UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA

Facultad de Ingeniería y Negocios

MEMORIA

Unidad Audiovisual

"Actualización en Mecánica"

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Proyecto realizado en la Empresa:

JFE Shoji Steel de México S.A de C.V.

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INTRODUCCION.

En la actualidad es importante para las empresas asegurar el buen estado de las maquinarias y equipos que utilizan para llevar a cabo los procesos que dan como resultado algún producto y que a su vez va a parar en manos de un exigente consumidor.

Sabemos de la importancia para las empresas de mantener los procesos libres de fallas que puedan provocar atrasos en producción o desperfectos en el producto final, para ellos implementan métodos que buscan contrarrestar toda falla que ocasioné perdidas económicamente hablando.

Cuando un quipo o maquinaria empieza a fallar la empresa debe de poner mucha atención a la situación, ya que directa o indirectamente provocara perdidas; la parte mecánica de la maquinaria siempre se debe de tener en buen estado para ellos la mayoría de las empresas implementan programas de mantenimiento; muchas veces los mantenimientos se hacen rutinarios y no se hace tanto énfasis en analizar de manera objetiva el problema en caso de que el equipo llegue a fallar; al no analizar el problema y tomar decisiones de manera empírica probablemente no se encuentren las causas raíz que ocasionó dicha situación; al analizar de manera objetiva y tener conocimiento pleno de las fuerzas que actúan en las maquinarias se aseguran que la selección de partes y refacciones sean la adecuada para el trabajo que se desea hacer.

I. ANTECEDENTES DE LA EMRPESA.

Esta empresa es de inversión Japonesa y se encuentra en el Parque Industrial El Lago que está ubicado en la Calle Paseo Cucapa # 10515 Colonia El Lago en la ciudad de Tijuana, el giro es de acero y su actividad principal que en ella se realizar es maquilar rollos de lámina de acero.

Esta compañía se encarga de abastecer placas de lámina de acero a empresas de giro electrónico; la cual sirve como chasis para los diferentes productos electrónicos que se elaboran en la ciudad de Tijuana.

Entro los clientes principales se encuentran SONY, SHARP, PANASONIC, SANSUMG, HITASHI y SANYO, entre otras.

II. DESCRIPCION GENERAL Y ESPECÍFICA DEL AREA DE TRABAJO.

En JFE Shoji Steel de México S.A de C.V se hace como actividad principal el corte de rollos de lámina de acero; la mayoría de la maquinaria y equipos está enfocada al área de producción llamada slitter.

En esta área es donde nosotros relazamos nuestro trabajo de investigación, el cual consistió en comparar si el sistema de transmisión de potencia de un alimentador de lamina hacia un troquel contaba con las partes mecánicas adecuadas para su buen funcionamiento, estas partes son poleas, sprockets, cadenas, bandas en v, bandas de tiempo y los rodamientos.

III. IDENTIFICACION DEL PROBLEMA.

a. SELECCIONAR COPLE.

Se analizó un Motor de 1 hp que gira a 1690 RPM y tiene un reductor marca Medusa de ratio de 289:1 y a su vez activa un alimentador de rollos de 4000 kilogramos carga máxima con un cople de mordazas a una temperatura ambiente de 30ºC.

El diámetro de flecha de la salida del reductor es de 2.5 pulgadas y el diámetro de flecha que activa el sistema es de 2.5 pulgadas.

$$T.N. = \frac{H.P. * 63025}{RPM}$$

T.N.= Torque Nominal.

H.P. = Caballos de Fuerza del Motor.

R.P.M.= Revoluciones del Motor.

$$T.N. = \frac{1 * 63025}{1690} = \mathbf{37.2928\ Lb - pulg}$$

Para obtener el torque del reductor se calculo las RPM de salida del mismo.

$$RPM\ Reductor = \frac{RPM\ Motor\ (1690)}{Ratio\ (289)} = \mathbf{5.8477\ Rpm}$$

Después se calcula el torque del reductor:

$$Torque\ Reductor. = \frac{1 * 63025}{Rpm\ Reductor\ (5.8477)} = \mathbf{10{,}777.7416\ lb - pulg}$$

Con estos datos ya nos fue posible seleccionar el cople

$$T.D. = Torque\ Reductor * Factor\ de\ Servicio$$

$$T.D. = (10777.7416)(1.75) = \mathbf{18{,}861.0478\ lb - pulg}$$

Ver Figura 1.

Al hacer el análisis para la selección del elemento flexible nos arrojo como resultado dos tipos de elementos materiales para el elemento flexible de acuerdo al torque de diseño.

El primero elemento flexible es de tipo **C2955** de NBR con capacidad de **18 900 Lb.pulg** y el segundo es del tipo **C295** de Hytrel con capacidad de **22 680 Lb-pulg.**

Ver Figura 2.

El numero de parte es del elemento flexible de para materia NBR es el **14856** y el numero de parte para Hytrel es **14808.**

Ver Figura 3.

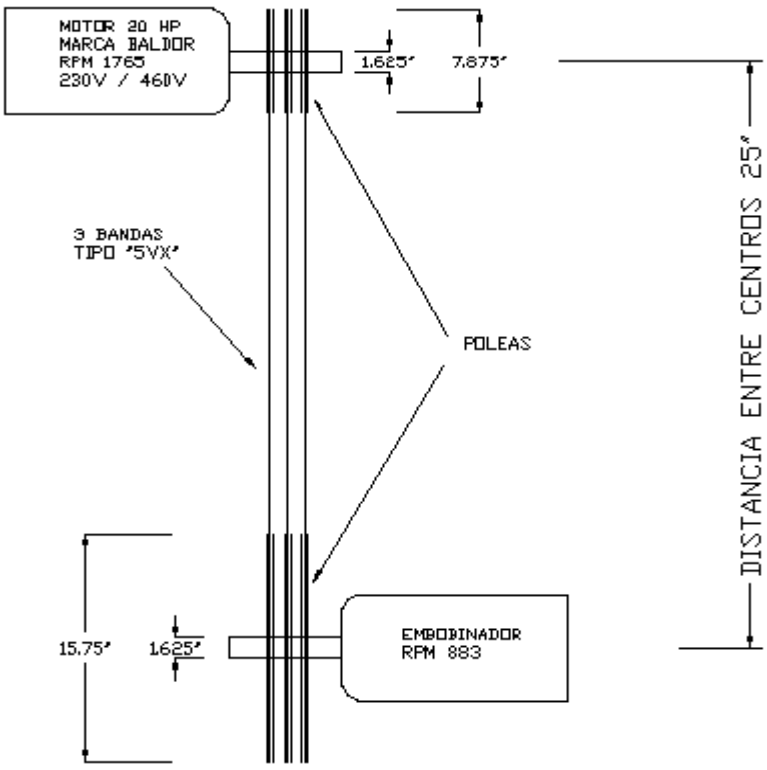
Al seleccionar las masas de acuerdo al diámetro de las flechas y a tipo de mordaza, para el **C2955** nos da el número de parte **48454** y para el **C295** da el número de parte **45249.**

Ver Figura 4.

b. SELECCIONAR TRANSMISION DE POTENCIA

c. SELECCIONAR CADENAS, BANDAS V Y POLEAS DE TIEMPO

En JFE Shoji Steel de México S.A. de C.V. analizamos un sistema de transmisión de potencia conformado por 3 bandas del tipo “V”. El sistema estaba como se muestra en la siguiente figura:



Este sistema es de trabajo continuo con condiciones ambientales y de temperatura normal.

Análisis del Sistema con Bandas del Tipo “VX”.

Lo primero que hicimos fue seleccionar el factor de servicio de la tabla 5 de la pagina D-43, del manual MARTIN SPROKET & GEAR.

Ver Figura 5.

El factor de servicio que nos arrojo fue el 2.0, no es muy parecida la aplicación, pero las condiciones en horas de trabajo y tipo de material que se maneja hacen que el sistema tenga similitudes en ese aspecto.

Después de tener el factor de servicio seleccionado, procedimos a calcular los HP's de diseño:

$$HPdiseño = HP\ x\ FS = 20\ x\ 2.0 = \mathbf{40\ HP}$$

Una vez que ya tenemos los HP de diseño procedemos a seleccionar el tipo de banda, en base a la velocidad del eje más rápido en el sistema (tabla 2 de la página D-44).

Ver Figura 6

El parámetro en selección del tipo de banda, en nuestro caso, quedo en un punto intermedio de bandas "3VX" y "5VX"; nos enfocamos a bandas "5VX" ya que son con las que contaba el sistema.

Ya que tenemos seleccionado el tipo de banda que vamos a usar, procedemos a sacar el diámetro mínimo de la polea motriz, arrojándonos el dato de diámetro mínimo de 6**"** para **40 HP** a **1750 RPM** (seleccionado de tabla 4 de página D-44).

Ver Figura 6.

Otro dato a sacar es la relación de velocidad la cual la sacamos de la tabla de acuerdo a las rpm del motor y rpm del sistema. Esto nos arrojo una combinación de poleas de **10.9"** de Ø en polea motriz y **21.2"** de Ø (seleccionados de pagina D-71).

Ver Figura 7.

Procedemos a seleccionar el factor de servicio corregido en base a la distancia entre centros.

Nos queda que el factor de servicio corregido es **0.95** con nuestro sistema trabajando a **24.2”** de distancia entre centros (valor menor mas aproximado aplicando tabla de la pagina D-71).

Ver Figura 7.

La banda nos quedo del tipo “**5VX1000”**

Esta banda soporta **37.35 HP** por pieza,

Para corregir los HP’s se hace la siguiente operación 37.35 x 0.95 = **35.48.**

Por ultimo procedemos a sacar el número de bandas requeridas para que el sistema funcione adecuadamente:

$$\#\ de\ Bandas = \frac{HP\ del\ sistema}{HP\ por\ banda\ corregida} = \frac{40}{35.48} = \mathbf{1.27 = 2\ Bandas\ 5VX}$$

Nuestra conclusión para este análisis es que el sistema esta sobrado con una banda ya que el cálculo nos dice que con dos bandas el sistema trabajaría bien.

Análisis del Sistema con Bandas de Tiempo

Hoy en día, las bandas de tiempo o HTS, están teniendo gran auge en la industria ya que tienen grandes ventajas sobre las bandas en “V” y las cadenas, estas pueden ser:

- Disminuyen espacio.
- Son silenciosas
- Sincronizan perfectamente maquinas

Analizamos el sistema anterior (que funciona con bandas “v”) con bandas de tiempo.

