

Fenner Power PLUS[®] **FA** & CRE PLUS Wedge Belts

ISO4184 - DIN7753 - BS3790 - RMA IP22

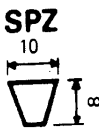
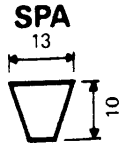
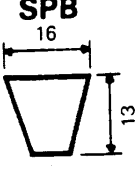
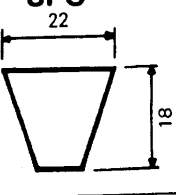
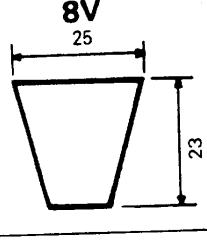
In addition to their precision-built qualities, Fenner Power Plus **FA** Wedge Belts have specially treated jackets to give superior anti-static and oil-resistant properties.

All Fenner Power Plus and CRE Plus wedge belts are static conductive to ISO1813, and will not self-ignite under severe slip/stall conditions.

FA Wedge belts are also available to meet the stringent safety standards of British Coal, produced to Specification 224-1961 and section 4.7 of BS3790 1981. These can be used with confidence by manufacturers of equipment for use underground or in explosive atmospheres. They are distinguished by the letters FRAS.

FA Fenner belts conform to American Petroleum Institute specifications.

FRICTION BELT DRIVES

									
Belt Designation		Belt Designation		Belt Designation		Belt Designation		Belt Designation	
Metric	R.M.A. (Imperial)	Metric	Metric	R.M.A. (Imperial)	Metric	Metric	R.M.A. (Imperial)	Metric	
SPZ	3V	SPA	SPB	5V	SPC	8V	Delta		
630*	250	800*	1250*	—	2000	1000	2540		
670*	—	825	1260*	500	2120	1120	2840		
710*	280	850*	1320*	—	2240	1250	3180		
750*	—	875	1340*	530	2360	1400	3550		
760*	300	900*	1400*	—	2500	1500	3810		
800*	315	925	1410*	560	2650	1600	4060		
850*	—	950*	1500*	—	2800	1800	4570		
900*	355	975	1600*	630	3000	2000	5080		
940	370	1000*	1700*	—	3150	2240	5690		
950*	—	1030	1800*	710	3350	2500	6350		
1000*	—	1060*	1900*	—	3500	2800	7100		
1010*	400	1090	2000*	—	3750	3150	8000		
1060*	—	1120*	2020*	800	4000	3550	9000		
1080*	425	1150	2120*	—	4250	4000	10160		
1120*	—	1180*	2150*	850	4500	4500	11430		
1140*	450	1220	2240*	—	4750	Metric belt designation denotes pitch length in millimetres. SPZ: Lp = Lo - 13mm SPA: Lp = Lo - 18mm SPB: Lp = Lo - 22mm SPC: Lp = Lo - 30mm Lp = Pitch length Lo = Outside length			
1180*	—	1250*	2280*	900	5000				
1200*	475	1280	2360*	—	5300				
1250*	—	1320*	2410*	950	5600				
1270*	500	1360	2500*	—	6000				
1320*	—	1400*	2530*	1000	6300				
1340*	530	1450*	2650*	—	6700				
1400*	—	1500*	2680*	1060	7100				
1420*	560	1550*	2800*	—	7500				
1470	580	1600*	2840*	1120	8000				
1500*	—	1650*	3000*	1180	8500	MASS PER UNIT LENGTH kg/m			
1520*	600	1700*	3150	—	9000				
1560*	617	1750*	3170	1250	9500	BELT SECTION	STD BELT	FRAS BELT	CRE BELT
1600*	630	1800*	3350	1320	10000	SPZ	0.066	0.085	0.062
1650*	650	1850	3350	1400	10600	SPA	0.118	0.138	0.110
1700*	670	1900*	3550	—	11200	SPB	0.191	0.207	0.184
1800*	710	1950*	3750	1500	11800	SPC	0.315	0.360	—
1850	730	2000*	3800	—	12500	8V	0.542	0.576	—
1900*	750	2060*	4000	1600					
2000*	—	2120*	4060	—					
2040*	800	2180	4250	1700					
2120*	—	2240*	4310	—					
2160*	850	2300	4560	1800					
2240*	—	2360*	4750	—					
2280*	900	2430*	4820	1900					
2360*	—	2500*	5070	2000					
2410*	950	2580	5300	—					
2500*	—	2650*	5380	2120					
2540*	1000	2720	5600	—					
2650*	—	2800*	5680	2240					
2690*	1060	2900	6000	2360					
2800*	—	3000*	6340	—					
2840*	1120	3150	6700	2500					
3000*	1180	3350	7500	2800					
3150	—	3550	8000	—					
3170	1250	3750		3150					
3350	—	4000							
3550	1400	4250							
		4500							

