

Tool-Box Talk

V-Belt Maintenance 101

Reference: Belt Drive Preventive Maintenance Manual by Gates Corporation.

V-Belt Maintenance is a requirement if you want to ensure optimum belt drive performance. This process requires proper maintenance and discipline to ensure effective belt operation and a long service life. When coupled with a regularly scheduled maintenance program, belt drives will run relatively trouble-free for a long time. Remember this: “Life of the v-belt begins with Installation”.

General Rules: (if you want to stop V-Belt failures)

1. Ensure proper alignment of sheaves both parallel and angular using a sheave laser alignment tool. Do not use a straight edge or string if one expects optimal life from your V-Belts.
2. Use a span sonic tension meter to measure deflection and tension of a V-Belt. To determine deflection and tension required go to your belt manufacture.



3. Another tool to use is simple tool to measure tension and deflection using a tension gauge.

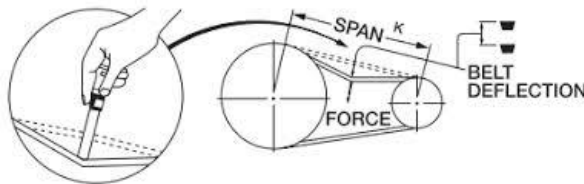
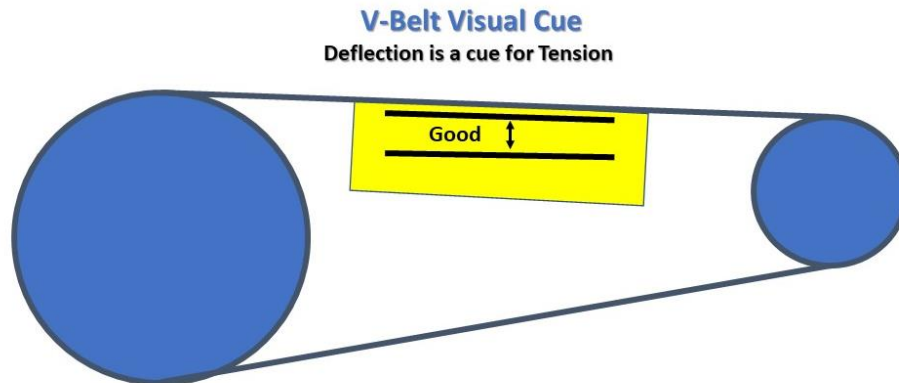


Table 1: Recommended Deflection Force Per Belt for Super HC[®] V-Belts, Super HC PowerBand[®] Belts, Super HC Molded Notch V-Belts or Super HC Molded Notch PowerBands Belts

V-Belt Cross Section	Small Sheave Diameter Range (in.)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (lbs.)	
				Minimum	Maximum
3V	2.65-2.80	1200-3600	2.50	3.0	4.3
	3.00-3.15	1200-3600	to	3.3	4.8
	3.35-3.65	1200-3600	4.00	3.7	5.4
	4.12-5.00	900-3600		4.4	6.4
3VX	5.30-6.90	900-3600		4.8	7.1
	2.20	1200-3600	2.50	2.8	4.1
	2.35-2.50	1200-3600	to	3.2	4.7
	2.65-2.80	1200-3600	4.00	3.5	5.1
	3.00-3.15	1200-3600		3.8	5.5
5VX	3.35-3.65	1200-3600		4.1	6.0
	4.12-5.00	900-3600		4.8	7.1
	5.30-6.90	900-3600		5.8	8.6
	4.40-4.65	1200-3600	2.50	9.0	13.0
5V	4.90-5.50	1200-3600	to	10.0	15.0
	5.90-6.70	1200-3600	4.00	11.0	17.0
	7.10-8.00	600-1800		13.0	19.0
	8.50-10.90	600-1800		14.0	20.0
	11.80-16.90	400-1200		15.0	23.0
8V	7.10-8.00	600-1800	2.50	11.0	16.0
	8.50-10.90	600-1800	to	13.0	18.0
	11.80-16.90	400-1200	4.00	14.0	21.0
	12.50-17.00	600-1200	2.50	28.0	41.0
10V	18.00-24.00	400-900	4.00	32.0	48.0

4. **WARNING:** Over-tension of belts is the number one cause of V-Belt Failure. 10% over-tension of V-Belts result in a reduction of bearing life by 10%.
5. Use Infrared for identifying over tension. Use vibration analysis for loose or damaged belts and strobe-lights for operator or maintenance craft inspections.
6. Upon installation, new belts should be checked for proper tension after 24 hours of operation using a strobe light or tachometer. Failure to execute this process on critical assets could result in V-Belts not meeting expectations of the end user.