Los datos son los mismos.

- Motor 20 H.P.
- 1765 RPM (motor)
- 883 RPM (embobinador)
- 25” Distancia entre centros
- Trabajo continuo
- NEMA C
- Condiciones de temperatura normales.

El primer paso que debemos de seguir para la selección de bandas de tiempo es la selección de la clase del motor, (tabla 1, pagina K-21 del manual MARTIN SPROKET & GEAR).

Ver Figura 8

En nuestro caso es un motor NEMA diseño C, que trabaja a 1765 RPM, con una potencia de 20 HP, corresponde a **CLASE II.**

Una vez obtenida la clase, procedemos a seleccionar el factor de servicio (tabla 2 pagina K-21).

Ver Figura 8.

En nuestro caso no encontramos alguna aplicación parecida a un embobinador de rollos de lámina, pero procedimos a seleccionar el factor de servicio basándonos en el tipo de material que manipula y las horas de trabajo; el factor de servicio que elegimos fue **2.0.**

Con el F.S. seleccionado procedemos a sacar los HP’s de diseño:

$$HPdiseño = HP\ x\ FS = 20\ x\ 2.0 = \mathbf{40\ HP}$$

El paso que sigue es la selección del paso de la banda y ese lo obtenemos (tabla 3 página K-23). Para 40 HP a 1750 rpm corresponde el paso **XH**.

Ver Figura 9.

Para seleccionar los diámetros de poleas calculamos la relación de velocidad del sistema.

$$Ratio = \frac{1765}{883} = \mathbf{1.99 = 2}$$

Las poleas correspondientes son 30 XH con diámetro de paso de **8.356”** (motriz) y 60 XH con diámetro de paso de **16.711”** (conducida) (tabla de la página K-56).

Ver Figura 10.

Basándonos en la misma relación de velocidad (2.0), (tabla página K-57) buscamos la distancia entre centros de nuestro sistema; al no encontrarla, buscamos una distancia entre centros más cercanos pero mayor; esta distancia corresponde a 29.102”, la cual nos arroja a una banda 980 XH (banda de paso 7/8” con 98” de largo y 112 dientes).

Ver Figura 11.

Para calcular el ancho de la banda dividimos los HP’s de diseño entre los HP’s para bandas de 1”

$$\frac{40\ HP}{19.06} = \mathbf{2.09 = 2.0"\ Ancho\ de\ Banda}$$

El arco de contacto para nuestro sistema con HTS nos quedo:

$$\frac{180 - (\ DP\ motriz - DP\ inducido)\ x\ 60}{Distancia\ entre\ centros}$$

$$\frac{180-(16.71-8.356)x\,60}{29.102} = \mathbf{162.72\ Grados}$$

Por último calculamos el TIM (número de dientes en un engranaje):

$$TIM = \frac{(\#\ de\ dientes\ motriz)x\ (arco\ de\ contacto)}{360}$$

$$TIM = \frac{(30)x\ (162.76)}{360} = \mathbf{13.56\ Dientes}$$

Cadenas.

Se analizó un Motor de 20 hp que gira a 1765 RPM y hace girar a un inducido a 883 RPM es NEMA C y tiene una distancia entre centros de 25 pulgadas.

$Factor\ de\ Servicio = (30\ H.P)(1.5) =$ **30 H.P error**

$Paso\ 80\ Con\ 25\ Dientes$

$$\frac{(25)1765}{886} = N2 = 50\ Dientes\ Paso\ 80$$

$$L = 2C + \frac{N+n}{2} + \frac{A}{C}$$

$$C = 25"\ Paso\ 5/8 = 40$$

$$L = 2(40) + \frac{(25+50)}{2} + \frac{(15.83)}{40} = 117.89 = 118 = 73.75\ Pulgadas$$
$$= 6.14\ Pies.$$

$Sprocket\ Motriz\ 25\ Dientes\ Paso\ 80$

Sprocket Inducido 50 *Dientes Paso* 80

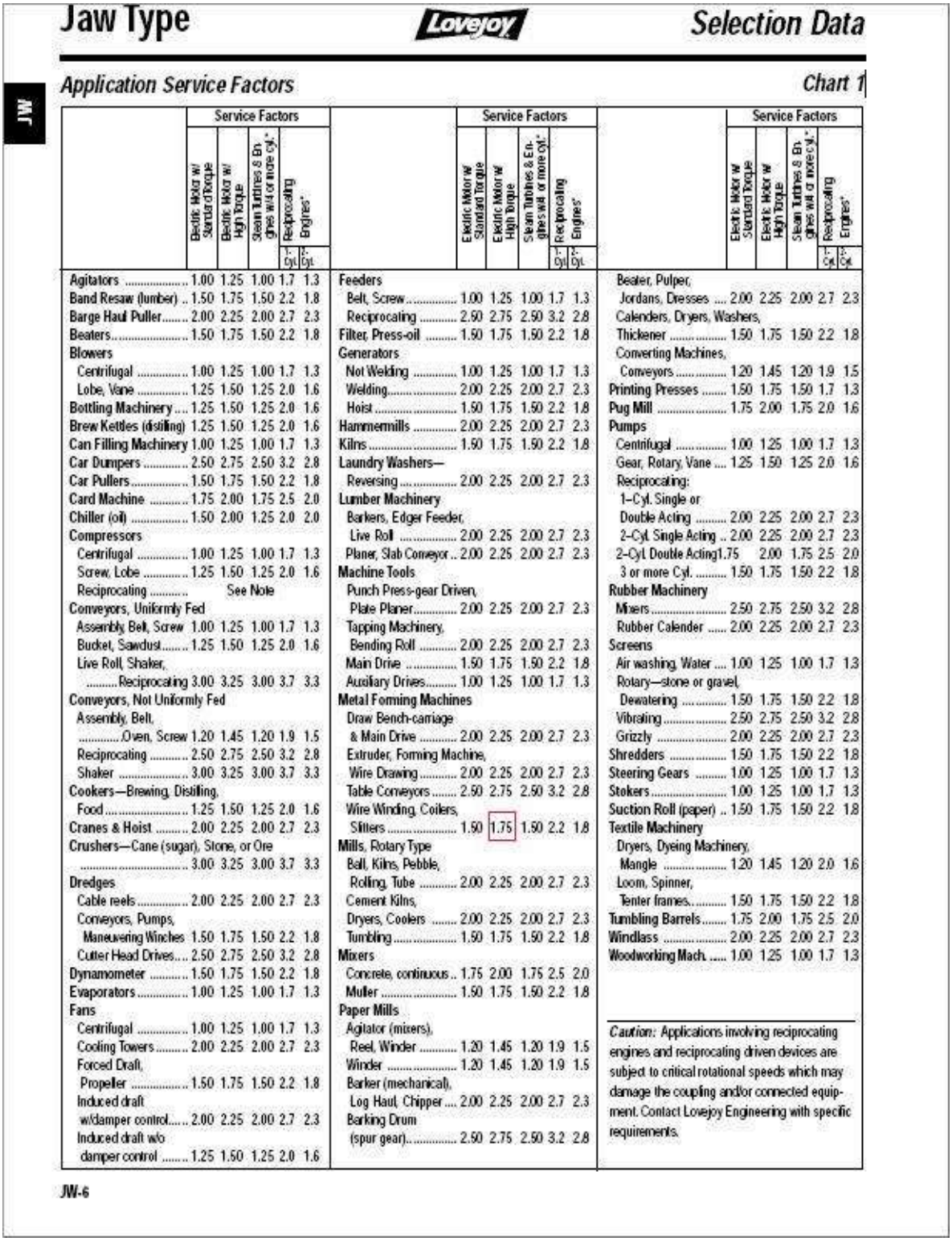
Cadena Paso 80, *Con* 73.75 *Pulgadas o* 6.14 *Pies.*

d. CALCULO DE LA VIDA UTIL DEL BALERO

IV. OBJETIVOS.
V. MARCO DE REFERENCIA TECNICA.
VI. INFORMACION TECNICA DE LOS TEMAS VISTOS EN CLASE.
VII. RESULTADOS OBTENIDOS.
VIII. CONCLUSIONES Y RECOMENDACIONES.

