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Seal Specialists

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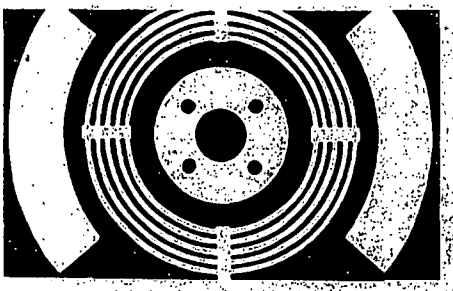
SCAN-PAC

FRICTION MATERIALS

ENGINEERING AND DESIGN DATA

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

GLEASON-000068



Material Selection Chart

TO SELECT THE RIGHT MATERIAL FOR YOUR APPLICATION

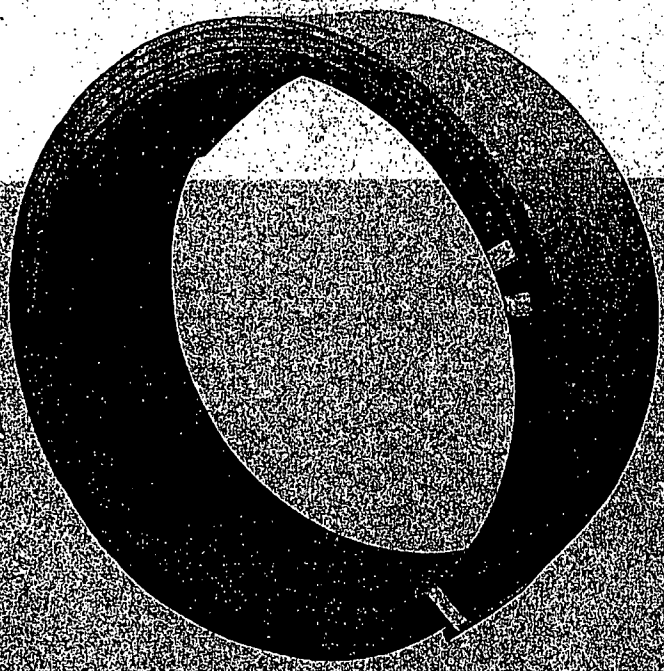
STYLE NO.	200	202	230	232	240	242	265	725	HDM
Forms Available.	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Disc Band Cone Seg Sheet	Roll Band Cone Sheet	Roll Band Cone Seg Sheet Disc	Disc Band Cone Seg Sheet	Roll Band
Type Surface: G—Ground P—Plain	G	G	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.

GLEASON-000069

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 a 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

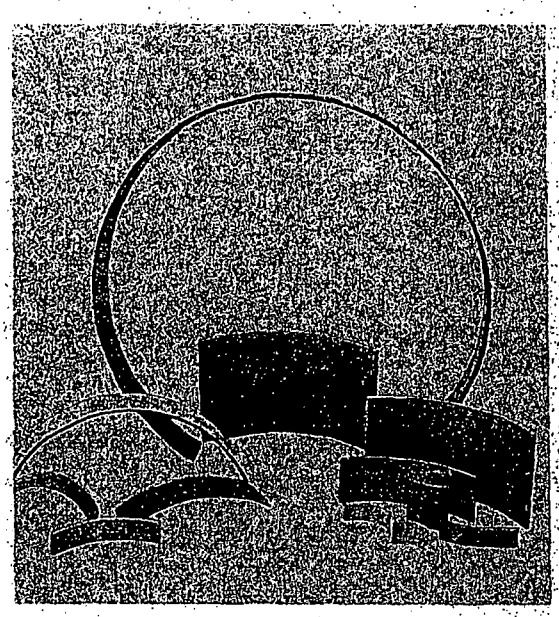
To assist you in the use of roll stock for various brake applications, the following tables list the recommended minimum roll diameters to which the stock may be curved without cracking. Style numbers are listed according to available thicknesses.

