Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=0.4; Maximum permissible specific bearing load plim=5 MPa

ID: L-BD0.4P5

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	17 | 7	22 | 10	30 | 12	50 | 20	65 | 30	115 | 50	180 | 80	350 | 150	700 | 300	1000 | 400	1000 | 400	1500 | 500
50	12 | 5	15 | 6	18 | 8	35 | 15	45 | 20	95 | 40	180 | 80	220 | 100	300 | 120	400 | 180	500 | 200	1000 | 400
100	12 | 5	15 | 6	15 | 6	28 | 12	40 | 20	75 | 30	135 | 60	160 | 70	220 | 100	250 | 100	350 | 150	500 | 200
500	9 | 4	12 | 5	10 | 4	20 | 8	30 | 12	55 | 25	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
1000	8 | 4	12 | 5	12 | 5	18 | 8	28 | 12	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
1500	7 | 3	12 | 5	12 | 5	16 | 7	25 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
2000	6 | 3	10 | 4	12 | 5	20 | 8	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
2500	6 | 3	12 | 5	13 | 6	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
3000	6 | 3	10 | 4	13 | 6	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
4000	6 | 3	12 | 5	13 | 6	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
6000	6 | 3	13 | 6	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
10000	8 | 4	13 | 6	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	100	100	100	100	68
100	68	100	100	68	68	100	100	150	150	220	220	220
500	46	68	100	100	100	220	220	320	460	320	220	220
1000	46	68	68	100	100	220	220	150	150	100	68	46
1500	46	46	68	150	100	150	150	68	68	68	46	32
2000	46	46	68	68	100	150	100	46	46	46	32	32
2500	32	32	46	100	100	68	46	46	32	32	32	32
3000	32	32	46	100	100	68	46	32	32	32	32	32
4000	32	46	46	100	100	68	46	32	32	32	32	32
6000	22	22	46	100	100	46	46	32	32	32	32	32
10000	15	22	32	32	32	32	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) — Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	1	0	0	0	0	0	0
50	1	1	1	1	1	0	0	0	0	0	0	0
100	0	1	1	1	0	0	0	0	0	0	0	1
500	0	1	1	1	1	0	1	2	2	4	4	5
1000	1	0	1	1	1	1	2	2	4	4	5	5
1500	1	0	1	1	1	2	2	4	4	5	5	5
2000	0	1	1	1	1	2	2	4	5	5	5	5
2500	1	0	1	1	2	2	4	4	5	5	5	5
3000	1	1	1	1	2	2	4	4	5	5	5	5
4000	0	0	1	2	2	4	4	5	5	5	5	5
6000	1	1	1	2	2	4	5	5	5	5	5	5
10000	0	1	2	2	4	5	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	3	3	0	0	0	2	2
50	1	1	1	1	1	1	0	0	0	0	0	0
100	1	1	1	1	1	1	0	0	0	0	0	0
500	1	1	1	1	1	0	0	0	0	0	0	0
1000	1	1	1	1	1	0	0	0	0	0	0	0
1500	1	1	1	1	1	0	0	0	0	0	0	0
2000	1	1	1	1	1	0	0	0	0	0	0	1
2500	1	1	1	1	1	1	0	0	0	0	0	1
3000	1	1	1	1	1	0	0	0	0	0	1	1
4000	1	0	1	1	0	0	0	0	0	0	1	1
6000	1	0	1	1	0	0	0	0	0	1	1	1
10000	0	2	2	1	1	0	0	0	1	1	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) — v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.02	0.03	0.03	0.06	0.09	0.18	0.37	0.52	0.52	0.79
50	0.03	0.04	0.05	0.09	0.12	0.25	0.47	0.58	0.79	1.05	1.31	2.62
100	0.06	0.08	0.08	0.15	0.21	0.39	0.71	0.84	1.15	1.31	1.83	2.62
500	0.24	0.31	0.26	0.52	0.79	1.44	1.96	2.62	4.19	6.54	9.16	13.09
1000	0.42	0.63	0.63	0.94	1.47	2.62	3.93	5.24	8.38	13.09	18.33	26.18
1500	0.55	0.94	0.94	1.26	1.96	3.93	5.89	7.85	12.57	19.63	27.49	39.27
2000	0.63	1.05	1.26	2.09	2.51	5.24	7.85	10.47	16.76	26.18	36.65	52.36
2500	0.79	1.57	1.7	2.09	3.14	6.54	9.82	13.09	20.94	32.72	45.81	65.45
3000	0.94	1.57	2.04	2.51	3.77	7.85	11.78	15.71	25.13	39.27	54.98	78.54
4000	1.26	2.51	2.72	3.35	5.03	10.47	15.71	20.94	33.51	52.36	73.3	104.72
6000	1.88	4.08	3.77	5.03	7.54	15.71	23.56	31.42	50.27	78.54	109.96	157.08
10000	4.19	6.81	6.28	8.38	12.57	26.18	39.27	52.36	83.78	130.9	183.26	261.8

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.08	0.23	0.28	0.5	0.51	0.87	0.69	0.38	0.24	0.25	0.5	0.67
50	0.17	0.56	0.69	0.95	1.11	1.32	0.69	0.91	1.39	1.39	2	1.25
100	0.17	0.56	1.11	1.49	1.25	2.22	1.23	1.79	2.27	4	3.81	5
500	0.28	0.83	2.5	3.12	2.78	3.64	4.44	5	4.46	4	3.81	5
1000	0.31	0.83	1.67	3.47	2.98	5	4.44	5	4.46	4	3.81	5
1500	0.48	0.83	1.67	4.46	4	5	4.44	5	4.46	4	3.81	5
2000	0.56	1.25	1.67	3.12	4.17	5	4.44	5	4.46	4	3.81	5
2500	0.56	0.83	1.28	4.46	4.17	5	4.44	5	4.46	4	3.81	5
3000	0.56	1.25	1.28	4.46	4.17	5	4.44	5	4.46	4	3.81	5
4000	0.56	0.83	1.28	4.46	4.17	5	4.44	5	4.46	4	3.81	5
6000	0.56	0.64	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
10000	0.31	0.64	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [μm] (TEST_Hmin) — Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3.7<4.5	4.1<4.5	3.6<4.7	3.4<5.2	5<5.5	6<6.6	10>7.7	27.9>9	73.5>9.52	92.2>9.74	46.4>9.74	39>10.05
50	4.4<4.5	3.7<4.5	3.5<4.5	4.2<4.8	5=5	8.6>6.02	20.9>7.36	24.6>7.62	21.1>8.25	28.8>8.99	20.6>9.25	37.8>10.42
100	5>4.5	4<4.5	2.9<4.5	3.6<4.57	6.1>4.77	7.5>5.41	16.3>6.57	15.3>7.04	14.8>7.57	9.5>7.85	11.9>8.89	10.2>9.72
500	5.1>4.34	4.2<4.26	2.2<4.31	3.1<4.14	4.1<4.25	6.1>4.93	5.2<5.57	4.9<6.42	5.6<8.05	5.8<9.49	6.6<10.94	0<12.1
1000	6.7>4.19	5.1>4.1	3.3<4.1	3.1<4.01	3.9<4.23	3.7<5.32	4.1<6.26	3.4<7.12	3.7<9.15	3.6<10.7	0<11.96	0<13.32
1500	4.1<4.13	4.6>4.01	3.4<4.01	2<4.06	2.9<4.37	3<5.66	3.4<6.8	2.5<7.76	2.6<9.9	0<11.25	0<12.82	0<14.98
2000	4.2>4.1	2.9<3.99	3.4<4.06	2.4<4.36	2<4.63	2.7<5.92	2.8<7.26	2.2<8.43	2.1<10.27	0<11.92	0<14.09	0<16.85
2500	3.9<4.05	4.2<4.21	3.8<4.3	1.6<4.36	1.9<4.8	2.1<6.19	2.4<7.83	2<8.7	0<10.64	0<12.7	0<15.47	0<18.83
3000	4<4.01	2.6<4.21	3.8<4.37	1.5<4.63	1.8<4.87	2<6.46	2.2<8.01	1.8<8.88	0<11.02	0<13.58	0<16.75	0.1<20.72
4000	4.1>4.06	4.7>4.63	3.6<4.72	1.4<4.89	1.6<5.02	1.8<7.03	2<8.38	1.6<9.44	0<12	0<15.55	0<19.52	0.1<24.59
6000	3.6<4.28	4.8<4.95	2.7<4.87	1.2<5.02	1.4<5.27	1.6<7.48	1.8<9.13	0.8<10.5	0<14.46	0<19.42	0<24.99	0.1<32.26
10000	6.1>4.95	4.5<5.18	2.3<5.19	0.9<5.45	1.1<5.9	1.3<8.52	1.4<11.08	0<13.55	0<19.51	0<27.28	0<35.95	0.1<47.73

B. Minimum lubricant film tickness hmin | hlim [μm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.2<4.5	1.3<4.5	1.2<4.7	1.2<5.2	1.6<5.5	2<6.6	3.3<7.7	9.5>9	26.6>9.52	35.1>9.74	19.6>9.74	10.3>10.05
50	1.5<4.5	1.2<4.5	1.1<4.5	1.4<4.8	1.7<5	3.2<6.02	9>7.36	12.1>7.62	12.6>8.25	18.4>8.99	16.6>9.25	34.6>10.42
100	1.7<4.5	1.4<4.5	1<4.5	1.3<4.57	2.1<4.77	3.3<5.41	9.7>6.57	11>7.04	14.5>7.57	12.2>7.85	18.8>8.89	20.2>9.72
500	2<4.34	1.7<4.26	0.9<4.31	1.7<4.14	2.9<4.25	7>4.93	7.6>5.57	10.7>6.42	21.6>8.05	29.7>9.49	39.7>10.94	45.6>12.1
1000	3<4.19	2.6<4.1	1.9<4.1	2.4<4.01	4<4.23	6.3>5.32	10.1>6.26	10.9>7.12	20>9.15	26.8>10.7	34.3>11.96	32.2>13.32
1500	2<4.13	2.9<4.01	2.3<4.01	2.7<4.06	3.4<4.37	6.6>5.66	10.5>6.8	9.5>7.76	17.6>9.9	27.1>11.25	36.6>12.82	32.9>14.98
2000	2.3<4.1	2.1<3.99	2.7<4.06	3<4.36	3.7<4.63	7.4>5.92	10.4>7.26	9.6>8.43	17.8>10.27	27.5>11.92	35.9>14.05	38.6>16.85
2500	2.3<4.05	3.2<4.21	3.6<4.3	2.9<4.36	4.1<4.8	6.1<6.19	8.6>7.83	10.7>8.7	17>10.64	26.3>12.7	40.3>15.47	44.1>18.83
3000	2.5<4.01	2.3<4.21	3.9<4.37	3.1<4.63	4.4<4.87	6.6>6.46	9.4>8.01	10.1>8.88	18.7>11.02	28.8>13.58	44.2>16.75	49>20.72
4000	2.9<4.06	5.1>4.63	4.6<4.72	3.4<4.89	5<5.02	7.5>7.03	10.8>8.38	11.6>9.44	21.5>12	33.2>15.55	51>19.52	57.4>24.59
6000	3<4.28	6.1>4.95	4.1<4.87	4<5.02	6>5.27	8.1>7.48	12.9>9.13	14.1>10.5	26.1>14.46	40.3>19.42	62>24.99	70.9>32.26
10000	6.1>4.95	7.6>5.18	4.4<5.19	3.3<5.45	5<5.9	8.9>8.52	14.4>11.08	17.9>13.55	33.2>19.51	51.5>27.28	79.1>35.95	91.2>47.73

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	10.9	15.9	23.8	48.7	61.2	112.1	173.8	338.2	557.5	702.4	946.4	1401.4
2	50	6.4	9.4	14.5	34.0	44.2	94.9	177.3	211.9	287.6	362.3	456.5	702.4
3	100	5.9	8.7	11.9	27.9	38.2	72.9	133.5	151.8	206.0	236.0	297.3	403.6
4	500	4.0	6.0	8.1	18.8	28.5	50.8	64.1	73.4	91.1	125.5	173.9	236.0
5	1000	3.2	4.9	8.4	17.9	26.4	40.4	50.8	70.4	95.6	133.5	190.7	276.7
6	1500	2.8	5.0	7.8	14.9	24.5	38.8	48.8	77.3	104.9	132.2	178.1	263.8
7	2000	2.5	4.6	7.4	18.3	22.8	35.2	49.2	75.1	101.9	128.4	176.6	239.6
8	2500	2.7	5.0	8.1	15.8	21.2	41.1	55.3	69.7	103.3	130.1	163.9	222.5
9	3000	2.6	4.8	7.9	15.7	19.9	38.7	52.1	71.6	97.2	122.4	154.2	209.3
10	4000	2.3	3.8	7.8	14.4	18.1	35.1	47.3	65.0	88.3	111.2	140.1	190.2
11	6000	2.4	4.6	7.5	12.6	15.8	32.8	41.3	56.8	77.1	97.2	122.4	166.2
12	10000	2.4	4.1	7.3	14.0	17.7	30.2	38.0	47.9	65.0	82.0	103.3	140.1

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
2	50	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
3	100	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
4	500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
5	1000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
6	1500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
7	2000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
8	2500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
9	3000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
10	4000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
11	6000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
12	10000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks˜ε>0.96

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	0.8504	0.7941	0.8165	0.8630	0.8471	0.8960	0.9076	0.8672	0.7901	0.8157	0.9071	0.9480
2	50	0.7890	0.8015	0.7507	0.8215	0.8330	0.8499	0.8341	0.8459	0.8591	0.8559	0.9176	0.9244
3	100	0.7912	0.8026	0.7760	0.8402	0.8304	0.8569	0.8272	0.8682	0.8653	0.9241	0.9319	0.9591
4	500	0.7847	0.8219	0.8487	0.8545	0.8612	0.8527	0.9037	0.9308	0.9409	0.9610	0.9686	0.9999
5	1000	0.7091	0.8002	0.8003	0.8532	0.8575	0.8991	0.9232	0.9521	0.9673	0.9797	0.9999	0.9999
6	1500	0.8342	0.8149	0.8022	0.9022	0.8930	0.9255	0.9422	0.9667	0.9792	0.9999	0.9999	0.9999
7	2000	0.7832	0.8575	0.8080	0.8997	0.9067	0.9354	0.9541	0.9728	0.9838	0.9999	0.9999	0.9999
8	2500	0.7212	0.8070	0.7948	0.9274	0.9163	0.9516	0.9630	0.9762	0.9999	0.9999	0.9999	0.9999
9	3000	0.7397	0.8587	0.8015	0.9320	0.9232	0.9557	0.9664	0.9800	0.9999	0.9999	0.9999	0.9999
10	4000	0.7463	0.7792	0.8130	0.9159	0.9325	0.9612	0.9713	0.9833	0.9999	0.9999	0.9999	0.9999
11	6000	0.8166	0.7964	0.8566	0.9301	0.9450	0.9691	0.9772	0.9919	0.9999	0.9999	0.9999	0.9999
12	10000	0.7723	0.7870	0.8433	0.9535	0.9619	0.9775	0.9839	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	0.9510	0.9366	0.9386	0.9537	0.9513	0.9656	0.9692	0.9545	0.9240	0.9298	0.9608	0.9863
2	50	0.9308	0.9369	0.9190	0.9383	0.9427	0.9438	0.9284	0.9241	0.9157	0.9081	0.9337	0.9309
3	100	0.9299	0.9329	0.9237	0.9433	0.9409	0.9363	0.8971	0.9054	0.8684	0.9023	0.8929	0.9190
4	500	0.9158	0.9299	0.9344	0.9204	0.9030	0.8291	0.8603	0.8491	0.7734	0.8007	0.8125	0.8542
5	1000	0.8711	0.8969	0.8876	0.8887	0.8569	0.8307	0.8124	0.8457	0.8213	0.8501	0.8668	0.9159
6	1500	0.9173	0.8854	0.8644	0.8703	0.8732	0.8345	0.8186	0.8758	0.8574	0.8636	0.8725	0.9235
7	2000	0.8810	0.8962	0.8456	0.8760	0.8308	0.8217	0.8313	0.8820	0.8650	0.8714	0.8848	0.9175
8	2500	0.8353	0.8541	0.8099	0.8669	0.8183	0.8607	0.8653	0.8747	0.8777	0.8837	0.8783	0.9113
9	3000	0.8347	0.8776	0.7923	0.8574	0.8076	0.8539	0.8593	0.8868	0.8717	0.8786	0.8725	0.9061
10	4000	0.8176	0.7622	0.7608	0.7988	0.7893	0.8424	0.8483	0.8777	0.8620	0.8704	0.8639	0.8988
11	6000	0.8444	0.7375	0.7838	0.7716	0.7641	0.8427	0.8318	0.8645	0.8490	0.8581	0.8519	0.8884
12	10000	0.7738	0.6401	0.7025	0.8236	0.8187	0.8418	0.8327	0.8466	0.8302	0.8408	0.8344	0.8750

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	0.00589	0.00168	0.00255	0.00664	0.01304	0.0621	0.329822	2.165458	8.947116	24.29535	32.26393	157.5602
2	50	0.00346	0.00217	0.00118	0.00662	0.01357	0.08228	0.67787	1.006973	1.150995	2.894097	5.364806	46.9367
3	100	0.00765	0.0043	0.00127	0.00737	0.02319	0.06468	0.33494	0.511268	0.743038	0.980189	2.809571	7.885062
4	500	0.01329	0.00922	0.00218	0.00816	0.02282	0.07888	0.176426	0.387657	1.261377	4.590157	14.06999	41.76867
5	1000	0.01198	0.01279	0.00507	0.01154	0.03041	0.09957	0.311858	0.764242	3.228786	12.12736	38.33261	119.4427
6	1500	0.02169	0.01649	0.00657	0.01146	0.03413	0.16185	0.513363	1.340043	5.742953	20.84261	65.13178	206.8634
7	2000	0.00791	0.01203	0.00798	0.02776	0.03008	0.22037	0.74405	1.939786	8.361866	30.49125	97.61974	293.397
8	2500	0.00461	0.01798	0.01235	0.01969	0.03735	0.31494	1.05566	2.488266	11.40051	41.77384	127.1147	383.1808
9	3000	0.00601	0.01338	0.0141	0.02308	0.04482	0.38386	1.295782	3.226103	14.07848	51.84329	157.2662	475.7304
10	4000	0.00729	0.01735	0.01748	0.01997	0.05968	0.52539	1.784295	4.463244	19.61501	72.91532	221.5849	674.9018
11	6000	0.01658	0.03551	0.02053	0.02984	0.09024	0.85084	2.793416	7.063549	31.60048	117.4667	360.5739	1101.222
12	10000	0.0583	0.03855	0.02081	0.06019	0.18494	1.55992	5.211457	12.65326	57.24137	215.4729	661.8819	2040.266

Table8 Mass of the bearing m [kg] (TEST_Mass)

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	0.0048	0.0087	0.0189	0.0647	0.1248	0.3622	0.9001	3.9175	20.8340	39.6162	39.6162	74.1818
2	50	0.0025	0.0037	0.0058	0.0274	0.0586	0.2404	0.9001	1.3718	2.2380	5.3668	7.4428	39.6162
3	100	0.0025	0.0037	0.0037	0.0178	0.0414	0.1433	0.5086	0.7013	1.3718	1.5568	3.9175	7.4428
4	500	0.0010	0.0025	0.0011	0.0064	0.0189	0.0886	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
5	1000	0.0009	0.0025	0.0025	0.0058	0.0178	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
6	1500	0.0006	0.0025	0.0025	0.0045	0.0098	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
7	2000	0.0005	0.0011	0.0025	0.0064	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
8	2500	0.0005	0.0025	0.0032	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
9	3000	0.0005	0.0011	0.0032	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
10	4000	0.0005	0.0025	0.0032	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
11	6000	0.0005	0.0032	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
12	10000	0.0009	0.0032	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	2.2	1.48	1.51	2.45	2.52	4.34	5.1	2.89	1.34	1.5	4.62	9.61
2	50	1.29	1.34	1.08	1.72	2.03	2.26	2.05	2.43	2.33	2.7	5.32	6.01
3	100	1.31	1.35	1.11	2.09	2.37	2.27	1.91	3.03	3.09	5.97	7.79	17
4	500	1.35	1.67	2.08	2.21	2.4	2.63	4.4	6.95	9.96	18.35	25.75	62.5
5	1000	0.99	1.39	1.39	2.55	2.55	4.12	5.87	12.78	25.14	33.04	65.51	272.53
6	1500	1.96	1.56	1.42	4.73	3.77	6.14	9.54	22.81	35.28	61.19	112.98	336.78
7	2000	1.53	2.29	1.48	4.16	4.78	7.88	13.72	27.56	39.04	89.95	160.2	298.56
8	2500	1.06	1.47	1.52	7.13	5.41	12.53	19.91	30.28	58.02	121.25	183.75	270.49
9	3000	1.18	2.32	1.59	8.01	6.13	14.62	22.59	33.3	70.89	138.62	170.02	248.63
10	4000	1.22	1.2	1.75	5.64	7.66	18.53	26.39	35.93	92.52	143.52	148.95	219.98
11	6000	2.05	1.53	2.41	7.63	10.65	24.64	31.04	42.38	118.56	117.32	123.86	183.61
12	10000	1.43	1.43	2.07	14.44	19.77	31.34	36.38	66.88	90.77	91.64	96.96	145.6