ANEXOS

Figura 1



Jaw Type — Lovejoy — Selection Data

JW

Application Service Factors — Chart 1

	Service Factors				
	Electric Motor w/ Standard Torque	Electric Motor w/ High Torque	Steam Turbines & Engines with 4 or more cyl.*	Reciprocating Engines* 1-Cyl.	Reciprocating Engines* 2-Cyl.
Agitators	1.00	1.25	1.00	1.7	1.3
Band Resaw (lumber)	1.50	1.75	1.50	2.2	1.8
Barge Haul Puller	2.00	2.25	2.00	2.7	2.3
Beaters	1.50	1.75	1.50	2.2	1.8
Blowers					
Centrifugal	1.00	1.25	1.00	1.7	1.3
Lobe, Vane	1.25	1.50	1.25	2.0	1.6
Bottling Machinery	1.25	1.50	1.25	2.0	1.6
Brew Kettles (distilling)	1.25	1.50	1.25	2.0	1.6
Can Filling Machinery	1.00	1.25	1.00	1.7	1.3
Car Dumpers	2.50	2.75	2.50	3.2	2.8
Car Pullers	1.50	1.75	1.50	2.2	1.8
Card Machine	1.75	2.00	1.75	2.5	2.0
Chiller (oil)	1.50	2.00	1.25	2.0	2.0
Compressors					
Centrifugal	1.00	1.25	1.00	1.7	1.3
Screw, Lobe	1.25	1.50	1.25	2.0	1.6
Reciprocating	See Note				
Conveyors, Uniformly Fed					
Assembly, Belt, Screw	1.00	1.25	1.00	1.7	1.3
Bucket, Sawdust	1.25	1.50	1.25	2.0	1.6
Live Roll, Shaker, Reciprocating	3.00	3.25	3.00	3.7	3.3
Conveyors, Not Uniformly Fed					
Assembly, Belt, Oven, Screw	1.20	1.45	1.20	1.9	1.5
Reciprocating	2.50	2.75	2.50	3.2	2.8
Shaker	3.00	3.25	3.00	3.7	3.3
Cookers—Brewing, Distilling, Food	1.25	1.50	1.25	2.0	1.6
Cranes & Hoist	2.00	2.25	2.00	2.7	2.3
Crushers—Cane (sugar), Stone, or Ore	3.00	3.25	3.00	3.7	3.3
Dredges					
Cable reels	2.00	2.25	2.00	2.7	2.3
Conveyors, Pumps, Maneuvering Winches	1.50	1.75	1.50	2.2	1.8
Cutter Head Drives	2.50	2.75	2.50	3.2	2.8
Dynamometer	1.50	1.75	1.50	2.2	1.8
Evaporators	1.00	1.25	1.00	1.7	1.3
Fans					
Centrifugal	1.00	1.25	1.00	1.7	1.3
Cooling Towers	2.00	2.25	2.00	2.7	2.3
Forced Draft, Propeller	1.50	1.75	1.50	2.2	1.8
Induced draft w/damper control	2.00	2.25	2.00	2.7	2.3
Induced draft w/o damper control	1.25	1.50	1.25	2.0	1.6
Feeders					
Belt, Screw	1.00	1.25	1.00	1.7	1.3
Reciprocating	2.50	2.75	2.50	3.2	2.8
Filter, Press-oil	1.50	1.75	1.50	2.2	1.8
Generators					
Not Welding	1.00	1.25	1.00	1.7	1.3
Welding	2.00	2.25	2.00	2.7	2.3
Hoist	1.50	1.75	1.50	2.2	1.8
Hammermills	2.00	2.25	2.00	2.7	2.3
Kilns	1.50	1.75	1.50	2.2	1.8
Laundry Washers—Reversing	2.00	2.25	2.00	2.7	2.3
Lumber Machinery					
Barkers, Edger Feeder, Live Roll	2.00	2.25	2.00	2.7	2.3
Planer, Slab Conveyor	2.00	2.25	2.00	2.7	2.3
Machine Tools					
Punch Press-gear Driven, Plate Planer	2.00	2.25	2.00	2.7	2.3
Tapping Machinery, Bending Roll	2.00	2.25	2.00	2.7	2.3
Main Drive	1.50	1.75	1.50	2.2	1.8
Auxiliary Drives	1.00	1.25	1.00	1.7	1.3
Metal Forming Machines					
Draw Bench-carriage & Main Drive	2.00	2.25	2.00	2.7	2.3
Extruder, Forming Machine, Wire Drawing	2.00	2.25	2.00	2.7	2.3
Table Conveyors	2.50	2.75	2.50	3.2	2.8
Wire Winding, Coilers, Slitters	1.50	1.75	1.50	2.2	1.8
Mills, Rotary Type					
Ball, Kilns, Pebble, Rolling, Tube	2.00	2.25	2.00	2.7	2.3
Cement Kilns, Dryers, Coolers	2.00	2.25	2.00	2.7	2.3
Tumbling	1.50	1.75	1.50	2.2	1.8
Mixers					
Concrete, continuous	1.75	2.00	1.75	2.5	2.0
Muller	1.50	1.75	1.50	2.2	1.8
Paper Mills					
Agitator (mixers), Reel, Winder	1.20	1.45	1.20	1.9	1.5
Winder	1.20	1.45	1.20	1.9	1.5
Barker (mechanical), Log Haul, Chipper	2.00	2.25	2.00	2.7	2.3
Barking Drum (spur gear)	2.50	2.75	2.50	3.2	2.8
Beater, Pulper, Jordans, Dresses	2.00	2.25	2.00	2.7	2.3
Calenders, Dryers, Washers, Thickener	1.50	1.75	1.50	2.2	1.8
Converting Machines, Conveyors	1.20	1.45	1.20	1.9	1.5
Printing Presses	1.50	1.75	1.50	1.7	1.3
Pug Mill	1.75	2.00	1.75	2.0	1.6
Pumps					
Centrifugal	1.00	1.25	1.00	1.7	1.3
Gear, Rotary, Vane	1.25	1.50	1.25	2.0	1.6
Reciprocating:					
1-Cyl. Single or Double Acting	2.00	2.25	2.00	2.7	2.3
2-Cyl. Single Acting	2.00	2.25	2.00	2.7	2.3
2-Cyl. Double Acting	1.75	2.00	1.75	2.5	2.0
3 or more Cyl.	1.50	1.75	1.50	2.2	1.8
Rubber Machinery					
Mixers	2.50	2.75	2.50	3.2	2.8
Rubber Calender	2.00	2.25	2.00	2.7	2.3
Screens					
Air washing, Water	1.00	1.25	1.00	1.7	1.3
Rotary—stone or gravel, Dewatering	1.50	1.75	1.50	2.2	1.8
Vibrating	2.50	2.75	2.50	3.2	2.8
Grizzly	2.00	2.25	2.00	2.7	2.3
Shredders	1.50	1.75	1.50	2.2	1.8
Steering Gears	1.00	1.25	1.00	1.7	1.3
Stokers	1.00	1.25	1.00	1.7	1.3
Suction Roll (paper)	1.50	1.75	1.50	2.2	1.8
Textile Machinery					
Dryers, Dyeing Machinery, Mangle	1.20	1.45	1.20	2.0	1.6
Loom, Spinner, Tenter frames	1.50	1.75	1.50	2.2	1.8
Tumbling Barrels	1.75	2.00	1.75	2.5	2.0
Windlass	2.00	2.25	2.00	2.7	2.3
Woodworking Mach.	1.00	1.25	1.00	1.7	1.3

Caution: Applications involving reciprocating engines and reciprocating driven devices are subject to critical rotational speeds which may damage the coupling and/or connected equipment. Contact Lovejoy Engineering with specific requirements.

JW-6

Figura 2

Jaw Type — Lovejoy — Selection Data

JW

Spider Performance Data — Chart 2

Characteristics	Temperature Range	Misalignment Angular Degree	Misalignment Parallel Inch	Shore Hardness[1]	Dampening Capacity	Chemical Resistance[2]	Color
SOX (NBR) Rubber—Nitrile Butadiene (Buna N) Rubber is a flexible elastomer material that is oil resistant, resembles natural rubber in resilience and elasticity and operates effectively in temperature range of -40 to +212°F (-40 to +100°C). Good resistance to oil. Standard elastomer. (Also applies to SXB Cushions.)	-40° to +212° F -40° to +100° C	1°	.015	80A	HIGH	GOOD	BLACK
URETHANE—Urethane has greater torque capability than NBR (1.5 times), provides less dampening effect, and operates at a temperature range of -30 to +160°F (-34 to +71°C). Good resistance to oil and chemicals. Not recommended for cyclic or start/stop applications.	-30° to +160° F -34° to +71° C	1°	.015	55D L050-L110 90-95A L150-L225	LOW	VERY GOOD	BLUE
HYTREL—Hytrel is a flexible elastomer designed for high torque and high temperature operations. Hytrel can operate in temperatures of -60F to +250°F (-51 to+121°C) and has an excellent resistance to oil and chemicals. Not recommended for cyclic or start/stop applications.	-60° to +250° F -51° to 121° C	½°	.015	55D	LOW	EXCELLENT	TAN
BRONZE—Bronze is a rigid, porous oil-impregnated metal insert exclusively for slow speed (maximum 250 RPM) applications requiring high torque capabilities. Bronze operations are not affected by extreme temperatures, water, oil, or dirt.	-40° to +450° F -40° to +232° C	½°	.010	----	NONE	EXCELLENT	BRONZE

Notes: 1. NBR standard shore hardness is 80A ±5A—Except L035=60A. Other softer or harder designs are available in NBR material; consult Lovejoy.
2. Chemical Resistance chart shown in Engineering Data section.

Coupling Nominal Rated Torque — Chart 3

Size	Maximum Bore Inch	Maximum Bore mm	Spider Material: SOX(NBR) Torque in-lbs	SOX(NBR) Torque Nm	Urethane Torque in-lbs	Urethane Torque Nm	Hytrel Torque in-lbs	Hytrel Torque Nm	Bronze Torque in-lbs	Bronze Torque Nm
L035	.375	9	3.5	0.4	N/A	N/A	N/A	N/A	N/A	N/A
L/AL050	.625	16	26.3	3.0	39	4.5	50	5.6	50	5.6
L/AL070	.750	19	43.2	4.9	65	7.3	114	12.9	114	12.9
L/AL075	.875	22	90.0	10.2	135	15.3	227	25.6	227	25.6
L/AL090	1.000	25	144.0	16.3	216	24.4	401	45.3	401	45.3
L/AL095	1.125	28	194.0	21.9	291	32.9	561	63.4	561	63.4
L/AL099	1.188	30	318.0	35.9	477	53.9	792	89.5	792	89.5
L/AL100	1.375	35	417.0	47.1	626	70.7	1134	128.0	1134	128.0
L/AL110	1.625	42	792.0	89.5	1188	134.0	2268	256.0	2268	256.0
L150	1.875	48	1240.0	140.0	1860	210.0	3708	419.0	3706	419.0
AL150	1.875	48	1450.0	163.8	N/A	N/A	N/A	N/A	N/A	N/A
L190	2.125	55	1728.0	195.0	2592	293.0	4680	529.0	4680	529.0
L225	2.625	65	2340.0	264.0	3510	397.0	6228	704.0	6228	704.0
L276	2.875	73	4716.0	533.0	N/A	N/A	N/A	N/A	12500	1412.0
C226	2.500	64	2988.0	338.0	N/A	N/A	5940	671.0	5940	671.0
C276	2.875	73	4716.0	533.0	N/A	N/A	9432	1066.0	N/A	N/A
C280	3.000	76	7560.0	854.0	N/A	N/A	13866	1567.0	N/A	N/A
C285	4.000	102	9182.0	1038.0	N/A	N/A	16680	1882.0	N/A	N/A
C295	3.500	89	11340.0	1281.0	N/A	N/A	22680	2563.0	22680	2563.0
C2955	4.000	102	18900.0	2136.0	N/A	N/A	37800	4271.0	37800	4271.0
H3067	4.500	114	33395.0	3774.0	N/A	N/A	47196	5333.0	47196	5333.0
H3567	5.000	127	46632.0	5269.0	N/A	N/A	63000	7119.0	63000	7119.0
H3667	5.629	143	64812.0	7323.0	N/A	N/A	88200	9966.0	88200	9966.0
H4067	6.250	159	88224.0	9969.0	N/A	N/A	126000	14237.0	126000	14237.0
H4567	7.000	178	119700.0	13525.0	N/A	N/A	170004	19209.0	170000	19209.0

Note: Bronze has a maximum RPM capability of 250 RPM. N/A indicates not available.

JW-5

Figura 3.

Jaw Type — Lovejoy — Item Selection

JW

C Type Couplings

Complete coupling selection includes two standard hubs, one cushion set, and one collar with hardware.

