E2/80027

TEXROPE®

Industrial belt preventive maintenance

TEXROPE® INDUSTRIAL BELT PREVENTIVE MAINTENANCE

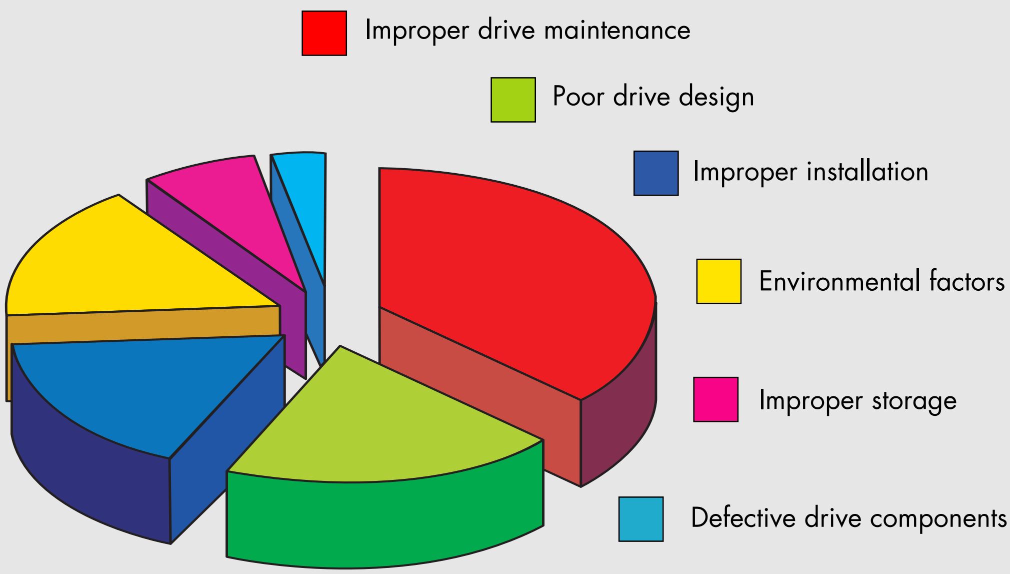
All TEXROPE® end users can benefit from our technical and commercial staff's know-how and support. This manual has been designed as a guide to help you install and maintain TEXROPE® industrial belts.

WHY PREVENTIVE MAINTENANCE?

When compared to the constant lubrication problems associated with chain drives, or the mechanical problems and high costs associated with gear drives, belts are the most cost-effective, reliable means of power transmission. This reliability can however only be obtained when belts and drives are properly maintained. The potential for long life is built into every TEXROPE® belt. When coupled to a regular maintenance programme, your belts and drives will run relatively trouble-free for a long period of time.

This manual has been designed as a guide to help you install and maintain TEXROPE® industrial belts, including standard V-belts, multi-ribbed belts and synchronous belts. Through proper installation and maintenance, the service life of your belt drives will dramatically improve - reducing downtime and production standstills.

CAUSES OF DRIVE PROBLEMS



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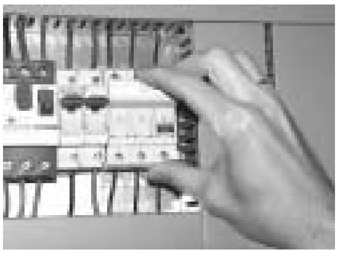
I. A SAFE WORKING ENVIRONMENT

It is common sense to establish a safe working environment in and around your belt drives. Besides making maintenance easier, the following precautions will ensure safety for the operator.

1. Always turn equipment off

- Turn off the power to the drive before you start working, even if you are going for a brief inspection.
- Lock the control box and tag it with a warning sign "Down for maintenance. Do not turn power on."



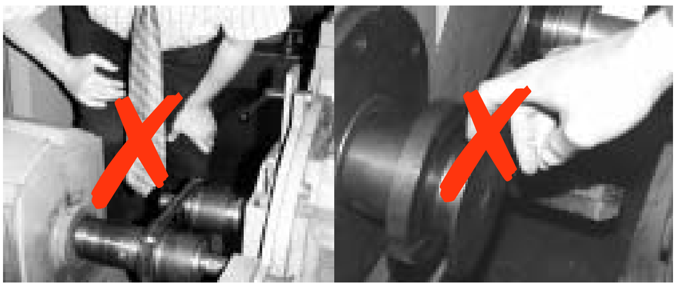
- If possible, remove fuses.
- Never touch a running machine.

2. Check position of components

- Make sure all machine components are in a "safe" position.
- Place fly-wheels, counterweights, gears and clutches in a neutral position to avoid accidental movements.
- Always follow the manufacturer's recommendations for safe maintenance practices.

3. Wear proper clothing

- Never wear loose or bulky clothes (e.g. ties, loose sleeves, lab coats) around belt drives.
- Wear gloves when inspecting pulleys to avoid being cut by nicks or sharply worn pulley edges.



4. Maintain safe access to the drives

- Keep the areas around the drive free of clutter, debris or other obstructions.
- Make sure the floor is clean and free of oil and debris.

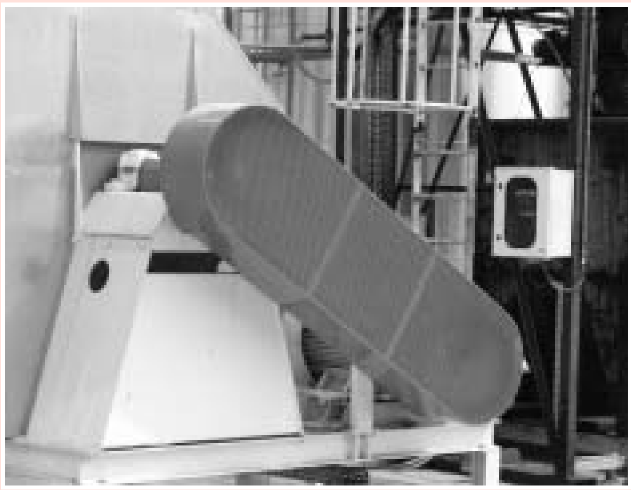
5. Drive guards

- Always keep belt drives completely guarded.
- Make sure the drive is properly designed.