7. Tighten all bolts using a torque wrench and proper torque specifications.
8. One option is to mark the back side of the V-Belt Guard in Yellow with 2 marks in black which is the expected deflection as the V-Belt rotates. (no shutdown required) As part of Operator Care works great because in most cases an operator walks past the V-Belts and checks “Good” or “Bad” in most production organizations.



Failure Modes experienced on V-Belt Drives:

Tension Loss, Caused by:

- Weak support structure
- Lubricant on belts
- Excessive sheave wear
- Excessive load

- Sub-minimal diameter (see chart to the below)

Belt Cross Section	Min Recommended Datum Diameter (Standard Groove) (in)
Classical V-belts	
AX	2.20
A	3.00
BX	4.00
B	5.40
CX	6.80
C	9.00
D	13.00
E	21.00

Tensile Break, Caused by:

- Excessive shock load

Failure Modes experienced on V-Belt Drives continues

Improper belt handling and storage prior to installation (crimping)

- First end, last out checkout for V-Belts
- Belts should be stored **in a cool and dry environment with no direct sunlight. Ideally, less than 85°F and 70% relative humidity.**

- **V-belts may be stored by hanging on a wall rack if they are hung on a saddle or diameter at least as large as the minimum diameter sheave** recommended for the belt cross section.
- When the belts are stored, they **must not be bent to diameters smaller than the minimum recommended sheave diameter for that cross section and not store hanging from a hook.**
- Belts may be stored **up to six years if properly stored** at temperatures less than 85F and relative humidity less than 70%.
- If the storage temperature **is higher than 85°F, the storage limit for normal service performance is reduced by one half** for each 15F increase in temperature. Belts should never be stored above 115F.

Belt Cracking, Caused by:

- **Extreme low temperature at start-up (see chart above)**
- **Extended exposure to chemicals or lubricants**

Recommended Baldor V-Belt Troubleshooting Guide. Go to the following for download:

https://library.e.abb.com/public/b76576ebc903091785257b44006cba6a/MN4002_4002-310.pdf

TROUBLE SHOOTER AND SERVICE GUIDE			
	TROUBLE AREA AND OBSERVATION	CAUSE	REMEDY
BELT STRETCH BEYOND TAKE-UP	Belt stretch unequally.	Misaligned drive, unequal work done by belts.	Realign and re-tension drive.
		Belt tensile member broken from improper installation.	Replace all belts with new set properly installed.
	All belts stretch about equally.	Insufficient take-up allowance.	Check take-up and follow allowance on page.
		Greatly overloaded or under-designed drive.	Redesign.
SHORT BELT LIFE	Relatively rapid failure; no visible reason.	Tensile members damaged through improper installation.	Replace with all new matched set, properly installed.
		Worn sheave grooves (check with groove gauge)	Replace sheaves.
		Under-designed drive.	Redesign.
	Sidewalls soft and sticky. Low adhesion between cover plies. Cross-section swollen.	Oil or grease on belts or sheaves.	Remove source of oil or grease. Clean belts and grooves with cloth moistened with alcohol.
	Sidewalls dry and hard. Low adhesion between cover plies. Bottom belt cracked.	High temperatures.	Remove source of heat. Ventilate drive better.
	Deterioration of rubber compounds used in belt	Belt dressing.	Never use dressing on V-belts. Clean with cloth moistened with alcohol. Tension drive properly to prevent slip.
	Extreme cover wear.	Belts rub against belt guard or other obstruction.	Remove obstruction or align drive to give needed clearance.
	Spin burns on belt.	Belts slip under starting or stalling load.	Tighten drive until slipping stops.
	Bottom of belt cracked.	Too small sheaves.	Redesign for larger sheaves.
Broken belts.	Object falling into or hitting drive.	Replace with new matched set of belts. Provide shield for drive.	

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