Cushions and Collar Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Size →	C226	C276	C280	C285	C295	C2955
Number of Cushions	6	6	6	6	6	10
SXB(NBR) cushion set	14547	14633	14712	14771	14805	14856
Hytrel cushion set	27529	14637	14716	14774	14809	14859
Bronze cushion set	14545	....	....	....	51914	51915
Collar with hardware	40122	40123	40124	40292	40293	40293

Note: Chemical resistance and compatibility for cushions is described in Engineering Data section (pg. ED-13).

C Type Metric Hubs

Standard Bore and Keyway Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Bore mm	Keyway mm	C226	C276	C280	C285	C295	C2955
30	8 x 3.3	62792	....	....	....	....	....
35	10 x 3.3	60243	47386	....	....	....	....
38	10 x 3.3	45348	62160	....	....	....	....
40	12 x 3.3	49379	54037	....	....	....	....
42	12 x 3.3	....	45219	....	....	....	....
45	14 x 3.8	52550	44723	58265	....	....	....
48	14 x 3.8	54288	....	52205	....	....	....
55	16 x 4.3	58011	58444	49012	....	....	....
60	18 x 4.4	....	47265	49378	....	....	....
65	18 x 4.4	....	52008	....	....	....	58676
70	20 x 4.9	....	59032	....	56794	54355	58677
75	22 x 5.4	....	....	....	....	47813	58678
80	22 x 5.4	....	....	....	44487	58675	58679
90	25 x 5.4	....	....	....	54363	....	....
95	25 x 5.4	....	....	....	....	....	62695

Note: RSB (Rough Stock Bore) hub has no keyway or set screw hole, it is not useable as shown and must be machined to proper bore tolerances. Hub includes inside sleeve and is drilled and tapped for collar bolts. Non-standard bores available—consult Lovejoy Engineering. For RSB hub part numbers see the C Type Inch Hub chart.

C Type Inch Hubs

Standard Bore and Keyway Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Bore	Keyway	C226	C276	C280	C285	C295	C2955
7/8 RSB		40125	40126	....	....	....	....
1 1/8	1/4 x 1/8	26036	26050	....	....	....	....
1 1/4 RSB		....	....	26067	41036	....	....
1 1/4	1/4 x 1/8	26037	26051	48988	47173	....	....
1 3/8	5/16 x 5/32	26038	26052	46278	55546	....	....
1 7/16	3/8 x 3/16	26039	....	....	....	....	....
1 1/2 RSB		....	....	....	....	41037	....
1 1/2	3/8 x 3/16	26040	26053	46277	48366	44824	....
1 5/8	3/8 x 3/16	26041	26054	46194	41892	56078	....
1 3/4 RSB		....	....	....	....	....	41038
1 3/4	3/8 x 3/16	26042	26055	44011	52311	45780	....
1 7/8	1/2 x 1/4	26043	26056	44012	51533	47080	49075
2	1/2 x 1/4	26044	26057	48194	....	....	....
2 1/8	1/2 x 1/4	26045	26058	44370	49809	44711	....
2 1/4	1/2 x 1/4	26046	44547	....	....	....	....
2 3/8	5/8 x 5/16	26047	26060	44014	47288	44825	52703
2 1/2	5/8 x 5/16	26048	46120	51998	56779	45249	48454
2 5/8	5/8 x 5/16	....	46755	44013	....	50145	54549
2 7/8	3/4 x 3/8	....	26064	51525	49456	52702	48108
3	3/4 x 3/8	....	....	48193	....	....	....
3 3/8	7/8 x 7/16	....	....	....	47171	45402	49077
3 1/2	7/8 x 7/16	....	....	....	46844	52988	44545
3 5/8	7/8 x 7/16	....	....	....	....	....	50106
3 3/4	7/8 x 7/16	....	....	....	....	....	58378
3 7/8	1 x 1/2	....	....	....	48247	....	49351
4	1 x 1/2	....	....	....	....	....	55016

Note: RSB (Rough Stock Bore) hub has no keyway or set screw hole, it is not useable as shown and must be machined to proper bore tolerances. Hub includes inside sleeve and is drilled and tapped for collar bolts. Non-standard bores available—consult Lovejoy Engineering.

Figura 4.

Jaw Type — Lovejoy — Item Selection

JW

C Type Couplings

Complete coupling selection includes two standard hubs, one cushion set, and one collar with hardware.

Cushions and Collar Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Size →	C226	C276	C280	C285	C295	C2955
Number of Cushions	6	6	6	6	6	10
SXB(NBR) cushion set	14547	14633	14712	14771	14805	14856
Hytrel cushion set	27529	14637	14716	14774	14808	14859
Bronze cushion set	14545	.....	.....	.....	51914	51915
Collar with hardware	40122	40123	40124	40292	40293	40293

Note: Chemical resistance and compatibility for cushions is described in Engineering Data section (pg. ED-13).

C Type Metric Hubs

Standard Bore and Keyway Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Bore mm	Keyway mm	C226	C276	C280	C285	C295	C2955
30	8 x 3.3	62792	.....	.....	.....	.....	.....
35	10 x 3.3	60243	47386	.....	.....	.....	.....
38	10 x 3.3	45348	62160	.....	.....	.....	.....
40	12 x 3.3	49379	54037	.....	.....	.....	.....
42	12 x 3.3	.....	45219	.....	.....	.....	.....
45	14 x 3.8	52550	44723	58265	.....	.....	.....
48	14 x 3.8	54288	.....	52205	.....	.....	.....
55	16 x 4.3	58011	58444	49012	.....	.....	.....
60	18 x 4.4	.....	47265	49378	.....	.....	.....
65	18 x 4.4	.....	52008	.....	.....	.....	58676
70	20 x 4.9	.....	59032	.....	56794	54355	58677
75	22 x 5.4	.....	.....	.....	.....	47813	58678
80	22 x 5.4	.....	.....	.....	44487	58675	58679
90	25 x 5.4	.....	.....	.....	54363	.....	.....
95	25 x 5.4	.....	.....	.....	.....	.....	62695

Note: RSB (Rough Stock Bore) hub has no keyway or set screw hole, it is not useable as shown and must be machined to proper bore tolerances. Hub includes inside sleeve and is drilled and tapped for collar bolts. Non-standard bores available—consult Lovejoy Engineering. For RSB hub part numbers see the C Type Inch Hub chart.

C Type Inch Hubs

Standard Bore and Keyway Chart

When referencing the Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table below.

Bore	Keyway	C226	C276	C280	C285	C295	C2955
7/8 RSB		40125	40126	.....	.....	.....	.....
1 1/8	1/4 x 1/8	26036	26050	.....	.....	.....	.....
1 1/4 RSB		.....	.....	26067	41036	.....	.....
1 1/4	1/4 x 1/8	26037	26051	48988	47173	.....	.....
1 3/8	5/16 x 5/32	26038	26052	46278	55546	.....	.....
1 7/16	3/8 x 3/16	26039	.....	.....	.....	.....	.....
1 1/2 RSB		.....	.....	.....	.....	41037	.....
1 1/2	3/8 x 3/16	26040	26053	46277	48366	44824	.....
1 5/8	3/8 x 3/16	26041	26054	46194	41892	56078	.....
1 3/4 RSB		.....	.....	.....	.....	.....	41038
1 3/4	3/8 x 3/16	26042	26055	44011	52311	45780	.....
1 7/8	1/2 x 1/4	26043	26056	44012	51533	47080	49075
2	1/2 x 1/4	26044	26057	48194	.....	.....	.....
2 1/8	1/2 x 1/4	26045	26058	44370	49809	44711	.....
2 1/4	1/2 x 1/4	26046	44547	.....	.....	.....	.....
2 3/8	5/8 x 5/16	26047	26060	44014	47288	44825	52703
2 1/2	5/8 x 5/16	26048	46120	51998	56779	45249	48454
2 5/8	5/8 x 5/16	.....	46755	44013	.....	50145	54549
2 7/8	3/4 x 3/8	.....	26064	51525	49456	52702	48108
3	3/4 x 3/8	.....	.....	48193	.....	.....	.....
3 3/8	7/8 x 7/16	.....	.....	.....	47171	45402	49077
3 1/2	7/8 x 7/16	.....	.....	.....	46844	52988	44545
3 5/8	7/8 x 7/16	.....	.....	.....	.....	.....	50106
3 3/4	7/8 x 7/16	.....	.....	.....	.....	.....	58378
3 7/8	1 x 1/2	.....	.....	.....	48247	.....	49351
4	1 x 1/2	.....	.....	.....	.....	.....	55016

Note: RSB (Rough Stock Bore) hub has no keyway or set screw hole, it is not useable as shown and must be machined to proper bore tolerances. Hub includes inside sleeve and is drilled and tapped for collar bolts. Non-standard bores available—consult Lovejoy Engineering.

Figura 5.

Martin

Stock Drive Selection

To select the best V-Belt Drive for an application, utilizing stock sheaves, simply follow the step by step instructions below:

BEFORE SELECTING A DRIVE, YOU NEED TO KNOW THESE FACTS:

1. The horsepower requirement of the drive.
2. The RPM of the driver.
3. The RPM of the driven machine.
4. The approximate center distance for the drive.
5. Shaft size of both units.
6. Average hours of operation per day.

TABLE 1 — SERVICE FACTORS

THE CORRECT SERVICE FACTOR IS DETERMINED BY:

1. The extent and frequency of peak loads.
2. The number of operating hours per year, broken down into average hours per day of continuous service.
3. The proper service category, (intermittent, normal or continuous). Select the one that most closely approximates your application conditions.

INTERMITTENT SERVICE — SERVICE FACTOR 1.0 TO 1.5
a. Light Duty — Not more than 6 hours per day.
b. Never exceeding rated load.

NORMAL SERVICE — SERVICE FACTOR 1.1 TO 1.6
a. Daily service 6 to 16 hours per day.
b. Where occasional starting or peak load does not exceed 200% of the full load.

CONTINUOUS SERVICE — SERVICE FACTOR 1.2 TO 1.8
a. Continuous service 16 to 24 hours per day.
b. Where starting or peak load is in excess of 200% of the full load or where starting or peak loads and overloads occur frequently.

TYPICAL SERVICE FACTORS

Driven machine types noted below are representative samples only. Select a category most closely approximating your application from those listed below.