Imperial belt designation denotes approximate effective length in tenths of an inch in accordance with R.M.A. Standards for jacketed belts.

Whilst the cross sections are identical, some manufacturers use other designations viz:
 SPZ is interchangeable with Alpha, 3V & 9N
 SPB is interchangeable with Beta, 5V & 15N
 8V is interchangeable with Delta, SPP & 25N
 SPZ, SPA, SPB & SPC belt designations shown in heavier type identify standard sizes in ISO 4184.

PRODUCT CODES - 8 digit for standard wedge belt.
 Digits 1 to 3: standard wedge 260 or FRAS 261, 267 for CRE.

Digit 4: section letter (SP)Z, A, B, C or D (Delta).
 Digits 5 to 8: 0 then first 3 of 4-figure lengths, or first 4 of 5-figure lengths.
 E.g.: standard SPB 2800 is coded 260B0280.

WORKING TEMPERATURES

Fenner Wedge and CRE belts perform satisfactorily within the temperature range -40 to 70°C.

Dimensions in millimetres unless otherwise stated.

Selection-Wedge Belt Drives

FRICION BELT DRIVES

EXAMPLE

Design a Wedge belt drive from a 50 kW 6 cylinder diesel engine which runs at 1050 rev/min to a reciprocating compressor running at 660 rev/min. The centre distance is to be approximately 1600 mm and the duty is 24 hours/day. The engine shaft is 70 mm diameter and the compressor shaft 80 mm diameter.

(a) Speed Ratio

$$\text{Speed Ratio} = \frac{1050}{660} = 1,59:1$$

(b) Service Factor

From Table 3 the service factor is 1,4.

(c) Design Power

$$= 50 \times 1,4 = 70 \text{ kW}$$

(d) Belt Section

By referring to Table 2 the intersection of design power and the speed of the faster shaft indicates SPB section.

(e) Minimum Pulley

From Table 1 (page 15) the minimum recommended pulley is approximately 250 mm.

(f) Pulley Pitch Diameters

By referring to the centre distance tables relating to SPB section belts on page 24 the selection is a driving pulley of 315 mm pitch diameter and a driven pulley of 500 mm pitch diameter.

(g) Belt Length, Centre Distance and Correction Factor

Reading across the table, the nearest centre distance to the 1600 mm required is 1607 mm. The belt size at the head of the column is SPB 4500. By following the colour shading to the top of the table, a correction factor of 1,05 is noted.

(h) Basic Power per Belt

From the power rating table (page 32) by interpolation the rated power/belt for a 315 mm pitch diameter pulley at 1050 rev/min is 18,67 kW.

(i) Speed Ratio Power Increment

The power increment (by interpolation) for a speed ratio of 1,59 1050 rev/min is 0,77 kW.