B. Sommerfeld number So (TEST_SoX)

	▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
1	10	12.57	9.29	8.61	13.52	13.87	23.54	27.04	14.83	6.44	6.77	18.25	33.88
2	50	7.31	8.22	6.06	9.18	10.56	10.39	7.42	6.92	5.18	5.18	7.5	6.96
3	100	7.13	7.33	5.92	10.43	11.07	8.1	4.5	4.91	3.21	4.32	4.1	5.44
4	500	5.71	7.14	7.66	5.56	4.36	2.02	2.37	2.09	1.22	1.33	1.59	2.2
5	1000	3.78	4.19	3.68	4.04	2.53	1.72	1.46	2.01	1.77	2.11	2.88	5.19
6	1500	5.66	3.57	2.66	3.11	2.82	1.79	1.54	2.92	2.63	2.47	3.11	5.89
7	2000	4.23	3.95	2.13	2.93	1.82	1.58	1.73	3.2	2.9	2.75	3.68	5.31
8	2500	2.5	2.34	1.71	2.97	1.62	2.38	2.53	2.88	3.43	3.28	3.36	4.89
9	3000	2.49	3	1.49	2.63	1.48	2.2	2.34	3.44	3.17	3.05	3.11	4.55
10	4000	2.07	1.06	1.21	1.47	1.29	1.94	2.07	3.01	2.79	2.71	2.77	4.1
11	6000	2.78	1.05	1.24	1.21	1.08	1.95	1.73	2.5	2.37	2.3	2.38	3.52
12	10000	1.44	0.55	0.7	1.81	1.62	1.93	1.75	2.03	1.93	1.91	1.96	2.89

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20.1	20.1	20.3	20.6	21.1	22.1	23	22.7	23
50	20.1	20.4	20.3	20.6	21	22.9	26.5	30.8	35.5	38.1	44	47.5
100	20.2	20.8	21.1	21.6	22.6	27.7	34.5	42.1	52.2	61.4	68.7	82.1
500	21.5	23.8	27	34.1	40.2	63.1	72.2	90.4	127.3	152.4	162	200.8
1000	23.4	29.5	32.4	43.7	54.5	85	102.5	120.7	164.4	174.4	209.7	381.7
1500	28	32.7	38.9	65.3	62.3	97.9	122.5	133.8	169	223.6	304.6	562.5
2000	29	38.4	44.7	62.4	86.6	115	137.9	149.3	183.5	291.4	399.4	743.4
2500	30.8	39.5	49.5	79.2	97	115.9	143.9	165.5	222.6	359.3	494.3	924.2
3000	33	44.4	54.6	87.9	107	129.6	160	168.5	263.1	427.2	589.1	1105.1
4000	37.8	55.4	63.8	105.2	126.6	154.9	186.6	189.8	344.2	562.9	778.8	1466.8
6000	42	63.8	74.2	133.1	162.3	191.9	229.1	233.9	506.2	834.3	1158.2	2190.1
10000	50	89.4	99.2	161.1	202.1	240	276.6	376.5	830.4	1377.2	1917	3636.9

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.1	50.3	50.4	50.4	50.7	50.4	50.8	52.0	52.1	52.3	51.4
100	50.0	50.1	50.6	50.6	50.6	51.9	51.9	52.9	56.1	59.1	59.0	59.4
500	50.1	50.3	51.6	53.8	54.6	64.6	65.8	71.0	81.0	76.5	70.8	70.4
1000	50.1	50.7	52.6	56.7	58.7	75.0	76.3	71.9	71.8	66.8	61.8	59.9
1500	50.1	50.9	53.7	61.3	60.8	74.1	75.0	65.2	64.9	64.1	61.2	58.7
2000	50.3	51.3	54.9	57.8	68.3	77.3	72.2	64.2	63.8	62.9	59.8	59.6
2500	50.7	51.6	54.8	61.7	70.8	67.6	64.7	65.4	62.1	61.3	60.6	60.5
3000	50.7	51.8	55.7	63.1	72.8	69.3	66.0	63.5	62.9	62.0	61.2	61.3
4000	50.9	54.7	57.3	74.3	76.2	72.1	68.4	64.9	64.2	63.0	62.2	62.3
6000	50.6	53.6	59.5	79.5	81.3	72.0	72.1	67.3	66.3	65.2	63.9	63.9
10000	50.6	57.9	67.8	69.5	70.7	72.2	71.9	71.6	70.0	68.7	67.0	65.9

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<767	0<965	0<1137	0<1306	0<1306	0<1306	0<1192	0<1192	1<1306	1<1306	2<1306	8<1306
50	0<697	0<833	0<1046	0<1132	0<1137	0<1192	0<1104	1<1085	1<1306	2<1306	4<1306	29<1306
100	0<655	0<792	0<996	0<1033	0<973	0<1104	0<1104	1<1085	2<1306	2<1306	6<1306	20<1306
500	0<567	0<655	0<770	0<893	0<926	1<1066	2<1085	6<1096	27<1197	136<1197	383<1187	364>1168
1000	0<545	0<631	0<783	0<848	1<928	3<1074	12<1092	42<1100	230<1104	802<1092	3111>1077	437>1056
1500	0<494	0<640	0<772	1<816	1<889	10<1036	40<1049	153<1056	659<1052	2911>1036	0207>1024	0392>996
2000	0<515	0<644	0<766	2<840	3<971	22<1011	96<1020	305<1023	1198>1017	6785>999	22435>975	8553>955
2500	0<604	1<683	1<770	2<798	6<958	52<990	209<999	494<999	2573>990	12971>971	35938>950	7888>926
3000	0<578	1<679	2<764	4<792	9<945	84<973	324<979	751<979	4221>968	19574>947	45568>928	8163>903
4000	1<564	2<691	3<755	6<903	19<926	175<947	623<950	1330>947	8708>935	32095>912	65667>893	2156>867
6000	2<514	10<688	6<732	16<879	56<897	475<912	1480>912	3136>906	20777>889	53308>867	10008>843	8596>819
10000	10<503	27<724	17<836	78<848	259<861	1477>869	4187>863	11269>856	39117>836	01372>812	209429>796	7153>764

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<767	0<965	0<1137	0<1306	0<1306	0<1306	0<1192	1<1192	3<1306	7<1306	9<1306	28<1306
50	0<697	0<833	0<1046	0<1132	0<1137	0<1192	1<1104	2<1085	2<1306	4<1306	6<1306	34<1306
100	0<655	0<792	0<996	0<1033	0<973	0<1104	1<1104	1<1085	2<1306	2<1306	3<1306	7<1306
500	0<567	0<655	0<770	0<893	0<926	1<1066	1<1085	2<1096	4<1197	10<1197	25<1187	53<1168
1000	0<545	0<631	0<783	0<848	1<928	1<1074	3<1092	7<1100	17<1104	55<1092	151<1077	409<1056
1500	0<494	1<640	0<772	0<816	1<889	3<1036	7<1049	21<1056	53<1052	131<1036	330<1020	928<996
2000	0<515	1<644	1<766	1<840	1<971	5<1011	13<1020	38<1023	97<1017	242<999	640<979	1367>955
2500	1<604	2<683	1<770	1<798	2<958	10<990	28<999	51<999	170<990	426<971	860<950	1847>926
3000	1<578	1<679	1<764	1<792	2<945	13<973	36<979	84<979	216<968	542<947	1093>928	2358>903
4000	1<564	2<691	2<755	2<903	3<926	20<947	53<950	122<947	316<935	795<912	1602>893	3479>867
6000	2<514	7<688	3<732	3<879	6<897	41<912	92<912	208<906	544<889	1370>867	2767>845	6000>819
10000	11<503	11<724	6<836	10<848	23<861	102<869	232<863	417<856	1089>836	2762>812	5544>790	11898>764

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00290	0.00183	0.00132	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00351	0.00246	0.00156	0.00133	0.00132	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00398	0.00272	0.00172	0.00160	0.00180	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00531	0.00397	0.00288	0.00214	0.00199	0.00150	0.00145	0.00142	0.00119	0.00119	0.00121	0.00125
1000	0.00575	0.00428	0.00278	0.00237	0.00198	0.00148	0.00143	0.00141	0.00140	0.00143	0.00147	0.00153
1500	0.00699	0.00416	0.00286	0.00256	0.00216	0.00159	0.00155	0.00153	0.00154	0.00159	0.00164	0.00172
2000	0.00644	0.00411	0.00291	0.00242	0.00181	0.00167	0.00164	0.00163	0.00165	0.00171	0.00178	0.00187
2500	0.00468	0.00366	0.00288	0.00268	0.00186	0.00174	0.00171	0.00171	0.00174	0.00181	0.00189	0.00199
3000	0.00511	0.00370	0.00292	0.00272	0.00191	0.00180	0.00178	0.00178	0.00182	0.00190	0.00198	0.00209
4000	0.00537	0.00357	0.00299	0.00209	0.00199	0.00190	0.00189	0.00190	0.00195	0.00205	0.00214	0.00227
6000	0.00646	0.00360	0.00318	0.00221	0.00212	0.00205	0.00205	0.00208	0.00216	0.00227	0.00239	0.00254
10000	0.00675	0.00325	0.00244	0.00237	0.00230	0.00226	0.00229	0.00233	0.00244	0.00259	0.00273	0.00292

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00290	0.00183	0.00132	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00351	0.00246	0.00156	0.00133	0.00132	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00398	0.00272	0.00172	0.00160	0.00180	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00531	0.00397	0.00288	0.00214	0.00199	0.00150	0.00145	0.00142	0.00119	0.00119	0.00121	0.00125
1000	0.00575	0.00428	0.00278	0.00237	0.00198	0.00148	0.00143	0.00141	0.00140	0.00143	0.00147	0.00153
1500	0.00699	0.00416	0.00286	0.00256	0.00216	0.00159	0.00155	0.00153	0.00154	0.00159	0.00164	0.00172
2000	0.00644	0.00411	0.00291	0.00242	0.00181	0.00167	0.00164	0.00163	0.00165	0.00171	0.00178	0.00187
2500	0.00468	0.00366	0.00288	0.00268	0.00186	0.00174	0.00171	0.00171	0.00174	0.00181	0.00189	0.00199
3000	0.00511	0.00370	0.00292	0.00272	0.00191	0.00180	0.00178	0.00178	0.00182	0.00190	0.00198	0.00209
4000	0.00537	0.00357	0.00299	0.00209	0.00199	0.00190	0.00189	0.00190	0.00195	0.00205	0.00214	0.00227
6000	0.00646	0.00360	0.00318	0.00221	0.00212	0.00205	0.00205	0.00208	0.00216	0.00227	0.00239	0.00254
10000	0.00675	0.00325	0.00244	0.00237	0.00230	0.00226	0.00229	0.00233	0.00244	0.00259	0.00273	0.00292

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0008	0.0041	0.0086	0.0359	0.0879	0.572	1.8852	10.6395	79.6991	218.0811	195.3094	489.9169
50	0.005	0.0219	0.0368	0.2195	0.4822	4.3302	20.2752	44.4992	112.4097	260.9785	434.7911	1990.194
100	0.0113	0.0481	0.0701	0.3619	0.9882	8.0681	32.1963	57.0251	132.3231	199.8455	470.8903	1123.793
500	0.0531	0.2341	0.2407	1.6874	4.3738	27.2151	54.9447	103.4359	277.2029	638.4925	1372.025	3272.492
1000	0.1188	0.5789	0.7516	2.8957	7.5955	39.069	86.7662	147.8276	373.2012	744.3841	1832.596	6544.985
1500	0.125	0.7734	1.147	2.8686	9.0427	46.7952	107.8577	167.1787	385.0328	981.7477	2748.894	9817.477
2000	0.1436	0.6279	1.5027	5.0812	8.168	57.0939	124.0098	189.8965	422.6734	1308.997	3665.191	13089.97
2500	0.172	1.1883	1.8575	3.7474	9.4429	57.6145	130.3486	213.728	523.5988	1636.246	4581.489	16362.46
3000	0.2079	0.8357	2.1793	4.2997	10.6716	65.8472	147.2028	218.1301	628.3185	1963.495	5497.787	19634.95
4000	0.2841	2.1521	2.7592	5.3962	13.0794	81.0535	175.2665	249.4197	837.758	2617.994	7330.383	26179.94
6000	0.3512	2.7635	3.2978	7.1604	17.4557	103.282	219.9145	314.1593	1256.637	3926.991	10995.57	39269.91
10000	1.0596	4.3766	4.8168	8.9344	22.336	132.176	269.8491	523.5988	2094.395	6544.985	18325.96	65449.85

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0012	0.0026	0.0127	0.0304	0.2032	0.6722	3.9466	26.0862	73.8964	86.1293	196.3495
50	0.0015	0.0062	0.0108	0.0717	0.1661	1.6461	8.5843	22.3809	66.7138	171.0585	349.9462	1819.493
100	0.0034	0.0144	0.0207	0.1281	0.3676	3.5407	18.2325	41.9983	129.4437	256.0013	726.2389	2135.696
500	0.019	0.0844	0.0998	0.8988	3.0377	33.201	80.4844	236.5109	1145.299	3541.595	8505.318	24723.11
1000	0.0476	0.265	0.3731	2.2098	7.6349	72.6397	238.7296	485.2538	2044.712	5893.235	13077.99	33939.43
1500	0.0595	0.4267	0.6892	3.719	10.5844	113.43	373.4352	587.9144	2464.976	8515.083	20986.3	52015.28
2000	0.0747	0.4459	1.1242	6.1881	15.9493	175.274	480.807	797.0914	3320.134	11340.84	27656.52	81382.74
2500	0.0932	0.8117	1.6966	6.6516	22.509	160.223	449.46	1104.606	3992.16	13651.01	38618.71	116228.7
3000	0.1226	0.7012	2.2925	8.7107	29.6713	214.336	599.3584	1258.023	5236.019	17863.96	50676.96	154594.6
4000	0.1932	2.3411	3.6506	14.1073	45.5964	336.994	951.9357	1918.18	8028.715	27423.34	77825.35	240239.6
6000	0.2897	3.6575	5.6261	25.7235	82.7448	544.071	1795.43	3530.156	14915.61	51657.59	145091.1	442676.5
10000	1.0518	8.7702	10.7566	34.0149	111.014	1008.14	3317.535	7951.287	33203.34	116592.8	324675.1	940533.6

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1.

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: L-BD0.8P5

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=0.8; Maximum permissible specific bearing load plim=5 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	13 | 12	17 | 15	24 | 20	40 | 40	50 | 40	90 | 80	140 | 115	300 | 250	500 | 400	700 | 500	1000 | 500	1500 | 500
50	9 | 8	12 | 10	14 | 12	28 | 25	37 | 30	80 | 70	150 | 120	200 | 180	250 | 200	300 | 250	500 | 400	700 | 500
100	10 | 8	12 | 10	12 | 10	24 | 20	32 | 30	70 | 60	110 | 100	125 | 100	170 | 150	200 | 180	300 | 250	400 | 350
500	7 | 6	10 | 8	8 | 7	15 | 12	24 | 20	45 | 40	55 | 50	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
1000	6 | 5	9 | 8	9 | 8	15 | 12	24 | 20	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
1500	7 | 6	9 | 8	10 | 8	14 | 12	20 | 20	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
2000	6 | 5	8 | 7	9 | 8	15 | 12	20 | 20	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
2500	5 | 4	8 | 7	10 | 8	15 | 12	17 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
3000	5 | 4	8 | 7	12 | 10	15 | 12	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
4000	5 | 4	8 | 7	10 | 8	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
6000	5 | 4	10 | 8	10 | 8	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
10000	7 | 6	10 | 8	12 | 10	13 | 12	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	68	100	100	68	68
100	68	100	100	68	68	68	100	150	150	220	150	150
500	46	68	100	100	100	150	220	320	460	320	220	220
1000	46	68	68	100	68	150	220	150	100	100	68	46
1500	32	46	68	100	100	150	150	68	68	46	46	32
2000	32	46	68	68	100	100	100	46	46	32	32	32
2500	32	32	46	68	100	68	46	32	32	32	32	32
3000	32	32	46	68	100	68	46	32	32	32	32	32
4000	22	32	46	100	100	46	32	32	32	32	32	32
6000	22	22	46	100	100	46	32	32	32	32	32	32
10000	10	15	22	22	22	22	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0	1	1	1	0	0	0	0	1	0	0	0
50	1	1	1	1	0	1	1	1	1	0	0	0
100	1	1	1	1	0	1	1	0	0	0	0	0
500	1	1	2	1	0	0	0	0	1	2	3	4
1000	1	1	1	0	0	0	2	2	3	4	5	5
1500	1	1	1	1	0	2	2	3	4	4	5	5
2000	1	1	1	1	1	2	2	3	4	5	5	5
2500	2	1	1	1	1	2	3	4	5	5	5	5
3000	2	1	2	1	2	2	3	4	5	5	5	5
4000	1	1	0	1	2	3	4	4	5	5	5	5
6000	1	1	1	2	2	3	4	5	5	5	5	5
10000	0	0	2	2	3	5	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	2	2	0	0	0	0	2
50	1	1	1	1	1	1	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	0
500	1	1	1	1	0	0	0	0	1	1	1	1
1000	1	1	1	1	0	0	0	0	0	0	0	0
1500	0	1	1	1	1	1	0	0	0	0	0	0
2000	1	1	1	1	1	0	0	0	0	0	0	0
2500	1	1	0	1	1	0	0	0	0	0	0	1
3000	1	1	1	0	1	0	0	0	0	0	0	1
4000	1	0	1	2	1	0	0	0	0	0	0	1
6000	1	1	1	1	1	0	0	0	0	0	1	1
10000	1	2	2	2	1	0	0	0	1	2	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.16	0.26	0.37	0.52	0.79
50	0.02	0.03	0.04	0.07	0.1	0.21	0.39	0.52	0.65	0.79	1.31	1.83
100	0.05	0.06	0.06	0.13	0.17	0.37	0.58	0.65	0.89	1.05	1.57	2.09
500	0.18	0.26	0.21	0.39	0.63	1.18	1.44	1.96	3.01	4.19	6.54	10.47
1000	0.31	0.47	0.47	0.79	1.26	1.94	2.62	3.93	6.02	8.38	13.09	20.94
1500	0.55	0.71	0.79	1.1	1.57	2.91	3.93	5.89	9.03	12.57	19.63	31.42
2000	0.63	0.84	0.94	1.57	2.09	3.87	5.24	7.85	12.04	16.76	26.18	41.89
2500	0.65	1.05	1.31	1.96	2.23	4.84	6.54	9.82	15.05	20.94	32.72	52.36
3000	0.79	1.26	1.88	2.36	2.51	5.81	7.85	11.78	18.06	25.13	39.27	62.83
4000	1.05	1.68	2.09	2.51	3.35	7.75	10.47	15.71	24.09	33.51	52.36	83.78
6000	1.57	3.14	3.14	3.77	5.03	11.62	15.71	23.56	36.13	50.27	78.54	125.66
10000	3.67	5.24	6.28	6.81	8.38	19.37	26.18	39.27	60.21	83.78	130.9	209.44