MINIMUM DIAMETERS TO WHICH INDUSTRIAL MOLDED COILS MAY BE CURVED

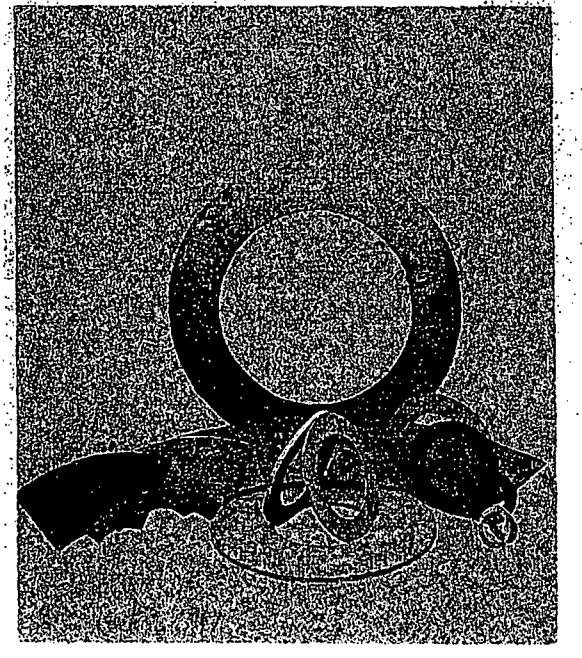
Thickness of Lining	Style				
	202	232	242	4 Star H.D.M.	265-G
1/8"	7"	7"	7"	—	5"
3/16"	9"	9"	9"	8"	7"
1/4"	11"	11"	11"	12"	10"
5/16"	13"	13"	13"	17"	—
3/8"	15"	15"	15"	20"	—

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

GLEASON-000070



	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.

