo action are quite complicated and require more detailed information than can be included in this section. Therefore, for specific design problems involving these types of mechanisms we suggest you contact our Sales Office for assistance and guidance in making your friction material selection.

Methods of Attaching Industrial Friction Materials

RIVETING

Asbestos friction materials are usually fastened in position with either rivets or bolts.

Due to normal wear of the friction material, it is sometimes difficult to prevent occasional contact of the fastenings with the drums. By the proper selection of the fastening material, the possible cutting, scoring, or wearing away of the drum may be minimized.

The materials generally employed for bolts and rivets are copper, brass and aluminum, or their alloys.

Copper rivets are strong, tough and ductile and are widely used against both cast iron and steel friction surfaces. However, copper tends to drag and plate the metal surface and may cause serious erosion of the drum.

Brass rivets are superior to copper because they resist abrasion better and show no tendency to score under normal operating conditions.

As a general rule, solid flat head rivets are the most satisfactory type for industrial purposes. Semi-tubular rivets are better for this work than the full tubular kind as they are considerably stronger. Split rivets should never be used on industrial work.

The minimum length of rivet should be the thickness of lining under the rivet head, plus the thickness of the brake band or shoe, plus the diameter of the rivet body. The maximum length should be the thickness of lining under the rivet head, plus the thickness of brake band or shoe, plus the diameter of the rivet body, multiplied by 1.25. The length of a rivet is measured in sixteenths of an inch from the underside of the head to the end of the shank or body.

For fabric linings it is suggested that rivet heads be made twice the diameter of the body or shank. Molded linings are dense and mechanically strong and do not require rivets with as large heads to hold the lining in position.

Molded blocks, being relatively thick and of large size, are usually fastened in place with standard bolts or heavy solid rivets. Flexible linings less than ½" thick are usually secured to the bands by rivets.

Countersinking

Fastenings of any type should never be permitted to come in contact with the brake drum or clutch plate, as they might cut or abrade it. The heads should be countersunk below the friction material surface as far as can conveniently be done without weakening the holding power of the fastening.

In flexible materials, it is customery to counterbore only half the thickness; in rigid materials, which are much stronger physically, about two-thirds of the thickness can be counterbored. Sinking the heads of fastenings in a flexible lining is sometimes accomplished merely by forcing the rivet head into the material, but this is not good practice. It is better workmanship to drill and counterbore for the fastening by removing material from lining. This is easily accomplished by standard drills and counterbores and the use of portable electric drills or drill presses.

Several machines are manufactured for drilling and counterboring brake lining, and rivet presses also are available for use in the automotive trade. These can be adapted in many cases for use on industrial braking equipment.

Rivet Hole Plugs

Rivet-hole countersinks in friction linings tend to accumulate dirt and abraded materials which increases the possibility of scoring the drums and reducing the life of the friction material.

The use of our semiplastic Rivet Hole Plugs, largely eliminates such destructive actions resulting from countersinks. They also help to increase the area of the friction material surface. The plugs are recommended for all styles of blocks and fabric linings.

After the blocks or lining have been riveted or bolted to the band or shoe, the plugs are inserted in the countersinks and driven firmly into place. It is important that plugs be ordered to exact dimensions so as to assure proper fit and to fill the countersink completely.

Any excess material which protrudes above the surface of the friction blocks or lining should be faced-off flush before placing in service.

NUMBER OF FASTENINGS REQUIRED

While friction materials normally require little more than contact with the band to keep them from sliding, there are times when considerable stress is brought on the fastenings, such as by a sudden vigorous application of the brake, and sufficient fastenings must be provided to prevent possible slipping of the friction material. Practice varies considerably, due to the nature of the service and the particular material to be held in place. The following table, based on average practice, shows allowable friction surface area per fastening:

Type of Friction Material	Thickness of Friction Materials, in.	Service Category*	Fastener Size	Friction Surface Per Fastener, sq. in.
Linings Woven and Molded	1/8-3/8	Light	1/8-3/16 in. Rivets	4
		Medium	1/4 in. Rivets	6
		Heavy	5/16 in. Rivets	8
Molded Blocks	1/2-4	Heavy	1/4-5/16 in. Rivets	8
		Heavy	3/8-1/2 in. Rivets	10