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.06	0.2	0.21	0.31	0.5	0.69	0.62	0.27	0.25	0.29	0.4	0.67
50	0.14	0.42	0.6	0.71	0.9	0.89	0.56	0.56	1	1.33	1	1.43
100	0.12	0.42	0.83	1.04	1.04	1.19	0.91	1.6	1.96	2.78	2.67	3.57
500	0.24	0.62	1.79	2.78	2.08	2.78	3.64	4.44	4.35	4.17	4	3.57
1000	0.33	0.69	1.39	2.78	2.08	4.5	5	4.44	4.35	4.17	4	3.57
1500	0.24	0.69	1.25	2.98	2.5	4.5	5	4.44	4.35	4.17	4	3.57
2000	0.33	0.89	1.39	2.78	2.5	4.5	5	4.44	4.35	4.17	4	3.57
2500	0.5	0.89	1.25	2.78	3.92	4.5	5	4.44	4.35	4.17	4	3.57
3000	0.5	0.89	0.83	2.78	4.17	4.5	5	4.44	4.35	4.17	4	3.57
4000	0.5	0.89	1.25	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
6000	0.5	0.62	1.25	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
10000	0.24	0.62	0.83	3.21	4.17	4.5	5	4.44	4.35	4.17	4	3.57

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.1>4.5	5.8>4.5	6.1>4.5	7.4>4.9	5.7>5.2	8.7>6.1	12.9>7.1	49.9>8.65	85.9>9.41	99.7>9.52	65.8>9.74	39>10.05
50	6.5>4.5	6.1>4.5	4.8>4.5	7>4.6	7.3>4.8	16.5>5.77	34.4>7.01	45.9>7.44	40.3>7.89	37.3>8.25	49.7>9.25	41.5>9.69
100	8.1>4.5	6.8>4.5	4.7>4.5	6.3>4.5	8.5>4.63	15.2>5.32	31.3>6.12	24.5>6.39	23.6>7.12	22.5>7.39	21.4>8.41	17.1>9.36
500	7.2>4.4	7>4.31	4.3<4.37	4.2<4.21	6.8>4.1	9.8>4.57	8.7>4.93	8.1>5.57	8.7>6.9	7.2<8.05	6.6<9.49	8.9<11.63
1000	6.8>4.26	7.9>4.16	5.1>4.16	4.1>4.05	5.4>4.06	4.8>4.68	5.1<5.32	4.9<6.26	4.2<7.6	4.1<9.15	2.3<10.7	0<12.64
1500	8.8>4.13	7.2>4.07	5.4>4.05	3.8<3.98	5.7>4.21	4.1<5.11	3.7<5.66	3.3<6.8	3.2<8.44	2.5<9.9	0<11.25	0<13.7
2000	7>4.1	6.1>4.04	5.3>4.01	3.1<4.21	5.7>4.36	3.2<5.26	3<5.92	2.8<7.26	2.7<8.91	1.2<10.27	0<11.92	0<15.27
2500	5.1>4.09	5.4>3.99	4.8>4.15	2.9<4.37	3.5<4.45	2.5<5.43	2.3<6.19	2.5<7.83	2<9.18	0<10.64	0<12.7	0<16.85
3000	5.4>4.05	5.5>4.06	7.5>4.28	2.7<4.54	2.3<4.63	2.3<5.6	2.1<6.46	2.3<8.01	1.7<9.46	0<11.02	0<13.58	0<18.34
4000	4.9>3.99	5.5>4.2	4.5>4.36	2.5<4.63	2<4.89	2<5.86	1.8<7.03	2<8.38	1.2<10.03	0<12	0<15.55	0<21.51
6000	5.1>4.21	5.9>4.8	4.1<4.8	2.1<4.87	1.6<5.02	1.7<6.41	1.6<7.48	1.5<9.13	0<11.49	0<14.46	0<19.42	0<27.68
10000	7.2>4.87	5.2>5.02	5.5>5.19	1.6<5.18	1<5.45	1.3<7.15	1.2<8.52	0.9<11.08	0<15.04	0<19.51	0<27.28	0.1<40.24

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.5<4.5	1.4<4.5	1.6<4.5	1.9<4.9	1.6<5.2	2.3<6.1	3.6<7.1	14.1>8.65	27.5>9.41	31.7>9.52	24.7>9.74	10.3>10.05
50	1.9<4.5	1.7<4.5	1.4<4.5	1.9<4.6	2.1<4.8	5.3<5.77	13>7.01	18>7.44	21.4>7.89	21.5>8.25	32.4>9.25	30.8>9.69
100	2.6<4.5	2.1<4.5	1.5<4.5	1.9<4.5	2.4<4.63	5.8>5.32	15.4>6.12	13.9>6.39	18.9>7.12	21.5>7.39	25.8>8.41	28.5>9.36
500	2.7<4.4	2.6<4.31	1.5<4.37	2.1<4.21	4.4>4.1	9.5>4.57	11.6>4.93	14.9>5.57	25.9>6.9	34.8>8.05	45>9.49	81.7>11.63
1000	2.8<4.26	3.6<4.16	2.5<4.16	3.3<4.05	5.3>4.06	7.5>4.68	10.8>5.32	15.2>6.26	20.8>7.6	31.4>9.15	36>10.7	55.6>12.64
1500	4.2>4.13	3.9<4.07	3.7<4.05	3.8<3.98	7.1>4.21	9.1>5.11	11.3>5.66	12.5>6.8	20.6>8.44	26.3>9.9	38.3>11.25	57.3>13.7
2000	3.5<4.1	3.5<4.04	3.9<4.01	3.8<4.21	7.8>4.36	8.9>5.26	11>5.92	12.5>7.26	20.6>8.91	25.4>10.27	37.3>11.92	67>15.27
2500	2.8<4.09	3.3<3.99	4.2>4.15	4.4>4.37	5.3>4.45	8.1>5.43	8.6>6.19	11.8>7.83	19.3>9.18	28.8>10.64	42.1>12.7	75.8>16.85
3000	3.1<4.05	3.9<4.06	7.3>4.28	4.9>4.54	5.4>4.63	8.9>5.6	9.5>6.46	13.1>8.01	21.3>9.46	32>11.02	46.3>13.58	84>18.34
4000	2.9<3.99	4.7>4.2	5.5>4.36	4.3<4.63	6.1>4.89	9>5.86	9.3>7.03	15.3>8.38	25>10.03	37.7>12	54.1>15.55	98.5>21.51
6000	3.6<4.21	7.1>4.8	6.6>4.8	5>4.87	7.1>5.02	11.1>6.41	11.6>7.48	19.1>9.13	31.3>11.49	47.2>14.46	67.6>19.42	23.5>27.68
10000	7.7>4.87	7.6>5.02	8.6>5.19	5.1<5.18	5.3<5.45	10.4>7.15	15.3>8.52	24.9>11.08	40.8>15.04	61.4>19.51	88.9>27.28	62.3>40.24

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.6	12.7	18.9	38.7	48.6	88.9	138.0	268.4	442.5	557.5	751.2	1112.3
50	5.1	7.5	11.5	27.0	35.1	75.3	140.7	190.7	228.3	287.6	410.8	557.5
100	4.7	6.9	9.5	22.2	30.3	66.5	105.9	120.5	163.5	187.3	259.5	352.2
500	3.2	4.8	6.4	14.9	22.6	44.4	50.8	58.3	72.3	99.6	138.0	187.3
1000	2.5	3.9	6.7	14.2	23.8	35.2	40.4	55.9	84.1	105.9	151.3	219.6
1500	2.6	4.0	6.2	13.3	19.4	30.8	38.8	61.4	83.3	112.2	141.4	209.3
2000	2.3	3.7	5.9	14.6	18.1	31.0	39.0	59.6	80.9	111.2	140.1	190.2
2500	2.2	4.0	6.4	14.3	16.8	32.6	43.9	60.4	82.0	103.3	130.1	176.6
3000	2.0	3.8	6.3	14.1	15.8	30.7	41.3	56.8	77.1	97.2	122.4	166.2
4000	2.2	3.5	6.2	11.4	14.4	29.8	41.0	51.6	70.1	88.3	111.2	151.0
6000	1.9	3.7	5.9	10.0	12.6	26.0	35.8	45.1	61.2	77.1	97.2	131.9
10000	2.2	3.8	6.4	12.1	15.3	26.1	30.2	38.0	51.6	65.0	82.0	111.2

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
50	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
100	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
3000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
4000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
6000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
10000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks˜ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.7076	0.6765	0.6718	0.6558	0.7701	0.8072	0.8462	0.7227	0.6563	0.7151	0.8684	0.9480
50	0.6255	0.6253	0.6284	0.6730	0.7329	0.6557	0.6724	0.6837	0.6774	0.7513	0.8010	0.8814
100	0.6140	0.6223	0.6004	0.6976	0.7318	0.6895	0.5938	0.7299	0.7219	0.7754	0.8576	0.9144
500	0.6356	0.6646	0.6602	0.7709	0.7401	0.7180	0.7897	0.8518	0.8746	0.9245	0.9555	0.9636
1000	0.6283	0.6207	0.6324	0.7877	0.7876	0.8305	0.8613	0.9081	0.9477	0.9638	0.9871	0.9999
1500	0.6404	0.6425	0.6450	0.8012	0.7570	0.8646	0.9058	0.9435	0.9635	0.9795	0.9999	0.9999
2000	0.6357	0.6513	0.6366	0.8473	0.6928	0.9000	0.9284	0.9540	0.9717	0.9911	0.9999	0.9999
2500	0.5829	0.6724	0.6983	0.8591	0.7873	0.9231	0.9475	0.9615	0.9793	0.9999	0.9999	0.9999
3000	0.5982	0.6520	0.5810	0.8692	0.8580	0.9307	0.9523	0.9657	0.9833	0.9999	0.9999	0.9999
4000	0.6530	0.6557	0.7253	0.8125	0.8804	0.9443	0.9612	0.9720	0.9890	0.9999	0.9999	0.9999
6000	0.6950	0.6923	0.7572	0.8455	0.9101	0.9549	0.9696	0.9803	0.9999	0.9999	0.9999	0.9999
10000	0.7023	0.7056	0.6211	0.9007	0.9483	0.9685	0.9795	0.9892	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9260	0.9212	0.9116	0.9116	0.9373	0.9497	0.9572	0.9219	0.8899	0.9096	0.9507	0.9863
50	0.8924	0.8982	0.8915	0.9105	0.9247	0.8891	0.8766	0.8760	0.8285	0.8566	0.8702	0.9120
100	0.8760	0.8848	0.8734	0.9105	0.9229	0.8815	0.8003	0.8470	0.7772	0.7853	0.8280	0.8575
500	0.8639	0.8766	0.8817	0.8840	0.8301	0.7276	0.7181	0.7269	0.6278	0.6347	0.6972	0.6650
1000	0.8469	0.8285	0.8222	0.8281	0.7896	0.7374	0.7078	0.7173	0.7416	0.7195	0.7984	0.8134
1500	0.8283	0.8084	0.7593	0.7991	0.6971	0.7000	0.7152	0.7854	0.7664	0.7868	0.8074	0.8284
2000	0.8177	0.7999	0.7297	0.8100	0.5820	0.7207	0.7359	0.7964	0.7807	0.8079	0.8254	0.8149
2500	0.7742	0.7982	0.7327	0.7880	0.6822	0.7551	0.8016	0.8152	0.8051	0.7932	0.8141	0.8025
3000	0.7715	0.7556	0.5966	0.7668	0.6652	0.7375	0.7889	0.8044	0.7927	0.7803	0.8049	0.7921
4000	0.7931	0.7090	0.6625	0.6705	0.6361	0.7473	0.8034	0.7847	0.7719	0.7584	0.7891	0.7751
6000	0.7856	0.6297	0.6075	0.6327	0.6001	0.7097	0.7733	0.7518	0.7407	0.7271	0.7618	0.7470
10000	0.6805	0.5667	0.4127	0.6784	0.7228	0.7505	0.7293	0.7099	0.6991	0.6855	0.7255	0.7102

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00178	0.00091	0.00149	0.00289	0.00516	0.0266	0.148684	1.16842	3.267123	8.911211	31.606	157.5602
50	0.00134	0.00081	0.00062	0.00434	0.00891	0.05253	0.41543	1.028942	0.860889	1.550812	7.807896	21.27532
100	0.00347	0.00161	0.00065	0.00519	0.01502	0.07153	0.219542	0.314477	0.468751	0.759498	2.62973	6.636817
500	0.00513	0.00502	0.0013	0.00529	0.017	0.06214	0.107646	0.24403	0.655343	1.841591	7.018425	29.61323
1000	0.00429	0.00595	0.00298	0.00915	0.02951	0.06413	0.143079	0.474103	1.820061	4.954765	19.71944	91.27798
1500	0.0139	0.00784	0.00476	0.01098	0.02587	0.09644	0.233318	0.859121	3.10072	9.058829	33.37438	157.4692
2000	0.0072	0.0064	0.00476	0.01839	0.02212	0.13946	0.337607	1.234683	4.505346	13.3803	49.32941	222.3356
2500	0.00265	0.0075	0.00765	0.02222	0.01937	0.19066	0.488859	1.663073	6.183583	17.23048	64.02707	288.818
3000	0.00342	0.00744	0.01164	0.02588	0.02015	0.22864	0.593947	2.037722	7.56531	21.19916	79.43312	358.6267
4000	0.0053	0.00881	0.01069	0.01143	0.02643	0.32493	0.856684	2.790609	10.41245	29.28698	111.409	504.7066
6000	0.00914	0.01984	0.01457	0.01685	0.03932	0.49225	1.318998	4.306068	16.35591	46.3977	177.4246	807.6707
10000	0.04055	0.02526	0.02017	0.04404	0.08682	0.9611	2.260838	7.503061	28.71275	81.93346	319.1803	1459.789

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0064	0.0103	0.0189	0.0829	0.1295	0.4562	1.0104	4.6626	14.8857	34.7234	49.5203	74.1818
50	0.0020	0.0050	0.0069	0.0370	0.0577	0.3561	1.1283	2.2473	3.1135	4.6626	14.8857	34.7234
100	0.0022	0.0050	0.0050	0.0189	0.0503	0.2682	0.6936	0.7861	1.5953	2.2473	4.6626	10.4355
500	0.0012	0.0022	0.0016	0.0073	0.0189	0.1171	0.1773	0.2867	0.7244	1.5028	3.1135	10.4355
1000	0.0009	0.0020	0.0020	0.0073	0.0189	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
1500	0.0012	0.0020	0.0022	0.0069	0.0159	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
2000	0.0009	0.0016	0.0020	0.0073	0.0159	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
2500	0.0006	0.0016	0.0022	0.0073	0.0103	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
3000	0.0006	0.0016	0.0050	0.0073	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
4000	0.0006	0.0016	0.0022	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
6000	0.0006	0.0022	0.0022	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
10000	0.0012	0.0022	0.0050	0.0064	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.06	1.68	1.54	1.76	2.46	3.45	4.51	1.99	1.36	1.62	3.66	9.61
50	1.3	1.21	1.27	1.68	2.04	1.5	1.48	1.78	1.52	2.31	3	5.75
100	1.09	1.19	1.06	1.76	2.35	1.74	1.14	1.98	2.1	2.84	5.09	9.4
500	1.32	1.42	1.54	2.47	2.18	2.08	3.12	4.67	6.18	11.53	22.49	31.34
1000	1.23	1.27	1.35	2.74	2.84	3.86	5.13	8.21	17.59	32.24	55.06	97.63
1500	1.35	1.43	1.28	3.2	2.84	5.35	7.97	15.36	31.15	49.3	97.09	162.58
2000	1.28	1.47	1.38	4.46	2.09	7.52	11.47	21.25	40.25	61.14	139.31	197.14
2500	0.92	1.63	1.69	5.01	2.99	10.48	16.88	28.32	48.22	77.59	161.8	179.85
3000	1	1.47	0.97	5.55	5.55	12.04	19.84	32.78	52.21	92.22	164.38	165.9
4000	1.34	1.5	1.94	3.39	6.86	15.7	27.98	39.75	57.95	113.84	143.52	146.25
6000	1.66	1.64	2.29	4.52	9.18	22.06	37.08	48.3	74.12	110.65	117.32	121.03
10000	1.85	1.75	1.18	8.23	18.42	35.96	47.5	57.17	82.7	84.72	91.64	95.63

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	11.75	10.56	8.8	9.69	13.54	18.84	24.22	10.39	6.78	7.74	14.6	33.88
50	7.4	7.51	7.16	9	10.78	7.1	5.96	6.4	3.75	5.04	5.6	8.01
100	5.93	6.62	5.93	8.67	11.2	6.53	3.34	4.45	2.82	3.01	3.86	5.26
500	5.51	5.97	6.63	6.41	3.93	2.18	2.13	1.95	1.29	1.46	1.68	1.57
1000	4.59	4.08	3.87	3.74	2.88	2.09	1.77	1.86	2.29	2.22	2.94	3.56
1500	3.95	3.47	2.31	3.15	2.13	1.73	1.84	2.7	2.61	3.15	3.15	4.02
2000	3.53	3.23	2.2	3.21	1.21	1.92	2.04	2.9	2.84	3.61	3.65	3.6
2500	2.51	3.19	2.01	2.74	1.73	2.29	3.01	3.35	3.33	3.27	3.32	3.29
3000	2.48	2.48	1.04	2.41	1.71	2.09	2.75	3.08	3.06	3.03	3.09	3.07
4000	2.84	1.96	1.41	1.53	1.47	2.2	3.05	2.68	2.7	2.69	2.76	2.76
6000	2.7	1.18	1.05	1.25	1.22	1.82	2.5	2.22	2.28	2.3	2.35	2.37
10000	1.66	0.85	0.48	1.79	2.25	2.24	1.98	1.79	1.85	1.88	1.94	1.97

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20.1	20.1	20.2	20.4	20.9	21.6	22.1	22.5	23
50	20.1	20.2	20.3	20.5	20.8	22.6	24.9	26.6	33.8	36	38.2	43.8
100	20.2	20.5	20.7	21.9	22.4	26.3	31	36.6	47.5	53.5	59.6	67.3
500	21.8	24.2	24.8	33.6	40.4	55.1	67.1	81.4	109	127.9	153.1	178
1000	23.7	28.6	31.1	46.6	52.9	75.7	91.7	105.9	132.1	172.7	193.7	256.7
1500	26.4	31.6	39.8	54.8	62.7	94.5	107.7	117.9	162.7	197.8	280.5	375.1
2000	27.5	33.8	42.8	61.9	75	104.2	120.7	139.1	191	223.2	367.4	493.5
2500	28	35.1	48.3	70.1	75.8	110.3	124.7	156.7	206.9	274	454.2	611.9
3000	29.9	38.6	51.4	77.7	98.6	123.1	141.2	177.5	228.5	324.8	541.1	730.2
4000	31.4	45	62.4	85.9	116.7	143.1	167.1	214.4	265.7	426.4	714.7	967
6000	37.6	62.3	78.4	108.1	147.5	190.4	221	275.5	359.8	629.6	1062.1	1440.5
10000	54.3	81.2	94.9	129.4	176	262.1	309	375.5	586.4	1036.1	1756.8	2387.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.2	50.1	50.1	50.2	50.2	50.1	50.0
50	50.0	50.2	50.4	50.5	50.5	51.0	50.6	50.7	52.3	52.6	51.6	51.7
100	50.0	50.3	50.9	50.8	50.7	51.6	52.3	53.3	56.7	59.3	57.0	57.8
500	50.1	50.5	52.2	54.1	54.7	62.3	66.9	71.4	82.8	78.7	72.6	72.5
1000	50.2	51.0	52.9	56.6	56.3	70.4	76.5	72.5	68.8	69.2	63.2	60.4
1500	50.2	51.3	54.2	58.9	61.8	74.6	75.5	65.7	66.5	63.8	62.5	59.5
2000	50.4	51.9	55.3	57.6	70.5	72.1	73.0	64.7	65.3	62.3	61.1	60.3
2500	51.0	51.9	54.9	58.9	71.9	68.6	66.0	63.0	63.3	63.4	62.0	61.1
3000	51.0	52.6	56.8	60.1	74.3	70.4	67.3	63.9	64.3	64.3	62.7	61.8
4000	50.8	53.5	57.5	75.7	78.0	69.3	65.8	65.8	66.0	66.0	64.0	63.0
6000	50.9	54.0	60.2	81.2	83.4	73.4	68.9	68.9	68.8	68.6	66.3	65.1
10000	50.6	55.9	69.2	67.7	68.4	69.0	73.8	73.3	73.1	72.6	69.6	68.0

