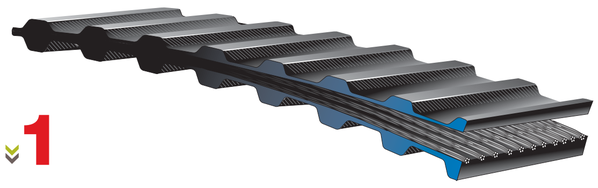
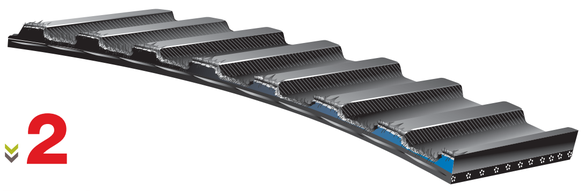
SYNCHRONOUS
Drive Failure Analysis

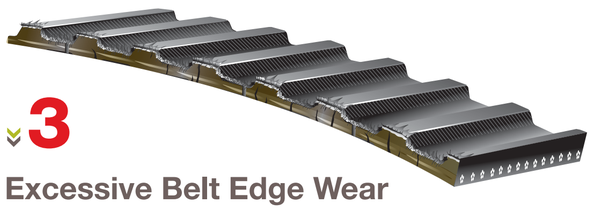
This chart is designed to more accurately identify and troubleshoot synchronous drive problems and failures.



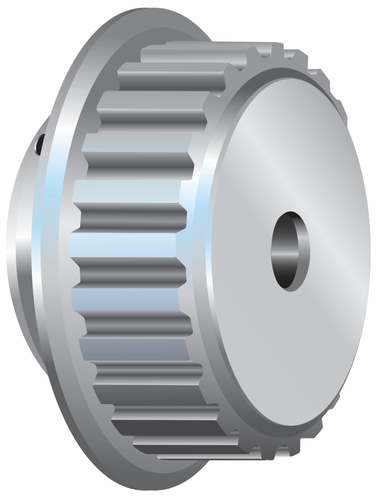
1 Delamination



2 Tracking

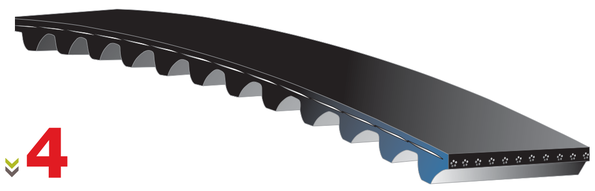


3 Excessive Belt Edge Wear

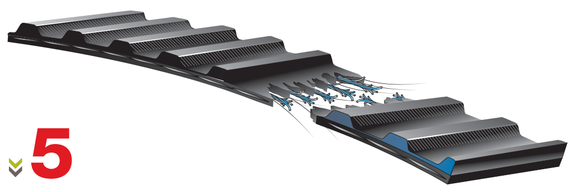


Flange Failure

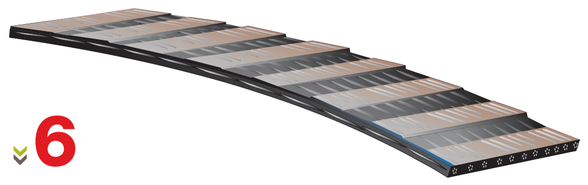
Flanges can be forced off by belts due to drive misalignment or improper flange attachment. Realign the drive and replace the sprocket.



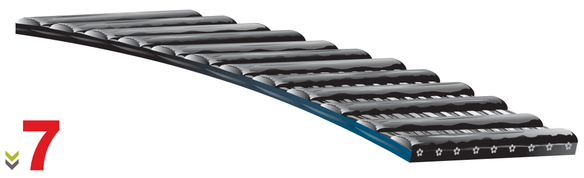
4 Excessive Tooth Wear



5 Tensile Break

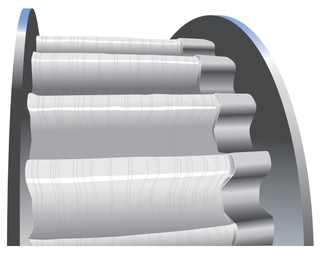


6 Tooth Shear



7 Land Area Worn

8 Unusually Loud Drive



Worn Sprockets

Sprocket grooves wear due to length of service, misalignment, debris, drive overloading, or improper belt tensioning. If a ridge can be detected between the worn and unworn areas of the groove, the sprocket should be replaced.

