

SELECTION

Stock D-V Wedge Drives: Standard Motor Speeds

Step 1—Determine Service Factor. Refer to Typical Service Factors, Table 2. Locate type of Driven and Driver equipment. (If an idler is used, increase the factor by value indicated). Correct factor is determined by: **1.** The extent and frequency of peak loads. **2.** Number of operating hours/year (broken down in average hours/day of continuous service). **3.** Proper service category. (Intermittent, Normal or Continuous). Select the one closest to the application conditions.

Step 2—Compute Design HP. Multiply normal running HP required or nameplate rating by service factor obtained in Step 1.

Step 3—Choose Belt Section. Using Table 1, below, read up from design HP figure obtained in Step 2 and over from the RPM of faster shaft. This intersection indicates belt section.

Step 4—Select the Drive. **a).** Using belt section from Step 3, refer to Stock Drive Selection Tables beginning on page PT7-46. **b).** Under appropriate driver speed column find Driven RPM nearest to the desired speed. To the right note HP per Belt. Read left for Driver/Driven Sheave information. (If driver is an electric motor be sure motor sheave diameter is not less than shown in Table 3). **c).** Read onto opposite page and find figure nearest the required center distance. Note Arc-Length Correction Factor in the shaded row **below** the C.D. figure. **d).** Read to the top of the table for the belt size. **e).** **To determine number of belts**, multiply the HP per Belt value by the ArcLength Correction Factor. This is the corrected hp/belt. Divide design HP by corrected HP figure to determine number of belts required.

EXAMPLE OF SELECTION

Select a D-V Wedge drive for a positive blower, with a $2\frac{15}{16}$ " shaft, to run @ 290 RPM, driven by a 30 HP, 1160 squirrel cage electric motor with a $2\frac{1}{8}$ " shaft. Desired center distance is 26". Service is continuous.

Step 1—Service factor from Table 2 is 1.4.

Step 2—Design HP = $1.4 \times 30 = 42$ HP.

Step 3—A 5V belt section is shown in Table 1 when reading to the right of 1160 RPM and up from 42 design HP.

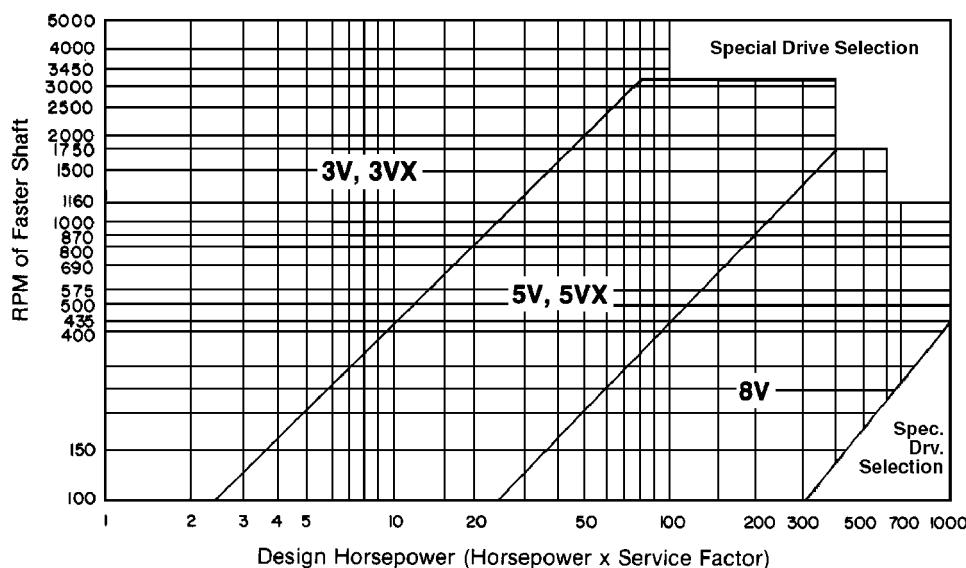
Step 4—Turn to 5V Stock Drive Selection Tables. On page PT7-68, under 1160 RPM Driver, read down to find 290 RPM. The nearest appears as 291.