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<729	0<901	0<1052	0<1263	0<1306	0<1306	0<1192	0<1192	0<1306	1<1306	2<1306	8<1306
50	0<664	0<793	0<965	0<1059	0<1074	0<1192	0<1104	1<1085	1<1306	1<1306	5<1306	12<1306
100	0<638	0<757	0<928	0<990	0<928	0<1104	0<1104	0<1085	1<1306	1<1306	4<1306	10<1306
500	0<550	0<639	0<736	0<838	0<885	1<1049	1<1066	2<1085	9<1187	34<1197	166<1197	637<1182
1000	0<527	0<608	0<741	0<818	1<899	2<1052	4<1074	17<1092	87<1104	315<1104	1320>1092	3188>1070
1500	0<494	0<617	0<747	0<795	1<852	5<1020	13<1036	65<1049	312<1056	968<1052	4460>1036	9285>1011
2000	0<515	0<625	0<727	1<796	2<958	12<996	32<1011	149<1020	660<1023	1960>1017	10050>999	15916>971
2500	0<588	0<643	1<735	2<789	2<933	26<979	70<990	294<999	1159>996	3572>990	16410>971	18095>943
3000	0<564	1<657	1<754	3<783	4<919	41<965	113<973	465<979	1713>976	5669>968	22310>947	20720>919
4000	0<551	1<651	2<723	2<885	7<903	90<943	263<947	922<950	3096>945	10954>935	32095>912	27773>883
6000	1<505	6<665	5<712	6<863	21<879	257<910	702<912	2237>912	7660>901	20777>889	53308>867	46690>836
10000	13<497	19<697	20<836	41<840	106<848	1016>869	2146>869	6207>863	19545>850	39117>836	01372>813	80554>780

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<729	0<901	0<1052	0<1263	0<1306	0<1306	0<1192	1<1192	2<1306	3<1306	9<1306	28<1306
50	0<664	0<793	0<965	0<1059	0<1074	0<1192	1<1104	2<1085	1<1306	2<1306	8<1306	17<1306
100	0<638	0<757	0<928	0<990	0<928	0<1104	1<1104	1<1085	1<1306	1<1306	3<1306	6<1306
500	0<550	0<639	0<736	0<838	0<885	1<1049	1<1066	1<1085	2<1187	5<1197	13<1197	35<1182
1000	0<527	0<608	0<741	0<818	1<899	1<1052	1<1074	4<1092	12<1104	23<1104	77<1092	257<1070
1500	1<494	0<617	0<747	0<795	1<852	2<1020	3<1036	12<1049	28<1056	68<1052	167<1036	584<1011
2000	1<515	1<625	0<727	1<796	1<958	3<996	6<1011	22<1020	51<1023	129<1017	321<999	857<971
2500	0<588	1<643	1<735	1<789	1<933	6<979	13<990	37<999	89<996	174<990	431<971	1153>943
3000	1<564	1<657	1<754	2<783	1<919	7<965	17<973	47<979	113<976	222<968	549<947	1473>919
4000	1<551	1<651	1<723	1<885	2<903	13<943	31<947	69<950	165<945	326<935	808<912	2173>883
6000	2<505	4<665	2<712	2<863	3<879	23<910	53<912	118<912	285<901	565<889	1397>867	3761>836
10000	12<497	9<697	8<836	9<840	14<848	72<869	105<869	237<863	572<850	1136>836	2807>812	7560>780

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00321	0.00210	0.00154	0.00107	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00387	0.00271	0.00183	0.00152	0.00148	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00419	0.00298	0.00198	0.00174	0.00198	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00563	0.00418	0.00315	0.00243	0.00218	0.00155	0.00150	0.00145	0.00121	0.00119	0.00119	0.00122
1000	0.00613	0.00461	0.00311	0.00255	0.00211	0.00154	0.00148	0.00143	0.00140	0.00140	0.00143	0.00149
1500	0.00699	0.00448	0.00306	0.00270	0.00235	0.00164	0.00159	0.00155	0.00153	0.00154	0.00159	0.00167
2000	0.00644	0.00437	0.00323	0.00269	0.00186	0.00172	0.00167	0.00164	0.00163	0.00165	0.00171	0.00181
2500	0.00493	0.00412	0.00316	0.00274	0.00196	0.00178	0.00174	0.00171	0.00172	0.00174	0.00181	0.00192
3000	0.00536	0.00395	0.00300	0.00278	0.00202	0.00183	0.00180	0.00178	0.00179	0.00182	0.00190	0.00202
4000	0.00561	0.00402	0.00326	0.00218	0.00209	0.00192	0.00190	0.00189	0.00191	0.00195	0.00205	0.00219
6000	0.00670	0.00386	0.00336	0.00229	0.00221	0.00206	0.00205	0.00205	0.00210	0.00216	0.00227	0.00244
10000	0.00690	0.00351	0.00244	0.00242	0.00237	0.00226	0.00226	0.00229	0.00236	0.00244	0.00259	0.00280

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00321	0.00210	0.00154	0.00107	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00387	0.00271	0.00183	0.00152	0.00148	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00419	0.00298	0.00198	0.00174	0.00198	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00563	0.00418	0.00315	0.00243	0.00218	0.00155	0.00150	0.00145	0.00121	0.00119	0.00119	0.00122
1000	0.00613	0.00461	0.00311	0.00255	0.00211	0.00154	0.00148	0.00143	0.00140	0.00140	0.00143	0.00149
1500	0.00699	0.00448	0.00306	0.00270	0.00235	0.00164	0.00159	0.00155	0.00153	0.00154	0.00159	0.00167
2000	0.00644	0.00437	0.00323	0.00269	0.00186	0.00172	0.00167	0.00164	0.00163	0.00165	0.00171	0.00181
2500	0.00493	0.00412	0.00316	0.00274	0.00196	0.00178	0.00174	0.00171	0.00172	0.00174	0.00181	0.00192
3000	0.00536	0.00395	0.00300	0.00278	0.00202	0.00183	0.00180	0.00178	0.00179	0.00182	0.00190	0.00202
4000	0.00561	0.00402	0.00326	0.00218	0.00209	0.00192	0.00190	0.00189	0.00191	0.00195	0.00205	0.00219
6000	0.00670	0.00386	0.00336	0.00229	0.00221	0.00206	0.00205	0.00205	0.00210	0.00216	0.00227	0.00244
10000	0.00690	0.00351	0.00244	0.00242	0.00237	0.00226	0.00226	0.00229	0.00236	0.00244	0.00259	0.00280

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0005	0.0027	0.006	0.0302	0.0595	0.4207	1.3696	9.8258	44.8848	115.0159	211.1594	489.9169
50	0.0031	0.0156	0.0235	0.1605	0.3699	3.9232	17.786	41.8707	104.0475	185.2239	520.1021	1279.298
100	0.0087	0.0346	0.0494	0.3111	0.7512	7.2984	29.491	50.092	110.3319	210.9596	457.2913	1046.815
500	0.0353	0.1821	0.2029	1.0818	3.3607	22.7633	40.8219	87.4512	236.5183	444.8067	1003.208	3493.783
1000	0.0698	0.3752	0.4869	2.1153	5.4169	25.3768	56.6038	122.4	298.0014	629.3704	1308.997	5235.988
1500	0.1294	0.5083	0.8578	2.795	7.2829	33.9325	69.2426	139.5128	379.2792	733.1387	1963.495	7853.982
2000	0.1429	0.5798	0.9971	3.3229	9.374	38.3249	79.5055	169.7682	454.4642	837.758	2617.994	10471.98
2500	0.1424	0.636	1.2214	3.9765	8.5244	41.1184	82.6422	194.8059	496.7009	1047.198	3272.492	13089.97
3000	0.1766	0.7844	2.3861	4.5846	6.8769	46.963	95.6902	224.3857	554.1108	1256.637	3926.991	15707.96
4000	0.2038	1.0513	1.8323	5.0016	8.4551	56.0638	116.1324	277.0512	653.1413	1675.516	5235.988	20943.95
6000	0.3143	1.8276	2.5251	6.6886	11.1505	77.593	158.6685	364.1625	903.2079	2513.274	7853.982	31415.93
10000	0.6885	2.6439	5.6863	8.8805	13.6419	110.24	228.1342	506.6048	1505.347	4188.79	13089.97	52359.88

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0002	0.0009	0.002	0.0108	0.0216	0.1612	0.5477	3.5997	16.2639	41.9583	87.4775	196.3495
50	0.0011	0.0049	0.0079	0.0569	0.1347	1.4957	7.3908	19.2115	56.7435	114.898	364.4984	1027.485
100	0.003	0.0117	0.0167	0.115	0.3005	3.2335	14.6037	29.8913	90.5352	203.078	531.6306	1482.504
500	0.0143	0.0735	0.0821	0.6147	2.2933	22.0237	52.69	151.9539	629.5922	1544.171	4617.061	19328.06
1000	0.0296	0.1756	0.2442	1.74	5.3694	37.8891	110.5976	310.0925	989.1229	2761.465	7532.248	27399.6
1500	0.0637	0.2813	0.5703	2.8204	8.7682	69.0265	173.6755	389.7777	1482.6	3614.272	12021.67	42884.27
2000	0.072	0.3414	0.7291	4.0185	13.1653	89.7592	226.0365	522.9575	1990.847	4737.767	15780.1	66108.11
2500	0.0722	0.4053	1.0811	5.6755	12.3512	102.667	225.6015	622.6624	2370.448	6642.119	22095.94	92741.67
3000	0.0952	0.5512	2.2704	7.546	14.2499	135.019	297.0645	819.5431	3122.158	8755.819	29089.73	122275.2
4000	0.1211	0.8785	2.2902	8.5632	21.5948	182.194	390.7648	1270.986	4831.124	13528.35	45074.25	189331.9
6000	0.2244	2.2834	4.2899	15.4082	38.4876	335.057	723.3012	2355.549	8932.031	24963.83	83802.91	351289.2
10000	0.7416	4.267	11.2447	22.5114	46.2763	529.931	1564.546	5092.943	19266.01	53731.39	181886.3	761432

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: L-BD1.2P5

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=1.2; Maximum permissible specific bearing load plim=5 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	14 | 20	17 | 25	24 | 30	40 | 50	50 | 60	90 | 115	140 | 180	300 | 400	500 | 500	700 | 500	1000 | 500	1500 | 500
50	9 | 12	12 | 15	14 | 20	28 | 40	35 | 50	75 | 100	125 | 150	170 | 250	250 | 300	300 | 400	400 | 500	700 | 500
100	10 | 12	12 | 15	12 | 15	24 | 30	30 | 40	60 | 80	105 | 150	120 | 150	150 | 180	180 | 250	250 | 300	350 | 500
500	7 | 10	10 | 12	8 | 10	15 | 20	24 | 30	40 | 50	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
1000	6 | 8	9 | 12	9 | 12	15 | 20	22 | 30	32 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
1500	6 | 8	9 | 12	10 | 12	12 | 15	20 | 25	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
2000	5 | 6	8 | 10	9 | 12	13 | 20	18 | 25	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
2500	4 | 5	7 | 10	10 | 12	13 | 20	17 | 25	32 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
3000	4 | 5	7 | 10	10 | 12	13 | 20	16 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
4000	5 | 6	7 | 10	9 | 12	12 | 15	15 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
6000	5 | 6	10 | 12	10 | 12	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
10000	6 | 8	9 | 12	9 | 12	12 | 15	14 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	68	100	68	46	46	46	46	46	46	46	32	22
50	68	100	68	46	46	46	68	68	68	100	68	46
100	46	68	68	46	46	68	68	100	150	150	150	150
500	32	46	68	68	68	150	220	220	320	220	220	150
1000	32	46	46	68	68	150	150	100	100	68	46	32
1500	32	32	46	100	68	100	100	46	46	46	32	22
2000	32	32	46	68	68	100	68	46	32	32	32	22
2500	32	32	32	68	68	46	32	32	32	22	22	22
3000	32	32	32	68	68	46	32	32	32	22	22	22
4000	22	32	46	68	68	46	32	32	32	22	22	22
6000	15	15	32	68	68	32	32	32	32	22	22	22
10000	10	15	22	22	22	22	22	22	22	22	22	22

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) — Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	0	0	0	1	1	0	0	0
50	1	1	1	1	1	1	1	1	1	1	1	0
100	1	1	1	1	0	1	1	1	1	1	0	0
500	1	1	1	1	1	1	0	0	1	1	3	4
1000	1	1	1	1	1	0	0	1	3	3	4	5
1500	1	1	1	1	0	1	2	2	3	4	5	5
2000	1	1	1	1	1	2	2	3	4	5	5	5
2500	1	1	1	1	1	2	2	3	4	5	5	5
3000	1	1	1	0	1	2	3	3	5	5	5	5
4000	2	1	1	1	2	3	3	4	5	5	5	5
6000	1	1	1	2	2	3	3	5	5	5	5	5
10000	1	1	1	2	2	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	2	2	0	0	0	1	3
50	1	1	1	1	1	0	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	0
500	1	1	1	1	0	1	1	1	1	1	1	1
1000	1	0	1	0	1	1	1	1	0	0	0	0
1500	0	0	1	0	1	1	1	0	0	0	0	0
2000	1	0	1	1	1	1	1	0	0	0	0	0
2500	1	1	1	1	1	1	0	0	0	0	0	0
3000	1	1	1	1	1	1	0	0	0	0	0	1
4000	1	1	1	1	1	1	1	1	0	0	0	1
6000	0	1	2	2	1	1	1	1	1	0	1	1
10000	1	2	2	1	1	1	1	1	1	2	2	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) — v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.16	0.26	0.37	0.52	0.79
50	0.02	0.03	0.04	0.07	0.09	0.2	0.33	0.45	0.65	0.79	1.05	1.83
100	0.05	0.06	0.06	0.13	0.16	0.31	0.55	0.63	0.79	0.94	1.31	1.83
500	0.18	0.26	0.21	0.39	0.63	1.05	1.18	1.57	2.49	3.4	5.24	7.85
1000	0.31	0.47	0.47	0.79	1.15	1.68	2.36	3.14	4.97	6.81	10.47	15.71
1500	0.47	0.71	0.79	0.94	1.57	2.36	3.53	4.71	7.46	10.21	15.71	23.56
2000	0.52	0.84	0.94	1.36	1.88	3.14	4.71	6.28	9.95	13.61	20.94	31.42
2500	0.52	0.92	1.31	1.7	2.23	4.19	5.89	7.85	12.44	17.02	26.18	39.27
3000	0.63	1.1	1.57	2.04	2.51	4.71	7.07	9.42	14.92	20.42	31.42	47.12
4000	1.05	1.47	1.88	2.51	3.14	6.28	9.42	12.57	19.9	27.23	41.89	62.83
6000	1.57	3.14	3.14	3.14	4.08	9.42	14.14	18.85	29.85	40.84	62.83	94.25
10000	3.14	4.71	4.71	6.28	7.33	15.71	23.56	31.42	49.74	68.07	104.72	157.08

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.04	0.12	0.14	0.25	0.33	0.48	0.4	0.17	0.2	0.29	0.4	0.67
50	0.09	0.28	0.36	0.45	0.57	0.67	0.53	0.47	0.67	0.83	1	1.43
100	0.08	0.28	0.56	0.69	0.83	1.04	0.63	1.11	1.85	2.22	2.67	2.86
500	0.14	0.42	1.25	1.67	1.39	2.5	3.7	4.17	4.58	4.27	4	4.17
1000	0.21	0.46	0.93	1.67	1.52	3.91	3.7	4.17	4.58	4.27	4	4.17
1500	0.21	0.46	0.83	2.78	2	4.17	3.7	4.17	4.58	4.27	4	4.17
2000	0.33	0.62	0.93	1.92	2.22	4.17	3.7	4.17	4.58	4.27	4	4.17
2500	0.5	0.71	0.83	1.92	2.35	3.91	3.7	4.17	4.58	4.27	4	4.17
3000	0.5	0.71	0.83	1.92	3.12	4.17	3.7	4.17	4.58	4.27	4	4.17
4000	0.33	0.71	0.93	2.78	3.33	4.17	3.7	4.17	4.58	4.27	4	4.17
6000	0.33	0.42	0.83	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17
10000	0.21	0.46	0.93	2.78	3.57	4.17	3.7	4.17	4.58	4.27	4	4.17

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) — Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	9.3>4.5	8>4.5	7.5>4.5	7.2>4.9	7.3>5.2	9.9>6.1	16>7.1	68.5>8.65	88.6>9.41	73.9>9.52	47.8>9.74	30.7>10.05
50	8.2>4.5	7.6>4.5	6.8>4.5	9.2>4.6	9.9>4.8	18.7>5.58	39.4>6.55	59.5>7.28	57.8>7.89	72.8>8.25	62.4>8.99	34.8>9.69
100	10.1>4.5	8.6>4.5	6.1>4.5	8.1>4.5	8.6>4.65	19.8>5.16	41.5>6.03	35.5>6.3	30.7>6.85	30>7.21	23.3>7.85	25>8.89
500	10.5>4.4	9.1>4.31	5.2>4.37	6.9>4.21	10.1>4.1	12>4.39	10.4>4.57	9.7>5.11	9.3>6.23	8.1>7.28	7.6<8.72	6.5<10.26
1000	9.7>4.26	10.8>4.16	7.2>4.16	7.1>4.05	9.6>4.07	5.7>4.4	7.1>5.04	5.9>5.8	4.4<6.93	3.9<8.18	3.7<10.03	0<11.28
1500	11.3>4.16	10>4.07	7.9>4.05	5.2>4.01	6.9>4.21	4.2<4.64	5.2<5.48	3.6<6.13	3.1<7.57	3<9.03	1.1<10.48	0<12.03
2000	7.8>4.14	8>4.04	7.8>4.01	6.3>4.14	6.8>4.28	3.6<5	3.7<5.63	3.1<6.49	2.5<8.23	2.2<9.29	0<10.94	0<12.9
2500	5.6>4.14	6.5>4.02	7.1>4.15	6>4.3	6.4>4.45	2.5<5.15	2.8<5.9	2.6<6.96	2.2<8.5	1.5<9.67	0<11.52	0<14.08
3000	5.8>4.1	6.6>3.98	7>4.21	5.6>4.37	3<4.63	2.3<5.13	2.6<6.08	2.4<7.34	1.9<8.78	0.8<9.95	0<12	0<15.16
4000	7.9>3.99	6.5>4.13	7.5>4.28	3.9<4.63	2.6<4.8	2<5.39	2.3<6.64	2.2<7.7	1.4<9.15	0<10.62	0<13.57	0<17.54
6000	7.1>4.21	8.9>4.8	6.5>4.8	1.7<4.8	2.1<4.95	1.5<5.84	2<7.09	1.8<8.26	0.8<10.11	0<12.48	0<16.74	0<22.2
10000	9.9>4.8	8.5>4.93	5.7>4.93	2.1<5.19	1.3<5.27	1.3<6.48	1.6<7.93	1.3<9.6	0<13.06	0<16.53	0<22.89	0<31.56

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.3<4.5	2<4.5	2<4.5	1.9<4.9	2<5.2	2.6<6.1	4.3<7.1	20.3>8.65	29.4>9.41	25.6>9.52	20.9>9.74	0.1<10.05
50	2.3<4.5	2.1<4.5	1.9<4.5	2.8<4.6	2.7<4.8	6.1>5.58	13.6>6.55	21.6>7.28	27>7.89	39.8>8.25	32>8.99	25.2>9.69
100	3.4<4.5	2.5<4.5	1.8<4.5	2.6<4.5	2.4<4.65	6.8>5.16	18.6>6.03	16.7>6.3	21.2>6.85	23.5>7.21	25.8>7.85	36.5>8.89
500	3.9<4.4	3.4<4.31	1.7<4.37	3<4.21	5.6>4.1	11.1>4.39	11.5>4.57	14>5.11	22.2>6.23	29.5>7.28	45.5>8.72	59.3>10.26
1000	4<4.26	4.9>4.16	3.5<4.16	4.9>4.05	8.3>4.07	9.1>4.4	13.4>5.04	14.1>5.8	20>6.93	24.1>8.18	31>10.03	36.7>11.28
1500	5.1>4.16	5.3>4.07	5.3>4.05	4.2>4.01	7.4>4.21	8.7>4.64	13.9>5.48	11.8>6.13	16.5>7.57	25.6>9.03	31.7>10.48	37.4>12.03
2000	3.5<4.14	4.5>4.04	5.5>4.01	6.3>4.14	7.5>4.28	9.9>5	13.3>5.63	14.1>6.49	15.9>8.23	24.4>9.29	37.8>10.94	44.3>12.9
2500	2.9<4.14	4.6>4.02	5.9>4.15	7.1>4.3	7.8>4.45	8.7>5.15	10.8>5.9	13.1>6.96	18.2>8.5	22.3>9.67	34.6>11.52	50.4>14.08
3000	3.2<4.1	5.3>3.98	6.4>4.21	7.7>4.37	6.3>4.63	8.8>5.13	12.1>6.08	14.6>7.34	20.4>8.78	25>9.95	38.5>12	56.1>15.16
4000	5.1>3.99	6.2>4.13	7.8>4.28	5.7>4.63	6.6>4.8	10.2>5.39	14.2>6.64	17.3>7.7	24.2>9.15	30.1>10.62	46>13.57	66.9>17.54
6000	5>4.21	9.6>4.8	9>4.8	4.4<4.8	6.6>4.95	10.7>5.84	17.3>7.09	21.4>8.26	30.3>10.11	38.5>12.48	59>16.74	85.7>22.2
10000	9.2>4.8	10.6>4.93	7.7>4.93	6>5.19	6.3>5.27	11.9>6.48	19.2>7.93	23.8>9.6	33.6>13.06	51.2>16.53	78.8>22.89	116>31.56

