WALTHER FLENDER®

YOUR EXPERT FOR THE PERFECT DRIVE

85 YEARS

L.E.A.N. DRIVE® SOFTWARE

DETERMINE THE ACTUAL LIFESPAN OF YOUT DRIVE

US PATENT NUMBER U10, 705, 512 B12
CN PATENT NUMBER ZL201680026518.X

PATENTED

GERMAN UTILITY MODEL REGISTERED
EUROPEAN PATENT PENDING

The previous design of timing belt drives was not transparent.

Competitor's premium timing belt

Pitch 5M in Watt / 9 mm belt width

Zahnscheibe	14	16	18	20	24	28	32	36	40	44	48	56	64	72	80
Speed of small toothed pulley n_1 (min⁻¹) rpm	Wirk-Ø d_w in mm / Pitch diameter of toothed pulley d_w (mm)														
	22,28	25,46	28,65	31,83	38,20	44,56	50,93	57,30	63,66	70,03	76,39	89,13	101,86	114,59	127,32
20	0,02	0,02	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,11	0,12	0,14
40	0,03	0,04	0,05	0,05	0,06	0,08	0,09	0,10	0,12	0,13	0,15	0,17	0,20	0,23	0,26
60	0,05	0,06	0,06	0,07	0,09	0,11	0,13	0,15	0,17	0,19	0,21	0,25	0,29	0,33	0,38
100	0,07	0,09	0,10	0,12	0,15	0,18	0,21	0,24	0,27	0,30	0,33	0,40	0,46	0,53	0,60
200	0,13	0,16	0,19	0,21	0,27	0,33	0,38	0,44	0,50	0,56	0,62	0,74	0,86	0,98	1,11
300	0,18	0,22	0,27	0,31	0,39	0,47	0,55	0,63	0,71	0,80	0,88	1,05	1,23	1,40	1,58
400	0,23	0,29	0,34	0,39	0,49	0,60	0,70	0,81	0,92	1,02	1,13	1,35	1,57	1,79	2,02
500	0,28	0,35	0,41	0,47	0,60	0,72	0,85	0,98	1,11	1,24	1,37	1,63	1,90	2,17	2,43
600	0,32	0,40	0,48	0,55	0,70	0,85	0,99	1,14	1,29	1,45	1,60	1,91	2,21	2,52	2,83
700	**0,37**	**0,46**	**0,54**	**0,63**	**0,79**	**0,96**	**1,13**	**1,30**	**1,47**	**1,65**	**1,82**	**2,17**	**2,51**	**2,86**	**3,20**
800	0,41	0,51	0,61	0,70	0,89	1,08	1,27	1,46	1,65	1,84	2,03	2,42	2,80	3,18	3,56
900	0,45	0,56	0,67	0,77	0,98	1,19	1,39	1,60	1,81	2,02	2,24	2,66	3,08	3,49	3,90
950	**0,47**	**0,59**	**0,70**	**0,81**	**1,02**	**1,24**	**1,46**	**1,68**	**1,90**	**2,12**	**2,34**	**2,77**	**3,21**	**3,64**	**4,07**
1000	0,49	0,61	0,73	0,84	1,06	1,29	1,52	1,75	1,98	2,21	2,43	2,89	3,34	3,79	4,23
1200	0,56	0,71	0,84	0,98	1,24	1,50	1,76	2,02	2,29	2,55	2,81	3,33	3,84	4,34	4,84
1400	0,63	0,80	0,95	1,10	1,40	1,70	1,99	2,29	2,58	2,87	3,17	3,74	4,30	4,85	5,39
1450	**0,65**	**0,82**	**0,98**	**1,13**	**1,44**	**1,74**	**2,05**	**2,35**	**2,65**	**2,95**	**3,25**	**3,84**	**4,41**	**4,97**	**5,52**
1600	0,70	0,89	1,06	1,23	1,56	1,88	2,21	2,54	2,86	3,18	3,50	4,12	4,73	5,32	5,89
1800	0,76	0,97	1,16	1,34	1,71	2,06	2,42	2,77	3,12	3,47	3,81	4,48	5,13	5,75	6,34
2000	0,83	1,05	1,26	1,46	1,85	2,24	2,62	3,00	3,38	3,75	4,11	4,82	5,49	6,13	6,74
2400	0,95	1,21	1,44	1,67	2,12	2,56	3,00	3,42	3,84	4,25	4,65	5,41	6,13	6,80	7,41
2850	**1,07**	**1,37**	**1,64**	**1,90**	**2,40**	**2,90**	**3,38**	**3,85**	**4,31**	**4,75**	**5,18**	**5,99**	**6,72**	**7,38**	**7,96**
3200	1,16	1,48	1,78	2,06	2,61	3,14	3,65	4,15	4,63	5,10	5,54	6,36	7,09	7,71	8,24
3600	1,26	1,61	1,93	2,24	2,83	3,40	3,94	4,47	4,97	5,45	5,90	6,71	7,41	7,98	8,41
4000	1,35	1,73	2,08	2,40	3,03	3,63	4,21	4,75	5,27	5,75	6,20	6,99	7,64	8,12	8,44
5000	1,55	2,00	2,40	2,78	3,48	4,15	4,76	5,33	5,85	6,32	6,73	7,39	7,80	7,96	7,85
6000	1,73	2,24	2,68	3,09	3,86	4,56	5,19	5,75	6,23	6,64	6,97	7,37	7,42	7,11	
7000	1,88	2,44	2,92	3,36	4,17	4,88	5,49	6,01	6,42	6,73	6,92	6,97			
8000	2,01	2,62	3,13	3,59	4,41	5,11	5,68	6,12	6,42	6,59	6,61				
10000	2,23	2,89	3,44	3,92	4,63	5,33	5,74	5,94	5,93	5,69	5,23				
12000	2,38	3,09	3,65	4,12	4,63	5,26	5,41	5,26	4,79	4,01					
14000	2,48	3,20	3,75	4,18	4,45	4,93	4,72	4,10	3,07						