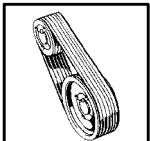
Note HP/belt as 10.00 for all D-V and POLYBAND belts over 200" and 12.00 for POLYBAND belts under 200". Also note sheaves listed as 7.1 Driver, 28.0 Driven. Table 3 shows driver is not undersize. Reading toward the right the C.D. figure nearest 26" is 26.4. The correction factor below the C.D. figure is .92. Top of table shows belt size as 5VX 1120.

The HP/belt for D-V is 12.00. This value x the .92 factor = 11.04 corrected HP/belt. $42 \text{ HP} \div 11.04 = 3.80$ Going to the next whole number, drive requires 3 belts. (Center to center operating distance is 26.4 nominal.)

Order: **1.** 4-5VX 1120 D-V belts. **2.** 1 - 4/5V7.1-2517 Taper-Lock Sheave. **3.** 1 - $2\frac{1}{8}$ " bore 2517 bushing. **4.** 1 - 4/5V28.0-3535 TAPER-LOCK Sheave. **5.** 1 - $2\frac{15}{16}$ " bore 3535 bushing.

TABLE 1 — NARROW CROSS SECTION SELECTION CHART





SELECTION

Service Factors

Table 2 - Typical Service Factors

Driven Machine Types Note: Certain machines may require flywheel sheaves or special construction to withstand heavy shock loads. Consult Mfg'r.	Driver: Normal Torque NEMA Des. A or B Motors DC Shunt Wound Motors Multi-Cylinder Engines			Driver: High Torque NEMA Des. C or D Motors DC Series Wound Motors Single Cylinder Engines		
	Service*			Service*		
	Intermit.	Normal	Contin.	Intermit.	Normal	Cont.
Agitators for Liquids	1.0	1.1	1.2	1.1	1.2	1.3
Blowers and Exhausters						
Centrif. Pumps, Compressors						
Fans up to 10HP						
Light Duty Conveyors						
Belt Conveyors, Bulk Mat'l						
Dough Mixers						
Fans over 10 HP						
Generators						
Line Shafts						
Laundry Machinery						
Machine Tools						
Punches, Presses, Shears						
Printing Machinery						
Positive Displ. Rotary Pumps						
Revolving & Vibrating Screens						
Brick Machinery						
Bucket Elevators						
Exciters						
Piston Compressors						
Conveyors: Drag, Pan, Screw						
Paper Mill Beaters						
Piston Pumps						
Pos. Displacement Blowers						
Pulverizers						
Saw Mill, Woodworking Mach'y						
Textile Machinery						
Crushers: Gyratory, Jaw, Roll						
Mills: Ball, Rod, Tube						
Hoists						
Rubber Calendars, Extruders, Mills						
Chokable Equipment, Fire Hazzard	2.0	2.0	2.0	2.0	2.0	2.0

*** Note:**
Intermittent:
Up to 6 Hrs/Day
Normal:
6-16 Hrs/Day
Continuous:
16-24 Hrs/Day

Adder for Idlers:
Outside on slack side 0.1
Inside on tight side 0.1
Outside on tight side 0.2