Symptom	Probable Cause	Corrective Action
1 Delamination	(1) Excessive shockload. (2) Less than 6 teeth in mesh. (3) Extreme sprocket run-out. (4) Worn sprockets. (5) Backside idler. (6) Incorrect sprocket groove profile. (7) Misaligned drive. (8) Belt undertensioned.	(1) Redesign to manufacturer's recommendations. (2) Redesign drive to manufacturer's recommendations. (3) Replace sprocket. (4) Replace sprocket. (5) Use inside idler. (6) Use proper belt/sprocket combination. (7) Realign drive. (8) Retension to manufacturer's recommendations.
2 Tracking	(1) Misaligned drive. (2) Center distance exceeds 8X small sprocket diameter.	(1) Realign drive. (2) Redesign drive or realign existing drive.
3 Excessive Belt Edge Wear	(1) Misaligned belt drive. (2) Damage due to belt mishandling. (3) Flange damage. (4) Belt too wide for sprocket. (5) Rough flange surface finish. (6) Improper belt tracking. (7) Belt rubbing against guard or drive structure.	(1) Realign drive. (2) Follow proper handling instructions. (3) Repair flange or replace sprocket. (4) Use proper belt width for sprocket. (5) Replace or repair flange. (6) Realign drive. (7) Remove obstruction or realign drive.
4 Excessive Tooth Wear	(1) Belt tension too low or too high. (2) Belt running partly off unflanged sprocket. (3) Misaligned drive. (4) Incorrect belt/sprocket match. (5) Worn, rough, or damaged sprocket. (6) Belt rubbing against drive bracketry. or other obstruction. (7) Excessive load.	(1) Retension to manufacturer's recommendations. (2) Realign drive. (3) Realign drive. (4) Use proper belt/sprocket combination. (5) Replace sprocket. (6) Remove obstruction or alter belt path. (7) Redesign drive to manufacturer's recommendations.

Symptom	Probable Cause	Corrective Action
5 Tensile Break	(1) Crimp failure-improper belt handling and storage prior to installation. (2) Excessive shockload. (3) Sub-minimal diameter. (4) Debris or foreign object in drive. (5) Extreme sprocket run-out. (6) Too low or too high belt tension.	(1) Follow proper handling and storage procedures. (2) Redesign drive to manufacturer's recommendations. (3) Redesign drive to use larger sprockets. (4) Protect drive. (5) Replace sprockets. (6) Retension to manufacturer's recommendations.
6 Tooth Shear	(1) Excessive shockload. (2) Less than 6 teeth in mesh. (3) Extreme sprocket run-out. (4) Worn sprockets. (5) Backside idler. (6) Incorrect sprocket groove profile. (7) Misaligned drive. (8) Belt undertensioned.	(1) Redesign drive to manufacturer's recommendations. (2) Redesign drive to manufacturer's recommendations. (3) Replace sprocket. (4) Replace sprocket. (5) Use inside idler. (6) Use proper belt/sprocket combination. (7) Realign drive. (8) Retension to manufacturer's recommendations.
7 Land Area Worn	(1) Excessive tension. (2) Excessive sprocket wear. (3) Debris in sprockets.	(1) Retension to manufacturer's recommendations. (2) Replace sprocket. (3) Eliminate and guard against debris.
8 Unusually Loud Drive	(1) Incorrect belt/sprocket match. (2) Incorrect tension. (3) Worn sprockets. (4) Debris in sprockets.	(1) Use proper belt/sprocket match. (2) Retension to manufacturer's recommendations. (3) Replace sprockets. (4) Eliminate and guard against debris.

Helpful preventive maintenance tools...for every application!

