$$3L \quad HP = r\left(\frac{0.2164d^{0.91}}{r^{0.09}} - 0.2324 - 0.0001396r^2d^3\right)$$

$$4L \quad HP = r\left(\frac{0.4666d^{0.91}}{r^{0.09}} - 0.7231 - 0.0002286r^2d^3\right)$$

$$5L \quad HP = r\left(\frac{0.7748d^{0.91}}{r^{0.09}} - 1.727 - 0.0003641r^2d^3\right)$$

where $d = d_0 - 2a$; d_0 = effective outside diameter of small sheave, in.; r = rpm of the faster shaft divided by 1000. The corrected horsepower rating is obtained by dividing the horsepower rating by the combined correction factor (Table 21), which accounts for drive geometry and service factor requirements.

Table 21. Combined Correction Factors

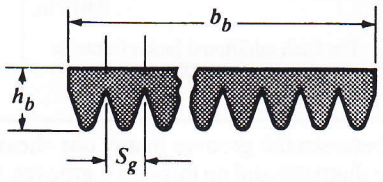
Type of Driven Unit	Speed Ratio	
	Less than 1.5	1.5 and Over
Fans and blowers	1.0	0.9
Domestic laundry machines	1.1	1.0
Centrifugal pumps	1.1	1.0
Generators	1.2	1.1
Rotary compressors	1.2	1.1
Machine tools	1.3	1.2
Reciprocating pumps	1.4	1.3
Reciprocating compressors	1.4	1.3
Wood working machines	1.4	1.3

V-Ribbed Belts ANSI/RMA IP-26.—V-ribbed belts are a cross between flat belts and V-belts. The belt is basically flat with V-shaped ribs projecting from the bottom, which guide the belt and provide greater stability than that found in a flat belt. The ribs operate in grooved sheaves.

V-ribbed belts do not have the wedging action of a V-belt and thus operate at higher tensions. This design provides excellent performance in high-speed and serpentine applications, and in drives that utilize small diameter sheaves. The V-ribbed belt comes in five cross sections: H, J, K, L, and M, specified by effective length, cross section and number of ribs.

Belt Cross Sections: Nominal dimensions of the five cross sections are given in Table 22.

Table 22. Nominal Dimensions of V-Ribbed Belt Cross Sections
ANSI/RMA IP-26, 1977

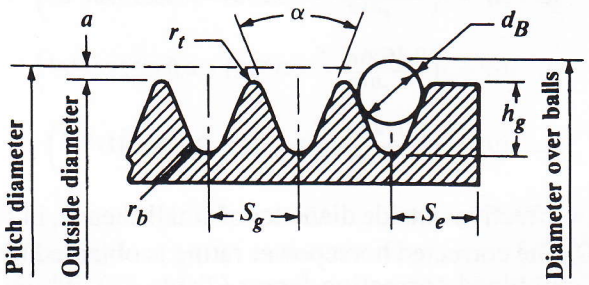


$b_b = N_r \times S_g$, where N_r = number of ribs and S_g is sheave groove spacing

Cross Section	h_b	S_g	Standard Number of Ribs
H	0.12	0.063	...
J	0.16	0.092	4, 6, 10, 16, 20
K	0.24	0.140	...
L	0.38	0.185	6, 8, 10, 12, 14, 16, 18, 20
M	0.66	0.370	6, 8, 10, 12, 14, 16, 18, 20

All dimensions in inches.

Table 23. V-Ribbed Belt Sheave and Groove Dimensions *ANSI/RMA IP-26, 1977*



Face width = $S_e\,(N_g - 1) + 2S_e$, where N_g is number of grooves

Cross Section	Minimum Recommended Outside Diameter	α Groove Angle ±0.25 (deg)	S_g[a]	r_t +0.005, −0.000	$2a$	r_b	h_g (min)	d_B ±0.0005	S_e
H	0.50	40	0.063 ±0.001	0.005	0.020	0.013 +0.000 −0.005	0.041	0.0469	0.080 +0.020 −0.010
J	0.80	40	0.092 ±0.001	0.008	0.030	0.015 +0.000 −0.005	0.071	0.0625	0.125 +0.030 −0.015
K	1.50	40	0.140 ±0.002	0.010	0.038	0.020 +0.000 −0.005	0.122	0.1093	0.125 +0.050 −0.000
L	3.00	40	0.185 ±0.002	0.015	0.058	0.015 +0.000 −0.005	0.183	0.1406	0.375 +0.075 −0.030
M	7.00	40	0.370 ±0.003	0.030	0.116	0.030 +0.000 −0.010	0.377	0.2812	0.500 +0.100 −0.040

[a] Summation of the deviations from S_g for all grooves in any one sheave shall not exceed ±0.010 in.

Other Sheave Tolerances[a]		
Outside Diameter	Radial Runout[b]	Axial Runout[b]
Up through 2.9 in. outside diameter ±0.010 in.	Up through 2.9 in. outside diameter 0.005 in.	0.001 in. per inch of outside diameter
Over 2.9 in. to and including 8.0 in. outside diameter ±0.020 in.	Over 2.9 in. to and including 10.0 in. outside diameter 0.010 in.	
For each additional inch of outside diameter over 8.0 in., add ±0.0025 in.	For each additional inch of outside diameter over 10.0 in., add 0.0005 in.	