Table 3 - NEMA Min. Sheave Dia. for D-V Wedge Drives

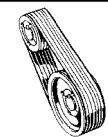
Motor RPM	Sheave	Motor Horsepower																									
		1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	400	
870	Min O.D.	2.2	2.4	2.4	2.4	3.0	3.0	3.8	4.4	5.2	6.0	6.8	6.8	6.8	8.2	8.4	10.0	9.5	12.0	12.5	13.2	13.2	15.0	...	...
	Max F.W.	2.3	2.3	2.8	2.8	3.4	3.4	4.0	4.0	4.7	4.7	5.3	5.3	5.9	5.9	7.3	7.3	8.5	8.5	8.5	8.5	11.6	11.6	11.6	...	...
1160	Min O.D.	...	2.2	2.4	2.4	2.4	3.0	3.0	3.8	4.4	4.4	5.2	6.0	6.8	6.8	8.2	9.0	10.0	10.0	12.0	13.2	13.2	15.0	14.1	...	...
	Max F.W.	...	2.3	2.3	2.8	2.8	3.4	3.4	4.0	4.0	4.7	4.7	5.3	5.3	5.9	5.9	7.3	7.3	8.5	8.5	8.5	8.5	11.6	11.6	11.6	11.6	...
1750	Min O.D.	2.2	2.4	2.4	2.4	3.0	3.0	3.8	4.4	4.4	4.4	4.4	5.2	6.0	6.8	7.4	8.6	8.6	10.5	10.5	13.2	13.2	13.2	13.2	14.1
	Max F.W.	2.3	2.3	2.3	2.8	2.8	3.4	3.4	4.0	4.0	4.7	4.7	5.3	5.3	5.9	5.9	7.3	7.3	8.5	8.5	9.4	9.4	11.6	11.6	11.6
3500	Min O.D.	...	...	...	2.2	2.4	2.4	3.0	3.8	4.4	4.4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Max F.W.	...	...	...	2.3	2.3	2.8	2.8	3.4	4.0	4.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Data in unshaded area is per NEMA Standard MG1-14.42.

Data in shaded area subject to approval of motor manufacturer.

F.W. = Face Width of sheave

SHEAVES PAGES PT7-2-PT7-27	BELTS PAGES PT7-28-PT7-41	SELECTION: CLASSICAL PAGES PT7-84-PT7-123	ENGINEERING/TECHNICAL PAGES PT7-123-PT7-128
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SELECTION

Stock D-V Wedge Drives: Non Standard Motor Speeds & Speed-up Drives

For Speeds Other Than Standard Motor Speeds:

Step 1 - Determine Speed Ratio = $\left(\frac{\text{Driver RPM}}{\text{Driven RPM}} \right)$

Step 2 - Compute Design HP Multiply normal running HP required or nameplate rating by service factor from Table 2.

Step 3 - Determine Maximum Diameter of Driver Sheave

$$@ 6500 \text{ FPM} : \text{O.D.} = \frac{6500 \text{ FPM}}{.262 \times \text{RPM}}$$

Step 4 - Select Belt Cross Section. Using Table 1, read up from design HP figure obtained in Step 2 and over from the RPM of faster shaft. This intersection indicates belt section.

Step 5 - Select Drive. Using the belt section from Step 4, make a tentative sheave selection from **stock drive tables**. (Note that several choices are available in the ratio obtained from Step 1. Other choices close to this ratio may also produce a functional drive.) Read onto opposite page and find figure nearest the required center distance. The Arc-Length correction factor is listed in the **shaded row below** the C.D. figure. Read to the top of the table for the belt size.

Step 6 - Size the Drive. From basic horsepower tables locate HP rating at intersection of RPM of faster shaft row and small sheave column. To this, add the "additional HP" figure based on drive ratio. This becomes the rated HP. Multiply this sum by the arc-length correction factor noted in Step 5. This becomes the corrected HP per belt. To find

$$\text{Required number of belts} : \frac{\text{Design HP}}{\text{Correction HP/Belt}}$$

EXAMPLE OF SELECTION

A V-drive is needed for a 30 HP 2200 RPM gasoline engine, with a $2\frac{1}{4}$ " dia. shaft, driving a generator, with a $2\frac{7}{16}$ " dia. shaft, @ 1800 RPM. It runs 8 hrs. a day. Center distance is 31".

$$\text{Step 1} - \text{Speed Ratio} = \frac{2200}{1800} = 1.23$$

$$\text{Step 2} - \text{Service Factor} = 1.2 \text{ Design HP} = 30 \times 1.2 = 36$$

$$\text{Step 3} - \text{Driver Sheave Max. Dia.} = \frac{6500}{.262 \times 2200} = 11.3$$

Step 4 - Belt Cross Section = Table 1 indicates 3VX.