IF IDLERS ARE USED, ADD THE FOLLOWING TO THE SERVICE FACTOR:

Idler on slack side (inside)	None
Idler on slack side (outside)	0.1
Idler on tight side (inside)	0.1
Idler on tight side (outside)	0.2

DRIVEN MACHINE TYPES	DRIVER TYPES: ELECTRIC MOTORS: AC Normal Torque Squirrel Cage and Synchronous, AC Split Phase, DC Shunt Wound, Internal Combustion Engines			DRIVER TYPES: ELECTRIC MOTORS: AC Hi-Torque, AC Hi-Slip, AC Repulsion-Induction, AC Single Phase Series Wound, AC Slip Ring, DC Compound Wound		
	INTERMITTENT SERVICE	NORMAL SERVICE	CONTINUOUS SERVICE	INTERMITTENT SERVICE	NORMAL SERVICE	CONTINUOUS SERVICE
Agitators for Liquids Blowers and Exhausters Centrifugal Pumps and Compressors Fans up to 10 HP Light Duty Conveyors	1.0	1.1	1.2	1.1	1.2	1.3
Belt Conveyors For Sand, Grain, etc. Dough Mixers Fans Over 10 HP Generators Line Shafts Laundry Machinery Machine Tools Punches-Presses-Shears Printing Machinery Positive Displacement Rotary Pumps Revolving and Vibrating Screens	1.1	1.2	1.3	1.2	1.3	1.4
Brick Machinery Bucket Elevators Exciters Piston Compressors Conveyors (Drag-Pan-Screw) Hammer Mills Paper Mill Beaters Piston Pumps Positive Displacement Blowers Pulverizers Saw Mill and Woodworking Machinery Textile Machinery	1.2	1.3	1.4	1.4	1.5	1.6
Crushers (Gyratory-Jaw-Roll) Mills (Ball-Rod-Tube) Hoists Rubber Calenders-Extruders-Mills	1.3	1.4	1.5	1.5	1.6	1.8
Choke-bore Equipment	2.0	2.0	2.0	2.0	3.0	2.0

FOR A GOOD COMMERCIAL DRIVE SELECTION, USE CONTINUOUS SERVICE FACTOR

Figura 6.

FOR MORE INFORMATION SEE US AT WWW.MARTINSPROCKET.COM

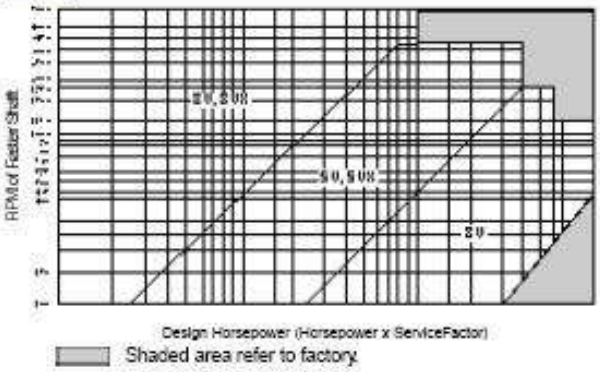
Stock Drive Selection

Martin

TYPICAL EXAMPLE

1. The driver is a 5 HP, normal torque electric motor.
2. The driver speed is 1750 RPM.
3. A speed reducer for a Martin screw conveyor is to be driven at 800 RPM.
4. The desired center distance is 20".
5. The driver shaft diameter is 1⅜ and the driven shaft diameter is also 1⅜.
6. The conveyor will operate 18-20 hours per day.

TABLE 2— HICap Wedge Cross Section Selection Chart



Shaded area refer to factory.

TABLE 3— Conventional Cross Section Selection

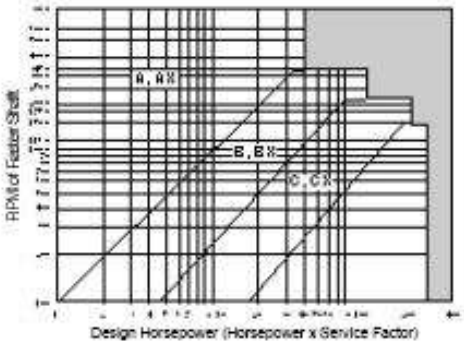


TABLE 4— Minimum Recommended Sheave Diameters for Electric Motors

MOTOR HORSE-POWER	MOTOR RPM					
	575	695	870	1160	1750	3450
.50	2.50	2.50	2.50	—	—	—
.75	3.00	2.50	2.50	2.50	—	—
1.00	3.00	3.00	2.50	2.50	2.25	—
1.50	3.00	3.00	3.00	2.50	2.50	2.25
2.00	3.75	3.00	3.00	2.50	2.50	2.50
3.00	4.50	3.75	3.00	3.00	2.50	2.50
5.00	4.50	4.50	3.75	3.00	3.00	2.50
7.50	4.25	4.50	4.50	3.75	3.00	3.00
10.00	6.00	5.25	4.50	4.50	3.75	3.00
15.00	6.75	6.00	5.25	4.50	4.50	3.75
20.00	8.25	6.75	6.00	5.25	4.50	4.50
25.00	9.00	8.25	6.75	6.00	4.50	4.50*
30.00	10.00	9.00	6.75	6.75	5.25	—
40.00	10.00	10.00	8.25	6.75	6.00	—
50.00	11.00	10.00	9.00	8.25	6.75	—
60.00	12.00	11.00	10.00	9.00	7.50	—
75.00	14.00	13.00	10.00	10.00	9.00	—
100.00	18.00	15.00	13.00	13.00	10.00	—
125.00	20.00	18.00	15.00	13.00	11.00	—
150.00	22.00	20.00	18.00	13.00	—	—
200.00	22.00	22.00	22.00	—	—	—
250.00	22.00	22.00	—	—	—	—
300.00	27.00	27.00	—	—	—	—

*NOTE: Data above the line are from National Electrical Manufacturers Association Standard MG1-3.16 and MG1-3.16A. Data below the line are a composite of Electrical Motor Manufacturers data. They are generally conservative, and specific motors and bearings may permit the use of a smaller motor sheave. Consult the motor manufacturer.

CAUTION

DO NOT USE STOCK SHEAVES ON SUCH EQUIPMENT AS DEBARKERS, WOOD CHIPPERS, CRUSHERS OR OTHER EQUIPMENT SUBJECT TO SEVERE SHOCK LOADS. CONSULT Martin FOR RECOMMENDATIONS.

Figura 7.