6. Test run

- Before you put the drive back into normal operation, have a test run to check whether everything functions normally.
- Make any verifications necessary and take corrective action if needed.

A properly designed guard has following features:



- it completely encloses the drive;
- it is equipped with grills or vents for good ventilation;
- the size of the openings must be adequate, i.e. small enough to prevent "pinch points";
- it is preferably equipped with an automatic shut-off device which deactivates the drive as soon as the guard is removed;
- it has accessible inspection doors and panels;
- it can easily be removed and replaced if damaged;
- where necessary, it should protect the drive from weather, debris and damage.

II. SIMPLE ROUTINE INSPECTIONS

Maintenance has two aspects: shorter, regular preventive inspections and thorough inspections with a longer period of machine shutdown. This section deals with the first type of routine inspection.

1. Simple drive inspection

- Make periodic drive inspection a normal part of your maintenance rounds.
- Look and listen for any unusual vibration or sound while observing the guarded drive in operation.
  A well designed and maintained drive will operate smoothly and quietly.
- Inspect the guard for looseness or damage.
- Keep it free of debris and grime buildup. Any accumulation of material on the guard will act as insulation and could cause the drive to run hotter. Above 60°C an internal temperature increase of 10°C may cut V-belt life in half.
- Look for oil or grease dripping from the guard. This may indicate over-lubricated bearings. Oil and grease attack rubber compounds, causing them to swell and distort.
- Check motor mounts for proper tightness.
- Check takeup slots or rails to see that they are clean and lightly lubricated.

2. When to perform preventive maintenance

Critical drives

A quick visual and hearing inspection may be needed every one to two weeks.

Normal drives

With most drives, a quick visual and hearing inspection can be performed once a month.

Complete inspection

A drive shutdown, for a thorough inspection of belts or pulleys and other drive components, may be required every three to six months.

Experience with your own equipment will be the best guide to how often you need to inspect the belt drives. The following factors will influence the frequency of drive inspection:

- drive operating speed;
- drive operating cycle;
- critical nature of equipment;
- temperature extremes in environment;
- environmental factors;
- accessibility of equipment.

III. THOROUGH INSPECTION

Belt drives regularly require a thorough inspection. By following the list below, you can maintain a drive efficiently, safely and with very little effort.

1. Guard inspection

- Check guards for wear or possible damage.
- Look for signs of wear or rubbing against drive components.
- Clean them if necessary.

2. Belt inspection

- Mark a point on the belt and turn the drive.
- Work your way around the belt(s), checking for cracks, frayed spots, cuts or unusual wear patterns.
- Check the belt for excessive heat.

3. Pulley inspection

- Check pulleys for unusual wear or obvious signs of damage.
- For synchronous belt drives, check the pulley diameters over the width of the pulley to ensure they are consistent and meet our tolerances.
- Check pulleys for proper alignment.

4. Check other drive components

- Examine bearings for proper alignment and lubrication.
- Check motor mounts for correct tightness.

5. Check belt tension

Inadequate tension - too high or too low - may cause problems. If too little tension is applied, V-belts may slip or synchronous belts may jump teeth. Experienced mechanics may claim to check belt tension with their thumb; TEXROPE® however recommends using its tension testers, which ensure simple and more accurate tension measurement.

The general procedure to check belt tension is as follows:

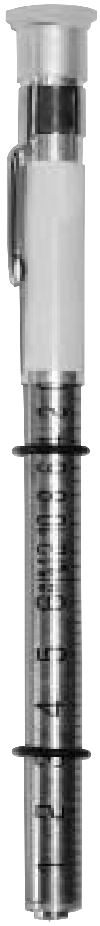
A. Measure at the centre of the span (t) the force required to deflect the belt on the drive 2 mm per 100 mm span length from its normal position.
B. If the measured force is less than the minimum recommended deflection force, the belts should be tightened.
C. New belts can be tensioned until the deflection force per belt is as close as possible to the maximum recommended deflection force.
D. To facilitate tension measuring, TEXROPE® has developed different tension testers.

Conventional tension tester

TEXROPE® conventional tension testers measure deflection force. The single tension tester measures deflection up to ±120 N and the double tension tester up to ±300 N. Both testers consist of a calibrated spring with two scales: one to measure the deflection and another to measure the applied force.

The reading of the scales can be done as follows:

1. Measure the span length (t).
2. The calculated deflection should be positioned with the lower ring on the distance scale. The upper ring should be on the zero position of the deflection force scale.
3. Put the tension tester perpendicular to the span and in the middle of the span. Exercise enough pressure to the tension tester to deflect the belt by the amount indicated by the lower ring. A straight edge, laid across pulleys, can help accuracy of reading.
4. The upper ring will slide up the upper scale and indicates the deflection force. Read at the bottom edge of the ring. When you use the double tension tester, you can read the values just underneath the rings. Calculate the sum of both values. This value has to be compared with the calculated min./max. force as per following formulae:



For synchronous belts:

Minimum deflection force

$$F = \frac{P \times 25}{v} \text{ (N)}$$

Maximum deflection force

$$F = \frac{P \times 60}{v} \text{ (N)}$$

Deflection = span length/50

For V-belts

Minimum deflection force

$$F = \frac{T_s}{25} \text{ (N)}$$

Maximum deflection force

$$F = \frac{1,5 \times T_s}{25} \text{ (N)}$$

Where:

P = transmitted power (kW)
v = belt speed (m/s)
T_s = static tension per span (N)
(see design manual E/80002)

Deflection = span length/100

Sonic tension meter

The sonic tension meter measures tension by analysing the sound waves, which the belt produces when strummed. A belt vibrates at a particular frequency based on its static tension, the belt mass and the free span. The tension tester transforms this frequency in a tension value.

This hand-held tension tester, running on batteries or on the mains (adapter included), is supplied with two types of sensors (rigid and flexible), either of which is quickly attached to meet a specific need.

1. Enter belt unit weight (see below), width and span on the keypad. These data remain in the meter even after shut-off.
2. Hold the small sensor up to the belt span and strum the belt slightly to make it vibrate.
3. Press the “measure” button. The computer processes the variations in sound pressure emanating from the belt span. The belt tension values are displayed on the panel in Newtons (N). If desired, the belt span frequencies can be displayed directly in Hertz (Hz).