Step 5 - In 3VX Stock Drive Selection Tables on pages PT7-48 and PT7-49, find the 1.23 ratio obtained in the Step 1 calculation. At the top of page PT7-48, the most economical drive is shown as 6.5 Driver, 8.0 Driven. The C.D. nearest 31" is 31.1. The correction factor below the C.D. figure is 1.05. Top of the column shows a 3VX850 belt. Refer to **Basic HP Tables** on page PT7-78, and PT7-79. From the 2200 RPM of faster shaft row and down from the 6.5 smaller sheave heading: 10.2 HP/belt plus an additional hp of .23 in the 1.19 thru 1.26 ratio column. The sum = $10.43 \text{ HP/belt} \times 1.05 \text{ arc length correction factor} = 10.95 \text{ HP/belt}$.

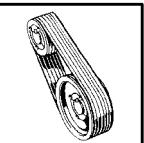
$$\text{Number of belts} = \frac{36}{10.95} = 3.28 \text{ or } 4 \text{ belts}$$

Order: 1- 4 groove 3V 6.5 TAPER-LOCK Sheave, 1-2517 $2\frac{1}{4}$ " bore bushing, 1-4 groove 8.0 TAPER-LOCK Sheave, 1- 2517 $2\frac{7}{16}$ " bore bushing, 4-3VX850 D-V Wedge Belts.

Example of a 3V Speed-Up Drive—

A 20 HP 1750 RPM AC motor, with a $1\frac{5}{8}$ " dia. shaft, is to drive a blower, with a $1\frac{7}{16}$ " shaft, @ 2500 RPM. The center distance = 26". Equipment runs 24 hrs./day.

1. Service Factor from Table 2 is 1.2.
2. Design HP = $20 \times 1.2 = 24 \text{ HP}$
3. Speed Ratio = $\frac{2500}{1750} = 1.43$
4. In Stock Drive Table, under 1.43 ratio, sheaves are listed as 5.6 Driver/8.0 Driven. (In a speed-up drive, the 5.6 sheave becomes the Driven, the 8.0 the Driver). The opposite page of the table shows the closest center distance as 26.8 with an arc correction factor of 1.03. Belt shown at top of column is 3VX750.
5. From **Basic Horsepower Tables** a 5.6 sheave @ 2500 RPM = $(9.46 + .37) = 9.83$. 9.83×1.03 arc length correction factor = 10.12 corrected HP/belt.
6. Number of Belts = $\frac{\text{Design HP}}{\text{Corrected HP}} = \frac{24}{10.12} = 2.37$ or 3 belts.
7. Order: 1-3 groove 3V 8.0 TAPER-LOCK Sheave, $1\frac{5}{8}$ " bore 2517 bushing, 1-3 groove 3V 5.6 TAPER-LOCK Sheave, $1\frac{7}{16}$ " bore 1610 bushing, 3-3VX750 D-V belts.



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Table 4 - Narrow Belt Length Correction Factors

