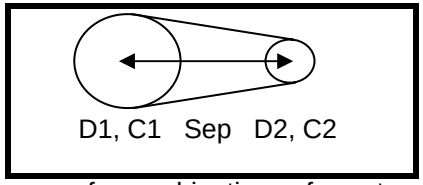
Belt Drive Belt Length Calculations Nigel Lawton May 2009

Enter your pulley root diameters and seperation in the yellow rows of the table.
Read off any acceptable belt lengths on left opposite a green highlighted cell.
Other belt lengths may be set in the yellow column of the table.
The formula used to calulate belt length (complex) is:
"BL=(2 x SQRT(Sep^2 + (.5 * D1 - .5 * D2)^2)) + (0.5 x 3.1415 x (D1+D2))"
Target stretch is 7-11%



Current available belt lengths:		
5.5mm	6.5mm	7.5mm
10mm	12mm	

Values within the thick bordered box are for combinations of my standard items

Pulley 1 root diameter		D1	3.0	3.0	3.0	5.0	5.0	5.0	1.1	3.0	5.0	5.0
Required seperation		Sep	6.3	8.0	9.7	4.5	6.3	8.1	11.3	8.3	5.0	6.6
Pulley 2 root diameter		D2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	3.0	3.0	3.0
Reduction ratio		(D2+0.42)/(D1+0.42)	1:2.3	1:2.3	1:2.3	1:3.6	1:3.6	1:3.6	1:1.0	1:1.0	1:1.6	1:1.6
Combined reduction with 14:1 worm & gear			1:31.5	1:31.5	1:31.5	1:49.9	1:49.9	1:49.9	1:14.0	1:14.0	1:22.2	1:22.2
Minimum seperation		Min Sep	3.1	3.1	3.1	4.1	4.1	4.1	2.1	4.0	5.0	5.0
Half circumference		0.5 C1	4.7	4.7	4.7	7.9	7.9	7.9	1.7	4.7	7.9	7.9
Half circumference		0.5 C2	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Total length simple calc (as a check)		(BL)	19.0	22.4	25.8	18.6	22.2	25.8	26.0	23.0	19.6	22.8
Belt Length complex calc		BL	19.2	22.6	25.9	19.0	22.5	26.0	26.1	26.0	22.8	25.9
Belt stretched 10%		C3	17.4	20.5	23.6	17.3	20.4	23.7	23.7	23.7	20.7	23.6
Equivalent sized belt for correct length.		D3	5.6	6.5	7.5	5.5	6.5	7.5	7.5	7.5	6.6	7.5
	Diam	Belt Length										
Actual stretch 4mm belt.	4	12.6	52.7%	79.5%	106.4%	51.2%	79.0%	107.1%	107.3%	107.1%	81.2%	106.2%
Actual stretch 4.5mm belt.	4.5	14.1	35.7%	59.6%	83.5%	34.4%	59.1%	84.1%	84.3%	84.1%	61.0%	83.3%
Actual stretch 5mm belt.	5	15.7	22.2%	43.6%	65.1%	21.0%	43.2%	65.7%	65.9%	65.7%	44.9%	65.0%
Actual stretch 5.5mm belt.	5.5	17.3	11.1%	30.6%	50.1%	10.0%	30.1%	50.6%	50.8%	50.6%	31.7%	50.0%
Actual stretch 6mm belt.	6	18.8	1.8%	19.7%	37.6%	0.8%	19.3%	38.0%	38.2%	38.1%	20.8%	37.5%
Actual stretch 6.5mm belt.	6.5	20.4		10.5%	27.0%		10.1%	27.4%	27.6%	27.4%	11.5%	26.9%
Actual stretch 7.5mm belt.	7.5	23.6			10.1%			10.4%	10.6%	10.5%		10.0%
Actual stretch 10mm belt.	10	31.4										
Actual stretch 12mm belt.	12	37.7										