*SERVICE CATEGORY

	LIGHT	MEDIUM	HEAVY
RUBBING SPEED, FT/MIN or	1000	1000 to 3000	3000 to 7500
PRESSURE, LB/SQ. IN.	5-24	25-50	50-150

NOTES
Brass tubular rivets or bolts and nuts are preferred.
Copper rivets are acceptable but are more aggressive in scoring tendency.
Brass bolts and steel nuts are acceptable.
Fasteners should be distributed proportionately over entire friction material area.
All ends of friction material should be held down with at least two fasteners per line.
Keep fasteners 1/2 in. from edges.
Countersink all fastener heads.
Rivet holes should be completely filled. Clinch all rivets.

BONDING

Industrial Friction Materials can be applied with the cement bonding method.

Since bonding differs greatly from conventional riveting and because a defective bond is very difficult to detect by inspection after the lining has been applied, it is most important to be familiar with and follow carefully the following principles of the bonding procedure.

Preparation of Metal Surface

1 The metal surface against which the lining will be bonded must be absolutely clean and flat, and of true radius. Bare metal must be exposed by suitable grinding or other mechanical means. No grease, paint, rust or other foreign matter should appear on the surface to be lined (Do not touch the surface with your hand after it has been prepared and before the cement is applied.)

2 After surface preparation — some bonders coat or dip, using a cement-type solution which is allowed to dry and protects prepared surface against oxidation until bonded. It is not necessary to remove coating before bonding.

Preparation of Lining

3 If precoated linings are not used, the bonding surface of the lining must also be clean and free from grease or any foreign matter before applying adhesive. This can be done by wiping with a clean, dry rag or by using an air hose.

CAUTION: Do not use a solvent of any type for this cleaning operation since it may penetrate into the lining and reduce the bonding strength.

Cure Cycle

4. To effect a complete, safe bond, the proper relationship between time, temperature and pressure must exist. These criteria are different for each type of lining and cement.

Pressure cycle must be positive and maintained (follow-up) during the cure cycle. Straps, bands and springs that are distorted must be discarded if they cannot be reworked so that proper clamping pressure is maintained during the bonding operation.

Methods of Attaching and Cutting Friction Materials

Be sure that your clamping device provides a *follow-up* pressure, which does not relax during heating, of at least 75 pounds-per-square-inch of bonding surface.

5. Assembly should be subjected to 400F or 450F bond line temperature for two minutes for an anvil-type bonding fixture. For oven-type bonding fixture subject assembly to 400F bond line temperature for 5 minutes. IMPORTANT: The bond line temperature is the surface temperature where the friction material comes in contact with the metal shoe or band to which it is to be bonded. Use thermocouple at bond line.

6. Upon removal from heat, allow the bonded shoe assembly to cool normally to room temperature.

CAUTION: Do not chill or accelerate cooling in any way.

After following these steps, the bonded shoe assembly is ready for use.

CAUTION: If in doubt about any of the above factors with respect to one or more assemblies, do not take a chance on a possible failure but remove the doubtful lining and rebond.

Shear Testing

7. Defective bonds cannot be readily recognized by visual inspection. Spot checking each group of assemblies by subjecting some parts to a shear test is recommended. For best results, some form of shear testing equivalent to approximately 300 pounds or more per square inch of lining area should be adopted. This may be done by means of a hammer and chisel or by a non-destructive bondproof machine which will not damage the assembly.

Removal of Worn Bonded Materials

8. Worn friction materials may be removed from a metal member by (a) mechanical or (b) thermal means.

a. Use a chisel, grinder or belt sander. In any case, finish the metal surface as under "Preparation of Metal Surface."

b. Temperatures of 700F to 900F at the bond line will remove friction materials. After metal parts have cooled, they must be prepared as under "Preparation of Metal Surface."

CUTTING METHODS and TOOLS

For economy reasons, many companies make a practice of carrying inventories of friction roll and sheet, cutting them to size and shape as required. This practice provides convenient service; however, it must be realized that friction materials are tough and consequently, to avoid waste, the proper cutting methods and tools should be used.