Belt Lgth. s	Factor for Belts:			Belt Lgth. s	Factor for Belts:		
	3VX	5V, 5VX	8V, 8VX		3VX	5V, 5VX	8V, 8VX
25	.83	...	...	118	1.12	.99	.89
26.5	.84	...	...	125	1.13	1.00	.90
28	.85	...	...	132	1.14	1.01	.91
30	.86	...	...	140	1.15	1.02	.92
31.5	.87	...	...	150	1.16	1.03	.93
33.5	.88	...	...	160	...	1.04	.94
35.5	.89	...	...	170	...	1.05	.94
37.5	.90	...	...	180	...	1.06	.95
40	.92	...	...	190	...	1.07	.96
42.5	.93	...	...	200	...	1.08	.97
45	.94	...	...	212	...	1.09	.98
47.5	.95	...	...	224	...	1.09	.98
50	.96	.85	...	236	...	1.10	.99
53	.97	.86	...	250	...	1.11	1.00
56	.98	.87	...	265	...	1.12	1.01
60	.99	.88	...	280	...	1.13	1.02
63	1.00	.89	...	300	...	1.14	1.03
67	1.01	.90	...	315	...	1.15	1.03
71	1.02	.91	...	335	...	1.16	1.04
75	1.03	.92	...	355	...	1.17	1.05
80	1.04	.93	...	375	...	...	1.06
85	1.06	.94	...	400	...	...	1.07
90	1.07	.95	...	425	...	...	1.08
95	1.08	.96	...	450	...	...	1.09
100	1.09	.96	.87	475	...	...	1.09
106	1.10	.97	.88	500	...	...	1.10
112	1.11	.98	.88	560	...	...	1.11

s = Outside circumference in inches.

Table 5 - Arc Correction Factors

<u>D-d</u> ★ C	Approx. Arc of Contact on Small Shv.	Factor
.00	180°	1.00
.10	174°	.99
.20	169°	.97
.30	163°	.96
.40	157°	.94
.50	151°	.93
.60	145°	.91
.70	139°	.89
.80	133°	.87
.90	127°	.85
1.00	120°	.82
1.10	113°	.80
1.20	106°	.77
1.30	99°	.73
1.40	91°	.70
1.50	83°	.65

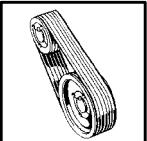
★ D = Dia. of large sheave.

d = Dia. of small sheave.

C = Center distance.

NOTE: To determine required belt length when center distance and sheave diameters are known, use the following formula.

$$L = 2C + 1.57 (D + d) + \frac{(D - d)^2}{4C}$$



SELECTION

5VX

D-V Wedge
Single Belts to 200"
POLYBAND to 200"

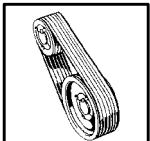
5V

D-V Wedge
Single Belts over 200"
POLYBAND over 200"