Use the following formula for conversion into Hz

$f^2 = (T \times 10^{-9}) / (4 \times S \times M \times W)$

Where:

T = belt span tension
S = length of the span to be measured (mm)
M = belt unit weight (g/m/mm)
f = natural frequency of the belt (Hz)
W = belt width (mm)

For more detailed information, e.g. suitability of the tension meter for different belt product lines, please contact your TEXROPE® representative.

Warning
TEXROPE® sonic tension meter is not certified for use in explosion risk areas.

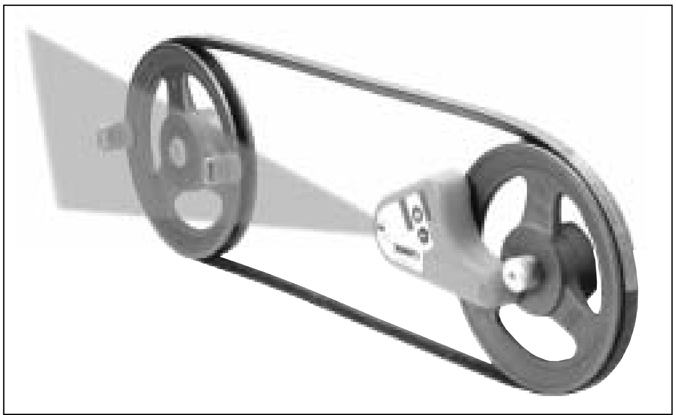
Belt unit weight (g/m) of TEXROPE® belts

S 84	**Z** 64	**A** 108	**B** 188	**C** 310	**D** 590	**E** 900	**25** 420
VP 2	**SPZ** 68	**SPA** 120	**SPB** 194	**SPC** 375	**19** 270		
HFX	**XPZ** 69	**XPA** 123	**XPB** 195	**XPC** 334			
VSX	**H** 5.9	**J** 8.4	**K** 20	**L** 30.9	**M** 124.1		
SPEEDFLEX®	**TYPE I** 240	**TYPE II** 270	**TYPE III** 400				
STB	**XL** 2.4	**L** 3.2	**H** 3.9	**XH** 11.3			
HTD®150	**8M** 5.5	**14M** 9.6					
DF	**STB XL** 1.9	**STB L** 3.2	**STB H** 4.6	**HTD® 8M** 7.2	**HTD® 14M** 12.3		

6. Pulley alignment

Noise, wear on pulleys, belts and bearings, vibrations and in the end … machine downtime may all be caused by improper pulley alignment. This can be prevented by using the TEXROPE® new laser alignment device, the TEXROPE® ATX.

Pulley alignment device TEXROPE® ATX

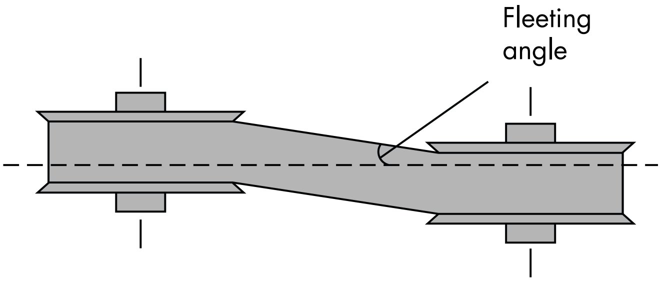


Mounted in a few seconds, the laser line projected on the targets allows you to quickly ascertain and correct misalignment. The TEXROPE® ATX identifies parallel as well as angular misalignment between the pulleys and is suitable for pulley diameters of 60 mm and larger. It is so light it can be mounted on non-magnetic pulleys with the double sided adhesive tape and used on both horizontally and vertically mounted machines.

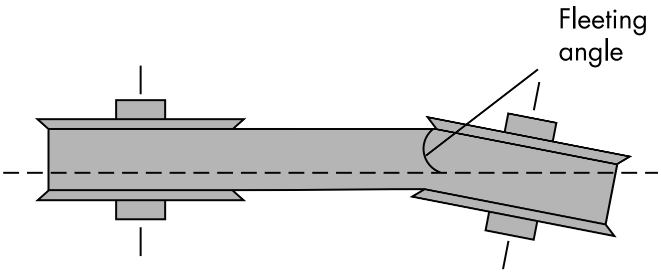
Check alignment tolerances

As a general rule, the deviation on pulley alignment on V-belt drives should not exceed 1/2° or 5 mm per 50 mm of drive centre distance. Alignment for VSX and synchronous belts should be controlled within 1/4° or 2.5 mm per 500 mm of drive centre distance.

Parallel misalignment



Angular misalignment



7. Belt storage

Under favourable storage conditions, good quality belts retain their initial serviceability and dimensions. Unfavourable conditions can adversely affect performance and cause dimensional changes.

7.1 General guidelines

Store your belts in a cool and dry environment with no direct sunlight. When stacked on shelves, the stacks should be small enough to prevent distortion of the bottom belts. When stored in containers, the container size should be sufficiently limited for the same reason.

Caution:

- Do not store belts on floors unless a suitable container is provided. They may be exposed to waterleaks or moisture or be damaged due to traffic.
- Do not store belts near windows (sunlight/moisture).
- Do not store belts near radiators or heaters or in the air flow from heating devices.
- Do not store belts in the vicinity of transformers, electric motors, or other electric devices that may generate ozone.
- Avoid areas where evaporating solvents or other chemicals are present in the atmosphere.
- Do not store belts in a configuration that would result in bend diameters less than the minimum recommended pulley diameter for normal bends and less than 1.2 times the minimum recommended diameters for reverse bends.

7.2 Methods of storage

7.2.1 V-belts

V-belts are often stored on pegs. Very long belts should be stored on sufficiently large pins (of not less than the minimum bend diameter), or crescent-shaped "saddles", to prevent their weight from causing distortion. Long V-belts may be coiled in loops for easy distortion-free storage.

7.2.2 Joined V-belts and multi-ribbed belts

Like V-belts, these belts may be stored on pins or saddles with precaution to avoid distortion. However, belts of this type up to approx. 3000 mm are normally shipped in a "nested" configuration, and it is necessary that especially joined V-belts be stored in a naturally relaxed form, and only nested or rolled up for transportation.