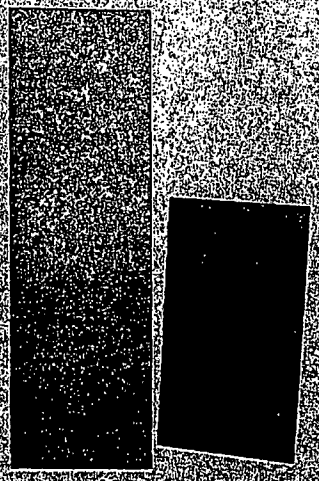
MOLDED FRICTION FACINGS

- 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

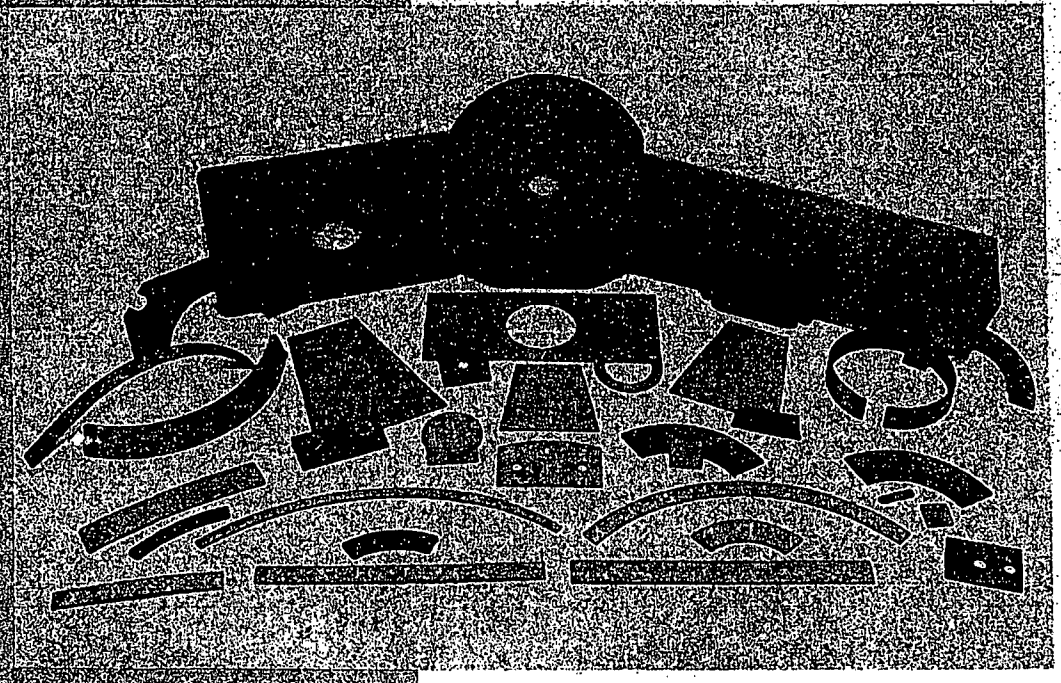
GLEASON-000071

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

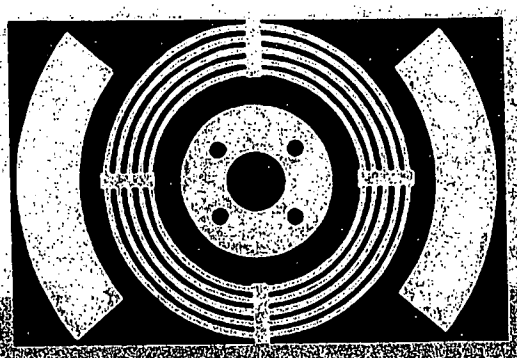
MOLDED CUSTOM PARTS



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

GLEASON-000072

Self Lubricating Bearings and Bushings



EEL-SLIP® PRODUCTS

Eel-Slip is engineered for use as a low friction bearing material which serves effectively without the usual lubrication. Impervious to most oils 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 rolling 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.

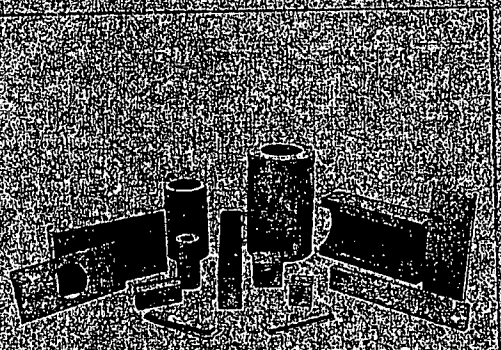
SIZES—Sheets are supplied in standard thicknesses of ⅛", 3/16", ¼", 5/16" and ⅜". By lamination other thicknesses up to 4" are also possible. The material can be furnished 36" wide x 72" thick x 10 ft. long. Longer pieces are satisfactorily made by splicing. Heavier slab stock can be furnished 30" x 30" x 4" thick maximum.

52 EEL-SLIP. Practically the same compound as employed for this type but this 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) ⅜" to 9¾" and for O.D. (outside diameter) 1" to 10¾". For size ⅜" I.D. these size limits apply, wall thickness ⅛" to ⅜" and length ¼" to 5". For sizes 1" to 8" I.D. wall thickness ¼" to 4½" and length ¼" to 6". For sizes 9" to 9¾" I.D. inclusive, wall thickness ½" to 8½" and length ½" 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 tipped tools give the cleanest cut.

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

BEARING CLEARANCES	
On shafts up to and including 2"	.010 to .015" clearance on diameter
Over 2" and including 4"	.020 to .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 grease grooves. These are generally located in the bottom half of the bearing 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.

GLEASON-000073

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

GLEASON-000074

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 $.707 \sqrt{R_o^2 + R_i^2} \div 12$

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 $\left\{ \begin{array}{l} \text{IHP} = 33{,}000 \text{ ft. lbs./min.} \\ \text{or} \quad 550 \text{ ft. lbs./sec.} \end{array} \right.$
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.

GLEASON-000075

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.

GLEASON-000076

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.

GLEASON-000077

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

* The 1-3/4-inch blade is used unless small radius parts are to be cut, in which case the one-inch blade is better.

For general purpose work, and where the saw life is not a prime factor, the one-inch blade is satisfactory.

Saw blades last 1-4 hours, depending on the material being cut.