(k) Corrected Power per Belt

$$= (18,67 + 0,77) \times 1,05$$

$$= 20,41 \text{ kW per belt.}$$

(l) Number of Belts required

$$= \frac{70}{20,41} = 3,43 \therefore \text{use 4 SPB Wedge belts.}$$

(m) Bore Sizes

From pulley dimension tables, a 315 x 4SPB has a maximum metric bore of 100 mm, which is greater than the 70 mm diameter engine shaft. the 500 x 4SPB also has a maximum metric bore of 100 mm and is suitable for the 80 mm compressor shaft.

DRIVE SPECIFICATION

Engine pulley	315 x 4SPB
Taper Lock bush	3525/70 mm
Compressor pulley	500 x 4SPB
Taper Lock bush	3525/80 mm
4 x SPB 4500 wedge belts give 1607 mm centres.	

TABLE 3: SERVICE FACTORS

SPECIAL CASES		TYPES OF PRIME MOVER					
		'Soft' starts			'Heavy' starts		
For speed increasing drives of: Speed ratio 1,00 – 1,24 multiply service factor by 1,00 Speed ratio 1,25 – 1,74 multiply service factor by 1,05 Speed ratio 1,75 – 2,49 multiply service factor by 1,11 Speed ratio 2,50 – 3,49 multiply service factor by 1,18 Speed ratio 3,50 and over multiply service factor by 1,25		Electric motors: AC – Star Delta start DC – Shunt wound Internal combustion engines with 4 or more cylinders All prime movers fitted with centrifugal clutches, dry or fluid couplings or electronic soft start devices			Electric motors: AC – Direct-on-line start DC – Series & compound wound Internal combustion engines with less than 4 cylinders Prime movers not fitted with soft start devices		
		Hours per day duty					
	TYPES OF DRIVEN MACHINE	10 and under	Over 10 to 16	Over 16	10 and under	Over 10 to 16	Over 16
Class 1 Light Duty	Agitators (uniform density), blowers, exhausters and fans (up to 7,5 kW). Centrifugal compressors and pumps. Belt conveyors (uniformly loaded).	1,0	1,1	1,2	1,1	1,2	1,3
Class 2 Medium Duty	Agitators and mixers (variable density), blowers, exhausters and fans (over 7.5 kW). Rotary compressors and pumps (other than centrifugal). Belt conveyors (not uniformly loaded), generators and exciters, laundry machinery, lineshafts, machine tools, printing machinery, sawmill and woodworking machinery, screens (rotary).	1,1	1,2	1,3	1,2	1,3	1,4
Class 3 Heavy Duty	Brick machinery, bucket elevators, compressors and pumps (reciprocating), conveyors (heavy duty). Hoists, mills (hammer), pulverisers, punches, presses, shears, quarry plant, rubber machinery, screens (vibrating), Textile machinery.	1,2	1,3	1,4	1,4	1,5	1,6
Class 4 Extra Heavy Duty	Crushers (gyratory-jaw roll), mills (ball-rod-tube).	1,3	1,4	1,5	1,5	1,6	1,8

Selection-Wedge Belt Drives

(a) Speed Ratio

Calculate speed ratio by dividing the rev/min of the faster shaft by the rev/min of the slower shaft.

(b) Service Factor

From Table 3 (page 16), select the service factor which is applicable to the drive. If the drive is speed increasing, an additional factor may be required – refer to top of Table 3.

(c) Design Power

Multiply the normal running power required by the Service Factor. This gives the design power which is used as the basis for selecting the drive.

(d) Belt Section

Refer to Table 2 (opposite) and trace to the right along the horizontal axis to the rev/min of the faster shaft. Trace upwards along the vertical axis to the design power. Choose the belt section represented by the area in which the point of intersection falls.

(e) Minimum Pulley Diameter

Refer to Table 1 (below) and select minimum recommended pulley, using the design power from step (c) and the faster shaft speed. The recommended pulley diameter is a guide to the minimum pulley pitch diameter capable of transmitting the design power at the given speed.