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.8	12.9	19.2	39.3	49.5	89.9	136.5	254.9	413.4	520.8	715.9	1057.8
50	5.1	7.6	11.7	27.0	34.9	73.3	122.9	166.6	226.1	251.2	358.8	520.8
100	4.8	7.0	9.6	22.1	30.0	58.1	104.9	116.6	142.8	179.9	226.7	307.7
500	3.2	4.9	6.5	15.0	22.6	38.8	44.4	56.0	69.1	95.7	120.6	179.9
1000	2.6	4.0	6.6	14.2	20.8	30.8	38.8	54.1	73.5	104.9	141.4	209.3
1500	2.2	4.0	6.0	11.6	19.3	29.8	37.5	57.3	77.8	98.0	134.7	199.1
2000	2.0	3.7	5.8	12.7	17.9	27.1	38.7	52.1	77.1	97.2	122.4	180.9
2500	1.9	3.5	6.3	12.5	16.7	30.5	41.9	52.8	71.6	98.2	123.7	167.9
3000	1.8	3.3	6.1	12.4	15.7	28.7	39.4	49.6	67.4	92.4	116.4	158.0
4000	1.9	3.1	5.4	11.3	14.2	26.0	35.8	45.1	61.2	84.0	105.8	143.6
6000	1.9	3.7	5.7	9.9	12.4	24.8	31.3	39.4	53.5	73.3	92.4	125.4
10000	1.9	3.3	5.6	10.6	13.3	22.8	28.7	36.2	49.1	61.9	77.9	105.8

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
50	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
100	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
1000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
1500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
2000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
2500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
3000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
4000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
6000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
10000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.5742	0.5532	0.5921	0.6638	0.7077	0.7796	0.8091	0.6195	0.6456	0.7889	0.9044	0.9591
50	0.5314	0.5330	0.4675	0.5662	0.6300	0.5834	0.5497	0.5169	0.5380	0.5148	0.6879	0.9006
100	0.5156	0.5214	0.4869	0.6132	0.7197	0.5290	0.4359	0.5922	0.5904	0.6668	0.8138	0.8572
500	0.4664	0.5635	0.5841	0.6192	0.6151	0.6188	0.7018	0.7830	0.8399	0.8962	0.9357	0.9638
1000	0.4703	0.4794	0.4876	0.6267	0.6016	0.7744	0.7886	0.8662	0.9349	0.9574	0.9739	0.9999
1500	0.4771	0.5037	0.4813	0.6992	0.7084	0.8345	0.8553	0.9235	0.9582	0.9696	0.9926	0.9999
2000	0.5321	0.5415	0.4653	0.6572	0.6023	0.8637	0.9030	0.9367	0.9676	0.9797	0.9999	0.9999
2500	0.4693	0.5678	0.5529	0.6819	0.6152	0.9129	0.9284	0.9497	0.9730	0.9870	0.9999	0.9999
3000	0.4902	0.5439	0.5604	0.7042	0.8153	0.9196	0.9364	0.9546	0.9776	0.9935	0.9999	0.9999
4000	0.4398	0.5546	0.5049	0.7032	0.8340	0.9326	0.9470	0.9612	0.9844	0.9999	0.9999	0.9999
6000	0.5767	0.5381	0.6114	0.8562	0.8556	0.9512	0.9571	0.9702	0.9921	0.9999	0.9999	0.9999
10000	0.5366	0.4759	0.5025	0.8542	0.9226	0.9631	0.9686	0.9815	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8925	0.8890	0.8923	0.9099	0.9217	0.9421	0.9493	0.8875	0.8823	0.9268	0.9582	0.9999
50	0.8693	0.8692	0.8492	0.8672	0.8985	0.8636	0.8449	0.8245	0.7841	0.7347	0.8401	0.9280
100	0.8358	0.8596	0.8464	0.8765	0.9225	0.8385	0.7468	0.8075	0.7170	0.7394	0.7940	0.7914
500	0.8016	0.8364	0.8641	0.8379	0.7856	0.6480	0.6714	0.6871	0.6163	0.6212	0.6148	0.6705
1000	0.7831	0.7655	0.7528	0.7447	0.6552	0.6375	0.6036	0.6777	0.7017	0.7357	0.7798	0.8314
1500	0.7658	0.7372	0.6529	0.7559	0.6834	0.6567	0.6142	0.7494	0.7741	0.7424	0.7966	0.8451
2000	0.7878	0.7406	0.6211	0.6586	0.5589	0.6263	0.6497	0.7157	0.7946	0.7709	0.7749	0.8302
2500	0.7207	0.6915	0.6289	0.6213	0.5320	0.6991	0.7246	0.7461	0.7755	0.8017	0.8046	0.8182
3000	0.7149	0.6334	0.5989	0.5931	0.6115	0.6878	0.7032	0.7275	0.7588	0.7862	0.7928	0.8071
4000	0.6363	0.5778	0.4849	0.5626	0.5848	0.6525	0.6683	0.6949	0.7321	0.7591	0.7699	0.7867
6000	0.7005	0.5020	0.4617	0.6236	0.5528	0.6584	0.6247	0.6520	0.6916	0.7207	0.7331	0.7548
10000	0.5665	0.3469	0.3205	0.5933	0.6234	0.6506	0.6222	0.6508	0.6949	0.6703	0.6860	0.7093

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00231	0.00098	0.00177	0.00345	0.00583	0.03114	0.173761	1.341664	3.96162	11.22501	41.71894	218.2566
50	0.00154	0.00093	0.00071	0.00463	0.00908	0.04994	0.250691	0.639456	1.020093	1.564847	4.505771	23.76105
100	0.00351	0.00189	0.00076	0.00568	0.01537	0.04725	0.218853	0.331516	0.342097	0.631989	1.729077	4.958035
500	0.00477	0.00532	0.00151	0.00611	0.01958	0.04614	0.067425	0.156365	0.436545	1.161811	3.989101	15.14856
1000	0.00422	0.00615	0.00314	0.01023	0.0232	0.04569	0.11692	0.302076	1.151895	3.214266	12.19286	46.04931
1500	0.00684	0.00816	0.00488	0.00822	0.02831	0.06336	0.190413	0.542397	2.097603	5.319514	20.73569	78.34024
2000	0.00429	0.00681	0.00479	0.01276	0.01813	0.08429	0.284163	0.723084	3.050964	7.915902	28.85131	110.3196
2500	0.00146	0.00493	0.00793	0.0152	0.01916	0.1444	0.413125	0.985602	3.889869	10.91347	39.68396	144.004
3000	0.00186	0.00491	0.00898	0.01757	0.02146	0.14804	0.496237	1.197447	4.74257	13.32125	49.17131	178.2793
4000	0.004	0.00577	0.00739	0.01195	0.02389	0.19483	0.657974	1.605543	6.492498	18.2289	68.20078	248.7843
6000	0.00903	0.01928	0.01376	0.01207	0.02465	0.31616	0.993083	2.445854	9.994657	28.58675	107.2301	397.9914
10000	0.02053	0.01474	0.00889	0.03538	0.05979	0.56525	1.816968	4.505452	18.76269	49.90098	189.4922	710.3729

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0115	0.0171	0.0283	0.1036	0.1942	0.6558	1.5814	7.4601	18.6071	34.7234	49.5203	74.1818
50	0.0030	0.0075	0.0115	0.0592	0.0912	0.4778	1.1791	2.6588	4.6703	7.4601	14.9079	34.7234
100	0.0033	0.0075	0.0075	0.0283	0.0631	0.3083	0.9942	1.1329	1.6924	2.8130	4.6703	13.0583
500	0.0020	0.0033	0.0022	0.0122	0.0283	0.1036	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
1000	0.0014	0.0030	0.0030	0.0122	0.0261	0.0671	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
1500	0.0014	0.0030	0.0033	0.0075	0.0199	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
2000	0.0009	0.0022	0.0030	0.0107	0.0180	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
2500	0.0006	0.0020	0.0033	0.0107	0.0171	0.0671	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
3000	0.0006	0.0020	0.0033	0.0107	0.0129	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
4000	0.0009	0.0020	0.0030	0.0075	0.0122	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
6000	0.0009	0.0033	0.0033	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
10000	0.0014	0.0030	0.0030	0.0075	0.0115	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.7	1.62	1.61	2.24	2.62	3.81	4.55	1.94	1.67	2.47	5.42	14.66
50	1.36	1.28	1.19	1.65	2.16	1.65	1.3	1.43	1.25	1.29	2.49	7
100	1.15	1.23	1.1	1.78	2.98	1.35	1.07	1.61	1.53	2.46	4.5	6.97
500	1.18	1.38	1.55	1.94	1.8	1.83	2.77	3.99	5.54	9.54	15.64	34.87
1000	1.11	1.14	1.18	2	1.83	3.67	4.11	7.29	15.26	28.17	46.31	121.41
1500	1.14	1.24	1.03	2.61	2.72	5.58	6.64	13	28.17	41.95	66.17	187.22
2000	1.22	1.32	1.09	2.57	1.86	7.14	9.97	16.2	38.7	53.26	90.95	220.73
2500	1.04	1.66	1.32	2.84	2.08	10.86	14.1	21.25	45.01	61.01	117.86	201.5
3000	1.11	1.52	1.36	3.1	4.67	12.22	16.12	25.25	49.91	67.95	133.84	184.65
4000	0.89	1.58	1.24	2.66	5.56	15.12	19.78	32	57.07	86.4	141.3	160.73
6000	1.45	1.25	1.69	6.34	7.12	22.36	27.71	42.43	65.24	109.81	115.02	133.18
10000	1.39	1.13	1.23	6.38	13.08	34.15	40.53	54.9	86.68	86.23	89.02	104.14

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	9.39	9.23	8.9	10.45	12.18	17.67	20.87	8.76	7.31	10.43	20.33	47.41
50	7.49	7.29	6.52	7.59	9.85	7.13	5.75	5.45	3.75	3.18	5.66	10.69
100	5.33	6.69	5.98	7.78	12.79	5.77	3.51	4.43	2.73	3.34	3.96	4.35
500	4.61	5.36	6.97	5.74	3.88	2.09	2.43	2.6	1.75	2.02	1.8	2.43
1000	3.99	3.66	3.45	3.33	2.31	2	1.81	2.5	2.57	3.28	3.77	5.46
1500	3.66	3.22	2.06	3.36	2.44	2.29	1.89	3.4	3.58	3.38	4.13	6.09
2000	3.82	3.13	1.95	2.59	1.56	2	2.22	2.93	4	3.84	3.68	5.41
2500	2.87	2.79	1.84	2.22	1.5	2.61	3.05	3.35	3.6	4.53	4.35	4.95
3000	2.8	2.19	1.59	1.96	1.77	2.61	2.78	3.09	3.32	4.15	4.05	4.58
4000	1.91	1.72	1.17	1.43	1.66	2.25	2.4	2.69	2.94	3.64	3.59	4.07
6000	2.54	1.1	0.96	1.79	1.68	2.3	1.99	2.24	2.46	3.08	3.03	3.48
10000	1.54	0.71	0.64	1.62	2.1	2.23	1.96	2.23	2.5	2.5	2.47	2.85

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20.1	20.2	20.3	20.5	21.1	21.6	21.9	22.4
50	20	20.1	20.2	20.4	20.5	21.6	23.6	25.8	29.9	34.1	34.8	41
100	20.1	20.3	20.5	21.3	21.5	24.4	28.5	32.2	42.6	48.1	56.9	65.4
500	21.2	23.1	23.6	30.8	36.4	54.1	62.3	70.1	95.5	109.3	134.9	165.2
1000	22.7	26.6	28.8	42.1	48.6	77.2	84.9	92.1	121.7	142.1	175.1	257.6
1500	24.7	29.1	36.5	49.3	57.2	87.2	101.3	105.2	145	181.7	216.5	376.5
2000	25.3	31.1	39.3	54.8	63.3	103.4	111.5	126	169.3	205.6	282.1	495.3
2500	27.9	38.7	43.8	61.9	68.8	111	119.6	139.8	195.3	222.3	347.6	614.1
3000	29.7	42.6	48.4	68.5	89.5	119.1	134.6	159.9	218	252.4	413.1	732.9
4000	31.4	49.9	56.5	79	101.6	143.7	163.2	197.7	257.1	329.9	544.1	970.6
6000	34.4	56.1	72.6	105.7	117.9	182.4	222.1	264.9	324	484.8	806.2	1445.9
10000	46.7	72.4	88.6	121.3	157	265	324.3	371.2	497.9	794.7	1330.3	2396.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.2	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.2	50.4	50.5	50.5	50.9	50.8	50.9	51.8	53.0	52.1	51.3
100	50.0	50.2	50.7	50.7	50.6	52.0	52.0	52.8	57.8	58.7	58.2	59.2
500	50.1	50.5	51.8	53.4	53.8	64.0	69.0	70.2	80.3	77.1	76.4	71.9
1000	50.2	51.0	52.7	55.8	57.9	73.1	75.2	71.0	71.2	67.3	63.3	61.0
1500	50.3	51.2	54.0	59.7	59.4	72.7	74.1	65.8	65.6	66.9	62.3	60.3
2000	50.5	51.7	55.2	60.0	67.6	75.8	70.8	68.0	64.2	65.1	63.6	61.1
2500	51.2	52.6	54.5	61.6	70.4	67.9	65.4	66.0	65.5	63.2	61.8	61.8
3000	51.3	53.4	55.3	63.0	70.4	70.1	66.8	67.2	66.7	64.1	62.5	62.5
4000	51.2	54.5	59.5	72.3	74.2	73.1	69.3	69.6	68.7	65.8	63.9	63.7
6000	50.8	53.7	60.1	76.4	80.9	72.6	73.1	73.3	72.0	68.4	66.2	65.7
10000	51.0	60.3	76.3	69.6	72.1	73.3	73.3	73.4	71.7	72.3	69.6	68.8

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<739	0<901	0<1052	0<1263	0<1306	0<1306	0<1192	0<1192	1<1306	1<1306	3<1306	12<1306
50	0<664	0<793	0<965	0<1059	0<1056	0<1192	0<1104	0<1085	1<1306	1<1306	2<1306	15<1306
100	0<638	0<757	0<928	0<990	0<914	0<1104	0<1104	0<1085	0<1306	1<1306	3<1306	7<1306
500	0<550	0<639	0<736	0<838	0<885	0<1042	1<1049	1<1070	5<1182	18<1192	76<1202	351<1192
1000	0<527	0<608	0<741	0<818	1<885	1<1042	4<1066	10<1081	49<1100	181<1104	729<1100	3811>1085
1500	0<487	0<617	0<747	0<772	1<852	4<1008	12<1032	37<1042	184<1052	539<1056	2063>1046	098>1029
2000	0<505	0<625	0<727	1<776	1<950	8<984	30<1005	78<1017	417<1023	1118>1020	4495>1008	20151>990
2500	0<570	0<631	1<735	1<770	2<933	23<973	63<987	152<996	711<999	1877>993	8309>982	26962>960
3000	0<548	1<643	1<730	2<764	4<919	29<955	100<971	246<976	1075>979	2840>973	12455>958	33928>938
4000	0<551	1<639	1<710	2<885	7<899	61<935	204<947	512<950	1998>947	5744>943	20728>923	58736>903
6000	1<505	7<665	5<712	5<852	11<867	184<903	573<912	1350>912	4530>908	13633>897	34356>879	91498>856
10000	8<490	13<686	10<821	31<836	67<843	682<867	1985>869	4115>867	13525>857	26163>845	65033>824	165068>801

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<739	0<901	0<1052	0<1263	0<1306	0<1306	0<1192	1<1192	2<1306	4<1306	12<1306	39<1306
50	0<664	0<793	0<965	0<1059	0<1056	0<1192	1<1104	1<1085	2<1306	2<1306	5<1306	22<1306
100	0<638	0<757	0<928	0<990	0<914	0<1104	1<1104	1<1085	1<1306	1<1306	2<1306	4<1306
500	0<550	0<639	0<736	0<838	0<885	1<1042	1<1049	1<1070	2<1182	4<1192	9<1202	26<1192
1000	0<527	0<608	0<741	0<818	1<885	1<1042	2<1066	4<1081	9<1100	22<1104	64<1100	196<1085
1500	0<487	1<617	0<747	0<772	1<852	2<1008	3<1032	10<1042	25<1052	47<1056	143<1046	442<1029
2000	0<505	1<625	1<727	1<776	1<950	2<984	7<1005	15<1017	47<1023	89<1020	211<1008	646<990
2500	0<570	1<631	1<735	1<770	1<933	6<973	14<987	25<996	62<999	156<993	369<982	868<960
3000	0<548	1<643	1<730	1<764	2<919	7<955	18<971	32<976	80<979	197<973	471<958	1104>938
4000	1<551	1<639	1<710	1<885	2<899	10<935	27<947	47<950	117<947	288<943	690<923	1617>903
6000	2<505	6<665	3<712	2<852	3<867	21<903	46<912	81<912	202<908	496<897	1185>879	2789>856
10000	9<490	8<686	5<821	8<836	11<843	51<867	114<869	203<867	508<857	989>845	2361>824	5562>801

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00312	0.00210	0.00154	0.00107	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00387	0.00271	0.00183	0.00152	0.00153	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00419	0.00298	0.00198	0.00174	0.00204	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00563	0.00418	0.00315	0.00243	0.00218	0.00157	0.00155	0.00149	0.00122	0.00120	0.00118	0.00120
1000	0.00613	0.00461	0.00311	0.00255	0.00218	0.00157	0.00150	0.00146	0.00141	0.00140	0.00141	0.00145
1500	0.00719	0.00448	0.00306	0.00286	0.00235	0.00168	0.00160	0.00157	0.00154	0.00153	0.00156	0.00161
2000	0.00669	0.00437	0.00323	0.00283	0.00189	0.00176	0.00169	0.00165	0.00163	0.00164	0.00168	0.00174
2500	0.00525	0.00428	0.00316	0.00288	0.00196	0.00180	0.00175	0.00172	0.00171	0.00173	0.00177	0.00185
3000	0.00568	0.00412	0.00320	0.00292	0.00202	0.00187	0.00181	0.00179	0.00178	0.00180	0.00186	0.00194
4000	0.00561	0.00418	0.00338	0.00218	0.00211	0.00195	0.00190	0.00189	0.00190	0.00192	0.00200	0.00209
6000	0.00670	0.00386	0.00336	0.00235	0.00227	0.00209	0.00205	0.00205	0.00207	0.00212	0.00221	0.00233
10000	0.00709	0.00362	0.00253	0.00244	0.00240	0.00227	0.00226	0.00227	0.00232	0.00239	0.00251	0.00266