FOR MORE INFORMATION SEE US AT WWW.MARTINSPROCKET.COM

Martin

Stock Drive Selection 5V

Nominal Center Distances And Arc-Length Correction Factor															Sheave Combination		Speed Ratio
5V/5VX Belt Length Designation																	
800	900	1000	1120	1250	1320	1400	1600	1800	2000	2240	2500	2800	3150	3550	DriveR O.D.	DriveN O.D.	
17.1	22.2	27.3	33.4	39.9	43.4	47.4	57.5	67.6	77.5	89.5	102.6	117.6	135.1	155.1	9.75	18.70	1.93
29.8	34.8	39.8	45.8	52.3	55.8	59.8	69.8	79.8	89.8	101.8	114.9	129.9	147.4	167.4	4.40	8.50	1.95
—	19.1	24.2	30.4	36.9	40.5	44.5	54.5	64.6	74.6	86.6	99.7	114.7	132.3	152.2	10.90	21.20	1.95
29.2	34.2	39.2	45.2	51.7	55.2	59.2	69.2	79.2	89.3	101.3	114.3	129.3	146.8	166.8	4.65	9.00	1.96
—	—	—	—	—	27.6	31.7	42.0	52.1	62.2	74.3	87.3	102.4	119.9	140.0	16.00	31.50	1.97
0.81	0.83	0.86	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.17			
24.2	29.2	34.2	40.2	46.8	50.3	54.3	64.3	74.3	84.3	96.3	109.3	124.3	141.8	161.8	6.70	13.20	1.98
23.2	28.2	33.2	39.3	45.8	49.3	53.3	63.3	73.3	83.4	95.4	108.4	123.4	140.9	160.9	7.10	14.00	1.99
27.7	32.7	37.7	43.8	50.3	53.8	57.8	67.8	77.8	87.8	99.8	112.8	127.8	145.3	165.3	5.20	10.30	2.00
27.0	32.0	37.0	43.0	49.6	53.1	57.1	67.1	77.1	87.1	99.1	112.1	127.1	144.6	164.6	5.60	10.90	2.00
25.0	30.1	35.1	41.1	47.6	51.1	55.1	65.2	75.2	85.2	97.2	110.2	125.2	142.7	162.7	6.30	12.50	2.00
0.80	0.83	0.86	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.14	1.16			
29.0	34.0	39.0	45.0	51.5	55.0	59.0	69.0	79.0	89.1	101.1	114.1	129.1	146.6	166.6	4.65	9.25	2.01
28.4	33.4	38.4	44.4	50.9	54.4	58.4	68.5	78.5	88.5	100.5	113.5	128.5	146.0	166.0	4.90	9.75	2.01
22.0	27.1	32.1	38.1	44.7	48.2	52.2	62.2	72.2	82.2	94.3	107.3	122.3	139.8	159.8	7.50	15.00	2.01
20.8	25.8	30.9	36.9	43.5	47.0	51.0	61.0	71.0	81.1	93.1	106.1	121.1	138.6	158.6	8.00	16.00	2.01
—	—	21.4	27.5	34.2	37.7	41.8	51.9	61.9	72.0	84.0	97.0	112.0	129.6	149.6	11.80	23.60	2.01
0.81	0.83	0.86	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.17			
—	—	—	—	28.7	32.3	36.3	46.5	56.6	66.6	78.7	91.7	106.8	124.3	144.3	14.00	28.00	2.01
25.9	31.0	36.0	42.0	48.5	52.0	56.0	66.0	76.0	86.0	98.1	111.1	126.1	143.6	163.6	5.90	11.80	2.02
17.4	22.6	27.6	33.7	40.3	43.8	47.8	57.9	67.9	77.9	89.9	102.9	118.0	135.5	155.5	9.25	18.70	2.03
29.4	34.4	39.4	45.4	51.9	55.4	59.4	69.4	79.4	89.4	101.4	114.5	129.5	147.0	167.0	4.40	9.00	2.07
26.6	31.7	36.7	42.7	49.2	52.7	56.7	66.7	76.8	86.8	98.8	111.8	126.8	144.3	164.3	5.50	11.30	2.07
0.81	0.83	0.86	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.17			
—	19.5	24.7	30.8	37.4	40.9	44.9	55.0	65.0	75.1	87.1	100.1	115.1	132.6	152.7	10.30	21.20	2.07
17.6	22.7	27.8	33.9	40.5	44.0	48.0	58.0	68.1	78.1	90.1	103.1	118.1	135.7	155.7	9.00	18.70	2.09
—	—	21.7	27.9	34.6	38.1	42.1	52.2	62.3	72.3	84.4	97.4	112.4	129.9	150.0	11.30	23.60	2.10
24.4	29.5	34.5	40.5	47.1	50.6	54.6	64.6	74.6	84.6	96.6	109.6	124.6	142.1	162.1	6.30	13.20	2.11
23.5	28.5	33.5	39.6	46.1	49.6	53.6	63.6	73.7	83.7	95.7	108.7	123.7	141.2	161.2	6.70	14.00	2.11
0.80	0.82	0.84	0.86	0.88	0.89	1.00	1.03	1.05	1.08	1.08	1.10	1.12	1.14	1.16			
—	—	—	—	—	28.3	32.4	42.7	52.8	62.9	75.0	88.1	103.1	120.7	140.7	15.00	31.50	2.11
28.6	33.6	38.6	44.6	51.1	54.6	58.6	68.6	78.6	88.7	100.7	113.7	128.7	146.2	166.2	4.65	9.75	2.12
27.9	33.0	38.0	44.0	50.5	54.0	58.0	68.0	78.0	88.0	100.0	113.0	128.0	145.5	165.5	4.90	10.30	2.12
27.2	32.2	37.2	43.3	49.8	53.3	57.3	67.3	77.3	87.3	99.3	112.3	127.3	144.8	164.8	5.20	10.90	2.12
25.2	30.2	35.2	41.2	47.7	51.2	55.2	65.2	75.2	85.2	97.2	110.2	125.2	142.7	162.7	6.30	12.50	2.12
29.2	34.2	39.2	45.2	51.7	55.2	59.2	69.2	79.2	89.2	101.3	114.3	129.3	146.8	166.8	4.40	9.25	2.13
0.81	0.83	0.86	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.14	1.16			
22.3	27.4	32.4	38.4	45.0	48.5	52.5	62.5	72.5	82.5	94.6	107.6	122.6	140.1	160.1	7.10	15.00	2.13
—	—	—	—	29.2	32.8	36.9	47.1	57.2	67.2	79.3	92.3	107.4	124.9	145.0	13.20	28.00	2.13
25.3	30.4	35.4	41.4	47.9	51.4	55.5	65.5	75.5	85.5	97.5	110.5	125.5	143.0	163.0	5.90	12.50	2.14
21.1	26.2	31.3	37.3	43.8	47.4	51.4	61.4	71.4	81.4	93.4	106.5	121.5	139.0	159.0	7.50	16.00	2.15
26.2	31.3	36.3	42.3	48.8	52.3	56.3	66.3	76.3	86.4	98.4	111.4	126.4	143.9	163.9	5.50	11.80	2.17
0.80	0.82	0.84	0.86	0.88	0.89	1.00	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16			
—	—	22.0	28.2	34.8	38.4	42.4	52.5	62.6	72.6	84.7	97.7	112.7	130.2	150.3	10.90	23.60	2.16
—	19.9	25.0	31.2	37.8	41.3	45.3	55.4	65.4	75.5	87.5	100.5	115.6	133.1	153.1	9.75	21.20	2.19
26.9	31.9	36.9	42.9	49.4	53.0	57.0	67.0	77.0	87.0	99.0	112.0	127.0	144.5	164.5	5.20	11.30	2.20
17.9	23.1	28.2	34.3	40.8	44.3	48.4	58.4	68.4	78.5	90.5	103.5	118.5	136.0	156.1	8.50	18.70	2.21
28.8	33.8	38.8	44.8	51.3	54.8	58.8	68.8	78.8	88.8	100.9	113.9	128.9	146.4	166.4	4.40	9.75	2.24
0.80	0.82	0.84	0.86	0.88	0.89	1.00	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16			
28.1	33.1	38.2	44.2	50.7	54.2	58.2	68.2	78.2	88.2	100.2	113.2	128.2	145.7	165.7	4.65	10.30	2.24
23.7	28.8	33.8	39.9	46.4	49.9	53.9	63.9	74.0	84.0	96.0	109.0	124.0	141.5	161.5	6.30	14.00	2.24
27.4	32.5	37.5	43.5	50.0	53.5	57.5	67.5	77.5	87.5	99.5	112.5	127.6	145.1	165.1	4.90	10.90	2.25
—	—	—	22.9	29.7	33.3	37.4	47.6	57.7	67.7	79.8	92.9	107.9	125.5	145.5	12.50	28.00	2.25
24.7	29.8	34.8	40.8	47.4	50.9	54.9	64.9	74.9	84.9	96.9	109.9	124.9	142.5	162.5	5.90	13.20	2.26
0.80	0.83	0.84	0.87	0.89	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.12	1.14	1.16			
22.6	27.6	32.7	38.7	45.3	48.8	52.8	62.8	72.8	82.9	94.9	107.9	122.9	140.4	160.4	6.70	15.00	2.26
—	—	—	—	25.2	28.9	33.1	43.4	53.5	63.7	75.8	88.8	103.9	121.4	141.5	14.00	31.50	2.26
21.4	26.5	31.5	37.6	44.1	47.6	51.7	61.7	71.7	81.7	93.8	106.8	121.8	139.3	159.3	7.10	16.00	2.27
26.4	31.5	36.5	42.5	49.0	52.5	56.6	66.6	76.6	86.6	98.6	111.6	126.6	144.1	164.1	5.20	11.80	2.29
25.6	30.7	35.7	41.7	48.2	51.7	55.8	65.8	75.8	85.8	97.8	110.8	125.8	143.3	163.3	5.50	12.50	2.30
0.80	0.82	0.84	0.86	0.88	0.89	1.00	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16			

FOR BELT SIZES NOT SHOWN, INTERPOLATE FOR ADDITIONAL CENTER DISTANCE.

SEARCH EXIT PREVIOUS NEXT INDEX D-71

Figura 8.

Martin

Stock Drive Selection

BASIC SERVICE FACTORS

To find a basic service factor: First, determine the class of the DriveR (prime mover) in Table 1. Then, determine the basic service factor for the application in Table 2, in the same class as driveR.

Table 1
Drive R (prime mover)

Class of DriveR		Class I	Class II	Class III
Momentary Peak Load % of Rated Load		150%	150 to 249%	250 to 400%
AC Electric Motors Single Phase				All
Squirrel Cage NEMADesign A	3450 rpm	40 hp up	1½ thru 30 hp	
	1750 rpm	100 hp up	5 thru 75 hp	1 thru 3 hp
	1160 rpm	15 hp up	¾ thru 10 hp	
	870 rpm	5 hp up	½ thru 3 hp	
NEMADesign B	3450 rpm		5 hp up	1½ thru 3 hp
	1750 rpm		5 hp up	1 thru 3 hp
	1160 rpm		5 hp up	¾ thru 3 hp
	870 rpm		2 hp up	½ thru 1½ hp
NEMA Design C	1750 rpm		15 hp up	5 thru 10 hp
	1160 rpm		7½ hp up	3 and 5 hp
	870 rpm		All	
NEMA Design D				All
NEMADesign F		All		
Wound Rotor				
	1750 rpm		20 hp	2 to 15 hp
	1160 rpm		15 hp	2 to 10 hp
	870 rpm		7½ hp	1 to 5 hp
Synchronous			NormalTorque	High Torque
D.C. ELECTRICMOTORS		Shunt	Compound	Series
ENGINES Internal combustion		8 Cyl. up	6 Cyl.	4 Cyl. or less
HYDRAULIC MOTORS, LINE SHAFTS				All

ADDITIONAL SERVICE FACTORS FOR SPEED-UP DRIVES

For speed-up drives, add to the basic service factor the additional factor given at right.

Speed-Up Ratio Range	Add'l Factor
1.00 to 1.24	None
1.25 to 1.74	.10
1.75 to 2.49	.20
2.50 to 3.49	.30
3.50 &Over	.40

FOR UNUSUAL CONDITIONS

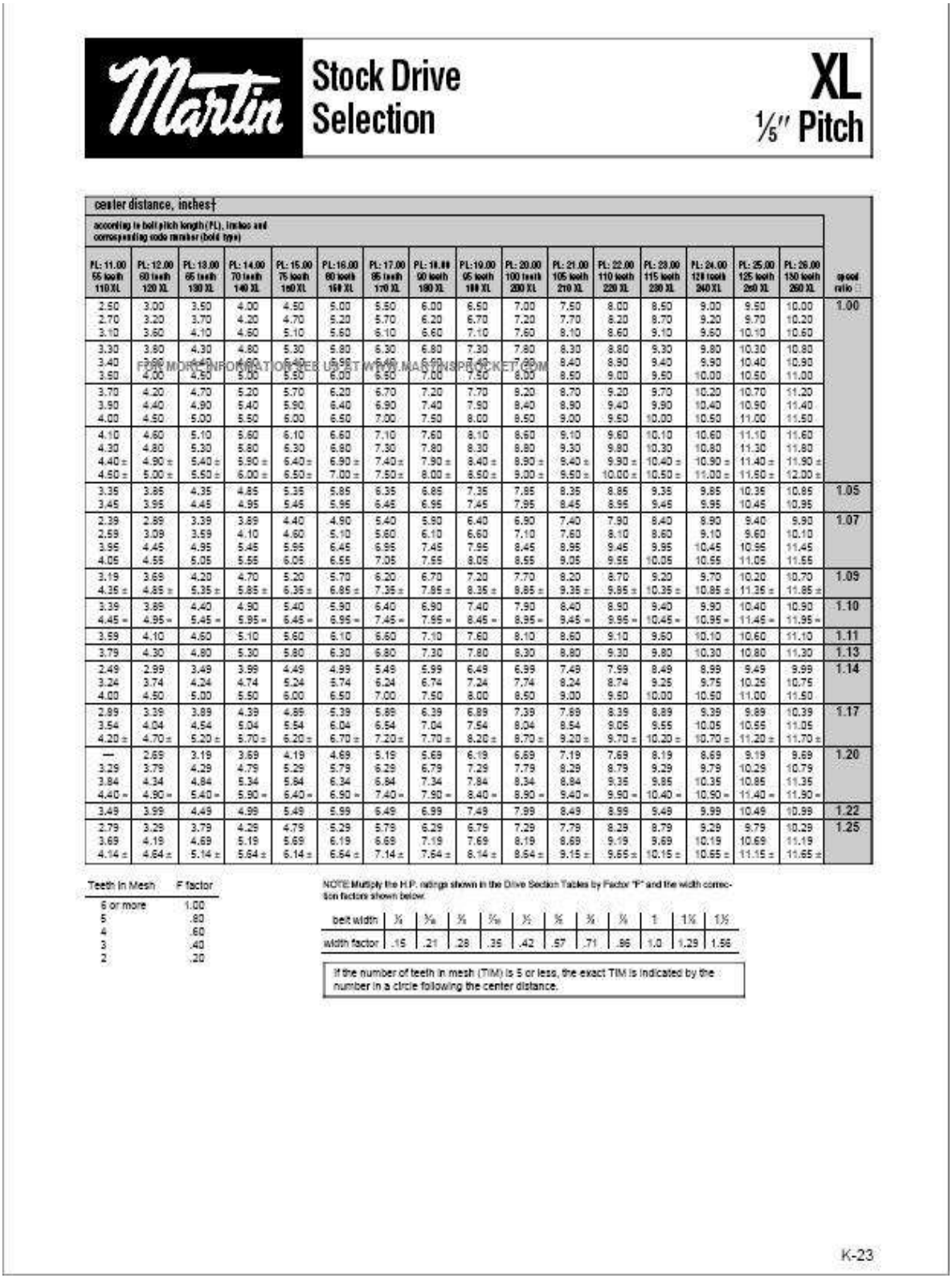
For 24-hour continuous operation and/or use of an idler, add 0.2 to basic service factor. For intermittent or seasonal operation, deduct 0.2 from basic service factor.