Based on experience in production and from accepted field practices, several methods and basic tools used to cut Friction Materials are suggested below:

Band Saw

Accepted all-purpose cutting tool. It is suitable for making cuts cleanly and accurately to length, and for radial cutting, such as facing and cone liner segments and O.D. cutting of solid rings and facings. The band saw can handle woven, molded, and brake block stocks up to 4" thick. However, blades, speed, set, etc. vary for optimum cutting of various materials. Tilting tables or jigs can be employed to make angular cuts. General practice, depending upon material and thickness, is as follows:

Molded Materials and Brake Blocks up to 4" thick; any length of cut:

Saw Plate - Pitch	— 5 point 4 teeth/inch
Saw Blade - Width*	— 1" and 1¾"
Saw Blade - Thickness	— 20 gauge
Speed	— approximately 1000-5000 ft./min.
Feed	— Hand

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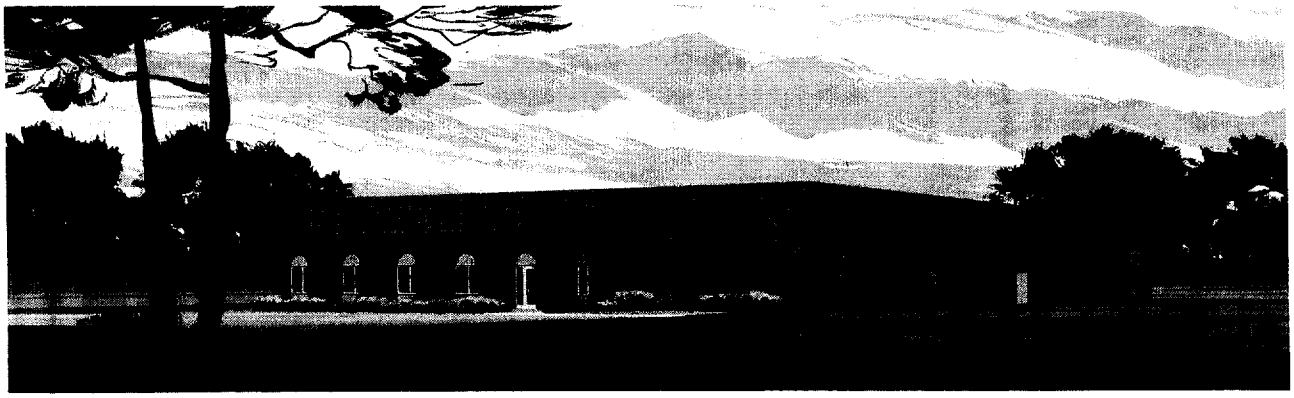

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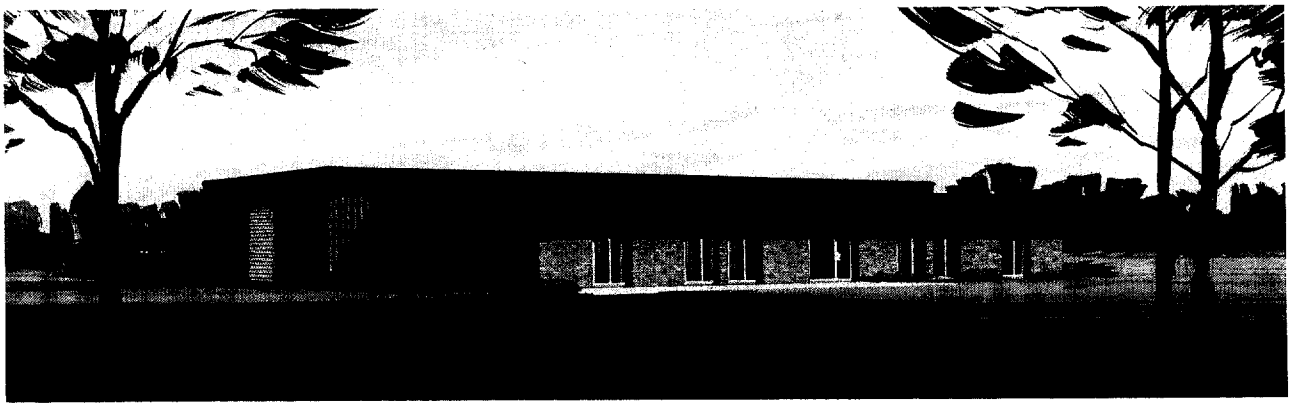

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PRODUCT WARRANTY:

Scan-Pac Mfg. Industrial Friction Materials are warranted free from defects in workmanship and in raw materials of our own manufacture. These products are not guaranteed as to performance under any specific service condition nor for any specific period of time. Our liability for breach of any warranty, express or implied, is limited, at our option, to refund of the invoice value of defective material or in the replacement thereof.