› Double Barrel Tension Tester
Product No.
7401-0075

› Pencil Type Tension Tester
Product No.
7401-0076

› Sonic Tension Meter
Product No.
7420-0507

› Sheave Gauges
Product No. (English)
7401-0014
Product No. (Metric)
7401-0013

› EZAlign
Product No. 7420-1000

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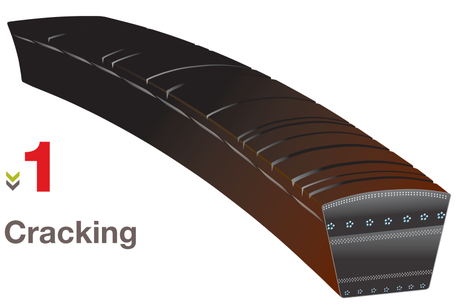
Form No. 12975

The Driving Force in Power Transmission®

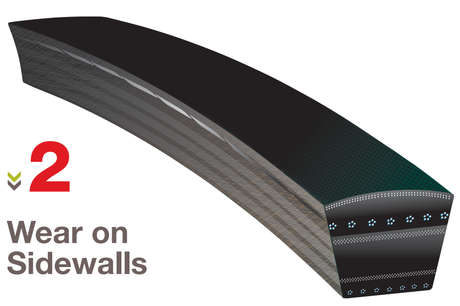
A Tomkins Company

V-BELTS
Drive Failure Analysis

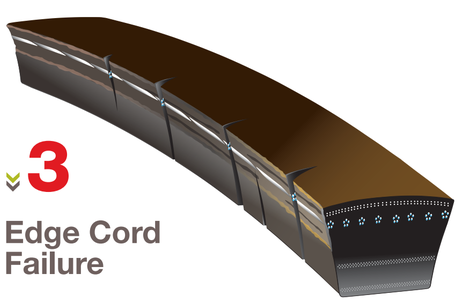
This chart is designed to more accurately identify and troubleshoot V-belt drive problems and failures.