Additional service factors are required for unusual conditions — such as load reversal, heavy stock, plugged motor stop, electric brake. These should be determined by a transmission specialist.

TABLE 2.
Basic Service Factors of Driven Machines

		Class I	Class II	Class III
agitators, mixers	liquid	1.4	1.6	1.8
(paddle or propeller)	semiliquid	1.6	1.7	1.8
bakery machinery	dough mixers	1.4	1.6	1.8
brick and clay machinery				
	augers, mixers, granulators	1.6	1.7	1.8
	pug mills	1.8	2.0	2.2
centrifugec		1.7	1.9	—
compressors	reciprocating	2.0	2.2	2.4
	centrifugal	1.6	1.7	1.8
conveyors	belt, light package;	1.3	1.6	1.7
	oven belt; ore, coal, sand	1.8	1.7	1.8
	apron, bucket, elevator, pan	1.7	1.8	1.8
	flight, screw	1.7	1.9	2.0
fans, blowers				
	centrifugal, induced draft exhausters	1.8	1.8	2.0
	propeller, mine fans, positive blowers	1.8	2.0	2.2
generators and exciters		1.8	1.8	2.0
hammer mills		1.7	1.9	2.1
hoists, elevators		1.8	1.8	2.0
laundry machinery	general	1.5	1.6	1.7
	extractors, washers	1.8	1.8	2.0
line shafts		1.5	1.7	1.9
machine tools				
	drill presses, lathes, screw machines	1.4	1.6	1.8
	boring mills, grinders	1.5	1.7	1.8
	milling machines, shapers	1.5	1.7	1.8
mills	ball, rod, pebble, etc.	—	2.2	2.5
paper machinery				
	agitators, calenders, dryers	1.4	1.6	1.8
	beaters, jordans, Nash pumps, pulpers	1.7	1.9	2.1
printing machinery				
	presses; newspaper, rotary			
	embossing, flat bed, magazine;			
	linotype machines, cutters, folders	1.4	1.6	1.8
pumps				
	centrifugal, gear, rotary, pipeline	1.5	1.7	1.8
	reciporcating	2.0	2.2	2.4
rubber plant machinery		1.8	1.8	2.0
saw mill machinery		1.8	1.8	2.0
screens	vibrating (shakers),	1.5	1.7	—
	drum, conical	1.4	1.5	—
textile machinery				
	looms, spinning frames, twisters	1.8	1.8	2.0
	warpers, reels	1.5	1.7	—
woodworking machinery				
	lathes, band saws	1.3	1.4	—
	jointers, circular saws, planers	1.4	1.6	—

Figura 9.



Martin

Stock Drive Selection

XL
1/5" Pitch

center distance, inches† according to belt pitch length (PL), inches and corresponding code number (bold type)																	speed ratio
PL: 11.00 55 tooth 110 XL	PL: 12.00 60 tooth 120 XL	PL: 13.00 65 tooth 130 XL	PL: 14.00 70 tooth 140 XL	PL: 15.00 75 tooth 150 XL	PL: 16.00 80 tooth 160 XL	PL: 17.00 85 tooth 170 XL	PL: 18.00 90 tooth 180 XL	PL: 19.00 95 tooth 190 XL	PL: 20.00 100 tooth 200 XL	PL: 21.00 105 tooth 210 XL	PL: 22.00 110 tooth 220 XL	PL: 23.00 115 tooth 230 XL	PL: 24.00 120 tooth 240 XL	PL: 25.00 125 tooth 250 XL	PL: 26.00 130 tooth 260 XL	
2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	1.00
2.70	3.20	3.70	4.20	4.70	5.20	5.70	6.20	6.70	7.20	7.70	8.20	8.70	9.20	9.70	10.20	
3.10	3.60	4.10	4.60	5.10	5.60	6.10	6.60	7.10	7.60	8.10	8.60	9.10	9.60	10.10	10.60	
3.30	3.80	4.30	4.80	5.30	5.80	6.30	6.80	7.30	7.80	8.30	8.80	9.30	9.80	10.30	10.80	
3.40	3.90	4.40	4.90	5.40	5.90	6.40	6.90	7.40	7.90	8.40	8.90	9.40	9.90	10.40	10.90	
3.60	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	
3.70	4.20	4.70	5.20	5.70	6.20	6.70	7.20	7.70	8.20	8.70	9.20	9.70	10.20	10.70	11.20	
3.90	4.40	4.90	5.40	5.90	6.40	6.90	7.40	7.90	8.40	8.90	9.40	9.90	10.40	10.90	11.40	
4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	
4.10	4.60	5.10	5.60	6.10	6.60	7.10	7.60	8.10	8.60	9.10	9.60	10.10	10.60	11.10	11.60	
4.30	4.80	5.30	5.80	6.30	6.80	7.30	7.80	8.30	8.80	9.30	9.80	10.30	10.80	11.30	11.80	
4.40 ±	4.90 ±	5.40 ±	5.90 ±	6.40 ±	6.90 ±	7.40 ±	7.90 ±	8.40 ±	8.90 ±	9.40 ±	9.90 ±	10.40 ±	10.90 ±	11.40 ±	11.90 ±	
4.50 ±	5.00 ±	5.50 ±	6.00 ±	6.50 ±	7.00 ±	7.50 ±	8.00 ±	8.50 ±	9.00 ±	9.50 ±	10.00 ±	10.50 ±	11.00 ±	11.50 ±	12.00 ±	
3.35	3.85	4.35	4.85	5.35	5.85	6.35	6.85	7.35	7.85	8.35	8.85	9.35	9.85	10.35	10.85	1.05
3.45	3.95	4.45	4.95	5.45	5.95	6.45	6.95	7.45	7.95	8.45	8.95	9.45	9.95	10.45	10.95	
3.39	3.89	4.39	4.89	4.40	4.90	5.40	5.90	6.40	6.90	7.40	7.90	8.40	8.90	9.40	9.90	1.07
3.59	4.09	3.59	4.10	4.60	5.10	5.60	6.10	6.60	7.10	7.60	8.10	8.60	9.10	9.60	10.10	
3.95	4.45	4.95	5.45	5.95	6.45	6.95	7.45	7.95	8.45	8.95	9.45	9.95	10.45	10.95	11.45	
4.05	4.55	5.05	5.55	6.05	6.55	7.05	7.55	8.05	8.55	9.05	9.55	10.05	10.55	11.05	11.55	
3.19	3.69	4.20	4.70	5.20	5.70	6.20	6.70	7.20	7.70	8.20	8.70	9.20	9.70	10.20	10.70	1.09
4.35 ±	4.85 ±	5.35 ±	5.85 ±	6.35 ±	6.85 ±	7.35 ±	7.85 ±	8.35 ±	8.85 ±	9.35 ±	9.85 ±	10.35 ±	10.85 ±	11.35 ±	11.85 ±	
3.39	3.89	4.40	4.90	5.40	5.90	6.40	6.90	7.40	7.90	8.40	8.90	9.40	9.90	10.40	10.90	1.10
4.45 ±	4.95 ±	5.45 ±	5.95 ±	6.45 ±	6.95 ±	7.45 ±	7.95 ±	8.45 ±	8.95 ±	9.45 ±	9.95 ±	10.45 ±	10.95 ±	11.45 ±	11.95 ±	
3.59	4.10	4.60	5.10	5.60	6.10	6.60	7.10	7.60	8.10	8.60	9.10	9.60	10.10	10.60	11.10	1.11
3.79	4.30	4.80	5.30	5.80	6.30	6.80	7.30	7.80	8.30	8.80	9.30	9.80	10.30	10.80	11.30	1.13
2.49	2.99	3.49	3.99	4.49	4.99	5.49	5.99	6.49	6.99	7.49	7.99	8.49	8.99	9.49	9.99	1.14
3.24	3.74	4.24	4.74	5.24	5.74	6.24	6.74	7.24	7.74	8.24	8.74	9.25	9.75	10.25	10.75	
4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	
2.89	3.39	3.89	4.39	4.89	5.39	5.89	6.39	6.89	7.39	7.89	8.39	8.89	9.39	9.89	10.39	1.17
3.54	4.04	4.54	5.04	5.54	6.04	6.54	7.04	7.54	8.04	8.54	9.05	9.55	10.05	10.55	11.05	
4.20 ±	4.70 ±	5.20 ±	5.70 ±	6.20 ±	6.70 ±	7.20 ±	7.70 ±	8.20 ±	8.70 ±	9.20 ±	9.70 ±	10.20 ±	10.70 ±	11.20 ±	11.70 ±	
—	2.69	3.19	3.69	4.19	4.69	5.19	5.69	6.19	6.69	7.19	7.69	8.19	8.69	9.19	9.69	1.20
3.29	3.79	4.29	4.79	5.29	5.79	6.29	6.79	7.29	7.79	8.29	8.79	9.29	9.79	10.29	10.79	
3.84	4.34	4.84	5.34	5.84	6.34	6.84	7.34	7.84	8.34	8.84	9.35	9.85	10.35	10.85	11.35	
4.40 ±	4.90 ±	5.40 ±	5.90 ±	6.40 ±	6.90 ±	7.40 ±	7.90 ±	8.40 ±	8.90 ±	9.40 ±	9.90 ±	10.40 ±	10.90 ±	11.40 ±	11.90 ±	
3.49	3.99	4.49	4.99	5.49	5.99	6.49	6.99	7.49	7.99	8.49	8.99	9.49	9.99	10.49	10.99	1.22
2.79	3.29	3.79	4.29	4.79	5.29	5.79	6.29	6.79	7.29	7.79	8.29	8.79	9.29	9.79	10.29	1.25
3.69	4.19	4.69	5.19	5.69	6.19	6.69	7.19	7.69	8.19	8.69	9.19	9.69	10.19	10.69	11.19	
4.14 ±	4.64 ±	5.14 ±	5.64 ±	6.14 ±	6.64 ±	7.14 ±	7.64 ±	8.14 ±	8.64 ±	9.15 ±	9.65 ±	10.15 ±	10.65 ±	11.15 ±	11.65 ±	

Teeth in Mesh	F factor
6 or more	1.00
5	.80
4	.60
3	.40
2	.20

NOTE: Multiply the H.P. ratings shown in the Drive Section Tables by Factor "F" and the width correction factors shown below.

belt width	¼	⅜	½	⅝	¾	⅞	1	1¼	1½
width factor	.15	.21	.28	.35	.42	.57	.71	.86	1.0	1.29	1.56

If the number of teeth in mesh (TIM) is 5 or less, the exact TIM is indicated by the number in a circle following the center distance.