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DESIGN FACTORS

Brake and Clutch Mechanisms

In any brake or clutch system the common objective is to rapidly convert the kinetic energy of the moving member into heat and to dissipate the generated heat as quickly as possible. This conversion is generally accomplished by bringing a friction material into contact with the moving member in such a manner as to either retard the free rotation of the mating part (the function of a brake) or to impart motion to connecting parts (the function of a clutch).

As an approach to design problems associated with these mechanisms, it is necessary to determine the amount of torque and resultant horsepower capacity of the clutch or brake. This data determines the work imposed on both the unit and the friction material itself.

Coefficient of Friction for brakes and clutches varies widely depending upon the finish of the surfaces, pressure, rubbing speed, surface temperatures and the materials used. The frictional values shown herein are representative of dynamic action under constant load — constant rubbing speed conditions; hence they are to be used as a guide for calculation purposes.

The following basic formulas are suggested:

TORQUE = to determine the amount of stopping power.

$$T = N \times f \times P \times r$$

Where: T = Torque in foot, lbs.
N = Number of friction surfaces.
f = Coefficient of friction of friction material.
P = total effective pressure on lining, lbs.
r = radius of brake or radius of gyration of disc., ft.

Where: Radius of gyration (in feet) for clutch disc is determined by the factor $\frac{.7071\sqrt{R_o^2 + R_i^2}}{12}$
where "R_o" = outside radius (in inches).
and "R_i" = inside radius (in inches).

The design value for "P" will vary since most friction materials can withstand extremely high unit pressures beyond the general range of those used in actual service. Normal brake and clutch designs stay within 200 psi.

It is suggested that a suitable safety factor be included in the above computation so as to compensate for normal mechanical losses within the system which might be caused by the frequency and severity of engagements, variation in temperatures during the operating cycle and related changes in coefficient of friction values caused by these conditions. For light service a safety factor of 25% is suggested, and in cases where applications are severe, causing high temperatures, a greater safety factor, approaching 50%, is suggested.

HORSEPOWER = rate of doing work or absorbing energy.

$$HP = \frac{2\pi rpm \times T}{33{,}000} = \frac{rpm \times T}{5250}$$

Where: HP = horsepower { IHP = 33,000 ft.lbs./min. or 550 ft.lbs./sec.
rpm = speed, revolutions per minute
T = torque in foot lbs.

A practical use of the horsepower formula is to aid in determining the friction material surface area that must be provided for normal life expectancy. The general rule of thumb for a friction device operating dry and continuous is to allow 1 hp. per 5 square inches of friction material surface area.

If operating conditions are not severe, that is, infrequent applications-low temperature the friction surface area can be reduced for a given horsepower rating; under severe conditions, allow greater area. Friction material life can also be extended by reducing unit pressure (resulting in lower torque and lower HP) as well as by increasing the lining surface area.

Another means of classifying brake or clutch capacity is to determine the "pv" factor, where p = unit pressure in lbs. per square inch and "v" = velocity in feet per second.

The "pv" factor is a means of estimating rate of heat generation, but does not take into consideration the rate at which heat is dissipated. The latter is the final criteria on useful performance, and various means are employed in basic design to improve heat dissipating characteristics. Such methods as segmenting or grooving the friction surface, introducing air flow over the friction surface by external sources, and providing air scoop on the hub or drum, are frequently used to augment the dissipation of heat.

The force analysis of band type brakes and shoe type internal brakes, both of which involve self-wrapping or servo action are quite complicated and require more detailed information than can be included in this section. Therefore, for specific design problems involving these types of mechanisms we suggest you contact our Sales Office for assistance and guidance in making your friction material selection.

Methods of Attaching Industrial Friction Materials

RIVETING

Asbestos friction materials are usually fastened in position with either rivets or bolts.

