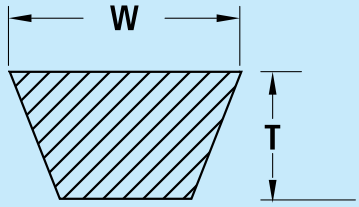
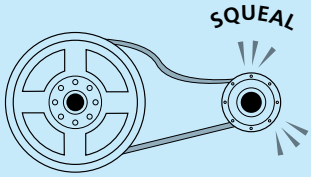
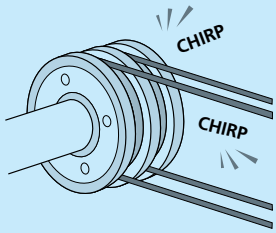
NOMINAL V-BELT CROSS SECTIONS



Belt Section	Industry Standard Description	Width W, in Inches	Thickness T, in Inches
3L	FHP	3/8	7/32
4L		1/2	5/16
5L		21/32	3/8
3V	Narrow	3/8	5/16
5V		5/8	17/32
8V		1	29/32
A	Classical	1/2	5/16
B		21/32	13/32
C		7/8	17/32
D		1-1/4	3/4

V-BELTS: WHAT TO LISTEN FOR





Squeal is usually a result of insufficient belt tension and requires prompt investigation. If squeal persists after you have checked all belts and adjusted tension, examine the drive itself for overloading.

Chirp, a sound like that of a chirping bird, can occur on all types of belt drives. Never apply dressing or oil to a belt in an effort to eliminate chirps or squeaks. Realignments of an idler may help. Chirps or squeaks are often annoying, but will not harm belts.

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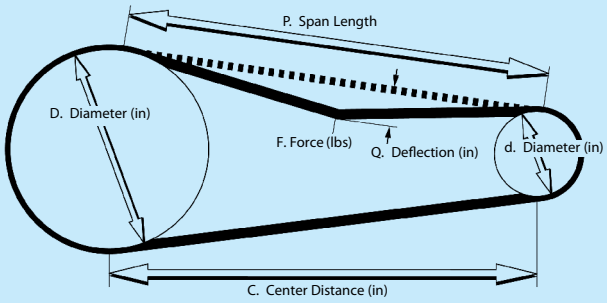
V-BELT TENSIONING



$$P = \sqrt{C^2 - \left(\frac{D-d}{2}\right)^2}$$

F = Deflection Force
q = Deflection, 1/64" per inch of span length
C = Center Distance
D = Large Sprocket Pitch Diameter
d = Small Sprocket Pitch Diameter
P = Span Length

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CONVEYOR BELT FPM TO RPM

Pulley Dia. Inches	FPM												
	100	150	200	250	300	350	400	500	600	700	800	900	1000
6	64	95	127	159	191	223	254	318	382	445	509	573	636
8	48	72	95	119	143	167	191	239	286	334	382	429	477
10	38	57	76	95	115	134	153	191	229	267	305	344	382
12	32	48	64	80	95	111	127	159	191	223	254	286	318
14	27	41	55	68	82	95	109	136	164	191	218	245	273
16	24	36	48	60	72	83	95	119	143	167	191	215	239
18	21	32	42	53	64	74	85	106	127	148	170	191	212
20	19	29	38	48	57	67	76	95	115	134	153	172	191
24	16	24	32	40	48	56	64	80	95	111	127	143	159
30	13	19	25	32	38	45	51	64	76	89	102	115	127
36	11	16	21	27	32	37	42	53	64	74	85	95	106
42	9	14	18	23	27	32	36	45	55	64	73	82	91
48	8	12	16	20	24	28	32	40	48	56	64	72	80
54	7	11	14	18	21	25	28	35	42	49	57	64	71
60	6	10	13	16	19	22	25	32	38	45	51	57	64

For values not shown use formula: **SFM = .2618 x D x rpm**
SFM = Surface Feet Per Minute
D = Pulley Diameter, Inches
rpm = Revolutions Per Minute