(f) Pulley Pitch Diameters

Refer to the drive selection tables on pages 17 to 28 and for the belt section chosen read down the speed ratio column to the value nearest the calculated speed ratio. Use the minimum pulley diameter from step (e) as a guide to the small pulley selection.

(g) Belt Length, Centre Distance and Correction Factor

The drive tables list all I.S.O. belt lengths.

Along the same line as the chosen speed ratio read across the table to find a suitable centre distance. The required belt length is given at the head of the column.

Note the correction factor by following the colour band in which the chosen centre distance falls, to the top of the table.

If the centre distance is not specified consider a drive with a centre distance approximately equal to the sum of the pulley pitch diameters.

When non-standard pulleys or belts are used the centre distance and belt length can be calculated using the formulae given on page 26.

(h) Basic Power per belt

Refer to the Power Rating Tables (pages 29 to 33). In the left-hand column locate rev/min of the faster shaft, i.e. the one with the small pulley. Read across to the column headed by the pitch diameter of the small pulley and note the rated power.

When the drive selected uses C.R.E. belts refer to page 34 for power ratings.

Note that Fenner pulleys are designed for belt speeds up to 40 m/s. If using non-Fenner pulleys seek manufacturers' approval.

N.B. The powers listed in the columns headed by the motor speeds in the Drive Tables (pages 17 to 28) give the power per belt including Speed Ratio Power increment.

These powers require correcting for belt length and arc of contact (g) and should be used in conjunction with the appropriate service factor.

(j) Speed Ratio Power Increment

From the Power Rating Tables (pages 29 to 33) note the additional power per belt for the speed ratio being used.

(k) Corrected Power per Belt

Add the speed ratio power increment (j) to the basic power per belt (h) and multiply by the correction factor from step (g).

(l) Number of belts required

Divide the Design Power found in step (c) by the corrected power per belt (k). The result gives the number of wedge belts required. If the answer contains a fraction use the next whole number.

(m) Bore sizes

Check that the pulleys will fit shafts by referring to the pulley dimension tables (pages 35 to 42).