Due to normal wear of the friction material, it is sometimes difficult to prevent occasional contact of the fastenings with the drums. By the proper selection of the fastening material, the possible cutting, scoring, or wearing away of the drum may be minimized.

The materials generally employed for bolts and rivets are copper, brass and aluminum, or their alloys.

Copper rivets are strong, tough and ductile and are widely used against both cast iron and steel friction surfaces. However, copper tends to drag and plate the metal surface and may cause serious erosion of the drum.

Brass rivets are superior to copper because they resist abrasion better and show no tendency to score under normal operating conditions.

As a general rule, solid flat head rivets are the most satisfactory type for industrial purposes. Semi-tubular rivets are better for this work than the full tubular kind as they are considerably stronger. Split rivets should never be used on industrial work.

The minimum length of rivet should be the thickness of lining under the rivet head, plus the thickness of the brake band or shoe, plus the diameter of the rivet body. The maximum length should be the thickness of lining under the rivet head, plus the thickness of brake band or shoe, plus the diameter of the rivet body, multiplied by 1.25. The length of a rivet is measured in sixteenths of an inch from the underside of the head to the end of the shank or body.

For fabric linings it is suggested that rivet heads be made twice the diameter of the body or shank. Molded linings are dense and mechanically strong and do not require rivets with as large heads to hold the lining in position.

Molded blocks, being relatively thick and of large size, are usually fastened in place with standard bolts or heavy solid rivets. Flexible linings less than ½" thick are usually secured to the bands by rivets.

Countersinking

Fastenings of any type should never be permitted to come in contact with the brake drum or clutch plate, as they might cut or abrade it. The heads should be countersunk below the friction material surface as far as can conveniently be done without weakening the holding power of the fastening.

In flexible materials, it is customery to counterbore only half the thickness; in rigid materials, which are much stronger physically, about two-thirds of the thickness can be counterbored. Sinking the heads of fastenings in a flexible lining is sometimes accomplished merely by forcing the rivet head into the material, but this is not good practice. It is better workmanship to drill and counterbore for the fastening by removing material from lining. This is easily accomplished by standard drills and counterbores and the use of portable electric drills or drill presses.

Several machines are manufactured for drilling and counterboring brake lining, and rivet presses also are available for use in the automotive trade. These can be adapted in many cases for use on industrial braking equipment.

Rivet Hole Plugs

Rivet-hole countersinks in friction linings tend to accumulate dirt and abraded materials which increases the possibility of scoring the drums and reducing the life of the friction material.

The use of our semiplastic Rivet Hole Plugs, largely eliminates such destructive actions resulting from countersinks. They also help to increase the area of the friction material surface. The plugs are recommended for all styles of blocks and fabric linings.

After the blocks or lining have been riveted or bolted to the band or shoe, the plugs are inserted in the countersinks and driven firmly into place. It is important that plugs be ordered to exact dimensions so as to assure proper fit and to fill the countersink completely.

Any excess material which protrudes above the surface of the friction blocks or lining should be faced-off flush before placing in service.

NUMBER OF FASTENINGS REQUIRED

While friction materials normally require little more than contact with the band to keep them from sliding, there are times when considerable stress is brought on the fastenings, such as by a sudden vigorous application of the brake, and sufficient fastenings must be provided to prevent possible slipping of the friction material. Practice varies considerably, due to the nature of the service and the particular material to be held in place. The following table, based on average practice, shows allowable friction surface area per fastening:

Type of Friction Material	Thickness of Friction Materials, in.	Service Category*	Fastener Size	Friction Surface Per Fastener, sq. in.
Linings Woven and Molded	1/8-3/8	Light	1/8-3/16 in. Rivets	4
		Medium	1/4 in. Rivets	6
		Heavy	5/16 in. Rivets	8
Molded Blocks	1/2-4	Heavy	1/4-5/16 in. Rivets	8
		Heavy	3/8-1/2 in. Rivets	10

***SERVICE CATEGORY**

	LIGHT	MEDIUM	HEAVY
RUBBING SPEED, FT/MIN	1000	1000 to 3000	3000 to 7500
or PRESSURE, LB/SQ. IN.	5-24	25-50	50-150

NOTES

Brass tubular rivets or bolts and nuts are preferred.
Copper rivets are acceptable but are more aggressive in scoring tendency.
Brass bolts and steel nuts are acceptable.
Fasteners should be distributed proportionately over entire friction material area.
All ends of friction material should be held down with at least two fasteners per line.
Keep fasteners 1/2 in. from edges.
Countersink all fastener heads.
Rivet holes should be completely filled. Clinch all rivets.