STOCK DRIVE SELECTIONS

Ratio	Stock Sheaves		3500 RPM Driver				1750 RPM Driver				1160 RPM Driver				Belt Number and Approx. Center Distance					
	Diameter		Driven RPM	HP/Belt		Driven RPM	HP/Belt		Driven RPM	HP/Belt		5VX 600	5VX 630	5VX 670	5VX 710	5VX 750	5VX 800	5VX 850		
	Driver	Driven		5VX	5V		5VX	5V		5VX	5V									
5.67	6.70	37.50	618	20.2	16.0	309	14.2	11.6	205	11.0	9.1	...	...	...	...	...	...	...	...
5.81	4.90	28.00	602	12.1	8.2	301	8.5	6.0	200	6.7	4.8	...	...	...	...	...	...	...	...
	5.50	31.50	602	14.9	10.8	301	10.5	7.9	199	8.1	6.2	...	...	...	...	...	...	...	...
5.94	8.50	50.00	589	27.9	23.2	295	19.7	16.9	195	15.3	13.3	...	...	...	...	...	...	...	...
6.03	6.30	37.50	580	18.5	14.3	290	13.0	10.3	192	10.1	8.1	...	...	...	...	...	...	...	...
6.13	4.65	28.00	571	11.0	7.1	285	7.7	5.2	189	6.0	4.2	...	...	...	...	...	...	...	...
6.16	5.20	31.50	568	13.5	9.5	284	9.5	7.0	188	7.4	5.5	...	...	...	...	...	...	...	...
6.32	8.00	50.00	554	25.8	21.2	277	18.2	15.4	184	14.1	12.1	...	...	...	...	...	...	...	...
6.45	5.90	37.50	543	16.7	12.6	271	11.7	9.1	180	9.1	7.2	...	...	...	...	...	...	...	...
6.49	4.40	28.00	539	9.8	5.9	270	6.9	4.4	179	5.4	3.6	...	...	...	...	...	...	...	...
6.54	4.90	31.50	535	12.1	8.2	268	8.5	6.0	177	6.7	4.8	...	...	...	...	...	...	...	...
6.74	7.50	50.00	519	23.7	19.3	260	16.7	14.0	172	12.9	11.0	...	...	...	...	...	...	...	...
6.90	4.65	31.50	507	11.0	7.1	254	7.7	5.2	168	6.0	4.2	...	...	...	...	...	...	...	...
6.93	5.50	37.50	505	14.9	10.7	253	10.5	7.9	167	8.1	6.2	...	...	...	...	...	...	...	...
7.13	7.10	50.00	491	22.0	17.6	245	15.4	12.8	163	12.0	10.0	...	...	...	...	...	...	...	...
ARC-LENGTH CORRECTION FACTOR															...	...	...	...	...
7.30	4.40	31.50	479	9.8	5.9	240	6.9	4.4	159	5.4	3.6	...	...	...	...	...	...	...	...
7.33	5.20	37.50	477	13.5	9.5	239	9.5	7.0	158	7.4	5.5	...	...	...	...	...	...	...	...
7.56	6.70	50.00	463	20.2	16.0	231	14.2	11.6	153	11.0	9.1	...	...	...	...	...	...	...	...
7.79	4.90	37.50	449	12.1	8.2	225	8.5	6.0	149	6.7	4.8	...	...	...	...	...	...	...	...
8.05	6.30	50.00	435	18.5	14.3	217	13.0	10.4	144	10.1	8.2	...	...	...	...	...	...	...	...
ARC-LENGTH CORRECTION FACTOR															...	...	...	...	...
8.22	4.65	37.50	426	11.0	7.1	213	7.7	5.2	141	6.0	4.2	...	...	...	...	...	...	...	...
8.60	5.90	50.00	407	16.7	12.6	203	11.7	9.1	135	9.1	7.2	...	...	...	...	...	...	...	...
8.70	440	37.50	402	9.8	5.9	201	6.9	4.4	133	5.4	3.6	...	...	...	...	...	...	...	...
9.24	5.50	50.00	379	14.9	10.9	189	10.5	7.9	126	8.1	6.2	...	...	...	...	...	...	...	...
9.78	5.20	50.00	358	13.5	9.5	179	9.5	7.0	119	7.4	5.5	...	...	...	...	...	...	...	...
10.40	4.90	50.00	337	12.1	8.2	168	8.5	6.0	112	6.7	4.8	...	...	...	...	...	...	...	...
10.97	4.65	50.00	319	11.0	7.1	160	7.7	5.2	106	6.0	4.2	...	...	...	...	...	...	...	...
11.60	4.40	50.00	302	9.8	5.9	151	6.9	4.4	100	5.4	3.6	...	...	...	...	...	...	...	...
ARC-LENGTH CORRECTION FACTOR															...	...	...	...	...

NOTES: * 5VX = Single and Polyband belts to 200" length
 5V = Single and Polyband belts over 200" long
 ** Stock belt size 5VX530, 5VX560 & 5VX600 not shown



SELECTION

5VX

D-V Wedge
Single Belts to 200"
POLYBAND to 200"

5V

D-V Wedge
Single Belts over 200"
POLYBAND over 200"