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00312	0.00210	0.00154	0.00107	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00387	0.00271	0.00183	0.00152	0.00153	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00419	0.00298	0.00198	0.00174	0.00204	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00563	0.00418	0.00315	0.00243	0.00218	0.00157	0.00155	0.00149	0.00122	0.00120	0.00118	0.00120
1000	0.00613	0.00461	0.00311	0.00255	0.00218	0.00157	0.00150	0.00146	0.00141	0.00140	0.00141	0.00145
1500	0.00719	0.00448	0.00306	0.00286	0.00235	0.00168	0.00160	0.00157	0.00154	0.00153	0.00156	0.00161
2000	0.00669	0.00437	0.00323	0.00283	0.00189	0.00176	0.00169	0.00165	0.00163	0.00164	0.00168	0.00174
2500	0.00525	0.00428	0.00316	0.00288	0.00196	0.00180	0.00175	0.00172	0.00171	0.00173	0.00177	0.00185
3000	0.00568	0.00412	0.00320	0.00292	0.00202	0.00187	0.00181	0.00179	0.00178	0.00180	0.00186	0.00194
4000	0.00561	0.00418	0.00338	0.00218	0.00211	0.00195	0.00190	0.00189	0.00190	0.00192	0.00200	0.00209
6000	0.00670	0.00386	0.00336	0.00235	0.00227	0.00209	0.00205	0.00205	0.00207	0.00212	0.00221	0.00233
10000	0.00709	0.00362	0.00253	0.00244	0.00240	0.00227	0.00226	0.00227	0.00232	0.00239	0.00251	0.00266

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0006	0.0023	0.0051	0.0244	0.0523	0.37	1.2479	8.7917	36.4279	85.5448	157.9306	390.57
50	0.0026	0.0128	0.0208	0.1388	0.3014	3.0016	13.8799	34.54	101.8533	232.3125	427.1481	1126.816
100	0.0072	0.0289	0.0417	0.2725	0.5781	6.3061	26.0854	48.0343	108.2145	188.9293	377.8768	1038.535
500	0.0321	0.1606	0.1775	1.1134	3.3959	20.1673	34.4757	71.1737	196.4609	392.1155	917.9774	2398.692
1000	0.0636	0.3499	0.4627	2.2913	6.0142	21.2181	52.83	102.512	264.497	536.3839	1239.262	3926.991
1500	0.1098	0.4806	0.8607	2.6698	7.1327	25.1643	66.1821	121.1846	325.2395	710.2836	1570.796	5890.486
2000	0.1105	0.5409	1.0193	3.6683	8.3939	31.2297	74.4883	150.7952	388.532	815.6231	2094.395	7853.982
2500	0.0965	0.487	1.2442	4.4119	9.5118	33.7454	81.0681	170.3124	456.2062	888.6708	2617.994	9817.477
3000	0.1186	0.5901	1.4862	5.1025	7.1271	37.1368	93.2999	198.9205	515.1747	1021.018	3141.593	11780.97
4000	0.2377	0.7816	1.9286	5.3652	8.4441	46.344	116.6253	252.6561	616.7808	1361.357	4188.79	15707.96
6000	0.2997	1.8868	2.7522	4.4806	10.3029	60.8576	164.5299	348.308	790.8516	2042.035	6283.185	23561.94
10000	0.6282	2.7731	3.6292	9.2119	14.3065	91.777	247.7249	499.389	1243.547	3403.392	10471.98	39269.91

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0002	0.0009	0.002	0.0102	0.0223	0.1631	0.5595	3.8221	15.1275	35.597	76.1193	196.3495
50	0.001	0.0048	0.0079	0.0606	0.1318	1.3314	5.8365	16.3754	52.4939	136.3704	266.7927	878.1526
100	0.0029	0.011	0.0154	0.119	0.2644	2.7527	12.4494	26.3363	76.5092	157.7896	406.3278	1313.253
500	0.0143	0.0722	0.0759	0.5988	2.1356	18.6438	37.2204	91.7387	386.7514	920.112	3066.454	9627.88
1000	0.0293	0.1737	0.2427	1.6934	5.2499	30.6792	85.7751	184.1183	707.4943	1613.804	4686.995	14653.49
1500	0.0541	0.2731	0.5578	2.2931	7.6151	41.9087	133.6474	247.2345	945.804	2600.453	7364.732	23140.24
2000	0.0555	0.3249	0.707	3.6571	9.2361	63.3358	171.5972	377.7837	1249.267	3448.336	11335.12	35327.15
2500	0.0515	0.3628	1.0261	5.079	11.3259	74.7052	183.6151	455.2857	1742.833	4143.691	13536.95	49090.97
3000	0.0678	0.483	1.3553	6.6085	12.7127	86.2096	240.6801	596.6636	2288.024	5431.684	17790.34	64273.54
4000	0.1428	0.7456	2.0248	7.7368	16.8342	131.078	368.062	912.4201	3508.926	8332.253	27390.78	98729.16
6000	0.2145	2.0568	3.9959	9.2979	22.2494	207.647	666.6887	1655.658	6399.873	15217.81	50280.41	180830.4
10000	0.5895	4.3741	6.8302	20.1495	38.4732	383.302	1233.328	3064.579	11851.56	32400.02	107735.3	387087.2

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=0.4; Maximum permissible specific bearing load plim=10 MPa

ID: L-BD0.4P10

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	17 | 7	22 | 10	30 | 12	50 | 20	65 | 30	115 | 50	180 | 80	350 | 150	700 | 300	1000 | 400	1000 | 400	1500 | 500
50	12 | 5	15 | 6	18 | 8	35 | 15	45 | 20	95 | 40	180 | 80	220 | 100	300 | 120	400 | 180	500 | 200	1000 | 400
100	12 | 5	15 | 6	15 | 6	28 | 12	40 | 20	75 | 30	135 | 60	160 | 70	220 | 100	250 | 100	300 | 120	500 | 200
500	9 | 4	12 | 5	10 | 4	20 | 8	30 | 12	55 | 25	65 | 30	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
1000	8 | 4	12 | 5	12 | 5	18 | 8	28 | 12	45 | 20	55 | 25	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
1500	7 | 3	12 | 5	12 | 5	15 | 6	25 | 10	40 | 20	50 | 20	80 | 40	115 | 50	160 | 70	250 | 100	400 | 180
2000	6 | 3	10 | 4	12 | 5	20 | 8	24 | 10	37 | 15	50 | 20	80 | 40	115 | 50	160 | 70	250 | 100	400 | 180
2500	6 | 3	12 | 5	13 | 6	16 | 7	22 | 10	45 | 20	60 | 25	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
3000	6 | 3	10 | 4	13 | 6	16 | 7	20 | 8	40 | 20	55 | 25	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
4000	6 | 3	9 | 4	13 | 6	15 | 6	20 | 8	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
6000	6 | 3	12 | 5	12 | 5	13 | 6	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
10000	8 | 4	12 | 5	12 | 5	15 | 6	18 | 8	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	100	100	100	100	68
100	68	100	100	68	68	100	100	150	150	220	220	220
500	46	68	100	100	100	220	220	320	460	320	220	220
1000	46	68	68	100	100	220	220	150	150	100	68	46
1500	46	46	68	150	100	150	150	68	68	68	46	32
2000	46	46	68	68	100	150	100	46	46	46	32	32
2500	32	32	46	100	100	68	46	46	32	32	32	32
3000	32	32	46	100	100	68	46	32	32	32	32	32
4000	32	46	46	100	100	68	46	32	32	32	32	32
6000	22	22	46	100	100	46	46	32	32	32	32	32
10000	15	22	32	32	32	32	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) — Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	1	0	0	0	0	0	0
50	0	1	2	1	1	0	0	0	0	0	0	0
100	0	1	2	1	0	0	0	0	0	0	1	1
500	0	0	1	1	1	0	1	1	2	4	4	4
1000	2	0	1	1	1	1	2	2	4	4	5	5
1500	1	0	1	1	1	2	2	3	4	5	5	5
2000	0	1	1	1	1	2	4	4	4	5	5	5
2500	2	0	1	1	2	2	4	4	5	5	5	5
3000	0	1	1	1	2	3	4	4	5	5	5	5
4000	0	1	1	2	2	4	4	4	5	5	5	5
6000	1	1	1	2	3	4	4	5	5	5	5	5
10000	0	1	2	2	3	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	3	3	0	0	0	2	2
50	1	1	1	1	1	1	0	0	0	0	0	0
100	1	1	1	1	1	1	0	0	0	0	0	0
500	1	1	1	1	1	0	0	1	0	0	0	0
1000	1	1	1	1	1	0	0	1	0	0	0	0
1500	1	1	1	1	1	0	1	0	1	0	0	0
2000	1	1	1	1	1	1	1	0	1	0	0	0
2500	1	1	1	1	1	1	1	1	1	1	0	1
3000	1	1	1	1	1	1	1	1	1	0	0	1
4000	1	1	1	1	1	1	1	1	1	0	0	1
6000	1	1	1	1	1	1	1	1	0	0	1	1
10000	0	2	3	1	1	1	1	1	0	1	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) — v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.02	0.03	0.03	0.06	0.09	0.18	0.37	0.52	0.52	0.79
50	0.03	0.04	0.05	0.09	0.12	0.25	0.47	0.58	0.79	1.05	1.31	2.62
100	0.06	0.08	0.08	0.15	0.21	0.39	0.71	0.84	1.15	1.31	1.57	2.62
500	0.24	0.31	0.26	0.52	0.79	1.44	1.7	1.96	3.01	4.19	6.54	10.47
1000	0.42	0.63	0.63	0.94	1.47	2.36	2.88	3.93	6.02	8.38	13.09	20.94
1500	0.55	0.94	0.94	1.18	1.96	3.14	3.93	6.28	9.03	12.57	19.63	31.42
2000	0.63	1.05	1.26	2.09	2.51	3.87	5.24	8.38	12.04	16.76	26.18	41.89
2500	0.79	1.57	1.7	2.09	2.88	5.89	7.85	9.82	15.05	20.94	32.72	52.36
3000	0.94	1.57	2.04	2.51	3.14	6.28	8.64	11.78	18.06	25.13	39.27	62.83
4000	1.26	1.88	2.72	3.14	4.19	7.75	10.47	15.71	24.09	33.51	52.36	83.78
6000	1.88	3.77	3.77	4.08	5.03	11.62	15.71	23.56	36.13	50.27	78.54	125.66
10000	4.19	6.28	6.28	7.85	9.42	19.37	26.18	39.27	60.21	83.78	130.9	209.44

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.08	0.23	0.28	0.5	0.51	0.87	0.69	0.38	0.24	0.25	0.5	0.67
50	0.17	0.56	0.69	0.95	1.11	1.32	0.69	0.91	1.39	1.39	2	1.25
100	0.17	0.56	1.11	1.49	1.25	2.22	1.23	1.79	2.27	4	5.56	5
500	0.28	0.83	2.5	3.12	2.78	3.64	5.13	8.89	8.7	8.93	8	6.94
1000	0.31	0.83	1.67	3.47	2.98	5.56	7.27	8.89	8.7	8.93	8	6.94
1500	0.48	0.83	1.67	5.56	4	6.25	10	6.25	8.7	8.93	8	6.94
2000	0.56	1.25	1.67	3.12	4.17	9.01	10	6.25	8.7	8.93	8	6.94
2500	0.56	0.83	1.28	4.46	4.55	5.56	6.67	8.89	8.7	8.93	8	6.94
3000	0.56	1.25	1.28	4.46	6.25	6.25	7.27	8.89	8.7	8.93	8	6.94
4000	0.56	1.39	1.28	5.56	6.25	9.01	10	8.89	8.7	8.93	8	6.94
6000	0.56	0.83	1.67	6.41	8.93	9.01	10	8.89	8.7	8.93	8	6.94
10000	0.31	0.83	1.67	5.56	6.94	9.01	10	8.89	8.7	8.93	8	6.94

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) — Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3.7<4.5	4.2<4.5	3.7<4.7	3.4<5.2	5<5.5	6<6.6	10>7.7	27.9>9	73.5>9.52	92.2>9.74	46.4>9.74	39>10.05
50	4.5=4.5	3.7<4.5	3.6<4.5	4.3<4.8	5=5	8.6>6.02	20.9>7.36	24.6>7.62	21.1>8.25	28.8>8.99	20.6>9.25	37.8>10.42
100	5>4.5	4.1<4.5	2.9<4.5	3.6<4.57	6.1>4.77	7.5>5.41	16.3>6.57	15.3>7.04	14.8>7.57	9.5>7.85	8<8.41	10.2>9.72
500	5.2>4.34	4.3>4.26	2.2<4.31	3.1<4.14	4.1<4.25	6>4.93	4.9<5.3	3.1<5.57	3.4<6.9	2.9<8.05	1.9<9.49	0<11.63
1000	6.7>4.19	5.2>4.1	3.4<4.1	3.1<4.01	3.9<4.23	3.4<5.04	2.7<5.51	2.1<6.26	2.2<7.6	0<9.15	0<10.7	0<12.64
1500	4.1<4.13	4.7>4.01	3.4<4.01	1.7<4.07	2.9<4.37	2.4<5.2	1.6<5.66	2.3<6.99	1.4<8.44	0<9.9	0<11.25	0<13.7
2000	4.2>4.1	2.9<3.99	3.4<4.06	2.5<4.36	2.1<4.63	1.5<5.26	1.4<5.92	2<7.55	0<8.91	0<10.27	0<11.92	0<15.27
2500	3.9<4.05	4.3>4.21	3.9<4.3	1.6<4.36	2<4.71	1.9<5.9	1.7<6.96	1.3<7.83	0<9.18	0<10.64	0<12.7	0<16.85
3000	4<4.01	2.6<4.21	3.8<4.37	1.5<4.63	1.4<4.8	1.6<5.79	1.4<6.85	1.1<8.01	0<9.46	0<11.02	0<13.58	0<18.34
4000	4.1>4.06	2.9<4.28	3.6<4.72	1.2<4.8	1.3<4.95	1<5.86	1<7.03	0.6<8.38	0<10.03	0<12	0<15.55	0<21.51
6000	3.6<4.28	3.7<4.87	2.7<4.87	1.1<4.95	0.7<5.02	0.9<6.41	0.8<7.48	0<9.13	0<11.49	0<14.46	0<19.42	0<27.68
10000	6.2>4.95	3.5<5.19	2.3<5.19	0.7<5.36	0.8<5.54	0.7<7.15	0<8.52	0<11.08	0<15.04	0<19.51	0<27.28	0.1<40.24

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.2<4.5	1.3<4.5	1.2<4.7	1.2<5.2	1.6<5.5	2<6.6	3.3<7.7	9.5>9	26.6>9.52	35.1>9.74	19.6>9.74	10.3>10.05
50	1.5<4.5	1.2<4.5	1.2<4.5	1.5<4.8	1.7<5	3.2<6.02	9>7.36	12.1>7.62	12.6>8.25	18.4>8.99	16.6>9.25	34.6>10.42
100	1.7<4.5	1.4<4.5	1<4.5	1.3<4.57	2.2<4.77	3.3<5.41	9.7>6.57	11>7.04	14.5>7.57	12.2>7.85	11.3>8.41	20.2>9.72
500	2<4.34	1.7<4.26	0.9<4.31	1.8<4.14	2.9<4.25	6.9>4.93	6.8>5.3	5.6>5.57	9.8>6.9	12.2>8.05	16.6>9.49	32.4>11.63
1000	3<4.19	2.7<4.1	1.9<4.1	2.4<4.01	3.9<4.23	5.6>5.04	6>5.51	5.7<6.26	9.4>7.6	11>9.15	13.7>10.7	22.5>12.64
1500	2.1<4.13	2.9<4.01	2.3<4.01	2<4.07	3.4<4.37	5.5>5.2	4.2<5.66	8>6.99	8<8.44	10.9>9.9	14.5>11.25	23.4>13.7
2000	2.3<4.1	2.2<3.99	2.7<4.06	3<4.36	3.6<4.63	3.8<5.26	4.1<5.92	8.1>7.55	8<8.91	10.8>10.27	14.2>11.92	27.2>15.27
2500	2.3<4.05	3.2<4.21	3.6<4.3	2.8<4.36	3.7<4.71	5.5<5.9	5.6<6.96	5.5<7.83	7.4<9.18	10.2<10.64	16>12.7	30.7>16.85
3000	2.5<4.01	2.3<4.21	4<4.37	3.1<4.63	2.7<4.8	5.5<5.79	5.7<6.85	5<8.01	8.3<9.46	11.2>11.02	17.7>13.58	34.2>18.34
4000	2.9<4.06	2.9<4.28	4.7<4.72	2.5<4.8	3<4.95	3.9<5.86	4.3<7.03	5.9<8.38	9.8<10.03	13.3>12	20.9>15.55	40.5>21.51
6000	3<4.28	4.4<4.87	4.1<4.87	2.6<4.95	2.5<5.02	4.2<6.41	5.2<7.48	7.3<9.13	12.2>11.49	16.6>14.46	26>19.42	50.5>27.68
10000	6.2>4.95	5.7>5.19	4.2<5.19	2.5<5.36	2.9<5.54	4.6<7.15	5.8<8.52	9.3<11.08	15.6>15.04	21.5>19.51	33.5>27.28	65.3>40.24

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10.9	15.9	23.8	48.7	61.2	112.1	173.8	338.2	557.5	702.4	946.4	1401.4
50	6.4	9.4	14.5	34.0	44.2	94.9	177.3	211.9	287.6	362.3	456.5	702.4
100	5.9	8.7	11.9	27.9	38.2	72.9	133.5	151.8	206.0	236.0	297.3	403.6
500	4.0	6.0	8.1	18.8	28.5	50.8	64.1	73.4	91.1	125.5	173.9	236.0
1000	3.2	4.9	8.4	17.9	26.4	40.4	50.8	70.4	95.6	133.5	190.7	276.7
1500	2.8	5.0	7.8	14.9	24.5	38.8	48.8	77.3	104.9	132.2	178.1	263.8
2000	2.5	4.6	7.4	18.3	22.8	35.2	49.2	75.1	101.9	128.4	176.6	239.6
2500	2.7	5.0	8.1	15.8	21.2	41.1	55.3	69.7	103.3	130.1	163.9	222.5
3000	2.6	4.8	7.9	15.7	19.9	38.7	52.1	71.6	97.2	122.4	154.2	209.3
4000	2.3	3.8	7.8	14.4	18.1	35.1	47.3	65.0	88.3	111.2	140.1	190.2
6000	2.4	4.6	7.5	12.6	15.8	32.8	41.3	56.8	77.1	97.2	122.4	166.2
10000	2.4	4.1	7.3	14.0	17.7	30.2	38.0	47.9	65.0	82.0	103.3	140.1

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
50	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
100	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
3000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
4000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
6000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
10000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks˜ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8427	0.7761	0.7986	0.8630	0.8471	0.8960	0.9076	0.8672	0.7901	0.8157	0.9071	0.9480
50	0.7768	0.7861	0.7237	0.8006	0.8179	0.8499	0.8341	0.8459	0.8591	0.8559	0.9176	0.9244
100	0.7799	0.7889	0.7533	0.8257	0.8188	0.8569	0.8272	0.8682	0.8653	0.9241	0.9469	0.9591
500	0.7742	0.8119	0.8381	0.8437	0.8508	0.8410	0.8882	0.9374	0.9455	0.9657	0.9861	0.9999
1000	0.6972	0.7887	0.7829	0.8427	0.8464	0.8870	0.9264	0.9557	0.9697	0.9999	0.9999	0.9999
1500	0.8285	0.8037	0.7851	0.9097	0.8825	0.9179	0.9541	0.9592	0.9818	0.9999	0.9999	0.9999
2000	0.7730	0.8503	0.7920	0.8902	0.8936	0.9481	0.9627	0.9666	0.9999	0.9999	0.9999	0.9999
2500	0.7044	0.7940	0.7771	0.9208	0.8929	0.9467	0.9627	0.9783	0.9999	0.9999	0.9999	0.9999
3000	0.7249	0.8503	0.7844	0.9260	0.9205	0.9522	0.9685	0.9819	0.9999	0.9999	0.9999	0.9999
4000	0.7319	0.8254	0.7990	0.9171	0.9300	0.9682	0.9777	0.9899	0.9999	0.9999	0.9999	0.9999
6000	0.8094	0.8209	0.8469	0.9183	0.9572	0.9753	0.9825	0.9999	0.9999	0.9999	0.9999	0.9999
10000	0.7610	0.8098	0.8281	0.9537	0.9565	0.9825	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9482	0.9312	0.9336	0.9537	0.9513	0.9656	0.9692	0.9545	0.9240	0.9298	0.9608	0.9863
50	0.9273	0.9328	0.9077	0.9316	0.9364	0.9438	0.9284	0.9241	0.9157	0.9081	0.9337	0.9309
100	0.9264	0.9287	0.9133	0.9373	0.9352	0.9363	0.8971	0.9054	0.8684	0.9023	0.9249	0.9190
500	0.9110	0.9261	0.9298	0.9114	0.8933	0.8169	0.8454	0.8886	0.8431	0.8578	0.8756	0.8527
1000	0.8649	0.8904	0.8783	0.8788	0.8455	0.8141	0.8353	0.8831	0.8703	0.8910	0.9150	0.9161
1500	0.9133	0.8786	0.8541	0.8900	0.8636	0.8126	0.8823	0.8565	0.8994	0.9022	0.9186	0.9221
2000	0.8747	0.8897	0.8340	0.8666	0.8152	0.8663	0.8901	0.8627	0.9055	0.9093	0.9261	0.9167
2500	0.8260	0.8444	0.7936	0.8572	0.8015	0.8449	0.8806	0.9056	0.9165	0.9190	0.9215	0.9113
3000	0.8263	0.8693	0.7729	0.8477	0.8460	0.8319	0.8721	0.9168	0.9108	0.9146	0.9174	0.9060
4000	0.8086	0.8233	0.7409	0.8244	0.8334	0.8797	0.9004	0.9074	0.9010	0.9059	0.9092	0.8972
6000	0.8376	0.7856	0.7663	0.8010	0.8408	0.8791	0.8879	0.8947	0.8881	0.8929	0.8987	0.8853
10000	0.7613	0.6933	0.6822	0.8432	0.8483	0.8776	0.8869	0.8792	0.8724	0.8778	0.8851	0.8704