BONDING

Industrial Friction Materials can be applied with the cement bonding method.

Since bonding differs greatly from conventional riveting and because a defective bond is very difficult to detect by inspection after the lining has been applied, it is most important to be familiar with and follow carefully the following principles of the bonding procedure.

Preparation of Metal Surface

1 The metal surface against which the lining will be bonded must be absolutely clean and flat, and of true radius. Bare metal must be exposed by suitable grinding or other mechanical means. No grease, paint, rust or other foreign matter should appear on the surface to be lined (Do not touch the surface with your hand after it has been prepared and before the cement is applied.)

2 After surface preparation — some bonders coat or dip, using a cement-type solution which is allowed to dry and protects prepared surface against oxidation until bonded. It is not necessary to remove coating before bonding.

Preparation of Lining

3 If precoated linings are not used, the bonding surface of the lining must also be clean and free from grease or any foreign matter before applying adhesive. This can be done by wiping with a clean, dry rag or by using an air hose.

CAUTION: Do not use a solvent of any type for this cleaning operation since it may penetrate into the lining and reduce the bonding strength.

Cure Cycle

4. To effect a complete, safe bond, the proper relationship between time, temperature and pressure must exist. These criteria are different for each type of lining and cement.

Pressure cycle must be positive and maintained (follow-up) during the cure cycle. Straps, bands and springs that are distorted must be discarded if they cannot be reworked so that proper clamping pressure is maintained during the bonding operation.

Methods of Attaching and Cutting Friction Materials

Be sure that your clamping device provides a *follow-up* pressure, which does not relax during heating, of at least 75 pounds-per-square-inch of bonding surface.

5. Assembly should be subjected to 400F or 450F bond line temperature for two minutes for an anvil-type bonding fixture. For oven-type bonding fixture subject assembly to 400F bond line temperature for 5 minutes. IMPORTANT: The bond line temperature is the surface temperature where the friction material comes in contact with the metal shoe or band to which it is to be bonded. Use thermocouple at bond line.

6. Upon removal from heat, allow the bonded shoe assembly to cool normally to room temperature.

CAUTION: Do not chill or accelerate cooling in any way.

After following these steps, the bonded shoe assembly is ready for use.

CAUTION: If in doubt about any of the above factors with respect to one or more assemblies, do not take a chance on a possible failure but remove the doubtful lining and rebond.

Shear Testing

7. Defective bonds cannot be readily recognized by visual inspection. Spot checking each group of assemblies by subjecting some parts to a shear test is recommended. For best results, some form of shear testing equivalent to approximately 300 pounds or more per square inch of lining area should be adopted. This may be done by means of a hammer and chisel or by a non-destructive bondproof machine which will not damage the assembly.

Removal of Worn Bonded Materials

8. Worn friction materials may be removed from a metal member by (a) mechanical or (b) thermal means.

a. Use a chisel, grinder or belt sander. In any case, finish the metal surface as under "Preparation of Metal Surface."

b. Temperatures of 700F to 900F at the bond line will remove friction materials. After metal parts have cooled, they must be prepared as under "Preparation of Metal Surface."

CUTTING METHODS and TOOLS

For economy reasons, many companies make a practice of carrying inventories of friction roll and sheet, cutting them to size and shape as required. This practice provides convenient service; however, it must be realized that friction materials are tough and consequently, to avoid waste, the proper cutting methods and tools should be used.