STOCK DRIVE SELECTIONS

Ratio	Belt Number and Approx. Center Distance																										
	5VX 900	5VX 950	5VX 100	5VX 1060	5VX 1120	5VX 1180	5VX 1250	5VX 1320	5VX 1400	5VX 1500	5VX 1600	5VX 1700	5VX 1800	5VX 1900	5VX 2000	5V 2120	5V 2240	5V 2360	5V 2500	5V 2650	5V 2800	5V 3000	5V 3150	5V 3350	5V 3550		
5.67	26.9	31.5	37	40	48	53	58	63	70	76	82	89	97	104	114	122	132	142			
5.81	...	18.0	21.0	24.4	27.8	31.0	34.7	38.4	42.6	48	53	58	63	68	73	79	85	91	98	106	114	124	131	141	151		
5.94	32	38	44	50	56	63	69	76	84	92	102	110	120	130			
6.03	27.1	31.8	37	43	48	53	58	64	70	76	82	89	97	104	115	122	132	142			
6.13	...	18.1	21.1	24.6	27.9	31.2	34.9	38.6	42.8	48	53	58	63	68	73	79	86	92	99	106	114	124	131	141	151		
6.16	23.5	27.0	30.9	34.7	39.0	44	49	55	60	65	70	76	82	88	95	103	110	120	128	138	148		
8.32	33	39	44	50	56	63	69	76.6	84	92	102	110	120	130			
6.45	27.4	32.0	38	43	48	54	59	64	70	76	82	89	97	105	115	122	132	142			
6.49	...	18.3	21.3	24.7	28.1	31.3	35.1	38.8	42.9	48	53	58	63	68	74	80	86	92	99	106	114	124	131	142	152		
6.54	20.0	23.7	27.2	31.1	34.9	39.2	44	50	55	60	65	70	76	82	88	95	103	111	121	128	138	148			
6.74	33	39	45	50	57	63	70	77	85	92	103	110	120	131			
6.90	20.2	23.8	27.3	31.2	35.1	39.3	45	50	55	60	65	70	76	83	89	96	103	111	121	127	138	149			
6.93	27.6	32.3	38	43	49	54	59	64	70	71	83	90	97	105	115	123	133	143			
7.13	33	39	45	51	57	64	70	77	85	93	103	111	121	131			
	...	0.75	0.77	0.81	.84	0.87	0.88	0.89	0.91	0.93	0.94	0.95	0.97	0.99	1.00	4.02	1.04	1.06	10.9	1.09	1.10	1.11	1.12	1.13	1.14		
7.30	20.3	24.0	27.5	31.4	35.2	39.5	45	50	55	60	65	71	77	83	86	96	103	111	121	129	139	149			
7.33	27.8	32.4	38	43	49	54	59	64	71	77	83	90	98	105	115	123	133	143.1				
7.56	33	39	45	51	57	64	70	77	85	93	103	111	121	131.2				
7.79	23.6	28.0	32.6	38	44	49	54	59	65	71	77	83	90	98	105	116	123	133	143.3				
8.05	34	40	45	51	58	64	70	78	86	93	103	111	121	131				
	...	0.79	0.82	0.84	0.86	0.88	0.89	0.90	0.93	0.94	0.96	0.97	0.98	1.00	1.02	1.04	10.5	10.7	10.8	1.10	1.11	1.12	1.14				
8.22	23.7	28.1	32.8	38	44	49	54	60	65	71	77	83	90	98	106	116	123	133	143				
8.60	34	40	46	51	59	64	71	78	86	94	104	111	122	132				
8.70	23.9	28.3	33.0	39	44	49	55	60	65	71	77	83	91	98	106	116	123	134	144				
9.24	34	40	46	52	58	64	71	78	86	94	104	112	122	132				
9.78	34	40	46	52	58	64	71	78	86	94	104	112	122	132				
10.40	35	41	46	52	59	65	71	79	86	91	104	112	122	132				
10.97	35	41	47	52	59	65	72	79	87	94	105	112	123	133				
11.60	35	41	47	52	59	65	72	79	87	95	101	112	123	133				
	0.84	0.86	0.87	0.88	0.90	0.92	0.94	0.95	0.96	0.98	1.00	1.02	1.04	1.05	1.07	1.09	1.11	1.12	1.14				

NOTES: Arc & Length factors are approximate values

Refer to Selection Procedure for more precise calculations