7.2.3 Synchronous belts

For synchronous belts, nests are formed by laying a belt on its side on a flat surface and placing as many belts inside the first belt as possible without undue force. When tight, the nests can be stacked without damage. Belts over approx. 3000 mm may be "rolled up" and tied for shipment. These rolls may be stacked for easy storage. Avoid small bend radii by inserting card tubes in the packaging.

7.2.4 Variable speed belts

These belts are more sensitive to distortion than most other belts. Hanging them from pins or racks is <u>not</u> recommended. These belts should be stored on shelves. Variable speed belts are often shipped in "sleeves" slipped over the belt. They should be stored on shelves in these sleeves. If they are shipped "nested", untie the nests and store them in a relaxed position.

7.3 Effects of storage

The quality of belts has not been found to change significantly within 8 years of proper storage at temperatures below 30°C (85°F) and relative humidity below 70%. Also there must be no exposure to direct sunlight. Ideal storage conditions are between 5°C (41°F) and 30°C (85°F).

If storage temperature is in excess of 30°C (85°F), the storage time will be reduced and belt service levels could be significantly reduced also. Under no circumstances should storage temperatures above 46°C (145°F) be reached.

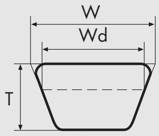
With a significant increase in humidity, it is possible for fungus or mildew to form on stored belts. This does not appear to cause serious belt damage but should be avoided if possible.

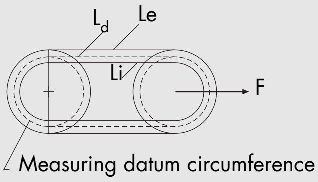
Equipment using belts is sometimes stored of left idle for longer periods (6 months or more). It is recommended that the tension on the belts be relaxed during such periods. Equipment storage conditions should be consistent with the guidelines for belt storage. If this is impossible, remove the belts and store them separately.

IV. INDUSTRIAL PRODUCT IDENTIFICATION

1. V-belts and multi-ribbed belts

TEXROPE® S 84

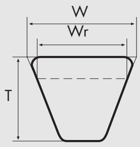


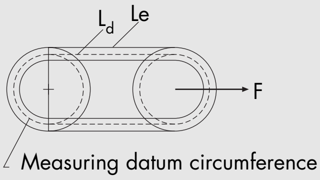


L_d = datum length
Le = outside length
Li = inside length

	Z	A	B	C	D	E	25
Nom. section W x T (mm)	10 x 6	13 x 8	17 x 11	22 x 14	32 x 19	38 x 25	25 x 16
Datum width Wd (mm)	8.50	11	14	19	27	32	21
Weight (g/m)	64	108	188	310	590	900	420
Min. pulley diameter (mm)	63	71	112	170	300	450	224
Le - L_d (mm)	15	16	22	34	51	66	35
L_d - Li (mm)	22	30	43	52	75	82	61

TEXROPE® VP 2

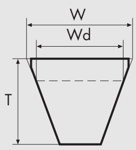


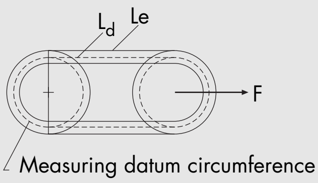


L_d = datum length
Le = outside length

	SPZ	SPA	SPB	SPC	19
Nom. section W x T (mm)	9.7 x 8	12.7 x 10	16.3 x 13	22 x 18	18.6 x 15
Datum width Wd (mm)	8.50	11	14	19	16
Weight (g/m)	68	120	194	375	270
Min. pulley diameter (mm)	71	90	140	200	180
Le - L_d (mm)	13	18	22	30	25

TEXROPE® HFX

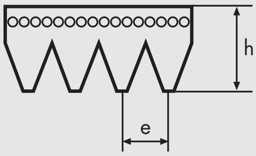




L_d = datum length
Le = outside length

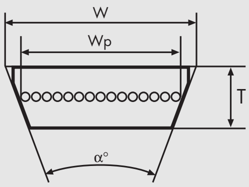
	XPZ	XPA	XPB	XPC
Nominal section W x T (mm)	10 x 8	13 x 10	16.3 x 13	23 x 18
Datum width Wd (mm)	8.5	11	14	19
Weight (g/m)	69	123	195	334
Min. pulley diameter (mm)	50	63	90	140
Le - L_d (mm)	13	18	22	30

TEXROPE® VSX



	H	J	K	L	M
Centre distance e (mm)	1.60	2.34	3.56	4.70	9.40
Height h (mm)	3.0	3.5	6.0	9.5	16.5
Weight per rib (g/m)	5.9	8.4	20	30.9	124.1
Min. pulley diameter (mm)	13	20	40	75	180
Min. reverse bend diameter (mm)	32	45	70	140	300

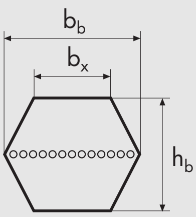
TEXROPE® VRX



Geometry of the sections

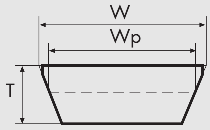
ISO 1604 sections	**W 16**	**W 20**	**W 25**	**W 31.5**	**W 40**	**W 50**
Nom. section W x T (mm)	17 x 6	21 x 7	26 x 8	33 x 10	42 x 13	52 x 16
Pitch width Wp (mm)	16	20	25	31.5	40	50
ISO 1604 sections	**W 63**	**W 80**	**W 100**			
Nom. section W x T (mm)	65 x 20	83 x 26	104 x 32			
Pitch width Wp (mm)	63	80	100			
"VNN" sections, W x T (mm)	**13 x 6**	**22 x 8**	**28 x 8**	**37 x 10**	**47 x 13**	**55 x 16**
Angle α°	26	26	26	28	28	28

TEXROPE® HEXAGO



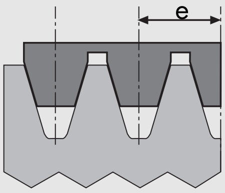
	HBB	HCC
b_b (mm)	17	23
b_x (mm)	11.8	16.8
h_b (mm)	13.5	17.5