TABLE 2

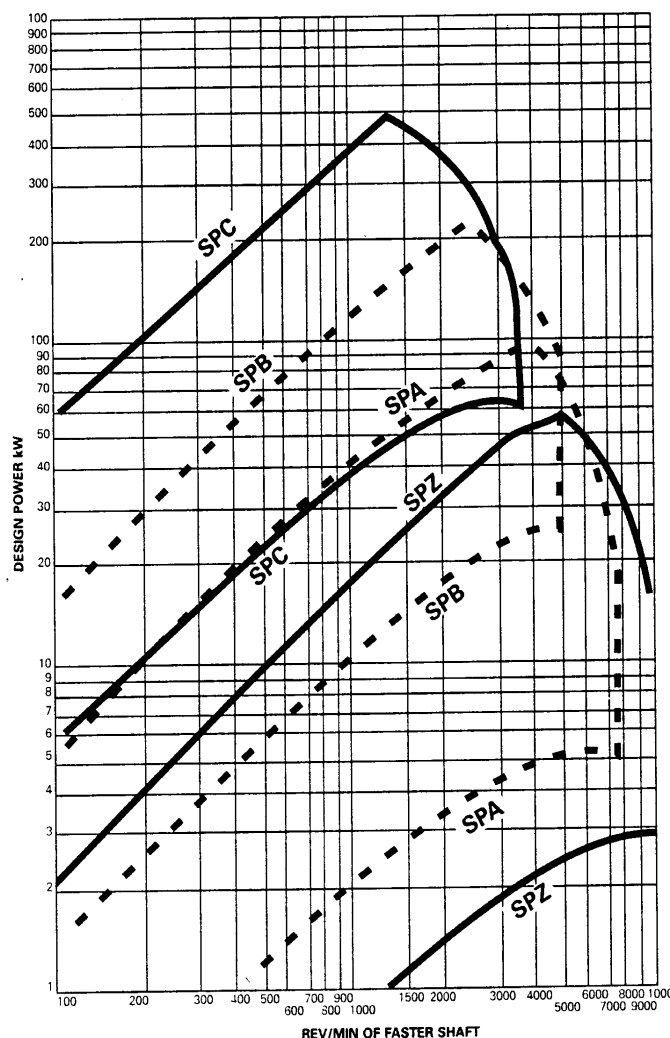
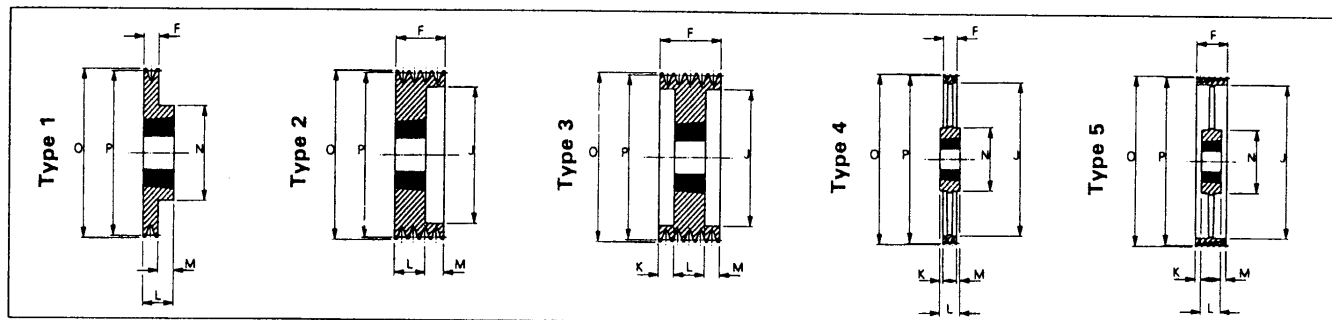


TABLE 1

Speed of faster shaft rev/min	*Minimum Pulley Diameter (mm)																			
	Design Power (kW)																			
	up to 1	3.0	4.0	5.0	7.5	10	15	20	25	30	40	50	60	75	90	110	130	150	200	250
500	56	90	100	112	125	140	180	200	212	236	250	280	280	315	375	400	450	475	500	560
600	56	85	90	100	112	125	140	180	200	212	224	250	265	280	300	335	375	400	475	500
720	56	80	85	90	100	106	132	150	160	170	200	236	250	265	280	300	335	375	450	500
960	56	75	80	85	95	100	112	132	150	180	180	200	224	250	280	300	335	375	400	450
1200	56	71	80	80	95	95	106	118	132	150	160	180	200	236	236	250	265	300	335	355
1440	56	63	75	80	85	85	100	112	125	140	160	170	190	212	236	236	250	280	315	335
1800	56	63	71	75	80	85	95	106	112	125	150	160	170	190	212	224	236	265	300	335
2880	56	60	67	67	80	80	85	90	100	112	125	140	160	170	180	212	224	236	-	-