Troubleshooting Belts

V-Belt Systems

TYPE OF FAILURE												POSSIBLE CAUSE OF FAILURE	CORRECTIVE ACTION
Excessive edge wear	Excessive tooth wear	Uneven tooth wear	Apparent belt stretch	Cracks in backing	Tooth shear	Tensile failure	Excessive drive noise	Tooth skipping (ratcheting)	Belt tracking	Excessive sprocket/sheave wear	Excessive drive vibration		
■	▫	▪					▫				▫	Belt hitting obstruction	Remove obstruction or use idler to reroute belt
	▪				■							Excessive load	Redesign drive
	▫					▪	▪			▫	▫	Belt overtensioned	Use tensioning gauge to set proper tension
	■	▪	▫				▪	■			▫	Belt undertensioned	Use tensioning gauge to set proper tension
	▪	▪									▫	Rough or damaged sprocket/sheave	Replace sprocket/sheave
	■	■			▪	■			■	▫		Misalignment	Align shafts and sprockets/sheaves
	▪	▪			▫			▫				Worn sprocket/sheave	Replace sprocket/sheave
					▫			▫	▫	▫	▫	Sprocket out of tolerance	Replace sprocket/sheave; never attempt to remachine
										■		Soft sprocket/sheave material	Use harder sprocket/sheave material
	▪	▫			▫	▪		▪	▪	■	▪	Debris in sprocket/sheave or drive	Shield drive
	▫		■					▪				Center distance changed	Check lock down bolts on motors and shafts
	▫		■				▫	▪	▪		■	Weak drive structure	Reinforce drive structure
				■	▫							Excessive low temperature	Moderate temperature especially at startup
			▫	■	▫						▫	Excessive high temperature	Moderate temperature, shield drive
			▪	▪	▫	▫		▫		▫		Exposure to oil, solvents, chemicals	Shield drive, eliminate chemicals
			▫	■								Sprocket diameter sub minimum	Redesign drive to increased sprocket/sheave diameters
				▪								Back side idler	Redesign to reduce wrap on backside idler
					■	▪		▪				Shock loading	Eliminate shock loading or redesign drive to handle it
	▫	▫			▪							Less than six teeth in mesh	Increase wrap on sprocket/sheave
						▫					▪	Excessive sprocket/sheave runout	Replace sprocket/sheave
						■				▫		Damage due to handling	Replace product, don't crimp belt or drop sprockets/sheaves
											▪	Vibrating bearings/mountings	Replace bearings or reinforce mountings
									▪			Center distance greater than 8x small sprocket/sheave diameter	Alignment is critical
							▪				■	Sprocket/sheave not properly balanced	Check sprocket/sheave balance

■ PRIMARY CAUSE ▪ POSSIBLE CAUSE ▫ COULD CAUSE BUT NOT LIKELY

PROBABLE CAUSES

PROBLEM	Excessive Oil	Exposure to Elements	Pried Over Sheaves	Contact w/ Obstruction	Insufficient Tension	Stalled Drive Sheaves	Constant Slippage	Rough Sheaves	Substandard Sheaves	Excessive Tension	Shock Load	Foreign Material	Excessive Dust	Drive Misalignment	Worn Sheaves	Excessive Vibration	High Ambient Temperature	Drive Underbelted	Damaged Tensile Member	Incorrect Belts	Incorrect Drive Setup	Insufficient Take Up	Improper Matching	Mixed Old & New Belts	Non Parallel Shafts	Different Manufacturers	Belt/Pulley Incompatible
Loose Cover & Swell	■																										
Weathering or “Craze” Cracks		■																									
Gouges			■	■																							
Spin Burn					■	■																					
Envelope Wear							■						■														
Uneven Envelope Wear								■						■	■										■		
Ply Separation									■	■																	
Side Split									■																		
Broken Belts			■								■	■															
Belts Turn Over														■	■	■											
Hardening & Premature Cracking		■															■										
Belt Squeal					■						■																
Excessive Stretch																							■	■	■	■	■
Excessive Vibration					■													■									
Belts Too Long At Installation																				■	■	■					
Belts Too Short At Installation																				■	■	■					
Mismatched Belts At Installation															■											■	
Cut Thru on Top (Joined Belts)															■												■
Flange Wear (Synchronous Belts)														■													
Web Fabric Wear (Synchronous Belts)																											■
Tooth Shear (Synchronous Belts)											■							■		■							