TEXROPE® LM



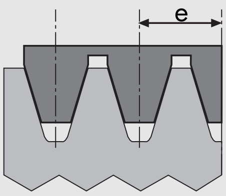
	LM 10	LM 13	LM 16
Nom. section W x T (mm)	10 x 5	13 x 6	16 x 7
Pitch width Wp (mm)	8	11	14
Min. pulley diameter (mm)	50	63	90

TEXROPE® MULTI 84



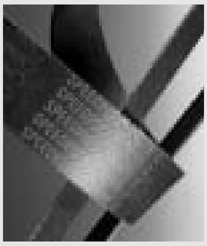
	HA	HB	HC
Section	A	B	C
Pulleys for belts	dual/single	dual/single	dual/single
Pulley standard	ASAE S 211.5	ASAE S 211.5	ASAE S 211.5
Centre distance of grooves e (mm)	15.9	19.05	25.4
Le - L_d (mm)	16	22	34

TEXROPE® MULTI VP 2



	15 J	SPB
Section	SPB	SPB
Pulleys for belts	'dual'	'single'
Pulley standard	ISO 5290	ISO 4183
Centre distance of grooves e (mm)	17.5	19.0
Le - L_d (mm)	22	22

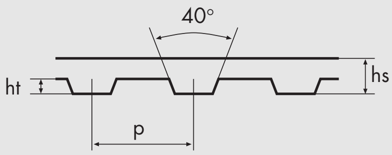
TEXROPE® SPEEDFLEX®



	TYPE I	TYPE II	TYPE III
Approximate thickness e (mm)	1.9	2.2	3
Weight per 10 cm belt width (g/m)	240	270	400
Available widths (mm)	15 up to 600	15 up to 600	300 up to 600
Recommended min. pulley diameter (mm)	25	50	100

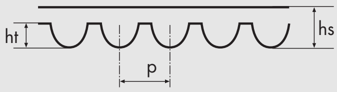
2. Synchronous belts

TEXROPE® STB



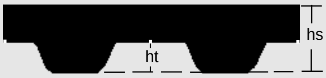
	XL	L	H	XH
Pitch p (mm)	5.080	9.525	12.700	22.225
Tooth height ht (mm)	1.27	1.91	2.29	6.35
Nominal height hs (mm)	2.3	3.5	4.0	11.4
Belt unit weight (g/m) for 1 mm width	2.4	3.2	3.9	11.3
Min. pulley diameter in number of teeth	10	10	14	18
Min. pitch diameter (mm)	16.17	30.32	56.6	127.34

TEXROPE® HTD®150

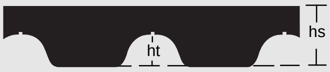


	8M	14M
Pitch p (mm)	8	14
Tooth height ht (mm)	3.4	6.0
Belt height hs (mm)	5.6	10.0
Belt unit weight (g/m) for 1 mm width	5.5	9.6
Minimal pulley outside diameter in number of teeth	22	28
Minimal pitch diameter (mm)	56.02	124.78

SynchroPower®



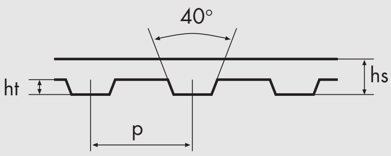
	T2.5	T5	T10
Pitch p (mm)	2.5	5.0	10.0
Tooth height ht (mm)	0.7	1.2	2.5
Belt height hs (mm)	1.3	2.2	4.5
Min. pulley diameter in number of teeth	10	10	12
Min. pitch diameter (mm)	7.95	15.91	38.19

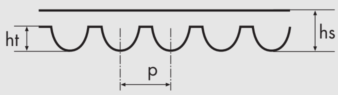


	AT5	AT10
Pitch p (mm)	5.0	10.0
Tooth height ht (mm)	1.2	2.5
Belt height hs (mm)	2.7	5.0
Min. pulley diameter in number of teeth	12	12
Min. pitch diameter (mm)	19.09	38.19

	DL-T5	DL-T10
Pitch p (mm)	5.0	10.0
Tooth height ht (mm)	1.2	2.5
Belt height hs (mm)	3.4	7.0
Min. pulley diameter in number of teeth	10	12
Min. pitch diameter (mm)	15.91	38.19

TEXROPE® LL

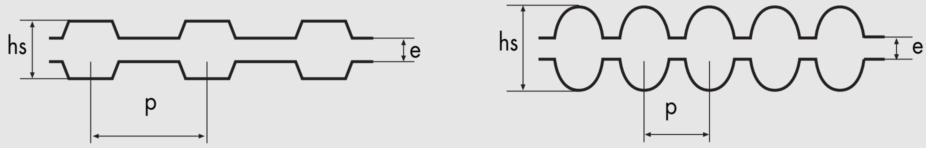




	XL	L	H	XH
Pitch p (mm)	5.080	9.525	12.700	22.225
Tooth height ht (mm)	1.27	1.91	2.29	6.35
Nominal height hs (mm)	2.3	3.5	4.0	11.4
Belt unit weight (g/m) for 1 mm width	2.4	3.2	3.9	11.3
Min. pulley diameter in number of teeth	10	10	14	18
Min. pitch diameter (mm)	16.17	30.32	56.6	127.34

	8M	14M
Pitch p (mm)	8	14
Tooth height ht (mm)	3.4	6.0
Belt height hs (mm)	5.6	10.0
Belt unit weight (g/m) for 1 mm width	5.5	9.6
Minimal pulley outside diameter in number of teeth	22	28
Minimal pitch diameter (mm)	56.02	124.78

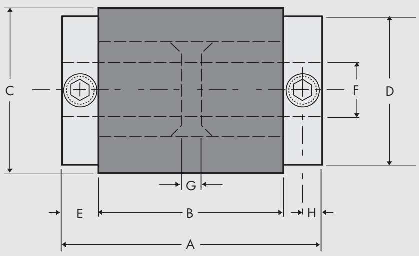
TEXROPE® DF



	STB profile			HTD® profile	
	XL	**L**	**H**	**8M**	**14M**
Pitch p (mm)	5.08	9.53	12.7	8	14
Nominal height hs (mm)	3.0	4.5	5.8	8.3	14.9
Thickness between teeth e (mm)	0.5	0.8	1.4	1.4	2.8
Belt unit weight (g/m) for 1 mm width.	1.9	3.2	4.6	7.2	12.3