Use slow speed until the saw blade becomes dull, then use high speed until good results can no longer be obtained.

Circle Saw

Excellent for length and width cuts. Use steel cutting blades, preferably carbide tipped.

Sabre Saw

Good for cutting lengths, ID's of facings and for radial cuts. Use steel cutting blades, preferably carbide tipped.

Caution — All Cutting

Airborne Asbestos dust can be a health hazard. Proper dust collection equipment should be used & respiratory equipment should be worn by operator. Safety glasses should also be worn to protect eyes against flying particles.

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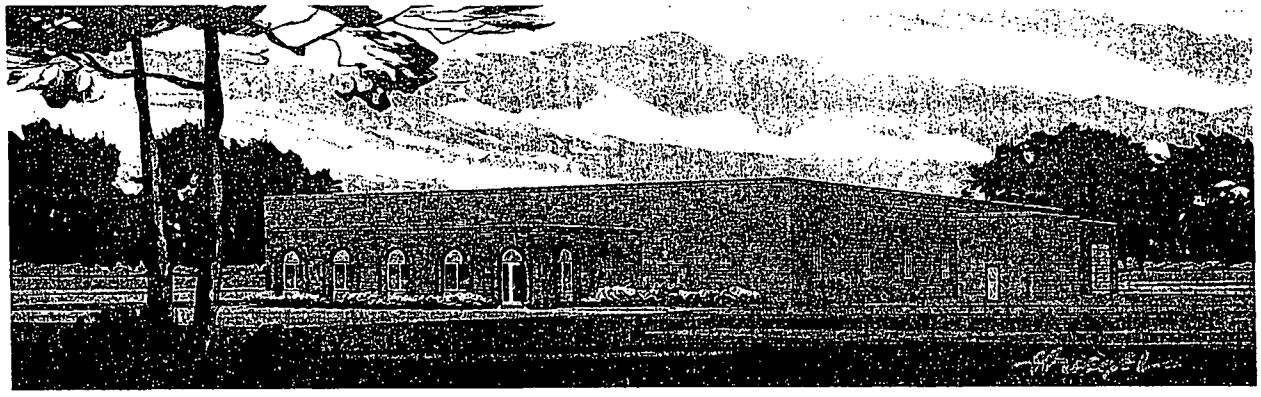

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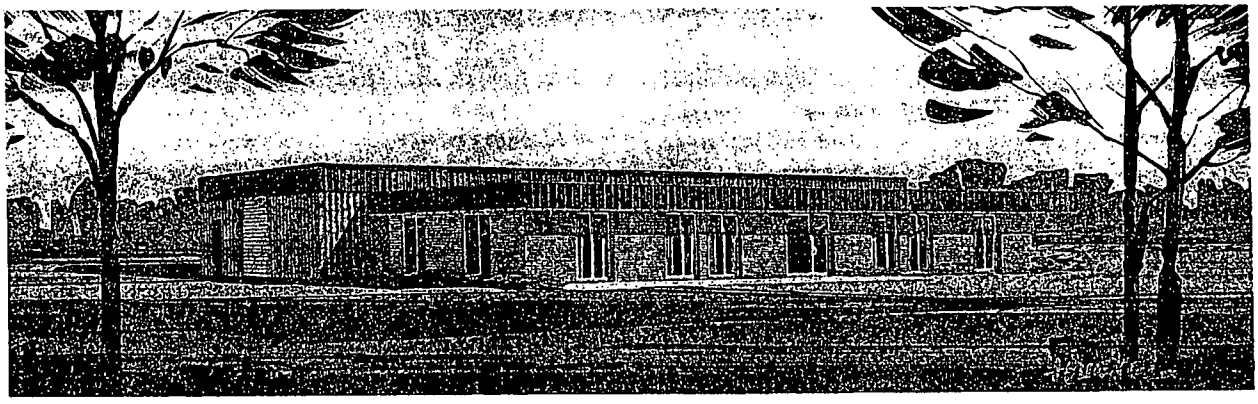

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