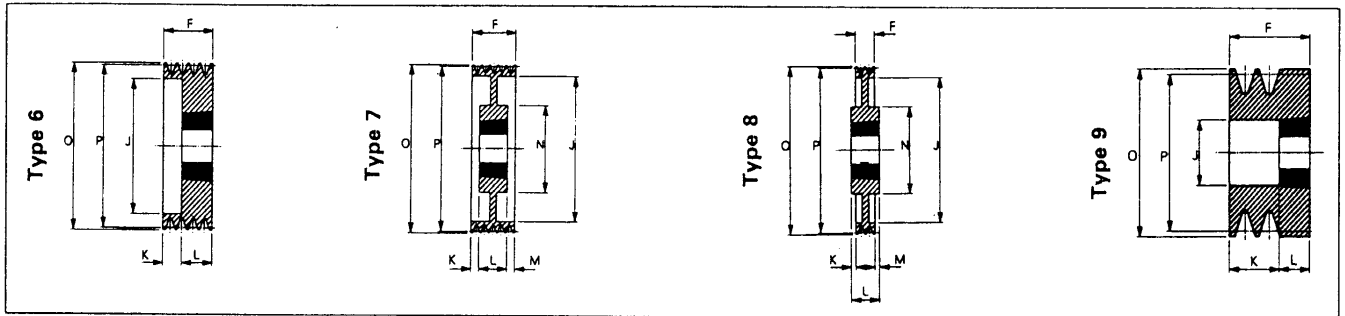
Taper Lock® Pulleys for SPZ & Z Belts



Catalogue Code	Pitch Dia (P)	No. of Grooves	Bush No.	Max. Bore		Pulley Type	F	J	K	L	M	N	Outside Dia (O)
				Metric	Inch								
031Z0041	56†	1	1008	25	1	9	37	35	15	22	—	—	60
Z0042	56	2	1108	28	1 1/8	9	49	35	27	22	—	—	60
031Z0051	60	1	1008	25	1	9	22	0	0	22	—	—	64
Z0052	60	2	1108	28	1 1/8	9	49	36	27	22	—	—	64
031Z0061	63	1	1108	28	1 1/8	1	16	—	—	22	6	—	67
Z0062	63	2	1108	28	1 1/8	6NR	28	38	6	22	—	—	67
Z0063	63	3	1108	28	1 1/8	6NR	40	38	18	22	—	—	67
031Z0071	67	1	1108	28	1 1/8	1	16	—	—	22	6	60	71
Z0072	67	2	1108	28	1 1/8	6NR	28	38	6	22	—	—	71
Z0073	67	3	1108	28	1 1/8	6NR	40	38	18	22	—	—	71
031Z0081	71	1	1108	28	1 1/8	1	16	—	—	22	6	60	75
Z0082	71	2	1108	28	1 1/8	6NR	28	42	6	22	—	—	75
Z0083	71	3	1108	28	1 1/8	6NR	40	42	18	22	—	—	75
031Z0091	75	1	1108	28	1 1/8	1	16	—	—	22	6	60	79
Z0092	75	2	1210	32	1 1/4	6NR	28	46	3	25	—	—	79
Z0093	75	3	1210	32	1 1/4	6NR	40	46	15	25	—	—	79
031Z0101	80	1	1210	32	1 1/4	1	16	—	—	25	9	75	84
Z0102	80	2	1210	32	1 1/4	1	28	—	—	28	0	0	84
Z0103	80	3	1210	32	1 1/4	6NR	40	51	15	25	—	—	84
Z0104	80	4	1210	32	1 1/4	6	52	54	27	25	—	—	84
031Z0111	85	1	1210	32	1 1/4	1	16	—	—	25	9	83	89
Z0112	85	2	1610	42	1 5/8	1	28	—	—	28	0	0	89
Z0113	85	3	1610	42	1 5/8	6NR	40	56	15	25	—	—	89