1 Cracking



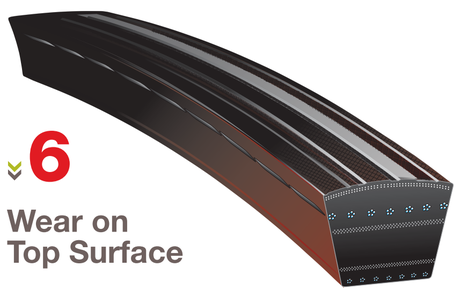
2 Wear on Sidewalls



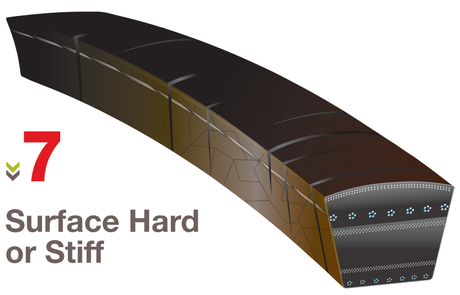
3 Edge Cord Failure

4 Wear on Top Corner

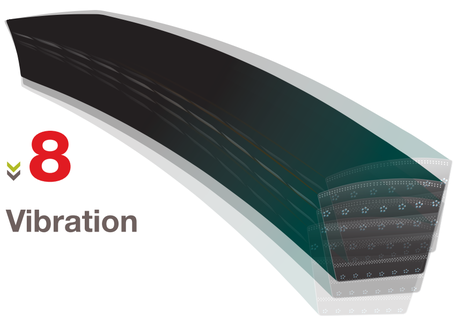
5 Surface Flaking Sticky or Swollen



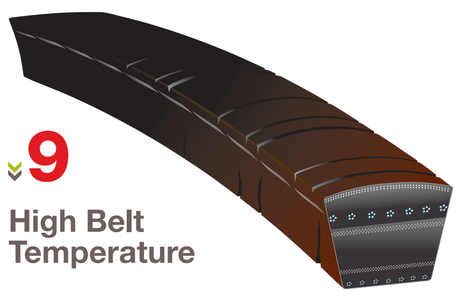
6 Wear on Top Surface



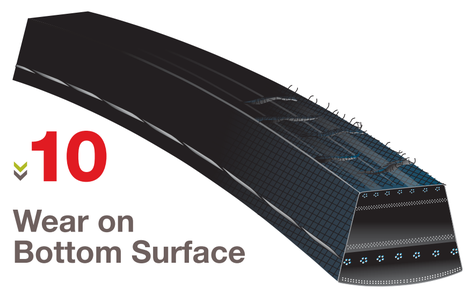
7 Surface Hard or Stiff



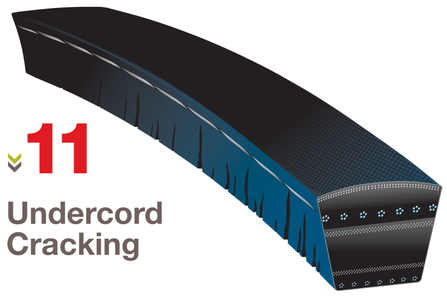
8 Vibration



9 High Belt Temperature



10 Wear on Bottom Surface

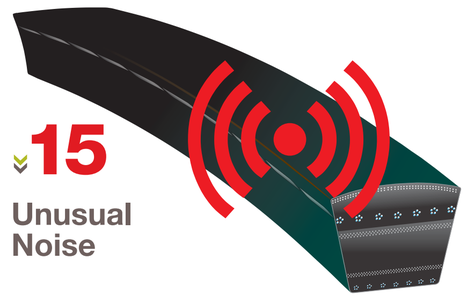


11 Undercord Cracking

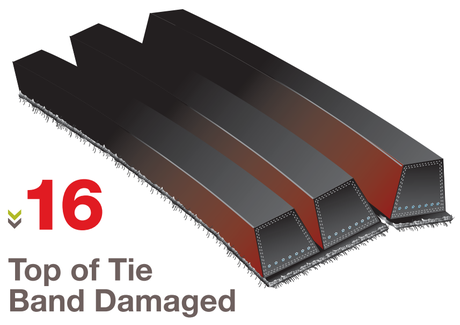
12 Turns Over or Comes Off Drive

13 Undercord Sidewall Burn or Hardening

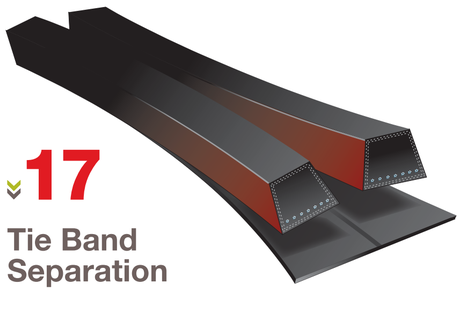
14 Wear on Bottom Corner



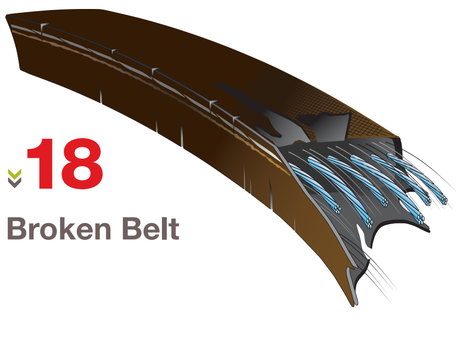
15 Unusual Noise



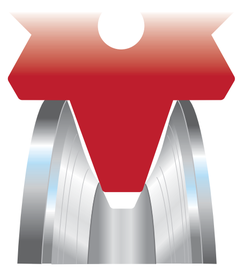
16 Top of Tie Band Damaged



17 Tie Band Separation



18 Broken Belt

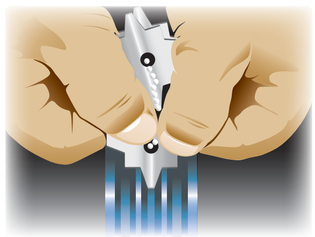


Worn Sheaves

Worn sheaves will decrease the life of belts and drive components over time. Some signs of worn sheave grooves are obvious with groove sidewall cupping. Another sign that sheave grooves are wearing is a polished appearance with grooves or ridges on the sheave groove sidewalls. Worn or damaged sheaves should be replaced immediately.

Sheave Gauge

Gates offers sheave gauges that aid in determining the correct belt or sheave cross section. Sheave gauges are also used to indicate excessive sheave groove wear.