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00517	0.00139	0.00207	0.00664	0.01304	0.0621	0.329822	2.165458	8.947116	24.29535	32.26393	157.5602
50	0.00303	0.00183	0.00094	0.00531	0.01113	0.08228	0.67787	1.006973	1.150995	2.894097	5.364806	46.9367
100	0.00676	0.00369	0.00102	0.00608	0.01995	0.06468	0.33494	0.511268	0.743038	0.980189	1.728192	7.885062
500	0.01191	0.00815	0.00188	0.00711	0.01982	0.07043	0.117933	0.162552	0.468902	1.271228	4.570831	20.83375
1000	0.0108	0.01141	0.00439	0.01019	0.02674	0.07054	0.131907	0.310858	1.142637	3.200556	12.06595	58.01502
1500	0.01971	0.01462	0.00573	0.00884	0.03014	0.08926	0.153144	0.734199	2.006066	5.427793	20.25386	99.30094
2000	0.00715	0.01067	0.00702	0.0245	0.02598	0.08841	0.220157	1.049311	2.891516	7.879857	29.77712	141.4052
2500	0.00403	0.01585	0.01083	0.01753	0.02667	0.22053	0.516755	0.986845	3.923289	10.64964	38.80504	184.8395
3000	0.00532	0.01165	0.01232	0.02065	0.02381	0.20819	0.525203	1.271633	4.812181	13.17947	48.26992	230.5351
4000	0.00651	0.00942	0.01537	0.0144	0.032	0.20419	0.513177	1.752069	6.693351	18.47512	67.87155	326.4013
6000	0.01497	0.02766	0.01805	0.01575	0.02919	0.32882	0.80434	2.75869	10.69888	29.68929	110.6069	532.9985
10000	0.05227	0.0291	0.01779	0.04295	0.07684	0.59858	1.474312	4.915419	19.40362	54.34951	203.1261	987.038

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0048	0.0087	0.0189	0.0647	0.1248	0.3622	0.9001	3.9175	20.8340	39.6162	39.6162	74.1818
50	0.0025	0.0037	0.0058	0.0274	0.0586	0.2404	0.9001	1.3718	2.2380	5.3668	7.4428	39.6162
100	0.0025	0.0037	0.0037	0.0178	0.0414	0.1433	0.5086	0.7013	1.3718	1.5568	2.2380	7.4428
500	0.0010	0.0025	0.0011	0.0064	0.0189	0.0886	0.1248	0.1433	0.3622	0.7013	1.5568	5.3668
1000	0.0009	0.0025	0.0025	0.0058	0.0178	0.0586	0.0886	0.1433	0.3622	0.7013	1.5568	5.3668
1500	0.0006	0.0025	0.0025	0.0037	0.0098	0.0414	0.0647	0.2035	0.3622	0.7013	1.5568	5.3668
2000	0.0005	0.0011	0.0025	0.0064	0.0094	0.0289	0.0647	0.2035	0.3622	0.7013	1.5568	5.3668
2500	0.0005	0.0025	0.0032	0.0045	0.0087	0.0586	0.0963	0.1433	0.3622	0.7013	1.5568	5.3668
3000	0.0005	0.0011	0.0032	0.0045	0.0064	0.0414	0.0886	0.1433	0.3622	0.7013	1.5568	5.3668
4000	0.0005	0.0010	0.0032	0.0037	0.0064	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
6000	0.0005	0.0025	0.0025	0.0032	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
10000	0.0009	0.0025	0.0025	0.0037	0.0058	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.02	1.31	1.31	2.45	2.52	4.34	5.1	2.89	1.34	1.5	4.62	9.61
50	1.18	1.19	0.9	1.45	1.74	2.26	2.05	2.43	2.33	2.7	5.32	6.01
100	1.2	1.22	0.94	1.79	2.1	2.27	1.91	3.03	3.09	5.97	10.87	17
500	1.25	1.53	1.86	1.97	2.13	2.29	4.21	8.34	11.14	23.82	38.05	67.69
1000	0.93	1.28	1.23	2.25	2.23	3.95	7.29	14.66	26.98	63.28	199.01	291.58
1500	1.85	1.43	1.25	4.78	3.23	6.8	13.69	21.21	37.23	142.94	294.86	355.75
2000	1.44	2.11	1.31	3.62	4.01	11.35	19.67	28.2	59.97	198.61	323.98	315.06
2500	0.97	1.33	1.34	6.17	4.38	11.7	20.38	31.96	90.43	251.92	290.36	283.93
3000	1.08	2.11	1.41	6.89	5.58	15.62	27.09	34.81	108.89	273.38	266.3	261.86
4000	1.13	1.88	1.56	5.28	6.8	24.21	31.48	40.91	141.12	236.14	231.25	230.1
6000	1.91	1.65	2.16	6.25	16.98	29.82	35.32	64.11	176.8	191.27	191.36	191.31
10000	1.33	1.5	1.77	13.48	16.67	35.61	50.36	98.29	134.73	147.59	148.33	150.61

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	11.55	8.21	7.48	13.52	13.87	23.54	27.04	14.83	6.44	6.77	18.25	33.88
50	6.7	7.32	5.1	7.74	9.04	10.39	7.42	6.92	5.18	5.18	7.5	6.96
100	6.57	6.6	5.02	8.95	9.78	8.1	4.5	4.91	3.21	4.32	6.06	5.44
500	5.31	6.52	6.77	4.89	3.79	1.79	2.47	3.53	2.2	2.64	2.92	2.59
1000	3.52	3.83	3.23	3.55	2.21	1.68	2.16	3.26	3.08	4.1	5.13	5.82
1500	5.31	3.24	2.34	3.61	2.47	1.96	3.22	3.19	4.54	4.73	5.41	6.53
2000	3.93	3.59	1.88	2.57	1.57	2.61	3.61	3.43	4.89	5.14	6.22	5.89
2500	2.26	2.1	1.5	2.62	1.56	2.3	3.33	4.52	5.66	5.96	5.68	5.4
3000	2.26	2.67	1.31	2.34	2.01	2.41	3.37	5.26	5.21	5.52	5.3	5.06
4000	1.89	1.84	1.07	1.62	1.76	3.15	4.2	4.63	4.63	4.94	4.75	4.57
6000	2.57	1.25	1.1	1.59	2.16	3.13	3.5	3.87	3.91	4.2	4.1	3.93
10000	1.34	0.65	0.6	1.96	2.41	3.06	3.44	3.07	3.17	3.44	3.35	3.24

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20.1	20.1	20.3	20.6	21.1	22.1	23	22.7	23
50	20.1	20.4	20.3	20.7	21	22.9	26.5	30.8	35.5	38.1	44	47.5
100	20.2	20.8	21.2	21.7	22.7	27.7	34.5	42.1	52.2	61.4	67.7	82.1
500	21.6	23.9	27.3	34.6	40.9	63.7	71.1	83	112.7	135.8	155.7	201.5
1000	23.4	29.7	32.6	44.2	55.3	86.1	98.5	109.6	141.4	182.1	291.4	383
1500	28.2	32.9	39.2	62.6	62.5	99.7	110.1	128.1	142.2	263.1	427.2	564.4
2000	29.1	38.8	45.1	62.8	87.7	111.9	123	149.7	183	344.2	562.9	745.9
2500	31	39.8	50	79.5	92.6	116.8	132.3	143.2	223.7	425.2	698.6	927.4
3000	33.3	45.1	55.2	88	93.9	131.2	152	144.1	264.5	506.2	834.3	1108.9
4000	38.1	52.7	64.6	101.4	110.1	146.1	151.9	169.3	346	668.3	1105.8	1471.8
6000	42.2	60.4	75.5	113.5	151.3	173.9	180.3	244	508.9	992.5	1648.7	2197.7
10000	50.3	84.7	101.4	153.8	155.9	208.4	237.9	393.4	834.9	1640.8	2734.4	3649.5

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.1	50.4	50.5	50.5	50.7	50.4	50.8	52.0	52.1	52.3	51.4
100	50.0	50.1	50.7	50.7	50.7	51.9	51.9	52.9	56.1	59.1	59.6	59.4
500	50.1	50.4	51.9	54.6	55.4	66.5	67.6	74.5	85.0	80.6	75.8	74.3
1000	50.2	50.8	53.0	57.6	60.2	77.7	78.8	75.9	76.5	72.3	66.6	62.5
1500	50.1	51.0	54.3	62.3	62.3	76.1	79.2	68.0	69.7	69.8	65.7	61.4
2000	50.4	51.5	55.8	58.8	71.4	80.3	76.9	67.0	68.4	68.2	63.9	62.4
2500	50.8	51.9	55.6	63.1	73.6	70.3	68.4	70.0	65.8	65.8	65.0	63.4
3000	50.8	52.1	56.6	64.8	76.1	72.1	70.0	67.2	67.2	66.9	66.0	64.3
4000	51.1	54.3	58.4	77.9	80.1	76.4	73.9	69.5	69.4	69.0	67.9	65.9
6000	50.7	53.8	61.0	83.1	84.6	76.6	77.6	72.8	72.3	71.9	70.3	67.9
10000	50.7	58.5	70.9	72.8	74.1	77.0	77.9	76.9	76.0	75.5	73.5	70.7

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<783	0<996	0<1178	0<1306	0<1306	0<1306	0<1192	0<1192	1<1306	1<1306	2<1306	8<1306
50	0<712	0<857	0<1092	0<1182	0<1182	0<1192	0<1104	1<1085	1<1306	2<1306	4<1306	29<1306
100	0<668	0<813	0<1039	0<1074	0<1005	0<1104	0<1104	1<1085	2<1306	2<1306	4<1306	20<1306
500	0<577	0<671	0<795	0<926	0<963	1<1112	2<1124	2<1132	9<1251	36<1263	156<1263	773<1245
1000	0<554	0<646	0<812	0<881	1<968	3<1124	5<1137	17<1150	74<1163	318<1163	2488>1150	9809>1128
1500	0<502	0<656	0<801	0<836	1<926	6<1081	12<1092	80<1108	209<1112	1393>1108	6916>1092	2545>1066
2000	0<524	0<660	0<793	2<873	3<1023	10<1049	30<1063	177<1077	548<1077	3058>1070	2055>1052	665>1023
2500	0<620	1<702	1<798	2<829	4<1002	39<1039	101<1049	186<1052	1193>1049	5493>1042	5949>1024	3336>993
3000	0<592	1<700	1<793	3<823	4<984	50<1020	142<1029	281<1032	1942>1029	7888>1020	20079>995	4708>968
4000	1<577	1<684	3<783	4<947	9<965	77<993	166<999	543<1002	3990>996	11286>984	28807>963	8956>931
6000	2<524	7<703	5<760	7<914	20<926	195<958	380<960	1677>960	9392>950	18661>938	48142>912	2261>881
10000	10<513	20<744	16<881	57<891	83<899	576<914	1316>914	5871>910	17641>895	35270>881	91196>856	2499>823

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<783	0<996	0<1178	0<1306	0<1306	0<1306	0<1192	1<1192	3<1306	7<1306	9<1306	28<1306
50	0<712	0<857	0<1092	0<1182	0<1182	0<1192	1<1104	2<1085	2<1306	4<1306	6<1306	34<1306
100	0<668	0<813	0<1039	0<1074	0<1005	0<1104	1<1104	1<1085	2<1306	2<1306	2<1306	7<1306
500	0<577	0<671	0<795	0<926	0<963	1<1112	1<1124	1<1132	2<1251	4<1263	13<1263	32<1245
1000	0<554	0<646	0<812	0<881	1<968	1<1124	2<1137	4<1150	9<1163	22<1163	75<1150	241<1128
1500	0<502	1<656	0<801	0<836	1<926	2<1081	3<1092	13<1108	27<1112	53<1108	160<1092	543<1066
2000	0<524	1<660	1<793	1<873	1<1023	2<1049	6<1063	23<1077	49<1077	95<1070	303<1052	800<1023
2500	0<620	2<702	1<798	1<829	1<1002	8<1039	17<1049	28<1052	83<1049	164<1042	409<1023	1080>993
3000	1<592	1<700	1<793	1<823	2<984	8<1020	19<1029	45<1032	106<1029	209<1020	523<999	1386>968
4000	1<577	1<684	2<783	1<947	2<965	11<993	24<999	66<1002	157<996	309<984	775<963	2052>931
6000	2<524	5<703	3<760	2<914	3<926	22<958	41<960	114<960	272<950	536<938	1348>912	3560>881
10000	10<513	9<744	6<881	9<891	13<899	54<914	101<914	226<910	542<895	1073>881	2690>856	7109>823

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00278	0.00172	0.00123	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00336	0.00232	0.00143	0.00122	0.00122	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00382	0.00258	0.00158	0.00148	0.00169	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00512	0.00379	0.00270	0.00199	0.00184	0.00138	0.00135	0.00133	0.00109	0.00107	0.00107	0.00110
1000	0.00555	0.00409	0.00259	0.00220	0.00182	0.00135	0.00132	0.00129	0.00126	0.00126	0.00129	0.00134
1500	0.00677	0.00396	0.00266	0.00244	0.00199	0.00146	0.00143	0.00139	0.00138	0.00139	0.00143	0.00150
2000	0.00621	0.00391	0.00271	0.00224	0.00163	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154	0.00163
2500	0.00444	0.00346	0.00268	0.00248	0.00170	0.00158	0.00155	0.00154	0.00155	0.00157	0.00163	0.00173
3000	0.00487	0.00348	0.00271	0.00252	0.00176	0.00164	0.00161	0.00160	0.00161	0.00164	0.00171	0.00182
4000	0.00513	0.00365	0.00278	0.00190	0.00183	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184	0.00197
6000	0.00621	0.00345	0.00295	0.00204	0.00199	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205	0.00220
10000	0.00649	0.00308	0.00220	0.00215	0.00211	0.00204	0.00204	0.00206	0.00213	0.00220	0.00233	0.00252

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00278	0.00172	0.00123	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00336	0.00232	0.00143	0.00122	0.00122	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00382	0.00258	0.00158	0.00148	0.00169	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00512	0.00379	0.00270	0.00199	0.00184	0.00138	0.00135	0.00133	0.00109	0.00107	0.00107	0.00110
1000	0.00555	0.00409	0.00259	0.00220	0.00182	0.00135	0.00132	0.00129	0.00126	0.00126	0.00129	0.00134
1500	0.00677	0.00396	0.00266	0.00244	0.00199	0.00146	0.00143	0.00139	0.00138	0.00139	0.00143	0.00150
2000	0.00621	0.00391	0.00271	0.00224	0.00163	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154	0.00163
2500	0.00444	0.00346	0.00268	0.00248	0.00170	0.00158	0.00155	0.00154	0.00155	0.00157	0.00163	0.00173
3000	0.00487	0.00348	0.00271	0.00252	0.00176	0.00164	0.00161	0.00160	0.00161	0.00164	0.00171	0.00182
4000	0.00513	0.00365	0.00278	0.00190	0.00183	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184	0.00197
6000	0.00621	0.00345	0.00295	0.00204	0.00199	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205	0.00220
10000	0.00649	0.00308	0.00220	0.00215	0.00211	0.00204	0.00204	0.00206	0.00213	0.00220	0.00233	0.00252

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0008	0.0042	0.0089	0.0359	0.0879	0.572	1.8852	10.6395	79.6991	218.0811	195.3094	489.9169
50	0.0051	0.0224	0.0382	0.23	0.5028	4.3302	20.2752	44.4992	112.4097	260.9785	434.7911	1990.194
100	0.0115	0.0492	0.0721	0.3783	1.0055	8.0681	32.1963	57.0251	132.3231	199.8455	344.9042	1123.793
500	0.0541	0.2389	0.249	1.7441	4.5217	27.6253	43.727	66.2438	171.2206	299.3823	654.4985	2617.994
1000	0.1205	0.5875	0.7675	2.9544	7.7704	31.9073	49.5482	94.2357	224.2456	418.879	1308.997	5235.988
1500	0.1269	0.787	1.169	2.6107	9.0866	30.0024	54.1353	124.5289	225.802	628.3185	1963.495	7853.982
2000	0.1457	0.6434	1.5294	5.1289	8.3075	31.9807	61.9079	149.4541	301.0693	837.758	2617.994	10471.98
2500	0.1756	1.2067	1.8916	3.7694	9.1179	46.6854	92.1666	129.6302	376.3366	1047.198	3272.492	13089.97
3000	0.2117	0.8595	2.2203	4.3055	8.8538	41.8682	83.3352	130.5138	451.6039	1256.637	3926.991	15707.96
4000	0.2883	1.1359	2.8102	4.988	10.7841	43.8939	79.2502	157.0796	602.1386	1675.516	5235.988	20943.95
6000	0.3548	2.46	3.3757	5.8933	8.3161	53.5388	96.3066	235.6194	903.2079	2513.274	7853.982	31415.93
10000	1.07	3.9324	4.9525	8.2039	16.5974	65.5411	130.8997	392.6991	1505.347	4188.79	13089.97	52359.88

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0012	0.0026	0.0127	0.0304	0.2032	0.6722	3.9466	26.0862	73.8964	86.1293	196.3495
50	0.0015	0.0062	0.0112	0.0721	0.1683	1.6461	8.5843	22.3809	66.7138	171.0585	349.9462	1819.493
100	0.0034	0.0145	0.0217	0.1294	0.3745	3.5407	18.2325	41.9983	129.4437	256.0013	474.9024	2135.696
500	0.0194	0.0849	0.0997	0.9293	3.0727	33.588	60.1835	115.7536	481.8348	1137.566	3430.992	14722.9
1000	0.048	0.2679	0.3742	2.2183	7.8412	57.127	111.0691	234.5229	883.9356	2078.041	5783.484	20960.68
1500	0.0605	0.4281	0.7075	3.1464	10.6525	67.9737	130.8295	382.1729	1148.714	3115.272	9205.015	32752.66
2000	0.0753	0.4496	1.1623	6.2076	16.1202	78.3721	172.9256	516.2823	1539.88	4147.918	11985.31	50614.83
2500	0.0942	0.8447	1.7402	6.6276	18.3487	129.974	274.9255	572.5033	1797.504	4880.141	16856.62	71453.69
3000	0.1238	0.7051	2.3432	8.8	18.1311	133.704	304.2127	632.0429	2392.988	6450.908	22360.78	95476.15
4000	0.1964	1.1545	3.7152	11.7323	28.1244	157.261	356.577	993.0707	3762.026	10149.98	35171.34	149751
6000	0.2918	3.0229	5.6932	15.273	29.6496	254.654	647.5477	1831.159	6939.986	18890.78	65180.19	277002.8
10000	1.0684	7.1306	10.8164	28.4148	53.8105	470.793	1199.809	3856.926	14717.75	40336.71	139018.8	591983