Z0114	85	4	1610	42	1 5/8	6	52	59	27	25	—	—	89
Z0115*	85	5	1610	42	1 5/8	6	64	59	39	25	—	—	89
031Z0121	90	1	1210	32	1 1/4	1	16	—	—	25	9	83	94
Z0122	90	2	1610	42	1 5/8	1	28	—	—	28	0	0	94
Z0123	90	3	1610	42	1 5/8	6NR	40	61	15	25	—	—	94
Z0124	90	4	1610	42	1 5/8	6	52	64	27	25	—	—	94
Z0125*	90	5	1610	42	1 5/8	6	64	64	39	25	—	—	94
031Z0131	95	1	1210	32	1 1/4	1	16	—	—	25	9	83	99
Z0132	95	2	1610	42	1 5/8	1	28	—	—	28	0	0	99
Z0133	95	3	1610	42	1 5/8	2	40	66	—	25	15	—	99
Z0134	95	4	1610	42	1 5/8	2	52	69	—	25	27	—	99
Z0135*	95	5	1610	42	1 5/8	2	64	69	—	25	39	—	99
031Z0141	100	1	1210	32	1 1/4	1	16	—	—	25	9	83	104
Z0142	100	2	1610	42	1 5/8	1	28	—	—	28	0	0	104
Z0143	100	3	1610	42	1 5/8	2	40	65	—	25	15	—	104
Z0144	100	4	1610	42	1 5/8	2	52	74	—	25	27	—	104
Z0145*	100	5	2012	50	2	6	64	74	32	32	—	—	104
031Z0151	106	1	1610	42	1 5/8	1	16	—	—	25	9	92	111
Z0152	106	2	1610	42	1 5/8	6NR	28	77	3	25	—	—	111
Z0153	106	3	1610	42	1 5/8	2	40	77	—	25	15	—	111
Z0154	106	4	1610	42	1 5/8	2	52	80	—	25	27	—	111
Z0155*	106	5	2012	50	2	6	64	80	32	32	—	—	111
031Z0161	112	1	1610	42	1 5/8	1	16	—	—	25	9	92	116
Z0162	112	2	1610	42	1 5/8	1	28	—	—	28	0	0	116
Z0163	112	3	2012	50	2	2	40	83	—	32	8	—	116
Z0164	112	4	2012	50	2	2	52	86	—	32	20	—	116
Z0165*	112	5	2012	50	2	2	64	86	—	32	32	—	116