Product No. *(English)*
7401-0014

Product No. *(Metric)*
7401-0013

Symptom	Probable Cause	Corrective Action
1 Cracking	(1) Sheaves too small for belt section. (2) Belt slip. (3) Backside idler diameter too small. (4) Improper belt storage. (5) Excessive hot or cold temperature.	(1) Use larger diameter sheaves. (2) Retension to manufacturer's recommendations. (3) Increase backside idler to acceptable diameter. (4) Don't coil belt too tightly, kink or bend. Avoid heat and direct sunlight. (5) Control drive environment.
2 Wear on Sidewalls	(1) Belt slip. (2) Sheave misalignment. (3) Worn sheaves. (4) Incorrect belt.	(1) Retension to manufacturer's recommendations. (2) Realign drive. (3) Replace sheaves. (4) Replace with correct belt size.
3 Edge Cord Failure	(1) Sheave misalignment. (2) Damaged tensile member. (3) Worn or incorrect sheaves.	(1) Check alignment and correct. (2) Follow correct installation procedure. (3) Replace sheaves for correct belt/sheave match.
4 Wear on Top Corner	(1) Belt-to-sheave fit incorrect. (2) Belt rubbing against guard or drive structure.	(1) Use correct belt/sheave match. (2) Remove obstruction.
5 Surface Flaking, Sticky or Swollen	(1) Oil or chemical contamination.	(1) Do NOT use belt dressing; eliminate sources of oil, grease, or chemical contamination.
6 Wear on Top Surface	(1) Belt rubbing against guard. (2) Damaged idler.	(1) Repair or replace guard. (2) Repair or replace idler.
7 Surface Hard or Stiff	(1) Hot drive environment. (2) Belt slip.	(1) Improve ventilation to drive. (2) Retension to manufacturer's recommendations.
8 Unusual Vibration	(1) Incorrect belt. (2) Poor equipment structural design. (3) Excessive sheave eccentricity. (4) Loose drive components.	(1) Use correct belt/sheave match. (2) Check structure for adequate strength and rigidity. (3) Replace defective sheave. (4) Check machine components, guards, motor mounts, motor pads, bushings, brackets and framework for adequate strength, stability and installation.
9 High Belt Temperature	(1) Hot drive environment. (2) Slipping.	(1) Improve ventilation to drive. (2) Retension until slipping stops.

Symptom	Probable Cause	Corrective Action
10 Wear on Bottom Surface	(1) Belt bottoming against sheave groove bottom. (2) Worn sheaves. (3) Debris in sheaves.	(1) Use correct belt/sheave match. (2) Replace sheaves. (3) Clean sheaves.
11 Undercord Cracking	(1) Sheaves too small for belt section. (2) Belt slip. (3) Backside idler diameter too small. (4) Excessive hot or cold temperature. (5) Improper belt storage.	(1) Use larger diameter sheaves. (2) Retension to manufacturer's recommendations. (3) Increase backside idler to acceptable diameter. (4) Control drive environment. (5) Don't coil belt too tightly, kink or bend. Avoid heat and direct sunlight.
12 Turns Over or Comes Off Drive	(1) Shock loading or vibration. (2) Foreign material in grooves. (3) Sheave misalignment. (4) Worn sheave grooves. (5) Subminimal diameter sheave.	(1) Check drive design; use PowerBand® (joined) belts. (2) Shield grooves and drive. (3) Realign drive. (4) Replace sheaves. (5) Replace sheave with correct diameter.
13 Sidewall Burning or Hardening	(1) Belt slip. (2) Worn sheaves. (3) Under-designed drive. (4) Shaft movement.	(1) Retension to manufacturer's recommendations. (2) Replace sheaves. (3) Redesign to manufacturer's recommendations. (4) Check for center distance changes.
14 Wear on Bottom Corner	(1) Belt-to-sheave fit incorrect. (2) Worn sheaves.	(1) Use correct belt/sheave match. (2) Replace sheaves.
15 Unusually Loud Drive	(1) Incorrect belt for sheaves. (2) Incorrect tension. (3) Worn sheaves. (4) Debris in sheaves. (5) Sheave misalignment.	(1) Use correct belt size and type. (2) Check belt tension and adjust. (3) Replace sheaves. (4) Clean sheaves; improve shielding; remove rust, paint; or remove dirt from grooves. (5) Realign drive.
16 Top of Tie Band Damaged	(1) Interference with guard. (2) Backside idler malfunction. (3) Debris in sheaves.	(1) Check and adjust guard. (2) Replace or repair backside idler. (3) Clean sheaves.
17 Tie Band Separation	(1) Improper groove spacing. (2) Worn or incorrect sheaves. (3) Sheave misalignment.	(1) Use sheaves manufactured to industry specifications. (2) Replace sheaves. (3) Realign drive.
18 Broken Belt	(1) Under-designed drive. (2) Belt rolled or pried onto sheave. (3) Object falling into drive. (4) Severe shock load.	(1) Redesign to manufacturers recommendations. (2) Use drive center distance adjustment when installing. (3) Provide adequate guard or drive protection. (4) Redesign to accommodate shock load.

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