Figura 10.

XH
7/8" Pitch

Stock Drive Selection

Martin

speed ratio □	pulley combination				driveN speed and hp capacity					
	driveR		driveN		1750 rpm driveR speed		1160 rpm driveR speed		870 rpm driveR speed	
	code: no. of grooves	pitch diameter in.	code: no. of grooves	pitch diameter in.	driveN speed rpm	hp for 1 inch belt	driveN speed rpm	hp for 1 inch belt	driveN speed rpm	hp for 1 inch belt
1.50	40 XH	11.141	60 XH	16.711	1167	22.22	773	17.44	580	13.79
	32 XH	8.913	48 XH	13.369	1167	19.87	773	14.57	580	11.29
	20 XH	5.570	30 XH	8.356	1167	13.85■	773	9.51■	580	7.23■
1.54	26 XH	7.241	40 XH	11.141	1138	17.17	754	12.13	566	9.29
1.56	18 XH	5.013	28 XH	7.799	1125	—	746	8.61■	559	6.52■
1.60	30 XH	8.356	48 XH	13.369	1094	19.06	725	13.79	544	10.63
	20 XH	5.570	32 XH	8.913	1094	13.85■	725	9.51■	544	7.23■
1.67	24 XH	6.685	40 XH	11.141	1050	16.14■	696	11.29	522	8.61
	18 XH	5.013	30 XH	8.356	1050	—	696	8.61■	522	6.52■
1.71	28 XH	7.799	48 XH	13.369	1021	18.16	677	12.97	508	9.97
1.78	18 XH	5.013	32 XH	8.913	984	—	653	8.61■	489	6.52■
1.80	40 XH	11.141	72 XH	20.054	972	22.22	644	17.44	483	13.79
1.82	22 XH	6.127	40 XH	11.141	963	15.03■	638	10.41■	479	7.92
1.85	26 XH	7.241	48 XH	13.369	948	17.17	628	12.13	471	9.29
1.88	32 XH	8.913	60 XH	16.711	933	19.87	618	14.57	464	11.29
2.00	30 XH	8.356	60 XH	16.711	875	19.06	580	13.79	435	10.63
	24 XH	6.685	48 XH	13.369	875	16.14■	580	11.29	435	8.61
	20 XH	5.570	40 XH	11.141	875	13.85■	580	9.51■	435	7.23■
2.10	40 XH	11.141	84 XH	23.396	833	22.22	552	17.44	414	13.79
2.14	28 XH	7.799	60 XH	16.711	817	18.16	541	12.97	407	9.97
2.18	22 XH	6.127	48 XH	13.369	802	15.03■	531	10.41■	399	7.92
2.22	18 XH	5.013	40 XH	11.141	788	—	523	8.61■	392	6.52■
2.25	32 XH	8.913	72 XH	20.054	778	19.87	516	14.57	387	11.29
2.31	26 XH	7.241	60 XH	16.711	758	17.17	502	12.13	377	9.29
2.40	40 XH	11.141	96 XH	26.738	729	22.22	483	17.44	363	13.79
	30 XH	8.356	72 XH	20.054	729	19.06	483	13.79	363	10.63
	20 XH	5.570	48 XH	13.369	729	13.85■	483	9.51■	363	7.23■
2.50	24 XH	6.685	60 XH	16.711	700	16.14■	464	11.29	348	8.61
2.57	28 XH	7.799	72 XH	20.054	681	18.16	451	12.97	339	9.97
2.63	32 XH	8.913	84 XH	23.396	667	19.87	442	14.57	331	11.29
2.67	18 XH	5.013	48 XH	13.369	656	—	434	8.61■	326	6.52■

□ Pulley combinations shown are for conventional speed-reduction ratios; same table can be used for speed step-up ratios by making proper correction of driveN speed and belt hp capacity per inch width.

■ Pulley diameter is below recommended minimum; if used reduced belt life must be expected.

† Center distances shown are **theoretical**; manufacturing tolerances of belt length and pulley diameters can affect actual operating drive center distances.

Figura 11.

Martin **Stock Drive Selection** **XH** 7/8" Pitch

center distance, inches† according to belt pitch length (PL), inches and corresponding code number (belt type)												
PL: 58.75 58 teeth 5XH	PL: 64.00 64 teeth 6XH	PL: 69.00 72 teeth 6XH	PL: 70.00 80 teeth 7XH	PL: 77.00 88 teeth 7XH	PL: 84.00 96 teeth 8XH	PL: 98.00 112 teeth 9XH	PL: 112.00 128 teeth 11XH	PL: 126.00 144 teeth 12XH	PL: 140.00 160 teeth 14XH	PL: 154.00 176 teeth 15XH	PL: 175.00 200 teeth 17XH	speed ratio
—	—	—	—	15.388	19.930	26.982	34.011	41.031	48.045	55.055	65.566	1.50
—	—	13.820	17.357	20.881	24.399	31.421	38.435	45.446	52.453	59.458	69.964	
14.370	17.006	20.515	24.022	27.528	31.031	38.037	45.041	52.044	59.046	66.048	76.550	
10.761	13.421	16.951	20.470	23.983	27.493	34.507	41.517	48.523	55.526	62.532	73.036	1.54
15.249	17.883	21.392	24.899	28.403	31.907	38.913	45.917	52.919	59.922	66.923	77.425	1.56
—	—	14.216	17.761	21.290	24.811	31.839	38.857	45.869	52.878	59.885	70.393	1.60
13.898	16.540	20.055	23.566	27.073	30.580	37.598	44.594	51.598	58.601	65.604	76.107	
11.152	13.820	17.357	20.881	24.399	27.911	34.929	41.941	48.949	55.955	62.961	73.466	1.67
14.781	17.420	20.934	24.443	27.950	31.455	38.466	38.464	52.474	59.476	66.479	76.982	
—	11.022	14.609	18.161	21.696	25.221	32.255	39.276	46.291	53.302	60.311	70.820	1.71
14.305	16.951	20.470	23.983	27.493	31.001	38.013	45.021	52.026	59.030	66.034	76.538	1.78
—	—	—	—	—	16.909	24.087	31.181	38.240	45.280	52.310	62.842	1.80
11.540	14.216	17.761	21.290	24.811	28.326	35.348	42.363	49.374	56.382	63.388	73.895	1.82
—	11.399	14.998	18.569	22.100	25.630	32.669	39.694	46.712	53.725	60.736	71.247	1.85
—	—	—	14.341	17.950	21.521	28.609	35.662	42.697	49.722	56.741	67.262	1.88
—	—	—	14.716	18.335	21.914	29.102	36.070	43.110	50.138	57.159	67.684	2.00
—	11.772	15.386	18.954	22.502	26.036	33.081	40.111	47.132	54.147	61.159	71.672	
11.924	14.609	18.161	21.696	25.221	28.740	35.767	42.784	49.797	56.807	63.815	74.323	
—	—	—	—	—	—	20.974	28.207	35.342	42.432	49.495	60.063	2.10
—	—	—	15.087	18.717	22.304	29.411	36.478	43.522	50.553	57.578	68.104	2.14
—	12.143	15.770	19.348	22.901	26.439	33.492	40.526	47.549	54.568	61.581	72.087	2.18
12.304	14.998	18.569	22.100	25.630	29.152	36.183	43.204	50.219	57.230	64.240	74.750	2.22
—	—	—	15.460	19.098	22.691	29.810	36.883	43.932	50.968	57.994	68.524	2.25
—	—	—	15.457	19.098	22.691	29.810	36.883	43.932	50.968	57.994	68.524	2.31
—	—	—	—	—	—	—	25.026	32.304	39.477	46.596	57.218	2.40
—	—	—	—	—	15.035	18.769	26.028	33.170	40.262	47.325	54.373	64.924	
—	12.513	16.152	19.738	23.298	26.842	33.900	40.940	47.957	54.987	62.003	72.520	
—	—	—	15.824	19.476	23.078	30.209	37.287	44.342	51.380	58.410	68.943	2.50
—	—	—	—	15.388	19.135	26.411	33.564	40.662	47.731	54.782	65.337	2.57
—	—	—	—	—	—	22.446	29.739	36.913	44.028	51.111	61.700	2.63
10.056	12.879	16.531	20.128	23.693	27.241	34.308	41.362	48.382	55.405	62.423	72.943	2.67

Teeth in Mesh	F factor
6 or more	1.00
5	.80
4	.60
3	.40
2	.20

NOTE: Multiply the H.P. ratings shown in the Drive Section Tables by Factor "F" and the width correction factors shown below.

belt width	1	1¼	1½	1¾	2	2½	3	3½	4	5	6	7	8	9	10	11	12	13	14
width factor	1.00	1.29	1.56	1.84	2.14	2.72	3.36	4.06	4.76	6.15	7.50	8.89	10.32	11.70	13.10	14.41	15.84	17.16	18.62

If the number of teeth in mesh (TIM) is 5 or less, the exact TIM is indicated by the number in a circle following the center distance.