Type 6NR pulleys are made to catalogue dimensions, but modern manufacturing techniques result in there being no recess behind the Taper Lock® bush, the J dimension is then approximately equal to the small diameter of the Taper Lock® bush.
 Dimensions in millimetres unless otherwise stated. * Non-preferred pulley sizes. † Pitch diameters in italic type indicate pulleys to be used with C.R.E. belts only. All envelope and prime functional dimensions are correct at the time of publication. Non-functional dimensions may vary slightly.

Taper Lock® Pulleys for SPZ & Z Belts



Catalogue Code	Pitch Dia (P)	No. of Grooves	Bush No.	Max. Bore		Pulley Type	F	J	K	L	M	N	Outside Dia (O)
				Metric	Inch								
031Z0171	118	1	1610	42	1 1/8	1	16	-	-	25	0	92	123
Z0172	118	2	1610	42	1 1/8	7	28	89	0	25	3	85	123
Z0173	118	3	2012	50	2	2	40	89	-	32	8	-	123
Z0174	118	4	2012	50	2	2	52	92	-	32	20	-	123
Z0175*	118	5	2012	50	2	2	64	92	-	32	32	-	123
031Z0181	125	1	1610	42	1 1/8	1	16	-	-	25	9	88	129
Z0182	125	2	1610	42	1 1/8	7	28	85	0	25	3	85	129
Z0183	125	3	2012	50	2	2	40	99	-	32	8	-	129
Z0184	125	4	2012	50	2	2	52	99	-	32	20	-	129
Z0185*	125	5	2012	50	2	2	64	99	-	32	32	-	129
031Z0191	132	1	1610	42	1 1/8	1	16	-	-	26.5	10.5	92	137
Z0192	132	2	1610	42	1 1/8	7	28	103	0	25	3	85	137
Z0193	132	3	2012	50	2	2	40	103	-	32	8	-	137
Z0194	132	4	2012	50	2	2	52	106	-	32	20	-	137
Z0195*	132	5	2517	60	2 1/2	2	64	106	-	45	19	-	137
031Z0201	140	1	1610	42	1 1/8	1	16	-	-	25	9	88	144
Z0202	140	2	1610	42	1 1/8	7	28	85	0	25	3	85	144
Z0203	140	3	2012	50	2	2	40	114	-	32	8	-	144
Z0204	140	4	2012	50	2	2	52	114	-	32	20	-	144
Z0205*	140	5	2517	60	2 1/2	2	64	111	-	45	19	-	144
031Z0221	160	1	1610	42	1 1/8	1	16	-	-	25	9	88	164
Z0222	160	2	2012	50	2	1	28	-	-	32	4	108	164
Z0223	160	3	2012	50	2	2	40	134	-	32	8	-	164
Z0224	160	4	2517	60	2 1/2	2	52	134	-	45	7	-	164
Z0225*	160	5	2517	60	2 1/2	2	64	131	-	45	19	-	164
031Z0241	180	1	1610	42	1 1/8	1	16	-	-	25	9	88	184
Z0242	180	2	2012	50	2	8	28	-	-	32	4	108	184
Z0243	180	3	2012	50	2	2	40	154	-	32	8	-	184
Z0244	180	4	2517	60	2 1/2	2	52	154	-	45	7	-	184
Z0245*	180	5	2517	60	2 1/2	2	64	151	-	45	19	-	184
031Z0261	200	1	2012	50	2	1	16	-	-	32	16	108	204
Z0262	200	2	2012	50	2	8	28	-	-	32	4	108	204
Z0263	200	3	2012	50	2	7	40	171	0	32	8	108	204
Z0264	200	4	2517	60	2 1/2	7	52	171	3.5	45	3.5	120	204
Z0265*	200	5	2517	60	2 1/2	7	64	171	9.5	45	9.5	120	204
031Z0301	250	1	2012	50	2	8	16	221	0	32	16	112	254
Z0302	250	2	2012	50	2	8	28	221	0	32	4	112	254
Z0303	250	3	2012	50	2	7	40	221	4	32	4	112	254
Z0304	250	4	2517	60	2 1/2	5	52	224	3.5	45	3.5	120	254
Z0305*	250	5	2517	60	2 1/2	5	64	224	9.5	45	9.5	120	254
031Z0331	315	1	2012	50	2	8	16	286	8	32	8	112	319
Z0332	315	2	2012	50	2	8	28	286	0	32	4	112	319
Z0333	315	3	2517	60	2 1/2	8	40	286	0	45	5	124	319
Z0334	315	4	2517	60	2 1/2	5	52	289	3.5	45	3.5	120	319
Z0335*	315	5	2517	60	2 1/2	5	64	289	9.5	45	9.5	120	319
031Z0351	400	1	2012	50	2	4	16	371	8	32	8	112	404
Z0352	400	2	2517	60	2 1/2	4	28	371	8.5	45	8.5	124	404
Z0353	400	3	2517	60	2 1/2	4	40	371	2.5	45	2.5	124	404
Z0354	400	4	2517	60	2 1/2	5	52	371	3.5	45	3.5	124	404
Z0355*	400	5	3020	75	3	5	64	371	6.5	51	6.5	159	404
031Z0372*	500	2	2517	60	2 1/2	4	28	471	8.5	45	8.5	124	504
Z0373*	500	3	2517	60	2 1/2	4	40	471	2.5	45	2.5	124	504
Z0374*	500	4	3020	75	3	5	52	471	0.5	51	0.5	159	504
Z0375*	500	5	3020	75	3	5	64	471	6.5	51	6.5	146	504
031Z0393*	630	3	2517	60	2 1/2	4	40	601	2.5	45	2.5	124	634
Z0394*	630	4	3020	75	3	5	52	601	0.5	51	0.5	146	634
Z0395*	630	5	3020	75	3	5	64	601	6.5	51	6.5	146	634

Dimensions in millimetres unless otherwise stated.

* Non-preferred pulley sizes.

All envelope and prime functional dimensions are correct at the time of publication. Non-functional dimensions may vary slightly.