Breitenfaktor / Width factor c_6 — Tab. 52

1,44 kW

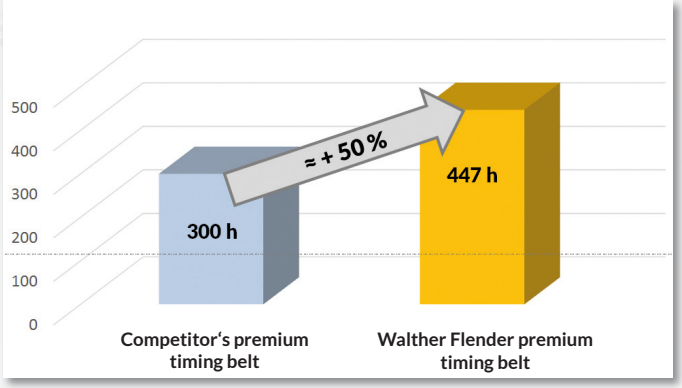
Walther Flender premium timing belt

Pitch 5MGT3 in Watt / 9 mm belt width

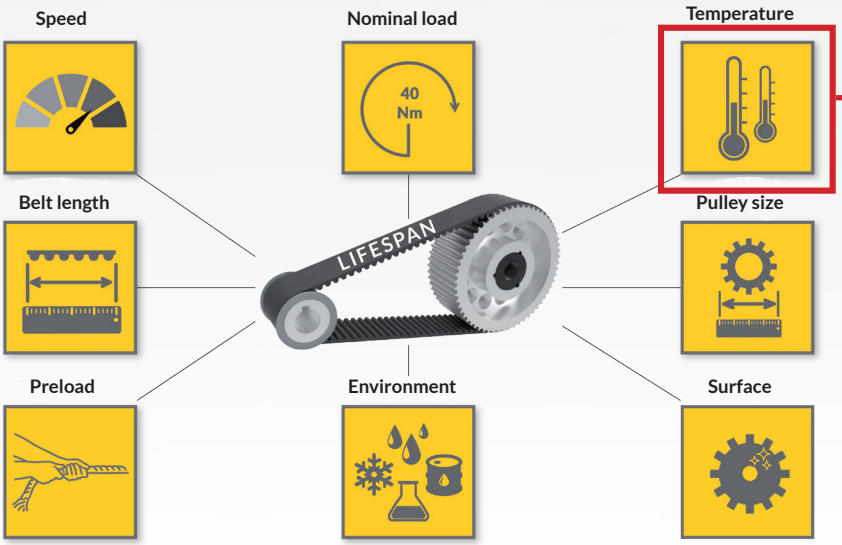
Speed of small toothed pulley	Performance data of the small pulley — Number of teeth														
	18	20	22	24	26	28	32	36	40	44	48	56	64	72	80
	Pitch diameter														
	28,65	31,83	35,01	38,20	41,38	44,56	50,93	57,30	63,66	70,03	76,39	89,13	101,86	114,59	127,32
20	12	14	17	19	21	24	28	33	37	42	46	55	64	73	82
40	22	27	31	35	40	45	54	62	71	80	88	105	122	139	155
60	32	38	45	52	58	65	77	90	103	115	128	153	177	201	225
100	50	60	71	81	92	102	123	144	164	184	204	244	283	322	361
200	90	111	131	151	171	190	230	269	307	346	384	459	534	608	681
300	127	157	186	215	244	273	330	387	443	499	554	664	772	879	985
400	162	201	239	277	315	352	427	501	574	647	719	861	1.002	1.142	1.280
500	195	243	290	337	383	429	521	611	701	790	879	1.054	1.226	1.397	1.567
600	227	283	339	394	449	504	612	719	825	931	1.035	1.242	1.446	1.648	1.847
700	258	322	387	450	514	577	701	825	947	1.068	1.188	1.426	1.661	1.893	2.123
800	288	361	433	505	577	648	789	928	1.066	1.203	1.339	1.608	1.873	2.135	2.394
1.000	345	434	524	612	700	787	960	1.131	1.300	1.468	1.634	1.963	2.288	2.608	2.925
1.200	399	505	611	715	819	922	1.126	1.328	1.527	1.725	1.922	2.309	2.692	3.069	3.442
1.400	451	574	695	815	934	1.053	1.288	1.520	1.750	1.977	2.203	2.648	3.087	3.520	3.947
1.450	464	590	714	840	963	1.085	1.328	1.567	1.805	2.039	2.272	2.732	3.185	3.631	4.071
1.600	502	640	777	912	1.047	1.181	1.446	1.708	1.967	2.224	2.478	2.980	3.474	3.961	4.441