3. Flexible couplings

TEXROPE® CFX

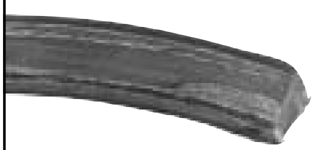


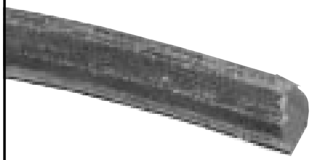
Complete coupling		Rubber sleeve		End piece					
Ref	**A mm**	**B mm**	**C mm**	**D mm**	**E mm**	**F min. plain bore mm**	**F max. bore mm**	**G mm**	**H mm**
CFX 11	24.5	13.3	18.5	18.0	5.6	4.0	9.0	1.0	2.8
CFX 21	56.0	40.0	29.0	30.0	8.0	8.0	15.0	2.0	4.0
CFX 33	58.7	39.7	38.1	36.5	9.5	9.5	15.9	1.6	4.8
CFX 43	58.7	39.7	44.5	41.3	9.5	9.5	22.2	1.6	4.8
CFX 56	61.9	39.7	58.7	52.4	11.1	14.0	30.2	1.6	5.6
CFX 66	69.1	40.5	74.6	69.9	14.3	14.0	35.0	2.4	7.1
CFX 76	87.4	54.0	88.9	82.6	16.7	12.7	41.3	3.2	8.7
CFX 86	87.4	54.0	103.2	95.3	16.7	12.7	47.6	3.2	8.7

Note: End pieces are supplied in minimum plain bore with set screw.

Please consult TEXROPE® industrial belt catalogue E2/80001 for a complete description of all V-belts, synchronous belts and flexible couplings.

V. TROUBLESHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	SOLUTION
1. PREMATURE BELT FAILURE		
Broken belt(s) 	1. Underdesigned drive	1. Redesign using TEXROPE® drive design manuals (E/80001 or E/80019).
	2. Belt rolled or prised onto pulley	2. Use drive takeup when installing.
	3. Object falling into drive	3. Provide adequate guard or drive protection.
	4. Severe shock load	4. Redesign to accommodate shock load.
Belt(s) fail(s) to carry load (slip); no visible reason	1. Underdesigned drive	1. Redesign using TEXROPE® drive design manuals (E/80002 or E/80019).
	2. Damaged tensile member	2. Follow correct installation procedure.
	3. Worn pulley grooves	3. Check for groove wear, replace as needed.
	4. Centre distance movement	4. Check drive for centre distance movement during operation.
Edge cord failure	1. Pulley misalignment	1. Check and correct alignment.
	2. Damaged tensile member	2. Follow installation procedure.
Belt delamination or undercord separation	1. Pulleys too small	1. Check drive design, replace with larger pulleys.
	2. Back idler too small	2. Increase back idler to acceptable diameter.
2. SEVERE OR ABNORMAL BELT WEAR		
Wear on belt top surface	1. Rubbing against guard	1. Replace or repair guard.
	2. Idler malfunction	2. Replace idler.
Wear on belt top corner	1. Belt-to-pulley fit incorrect (belt too small for groove)	1. Use correct belt-to-pulley combination.
Wear on belt sidewalls 	1. Belt slip	1. Retension until slipping stops.
	2. Misalignment	2. Realign pulleys.
	3. Worn pulleys	3. Replace pulleys.
	4. Incorrect belt	4. Replace with correct belt size.
Wear on belt bottom corners	1. Belt-to-pulley fit incorrect	1. Use correct belt-to-pulley combination.
	2. Worn pulleys	2. Replace pulleys.

PROBLEM	PROBABLE CAUSE	SOLUTION
Wear on belt bottom surface 	1. Belt bottoming on pulley groove	1. Use correct belt-to-pulley combination.
	2. Worn pulleys	2. Replace pulleys.
	3. Debris in pulleys	3. Clean pulleys.
Undercord cracking	1. Pulley diameter too small	1. Use larger diameter pulleys.
	2. Belt slip	2. Retension until slipping stops.
	3. Back idler too small	3. Use larger diameter back idler.
	4. Improper storage	4. Do not coil belt too tightly, kink or bend. Avoid heat and direct sunlight.
Burn or hardening on bottom or sidewall 	1. Belt slip	1. Retension until slipping stops.
	2. Worn pulleys	2. Replace pulleys.
	3. Underdesigned drive	3. Redesign using TEXROPE® drive design manuals (E/80002 or E/80019).
	4. Centre distance movement	4. Check drive for centre distance movement during operation.
Extensive hardening of belt exterior	1. Hot drive environment	1. Improve ventilation to drive.
Belt surface flaking, sticky or swollen 	1. Oil or chemical contamination	1. Do not use belt dressing. Eliminate leaks.

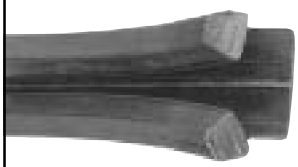
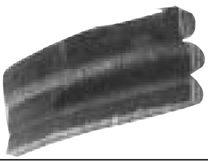
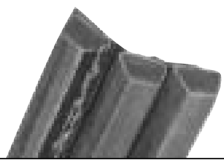
3. BELTS TURN

PROBLEM	PROBABLE CAUSE	SOLUTION
Involves single or multiple belts 	1. Shock loading or vibration	1. Check drive design. Use a TEXROPE® MULTI belt.
	2. Debris in pulleys	2. Shield grooves and drive.
	3. Misalignment	3. Realign pulleys.
	4. Worn pulley grooves	4. Replace pulleys.
	5. Damaged tensile member	5. Use correct installation and belt storage procedure.
	6. Incorrectly placed flat idler pulley	6. Carefully place flat idler on slack side of drive as close as possible to driveR pulleys.
	7. Mismatched belt set	7. Replace with new set of matched belts. Do not mix old and new belts.
	8. Poor drive design	8. Check for centre distance stability and vibration dampening.