[a] Variations in pitch diameter between the grooves in any one sheave must be within the following limits: Up through 2.9 in. outside diameter and up through 6 grooves, 0.002 in. (add 0.001 in. for each additional groove); over 2.9 in. to and including 19.9 in. and up through 10 grooves, 0.005 in. (add 0.0002 in. for each additional groove); over 19.9 in. and up through 10 grooves, 0.010 in. (add 0.0005 in. for each additional groove). This variation can be obtained by measuring the distance across two measuring balls or rods placed in the grooves diametrically opposite each other. Comparing this "diameter-over-balls or -rods" measurement between grooves will give the variation in pitch diameter.

[b] Total indicator reading.

All dimensions in inches

Belt Size Designation: Belt sizes are identified by a standard belt number, which consists of belt effective length to the nearest tenth of an inch, a letter designating cross section, and the number of ribs. For example, 540L6 signifies a 54.0 in. effective length, L belt, six ribs wide.

Sheave Dimensions.: Groove angles and dimensions for sheaves and face widths of sheaves for multiple belt drives are given in Table 23, along with various tolerance values.

Cross Section Selection.: Use the chart (Fig. 9) as a guide to the V-ribbed belt cross section for any combination of design horsepower and speed of the faster shaft. When the intersection of the design horsepower and speed of the faster shaft falls near a line between two areas on the chart, the possibilities in both areas should be explored. Special circumstances (such as space limitations) may lead to a choice of belt cross section different from that indicated in the chart. H and K cross sections are not included because of their specialized use. Belt manufacturers should be contacted for specific data.

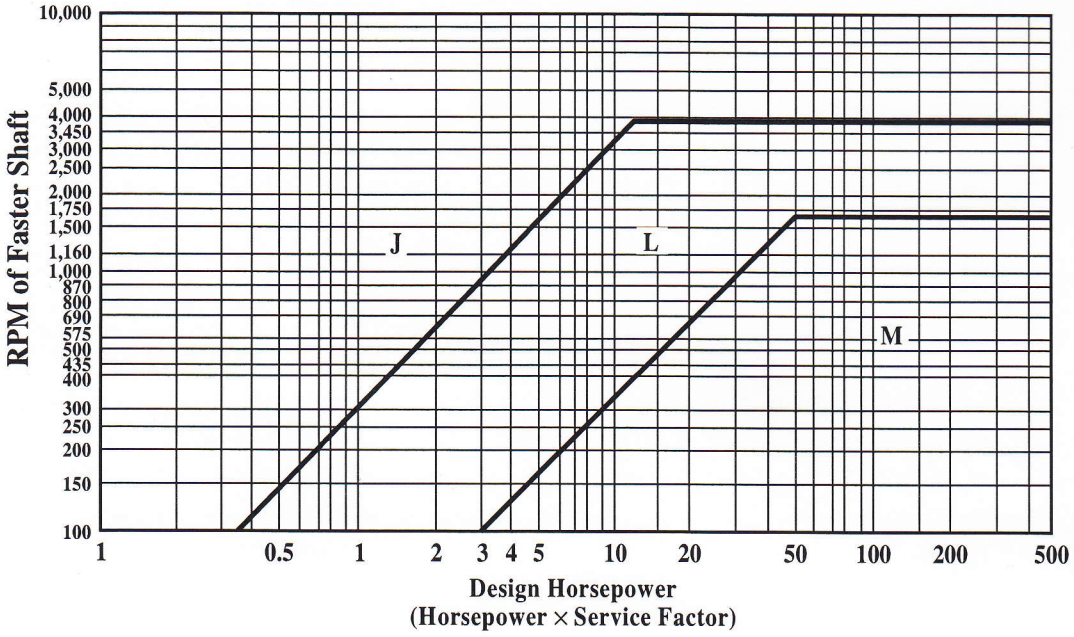


Fig. 9. Selection of V-Ribbed Belt Cross Section

Horsepower Ratings.: The horsepower rating formulas are:

$$\text{J: HP} = d_p r\left[\frac{0.1240}{(d_p r)^{0.09}} - \frac{0.08663}{d_p} - 0.2318\times10^{-4}(d_p r)^2\right] + 0.08663 r\left[1 - \frac{1}{K_{SR}}\right]$$

$$\text{L: HP} = d_p r\left[\frac{0.5761}{(d_p r)^{0.09}} - \frac{0.8987}{d_p} - 1.018\times10^{-4}(d_p r)^2\right] + 0.8987 r\left[1 - \frac{1}{K_{SR}}\right]$$

$$\text{M: HP} = d_p r\left[\frac{1.975}{(d_p r)^{0.09}} - \frac{6.597}{d_p} - 3.922\times10^{-4}(d_p r)^2\right] + 6.597 r\left[1 - \frac{1}{K_{SR}}\right]$$

In these equations, d_p = pitch diameter of the small sheave, in.; r = rpm of the faster shaft divided by 1000; K_{SR} = speed ratio factor given in the accompanying table. These formulas give the maximum horsepower per rib recommended, corrected for the speed ratio. To obtain the horsepower per rib for an arc of contact other than 180 degrees, and for belts longer or shorter than the average length, multiply the horsepower obtained from these formulas by the length correction factor (Table 25) and the arc of contact correction factor (Table 26).