Based on experience in production and from accepted field practices, several methods and basic tools used to cut Friction Materials are suggested below:

Band Saw

Accepted all-purpose cutting tool. It is suitable for making cuts cleanly and accurately to length, and for radial cutting, such as facing and cone liner segments and O.D. cutting of solid rings and facings. The band saw can handle woven, molded, and brake block stocks up to 4" thick. However, blades, speed, set, etc. vary for optimum cutting of various materials. Tilting tables or jigs can be employed to make angular cuts. General practice, depending upon material and thickness, is as follows:

Molded Materials and Brake Blocks up to 4" thick; any length of cut:

Saw Plate - Pitch	— 5 point 4 teeth/inch
Saw Blade - Width*	— 1" and 1¾"
Saw Blade - Thickness	— 20 gauge
Speed	— approximately 1000-5000 ft./min.
Feed	— Hand

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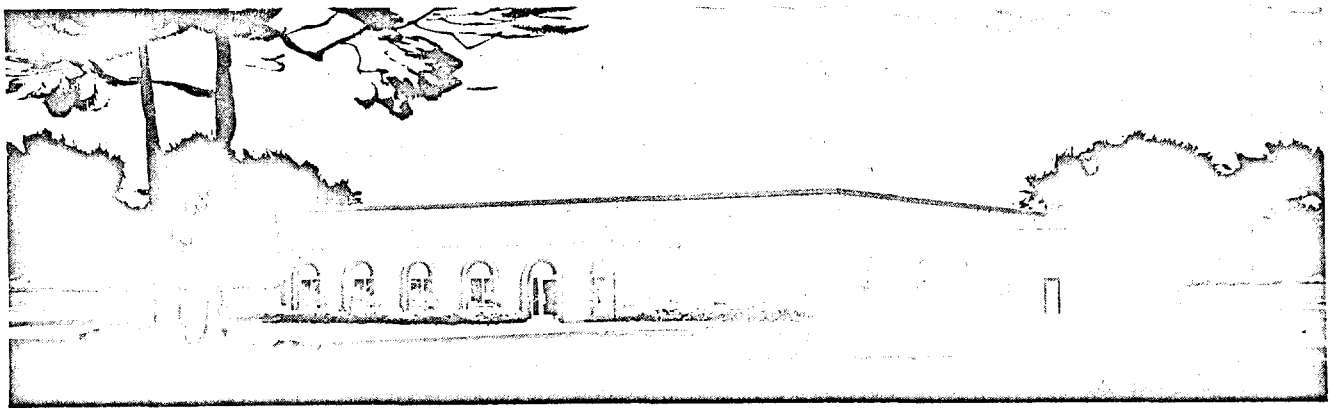

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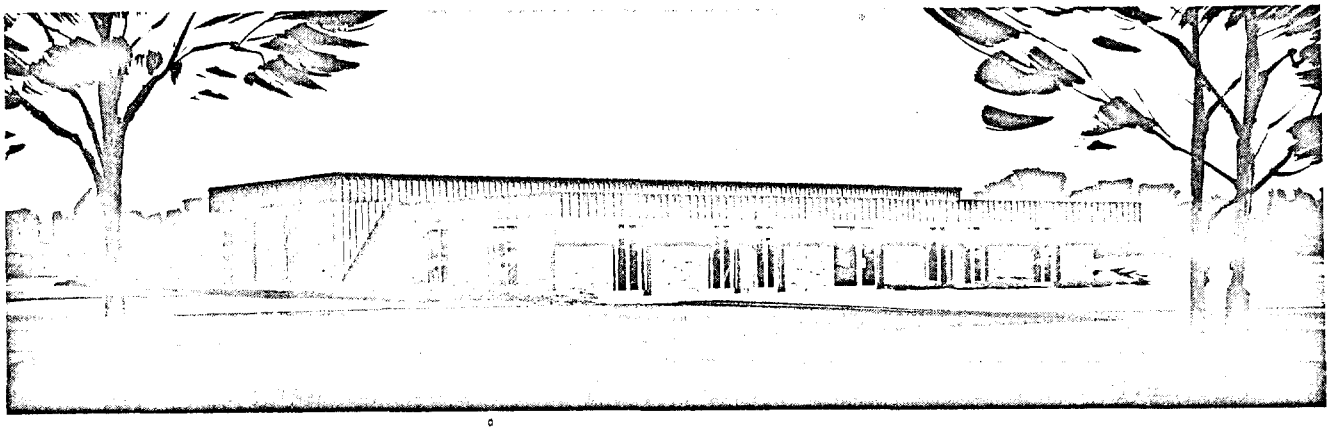

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