PROBLEM	PROBABLE CAUSE	SOLUTION
4. BELT STRETCHES BEYOND AVAILABLE TAKEUP		
Multiple belts stretch unequally	1. Misalignment	1. Realign and retension drive.
	2. Debris in pulleys	2. Clean pulleys.
	3. Broken tensile member or cord damaged	3. Replace all belts, install properly.
	4. Multiple belt set	4. Replace with new set of matched belts.
Single belt, or where all belts stretch evenly	1. Insufficient takeup allowance	1. Check takeup. Use allowance specified in TEXROPE® drive design manual (E/80002 or E/80019).
	2. Grossly overloaded or underdesigned drive	2. Redesign drive.
	3. Broken tensile member	3. Replace belt, install properly.
5. BELT NOISE		
Squeal or "chirp"	1. Belt slip	1. Retension.
	2. Object falling into drive	2. Clean belt and pulleys.
Slapping noise	1. Loose belts	1. Retension.
	2. Mismatched set	2. Install matched belt set.
	3. Misalignment	3. Realign pulleys so all belts share load equally.
Rubbing sound	1. Guard interference	1. Repair, replace or redesign guard.
Grinding sound	1. Damaged bearings	1. Replace, align and lubricate.
Unusually loud drive	1. Incorrect belt	1. Use correct belt size. Use correct belt tooth profile for pulleys on synchronous drive.
	2. Worn pulleys	2. Replace pulleys.
	3. Object falling into drive	3. Clean pulleys, improve shielding. Remove rust, paint or dirt from grooves.
6. UNUSUAL VIBRATION		
Belts flapping	1. Belts undertensioned	1. Retension.
	2. Mismatched set	2. Replace with new set of matched belts.
	3. Pulley misalignment	3. Realign pulleys.

PROBLEM	PROBABLE CAUSE	SOLUTION
Excessive vibration in drive system	1. Incorrect belt	1. Use correct belt cross-section in pulley.
	2. Poor machine or equipment design	2. Check structure and brackets for adequate strength.
	3. Pulley out of round	3. Replace pulley.
	4. Loose drive components	4. Check machine components and guards, motor mounts, motor pads, bushings, brackets and framework for stability, adequate design strength, proper maintenance and proper installation.

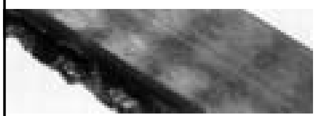
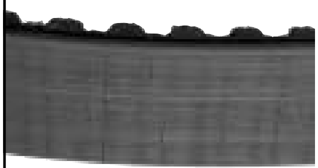
7. BANDED (JOINED) BELT PROBLEMS

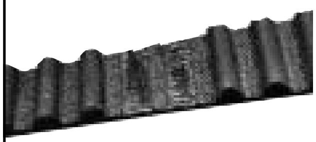
Tie-band separation 	1. Worn pulleys	1. Replace pulleys.
	2. Improper groove spacing	2. Use standard groove pulleys.
Top of tie-band frayed, worn or damaged 	1. Guard interference	1. Check guard.
	2. Back idler malfunction or damaged	2. Repair or replace back idler.
Banded belt comes off drive	1. Object falling into drive	1. Clean pulleys. Use single belts to prevent debris from being trapped in grooves.
One or more ribs run outside of pulley 	1. Misalignment	1. Realign drive.
	2. Undertensioned	2. Retension.

8. PROBLEMS WITH PULLEYS

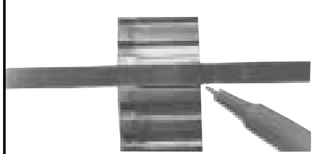
Broken or damaged pulley	1. Incorrect pulley installation	1. Do not tighten bushing bolts beyond recommended torque values.
	2. Object falling into drive	2. Use adequate drive guard.
	3. Excessive rim speeds	3. Keep pulley rim speeds below maximum recommended values.
	4. Incorrect belt installation	4. Do not prise belts onto pulleys.
Severe, rapid groove wear	1. Excessive belt tension	1. Retension, check drive design.
	2. Sand, debris or contamination	2. Clean and shield drive as well as possible.

PROBLEM	PROBABLE CAUSE	SOLUTION
9. PROBLEMS WITH OTHER DRIVE COMPONENTS		
Bent or broken shaft	1. Excessive tension	1. Retension.
	2. Overdesigned drive (*see page 21)	2. Check drive design, may need to use smaller or fewer belts.
	3. Accidental damage	3. Redesign drive guard.
	4. Machine design error	4. Check drive design.
Damaged guard	1. Accidental damage or poor guard design	1. Repair, redesign for durability.
10. HOT BEARINGS		
Belt overtensioned	1. Worn grooves - belts bottoming and will not transmit power until overtensioned (*see page 21)	1. Replace pulleys, tension drive properly.
	2. Improper tension	2. Retension.
Pulleys too small	1. Motor manufacturer's pulley diameter recommendations not followed	1. Redesign using TEXROPE® drive design manuals (E/80002 or E/80019).
Poor bearing condition	1. Bearing underdesigned	1. Check bearing design.
	2. Bearing not properly maintained	2. Align and lubricate bearing.
Pulleys too far out on shaft	1. Error or obstruction problem	1. Place pulleys as close as possible to bearings. Remove obstructions.
Belt slippage	1. Drive undertensioned	1. Retension.
11. PERFORMANCE PROBLEMS		
Incorrect driveN speeds	1. Design error	1. Use correct driveR/driveN pulley size for desired speed ratio.
	2. Belt slip	2. Retension.
12. PROBLEMS WITH SYNCHRONOUS BELTS		
Unusual noise	1. Misaligned drive	1. Correct alignment.
	2. Improper tension	2. Adjust to recommended value.
	3. Back idler	3. Use inside idler.
	4. Worn pulley	4. Replace pulley.
	5. Bent guide flange	5. Replace guide flange.
	6. Belt speed too high	6. Redesign drive.
	7. Incorrect belt profile for pulley (STB, HTD®150, etc.)	7. Use correct belt-to-pulley combination.
	8. Subminimal diameter	8. Redesign drive using larger diameters.
	9. Excessive load	9. Redesign drive for increased capacity.