1.750	538	688	837	984	1.130	1.275	1.563	1.847	2.128	2.406	2.682	3.225	3.760	4.286	4.805
1.800	550	704	856	1.008	1.158	1.307	1.602	1.893	2.181	2.466	2.749	3.306	3.854	4.394	4.925
2.000	597	767	934	1.101	1.266	1.430	1.754	2.075	2.391	2.705	3.015	3.627	4.227	4.818	5.399
2.400	688	887	1.085	1.282	1.476	1.669	2.052	2.429	2.802	3.170	3.534	4.251	4.954	5.644	6.319
2.800	773	1.003	1.231	1.456	1.680	1.902	2.340	2.773	3.200	3.622	4.038	4.857	5.657	6.439	7.203
3.200	855	1.114	1.371	1.625	1.877	2.127	2.621	3.108	3.587	4.061	4.528	5.444	6.336	7.205	8.051
3.600	933	1.221	1.506	1.789	2.069	2.346	2.894	3.433	3.965	4.488	5.003	6.012	6.992	7.941	8.861
4.000	1.008	1.325	1.638	1.948	2.255	2.560	3.161	3.751	4.332	4.904	5.466	6.563	7.624	8.648	9.633
5.000	1.182	1.569	1.951	2.328	2.702	3.071	3.799	4.512	5.210	5.895	6.565	7.862	9.099	10.274	
6.000	1.341	1.795	2.243	2.685	3.121	3.552	4.399	5.226	6.032	6.817	7.581	9.043	10.414		
8.000	1.618	2.199	2.770	3.333	3.886	4.430	5.491	6.514	7.499	8.444	9.348				
10.000	1.845	2.544	3.228	3.898	4.554	5.195	6.432	7.607	8.716	9.756	10.721				
12.000	2.026	2.831	3.617	4.381	5.123	5.843	7.214	8.487							
14.000	2.160	3.062	3.934	4.777	5.588	6.367	7.821								

0,84 kW

Laboratory tests show: Performance data in catalogues do not allow conclusions to be drawn on the lifespan.



For exact information on the lifespan of timing belt drives, the application-specific influencing factors must be taken into account.



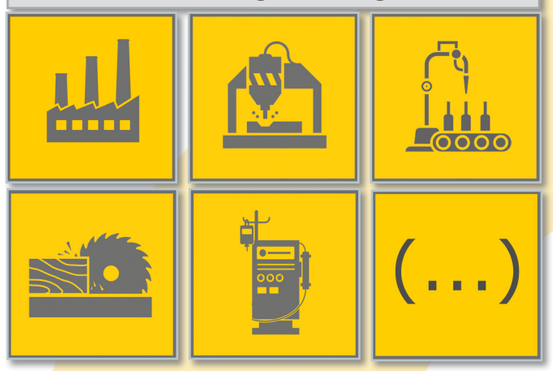
A simple temperature difference of 20°C can decrease the lifespan by 50%.