SOLUTIONS

PROBLEM	Lubricate Properly	Clean Sheaves & Belt	Replace Belts	Provide Protection	Install Properly	Check for Belt Length	Remove Obstruction	Tension Properly	Free Sheaves	Replace Sheaves	File Smooth	Redesign Drive	Operate Properly	Align Drive	Provide Ventilation	Check for Proper Belt	Check Machinery	Use Only New Belts	Use Single Source	Check Fit	Replace Pulleys
Loose Cover & Swell	■	■																			
Weathering or “Craze” Cracks			■	■																	
Gouges					■	■	■														
Spin Burn	■							■	■												
Envelope Wear				■				■						■							
Uneven Envelope Wear										■	■			■							
Ply Separation					■					■											
Side Split												■									
Broken Belts				■	■								■			■					
Belts Turn Over								■		■				■							
Belt Squeal								■													
Excessive Stretch								■		■						■					
Excessive Vibration			■		■			■													
Belts Too Long At Installation								■								■	■				
Belts Too Short At Installation																■	■				
Mismatched Belts At Installation			■							■				■				■	■	■	■
Cut Thru on Top (Joined Belts)										■											
Flange Wear (Synchronous Belts)														■							
Web Fabric Wear (Synchronous Belts)								■								■				■	■
Tooth Shear (Synchronous Belts)								■								■				■	

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Coefficients of Friction

Coefficients of Friction "F"

Material	Static		Sliding	
	Dry	Lubricated	Dry	Lubricated
Aluminum on aluminum	1.35	-	-	-
Canvas belt on rubber lagging	0.30	-	-	-
Canvas belt, stitched, on steel	-	-	0.20	0.10
Canvas belt, woven, on steel	-	-	0.22	0.10
Cast iron on asbestos, fabric brake material	-	-	0.35-0.40	-
Cast iron on brass	-	-	0.30	-
Cast iron on bronze	-	-	0.22	0.07-0.08
Cast iron on cast iron	1.10	-	0.15	0.06-0.10
Cast iron on copper	1.05	-	0.29	-
Cast iron on lead	-	-	0.43	0.13-0.36
Cast iron on leather	.6	-	-	0.07-0.20
Cast iron on oak (parallel)	-	-	0.30-0.50	-
Cast iron on magnesium	-	-	0.25	0.133
Cast iron on steel, mild	-	0.18	0.23	-
Cast iron on tin	-	-	0.32	-
Cast iron on zinc	0.85	-	0.21	-
Earth on earth	0.25-1.0	-	-	-
Glass on glass	0.94	-	0.40	-
Hemp rope on wood	0.50-0.80	-	0.40-0.70	-
Nickel on nickel	1.10	-	0.53	0.12
Oak on leather (parallel)	0.50-0.60	-	0.30-0.50	-
Oak on oak (parallel)	0.62	-	0.48	0.16
Oak on oak (perpendicular)	0.54	-	0.32	0.07
Rubber tire on pavement	0.8-0.9	0.6-0.7*	0.75-0.85	0.5-0.7*
Steel on ice	0.03	-	0.01	-
Steel, hard, on babbit	0.42-0.70	0.08-0.25	0.33-0.35	0.05-0.16
Steel, hard, on steel, hard	0.78	0.11-0.23	0.42	0.03-0.12
Steel, mild, on aluminum	0.61	-	0.47	-
Steel, mild, on brass	0.51	-	0.44	-
Steel, mild, on bronze	-	-	0.34	0.17
Steel, mild, on copper	0.53	-	0.36	0.18
Steel, mild, on steel, mild	0.74	-	0.57	0.09-0.19
Stone masonry on concrete	0.76	-	-	-
Stone masonry on ground	0.65	-	-	-
Wrought iron in bronze	0.19	0.07-0.08	0.18	-
Wrought iron on wrought iron	-	0.11	0.44	0.08-0.10

* Wet pavement.