PROBLEM	PROBABLE CAUSE	SOLUTION
Tension loss	1. Weak support structure	1. Reinforce structure.
	2. Excessive pulley wear	2. Use other pulley material.
	3. Fixed (non-adjustable) centres	3. Use inside idler for belt adjustment.
	4. Excessive debris	4. Remove debris, check guard.
	5. Excessive load	5. Redesign drive for increased capacity.
	6. Subminimal diameter	6. Redesign drive using larger diameters.
	7. Belt, pulley or shafts running too hot	7. Check for conductive heat transfer from prime mover.
	8. Unusual belt degradation	8. Reduce ambient drive temperature to +85°C maximum.
Excessive belt edge wear	1. Damage due to handling	1. Follow proper handling instructions.
	2. Bent guide flange	2. Repair flange or replace pulley.
	3. Belt too wide	3. Fit correct width belt.
	4. Drive undertensioned	4. Adjust to recommended value.
	5. Rough flange surface finish	5. Replace or repair flange (to eliminate abrasive surface).
	6. Improper tracking	6. Correct alignment.
	7. Belt hitting drive guard or bracketry	7. Remove obstruction or use inside idler.
Broken tensile member	1. Excessive shock load	1. Redesign drive for increased capacity.
	2. Subminimal diameter	2. Redesign drive using larger diameters.
	3. Improper belt handling and storage prior to installation	3. Follow proper handling and storage procedures.
	4. Debris or foreign object in the drive	4. Remove object and check guard.
	5. Extreme pulley run-out	5. Replace pulley.
Belt cracking	1. Subminimal diameter	1. Redesign drive using larger diameters.
	2. Back idler	2. Use inside idler or increase diameter of back idler.
	3. Extreme low temperature at start-up	3. Pre-heat drive environment.
	4. Extended exposure to harsh chemicals	4. Protect drive.
	5. Cocked bushing/pulley assembly	5. Install bushing as per instructions.

PROBLEM	PROBABLE CAUSE	SOLUTION
Premature tooth wear	1. Too low or too high belt tension	1. Adjust to recommended value.
	2. Belt running partly off unflanged pulley	2. Correct alignment.
	3. Misaligned drive	3. Correct alignment.
	4. Incorrect belt profile for pulley (STB, HTD®150, etc.)	4. Use correct belt-to-pulley combination.
	5. Worn pulley	5. Replace pulley.
	6. Rough pulley teeth	6. Replace pulley.
	7. Damaged pulley	7. Replace pulley.
	8. Pulley not to dimensional specification	8. Replace pulley.
	9. Belt hitting drive bracketry or other structure	9. Remove obstruction or use idler.
	10. Excessive load	10. Redesign drive for increased capacity.
	11. Insufficient hardness of pulley material	11. Use a more wear resistant pulley.
	12. Excessive debris	12. Clean drive and check guard.
	13. Cocked bushing/pulley assembly	13. Install bushing as per instructions.
Tooth shear	1. Excessive shock loads	1. Redesign drive for increased capacity.
	2. Less than 6 teeth in mesh	2. Redesign drive.
	3. Extreme pulley run-out	3. Replace pulley.
	4. Worn pulley	4. Replace pulley.
	5. Back idler	5. Use inside idler.
	6. Incorrect belt profile for pulley (STB, HTD®150, etc.)	6. Use correct belt-to-pulley combination.
	7. Misaligned drive	7. Correct alignment.
	8. Drive undertensioned	8. Adjust tension to recommended value.

13. PULLEY PROBLEMS

Bent guide flange	1. Belt forcing flange off	1. Correct alignment or properly secure flange to pulley.
Unusual pulley wear	1. Pulley has too little wear resistance (e.g. plastic, soft metals, aluminium)	1. Use other pulley material.
	2. Misaligned drive	2. Correct alignment.
	3. Excessive debris	3. Clean drive and check guard.
	4. Excessive load	4. Redesign drive for increased capacity.
	5. Improper tension	5. Adjust to recommended value.
	6. Incorrect belt profile for pulley (STB, HTD®150, etc.)	6. Use correct belt-to-pulley combination.

PROBLEM	PROBABLE CAUSE	SOLUTION
14. PERFORMANCE PROBLEMS WITH SYNCHRONOUS BELTS		
Belt tracking problems	1. Belt running partly off unflanged pulley	1. Correct alignment.
	2. Centres exceed 8 times small pulley diameter and both pulleys are flanged	2. Correct alignment to set belt to track on both pulleys.
	3. Excessive belt edge wear	3. Correct alignment.
Excessive temperature: bearings, housing, shafts, ...	1. Misaligned drive	1. Correct alignment.
	2. Improper tension	2. Adjust to recommended value.
	3. Incorrect belt profile for pulley (STB, HTD® 150, etc.)	3. Use correct belt-to-pulley combination.
Shafts out of synchronisation	1. Design error	1. Use correct pulley sizes.
	2. Incorrect belt	2. Use correct belt with correct tooth profile for grooves.
Vibration	1. Incorrect belt profile for pulley (STB, HTD® 150, etc.)	1. Use correct belt-to-pulley combination.
	2. Improper tension	2. Adjust to recommended value.
	3. Bushing or key loose	3. Check and reinstall as per instructions.
Incorrect driveN speeds	1. Design error	1. Redesign drive.

* *Using too many belts, or belts that are too large, can severely stress motor or driveN shafts. This can happen when load requirements are reduced on a drive, but the belts are not redesigned accordingly. This can also happen when a drive is greatly overdesigned. Forces created from belt tensioning are too great for the shafts.*

NOTE:
All Texrope® antistatic V-belts are in accordance with the antistatic requirements as stated in EN 13463-5 (pending) - "Non-electrical equipment intended for use in potentially explosive atmospheres - Part-5: protection by constructural safety" - and can as such be used in the conditions described in the Directive 94/9/EC - ATEX.

Important:

Every effort has been made to ensure that the information contained in this manual is complete and accurate. Nevertheless, the manufacturer cannot be held responsible for errors or omissions which have occurred after its release for printing; or for the use of its products in special or exceptional circumstances if a TEXROPE® representative has not been consulted beforehand about the suitability of the intended application.

This issue is released January 2004 and supersedes all previous versions. If your catalogue is more than 2 years old, please consult a TEXROPE® representative to check whether you have the latest version.

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