How does Walther Flender determine the service life of your belt drive in an accurate and reliable way?

Through a new application-specific design methodology, developed by Walther Flender in cooperation with the University of Stuttgart.

LEBENSDAUER
Auslegungsmethode entwickelt und geprüft in Kooperation mit
UNI STUTTGART
GEPRÜFT

Application in mechanical and plant engineering



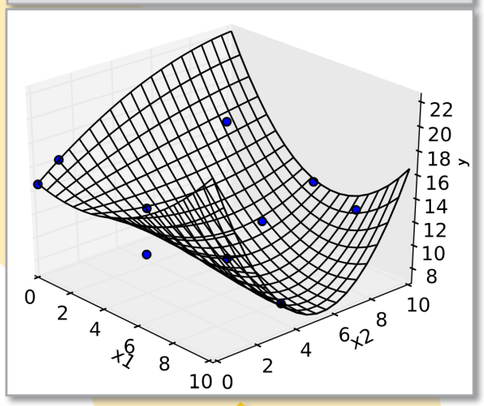
Field data input

L.E.A.N. DRIVE® Software

Actual lifespan achieved by 95% of the components

Algorithm

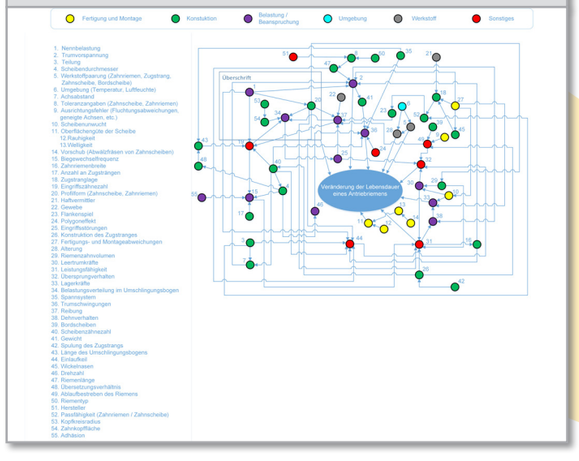
Generation of a lifetime model



Specifications

Results

Factors influencing the lifespan



Specific influencing factors

Test plan determination

Test plan

Versuchnr.	Parameter A	Parameter B	Parameter C	Ausfallzeit
1	94	2005	1,3	77
2	82	1410	1,3	74
3	83	2084	1,9	90
4	43	2892	0,7	79
5	32	914	0,9	74
6	29	804	0,8	100
7	84	2137	1,6	93
8	44	2406	1,3	99
9	52	2399	1,3	96
10	39	2782	1,5	104
11	70	1586	1,4	107
12	61	823	1,9	47
13	50	2040	1,9	85
14	50	1190	1,5	73
15	19	1081	0,8	56
16	39	435	1,1	78
17	33	831	1,5	99
18	57	2044	1,5	52
19	90	522	1,1	112
20	63	2314	0,9	36

Test plan

Run the test plan through the WF test laboratory with over 20 test stands

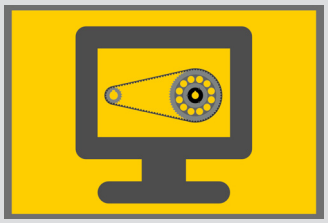
Quelle Abbildungen: Fachvortrag Alexander Kremer, M. Sc. Prof. Dr.-Ing. Bernd Bertsche und Dr.-Ing. Andreas Scholzen, VDI Fachkonferenz „Umschlingungsgetriebe 2018

L.E.A.N. DRIVE®

One software - many possibilities

Focus customer:
Application optimised designs

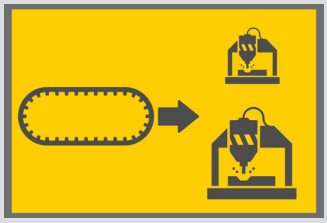
Integration in configurators



Sales tool

Design to cost calculator
(incl. Energy + Co2)

Standardisation
„one belt fits all“



Predictive Maintenance
Prediction of maintenance intervals

Focus Product:
Shortening product development (time)

Minimising your own testing efforts

Reducing costs

Shortening the products time-to-market

Applicable for timing belts and basically all components that are subject to mechanical wear.

Determine the actual lifespan of your drive.

Your direct contact details to our application technology department:

leandrive@walther-flender.de

www.walther-flender.de

LIFESPAN

Design method developed and tested in cooperation with

UNI STUTTGART

TESTED

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CN PATENT NUMBER ZL201680026518.X

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