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: L-BD0.8P10

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=0.8; Maximum permissible specific bearing load plim=10 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	13 | 12	17 | 15	24 | 20	40 | 40	50 | 40	90 | 80	140 | 115	300 | 250	500 | 400	700 | 500	1000 | 500	1500 | 500
50	9 | 8	12 | 10	14 | 12	28 | 25	37 | 30	80 | 70	150 | 120	200 | 180	250 | 200	300 | 250	500 | 400	700 | 500
100	10 | 8	12 | 10	12 | 10	24 | 20	32 | 30	70 | 60	110 | 100	125 | 100	170 | 150	200 | 180	300 | 250	400 | 350
500	7 | 6	10 | 8	8 | 7	15 | 12	24 | 20	45 | 40	55 | 50	60 | 50	80 | 70	115 | 100	160 | 150	250 | 200
1000	6 | 5	9 | 8	9 | 8	15 | 12	24 | 20	37 | 30	45 | 40	60 | 50	85 | 70	115 | 100	160 | 150	250 | 200
1500	7 | 6	9 | 8	10 | 8	14 | 12	20 | 20	32 | 30	40 | 40	65 | 60	85 | 70	115 | 100	160 | 150	250 | 200
2000	6 | 5	8 | 7	9 | 8	15 | 12	20 | 20	32 | 30	40 | 40	60 | 50	85 | 70	115 | 100	160 | 150	250 | 200
2500	5 | 4	8 | 7	10 | 8	15 | 12	17 | 15	35 | 30	45 | 40	65 | 60	85 | 70	115 | 100	160 | 150	250 | 200
3000	5 | 4	8 | 7	12 | 10	15 | 12	16 | 15	32 | 30	45 | 40	60 | 50	80 | 70	115 | 100	160 | 150	250 | 200
4000	5 | 4	8 | 7	10 | 8	12 | 10	15 | 12	30 | 25	45 | 40	55 | 50	80 | 70	115 | 100	160 | 150	250 | 200
6000	5 | 4	10 | 8	10 | 8	10 | 8	13 | 12	28 | 25	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
10000	7 | 6	10 | 8	12 | 10	13 | 12	16 | 15	28 | 25	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	68	100	100	68	68
100	68	100	100	68	68	68	100	150	150	220	150	150
500	46	68	100	100	100	150	220	320	460	320	220	220
1000	46	68	68	100	68	150	220	150	100	100	68	46
1500	32	46	68	100	100	150	150	68	68	46	46	32
2000	32	46	68	68	100	100	100	46	46	32	32	32
2500	32	32	46	68	100	68	46	32	32	32	32	32
3000	32	32	46	68	100	68	46	32	32	32	32	32
4000	22	32	46	100	100	46	32	32	32	32	32	32
6000	22	22	46	100	100	46	32	32	32	32	32	32
10000	10	15	22	22	22	22	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	0	0	0	0	1	0	0	0
50	1	1	1	1	0	1	1	1	1	0	0	0
100	1	1	2	1	0	1	1	0	0	0	0	0
500	1	1	2	0	0	1	0	0	2	2	4	4
1000	1	1	1	0	0	0	2	2	3	4	4	5
1500	1	1	1	1	0	2	2	2	4	4	5	5
2000	1	1	1	1	1	2	2	3	4	4	5	5
2500	2	1	1	1	1	2	3	3	4	5	5	5
3000	2	1	2	1	2	2	3	4	4	5	5	5
4000	1	1	0	1	2	3	3	4	5	5	5	5
6000	1	1	1	2	2	3	4	4	5	5	5	5
10000	1	1	3	2	3	4	4	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	2	2	0	0	0	0	2
50	1	1	1	1	1	1	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	0
500	1	1	1	1	0	1	1	0	0	0	0	0
1000	1	1	1	1	0	0	1	0	0	0	0	0
1500	0	1	1	1	1	1	1	0	0	0	0	0
2000	1	1	1	1	1	1	0	0	0	0	0	0
2500	1	1	0	0	1	0	0	0	0	0	0	0
3000	1	1	2	0	1	0	0	0	0	0	0	0
4000	1	1	1	2	2	0	0	0	0	0	0	0
6000	1	1	2	2	2	0	1	1	0	0	0	1
10000	1	2	2	2	2	1	0	0	0	0	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.16	0.26	0.37	0.52	0.79
50	0.02	0.03	0.04	0.07	0.1	0.21	0.39	0.52	0.65	0.79	1.31	1.83
100	0.05	0.06	0.06	0.13	0.17	0.37	0.58	0.65	0.89	1.05	1.57	2.09
500	0.18	0.26	0.21	0.39	0.63	1.18	1.44	1.57	2.09	3.01	4.19	6.54
1000	0.31	0.47	0.47	0.79	1.26	1.94	2.36	3.14	4.45	6.02	8.38	13.09
1500	0.55	0.71	0.79	1.1	1.57	2.51	3.14	5.11	6.68	9.03	12.57	19.63
2000	0.63	0.84	0.94	1.57	2.09	3.35	4.19	6.28	8.9	12.04	16.76	26.18
2500	0.65	1.05	1.31	1.96	2.23	4.58	5.89	8.51	11.13	15.05	20.94	32.72
3000	0.79	1.26	1.88	2.36	2.51	5.03	7.07	9.42	12.57	18.06	25.13	39.27
4000	1.05	1.68	2.09	2.51	3.14	6.28	9.42	11.52	16.76	24.09	33.51	52.36
6000	1.57	3.14	3.14	3.14	4.08	8.8	11.62	15.71	25.13	36.13	50.27	78.54
10000	3.67	5.24	6.28	6.81	8.38	14.66	19.37	26.18	41.89	60.21	83.78	130.9

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.06	0.2	0.21	0.31	0.5	0.69	0.62	0.27	0.25	0.29	0.4	0.67
50	0.14	0.42	0.6	0.71	0.9	0.89	0.56	0.56	1	1.33	1	1.43
100	0.12	0.42	0.83	1.04	1.04	1.19	0.91	1.6	1.96	2.78	2.67	3.57
500	0.24	0.62	1.79	2.78	2.08	2.78	3.64	6.67	8.93	8.7	8.33	10
1000	0.33	0.69	1.39	2.78	2.08	4.5	5.56	6.67	8.4	8.7	8.33	10
1500	0.24	0.69	1.25	2.98	2.5	5.21	6.25	5.13	8.4	8.7	8.33	10
2000	0.33	0.89	1.39	2.78	2.5	5.21	6.25	6.67	8.4	8.7	8.33	10
2500	0.5	0.89	1.25	2.78	3.92	4.76	5.56	5.13	8.4	8.7	8.33	10
3000	0.5	0.89	0.83	2.78	4.17	5.21	5.56	6.67	8.93	8.7	8.33	10
4000	0.5	0.89	1.25	4.17	5.56	6.67	5.56	7.27	8.93	8.7	8.33	10
6000	0.5	0.62	1.25	6.25	6.41	7.14	9.01	10	8.93	8.7	8.33	10
10000	0.24	0.62	0.83	3.21	4.17	7.14	9.01	10	8.93	8.7	8.33	10

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.2>4.5	5.8>4.5	6.1>4.5	7.4>4.9	5.7>5.2	8.7>6.1	12.9>7.1	49.9>8.65	85.9>9.41	99.7>9.52	65.8>9.74	39>10.05
50	6.5>4.5	6.1>4.5	4.8>4.5	7>4.6	7.5>4.8	16.5>5.77	34.4>7.01	45.9>7.44	40.3>7.89	37.3>8.25	49.7>9.25	41.5>9.69
100	8.1>4.5	6.8>4.5	4.7>4.5	6.4>4.5	8.7>4.63	15.2>5.32	31.3>6.12	24.5>6.39	23.6>7.12	22.5>7.39	21.4>8.41	17.1>9.36
500	7.2>4.4	7>4.31	4.3<4.37	4.3>4.21	6.9>4.1	10>4.57	8.9>4.93	5.8>5.11	4.2<5.76	3.7<6.9	3.3<8.05	0<9.49
1000	6.8>4.26	7.9>4.16	5.1>4.16	4.1>4.05	5.5>4.06	4.9>4.68	4.6<5.04	3.5<5.8	2.4<6.64	2<7.6	0<9.15	0<10.7
1500	8.8>4.13	7.2>4.07	5.4>4.05	3.8<3.98	5.9>4.21	3.3<4.83	2.8<5.2	2.9<6.32	1.8<7.18	0<8.44	0<9.9	0<11.25
2000	7>4.1	6.1>4.04	5.3>4.01	3.1<4.21	5.8>4.36	2.5<5.09	2.2<5.35	2<6.49	1.4<7.75	0<8.91	0<10.27	0<11.92
2500	5.1>4.09	5.4>3.99	4.8>4.15	3<4.37	3.7<4.45	2.7<5.34	2<5.9	2.1<7.25	1<8.22	0<9.18	0<10.64	0<12.7
3000	5.3>4.05	5.5>4.06	7.5>4.28	2.8<4.54	2.4<4.63	1.8<5.32	1.9<6.08	1.6<7.34	0<8.2	0<9.46	0<11.02	0<13.58
4000	4.9>3.99	5.5>4.2	4.5>4.36	2.5<4.63	1.5<4.8	1.2<5.39	1.6<6.64	1.1<7.31	0<8.57	0<10.03	0<12	0<15.55
6000	5.1>4.21	6>4.8	4.2<4.8	1.2<4.8	1.3<4.95	1.1<5.65	0.7<6.41	0.4<7.48	0<9.42	0<11.49	0<14.46	0<19.42
10000	7.2>4.87	5.2>5.02	5.5>5.19	1.7<5.18	1<5.45	0.8<6.28	0.4<7.15	0<8.52	0<11.57	0<15.04	0<19.51	0<27.28

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.6<4.5	1.4<4.5	1.7<4.5	2<4.9	1.6<5.2	2.3<6.1	3.6<7.1	14.1>8.65	27.5>9.41	31.7>9.52	24.7>9.74	10.3>10.05
50	2<4.5	1.7<4.5	1.5<4.5	2<4.6	2.1<4.8	5.3<5.77	13>7.01	18>7.44	21.4>7.89	21.5>8.25	32.4>9.25	30.8>9.69
100	2.7<4.5	2.1<4.5	1.6<4.5	2<4.5	2.5<4.63	5.8>5.32	15.4>6.12	13.9>6.39	18.9>7.12	21.5>7.39	25.8>8.41	28.5>9.36
500	2.7<4.4	2.6<4.31	1.5<4.37	2.2<4.21	4.5>4.1	9.6>4.57	11.6>4.93	8.9>5.11	11>5.76	14.1>6.9	18.1>8.05	22.8>9.49
1000	2.9<4.26	3.6<4.16	2.5<4.16	3.3<4.05	5.4>4.06	7.5>4.68	9.5>5.04	9.1>5.8	9.1>6.64	12.3>7.6	14.7>9.15	14.8>10.7
1500	4.3>4.13	3.9<4.07	3.8<4.05	3.9<3.98	7.2>4.21	7.7>4.83	8.8>5.2	10.8>6.32	9.1>7.18	10.6>8.44	15.7>9.9	15.2>11.25
2000	3.6<4.1	3.6<4.04	4<4.01	3.9<4.21	7.6>4.36	7.6>5.09	8.6>5.35	7.7>6.49	9.2>7.75	10.2>8.91	15.2>10.27	18>11.92
2500	2.9<4.09	3.4<3.99	4.3>4.15	4.4>4.37	5.2>4.45	7.6>5.34	7.7>5.9	10.2>7.25	8.7>8.22	11.6>9.18	17.3>10.64	20.6>12.7
3000	3.1<4.05	4<4.06	7.2>4.28	4.9>4.54	5.3>4.63	7.6>5.32	8.5>6.08	8.1>7.34	8.8>8.2	12.9>9.46	19.2>11.02	23.2>13.58
4000	3<3.99	4.7>4.2	5.5>4.36	4.2<4.63	4.3<4.8	5.5>5.39	8.4>6.64	8.5>7.31	10.4>8.57	15.1>10.03	22.4>12	27.7>15.55
6000	3.7<4.21	7.1>4.8	6.5>4.8	3.2<4.8	4.4<4.95	6.3>5.65	5.7<6.41	7.1<7.48	12.8>9.42	18.7>11.49	27.7>14.46	34.8>19.42
10000	7.8>4.87	7.6>5.02	8.2>5.19	5<5.18	5.3<5.45	6<6.28	7.4>7.15	9.1>8.52	16.6>11.57	24.3>15.04	36.3>19.51	45.6>27.28

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.6	12.7	18.9	38.7	48.6	88.9	138.0	268.4	442.5	557.5	751.2	1112.3
50	5.1	7.5	11.5	27.0	35.1	75.3	140.7	190.7	228.3	287.6	410.8	557.5
100	4.7	6.9	9.5	22.2	30.3	66.5	105.9	120.5	163.5	187.3	259.5	352.2
500	3.2	4.8	6.4	14.9	22.6	44.4	50.8	58.3	72.3	99.6	138.0	187.3
1000	2.5	3.9	6.7	14.2	23.8	35.2	40.4	55.9	84.1	105.9	151.3	219.6
1500	2.6	4.0	6.2	13.3	19.4	30.8	38.8	61.4	83.3	112.2	141.4	209.3
2000	2.3	3.7	5.9	14.6	18.1	31.0	39.0	59.6	80.9	111.2	140.1	190.2
2500	2.2	4.0	6.4	14.3	16.8	32.6	43.9	60.4	82.0	103.3	130.1	176.6
3000	2.0	3.8	6.3	14.1	15.8	30.7	41.3	56.8	77.1	97.2	122.4	166.2
4000	2.2	3.5	6.2	11.4	14.4	29.8	41.0	51.6	70.1	88.3	111.2	151.0
6000	1.9	3.7	5.9	10.0	12.6	26.0	35.8	45.1	61.2	77.1	97.2	131.9
10000	2.2	3.8	6.4	12.1	15.3	26.1	30.2	38.0	51.6	65.0	82.0	111.2

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
50	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
100	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
1000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
1500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
2000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
2500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
3000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
4000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
6000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
10000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.6892	0.6533	0.6436	0.6283	0.7701	0.8072	0.8462	0.7227	0.6563	0.7151	0.8684	0.9480
50	0.6079	0.6027	0.5966	0.6438	0.7026	0.6557	0.6724	0.6837	0.6774	0.7513	0.8010	0.8814
100	0.5996	0.6006	0.5669	0.6698	0.7087	0.6895	0.5938	0.7299	0.7219	0.7754	0.8576	0.9144
500	0.6213	0.6486	0.6375	0.7469	0.7153	0.6847	0.7649	0.8585	0.9073	0.9405	0.9619	0.9999
1000	0.6144	0.6038	0.6082	0.7665	0.7647	0.8080	0.8474	0.9103	0.9552	0.9717	0.9999	0.9999
1500	0.6289	0.6254	0.6221	0.7815	0.7296	0.8638	0.9042	0.9360	0.9698	0.9999	0.9999	0.9999
2000	0.6224	0.6342	0.6133	0.8315	0.6531	0.9004	0.9284	0.9552	0.9778	0.9999	0.9999	0.9999
2500	0.5630	0.6526	0.6747	0.8441	0.7549	0.9055	0.9434	0.9578	0.9849	0.9999	0.9999	0.9999
3000	0.5814	0.6322	0.5540	0.8547	0.8358	0.9324	0.9491	0.9668	0.9999	0.9999	0.9999	0.9999
4000	0.6371	0.6346	0.7017	0.7874	0.8915	0.9529	0.9585	0.9774	0.9999	0.9999	0.9999	0.9999
6000	0.6809	0.6714	0.7343	0.8908	0.9041	0.9600	0.9793	0.9915	0.9999	0.9999	0.9999	0.9999
10000	0.6885	0.6804	0.5845	0.8811	0.9391	0.9735	0.9885	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9209	0.9140	0.8992	0.8992	0.9373	0.9497	0.9572	0.9219	0.8899	0.9096	0.9507	0.9863
50	0.8828	0.8861	0.8748	0.8969	0.9160	0.8891	0.8766	0.8760	0.8285	0.8566	0.8702	0.9120
100	0.8681	0.8734	0.8566	0.8986	0.9161	0.8815	0.8003	0.8470	0.7772	0.7853	0.8280	0.8575
500	0.8560	0.8679	0.8694	0.8704	0.8146	0.6982	0.6939	0.7813	0.7539	0.7754	0.7882	0.8299
1000	0.8392	0.8181	0.8060	0.8130	0.7674	0.7099	0.6876	0.7673	0.8327	0.8302	0.8540	0.9084
1500	0.8206	0.7949	0.7364	0.7803	0.6719	0.6791	0.6984	0.7636	0.8460	0.8670	0.8587	0.9150
2000	0.8084	0.7854	0.7059	0.7921	0.5464	0.6988	0.7186	0.8272	0.8531	0.8795	0.8725	0.9066
2500	0.7560	0.7817	0.7085	0.7671	0.6531	0.7289	0.7824	0.7985	0.8677	0.8695	0.8621	0.8988
3000	0.7549	0.7347	0.5718	0.7445	0.6376	0.7155	0.7669	0.8326	0.8619	0.8605	0.8538	0.8914
4000	0.7792	0.6860	0.6400	0.6452	0.6992	0.7904	0.7832	0.8191	0.8478	0.8472	0.8408	0.8795
6000	0.7731	0.6084	0.5860	0.6997	0.6703	0.7610	0.8348	0.8470	0.8272	0.8282	0.8214	0.8641
10000	0.6655	0.5366	0.3791	0.6460	0.6889	0.7918	0.8052	0.8207	0.7990	0.8017	0.7940	0.8435

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00155	0.00077	0.0012	0.00241	0.00516	0.0266	0.148684	1.16842	3.267123	8.911211	31.606	157.5602
50	0.00116	0.0007	0.00051	0.00362	0.00748	0.05253	0.41543	1.028942	0.860889	1.550812	7.807896	21.27532
100	0.00308	0.00139	0.00054	0.00442	0.01325	0.07153	0.219542	0.314477	0.468751	0.759498	2.62973	6.636817
500	0.00459	0.0045	0.00115	0.00467	0.01513	0.05371	0.095163	0.12885	0.245446	0.728287	2.050208	7.483834
1000	0.00388	0.00539	0.00264	0.00816	0.02594	0.05537	0.097937	0.242963	0.730472	1.823698	5.30943	20.30565
1500	0.01268	0.00705	0.00419	0.00983	0.02294	0.06017	0.121992	0.528924	1.215347	3.173437	8.848235	34.18799
2000	0.00653	0.00577	0.00421	0.0163	0.01855	0.08664	0.175705	0.607849	1.733437	4.600556	12.92082	48.32386
2500	0.00233	0.00667	0.00673	0.01971	0.01654	0.14433	0.332267	1.030956	2.326355	5.96426	16.74534	63.11111
3000	0.00303	0.0066	0.01019	0.02298	0.01731	0.14191	0.401416	0.994244	2.47176	7.326617	20.72542	78.55673
4000	0.00473	0.00778	0.00947	0.00988	0.01979	0.17022	0.579427	1.106116	3.422997	10.21936	29.08185	110.6979
6000	0.00828	0.01757	0.01292	0.00977	0.02134	0.22158	0.525061	1.295926	5.41229	16.36355	46.74155	180.7893
10000	0.03651	0.02171	0.01658	0.03748	0.07372	0.42004	0.916212	2.285117	9.681616	29.5623	84.99152	332.3313

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0064	0.0103	0.0189	0.0829	0.1295	0.4562	1.0104	4.6626	14.8857	34.7234	49.5203	74.1818
50	0.0020	0.0050	0.0069	0.0370	0.0577	0.3561	1.1283	2.2473	3.1135	4.6626	14.8857	34.7234
100	0.0022	0.0050	0.0050	0.0189	0.0503	0.2682	0.6936	0.7861	1.5953	2.2473	4.6626	10.4355
500	0.0012	0.0022	0.0016	0.0073	0.0189	0.1171	0.1773	0.1927	0.3561	0.7244	1.5028	3.1135
1000	0.0009	0.0020	0.0020	0.0073	0.0189	0.0577	0.1171	0.1927	0.3776	0.7244	1.5028	3.1135
1500	0.0012	0.0020	0.0022	0.0069	0.0159	0.0503	0.0829	0.2497	0.3776	0.7244	1.5028	3.1135
2000	0.0009	0.0016	0.0020	0.0073	0.0159	0.0503	0.0829	0.1927	0.3776	0.7244	1.5028	3.1135
2500	0.0006	0.0016	0.0022	0.0073	0.0103	0.0547	0.1171	0.2497	0.3776	0.7244	1.5028	3.1135
3000	0.0006	0.0016	0.0050	0.0073	0.0097	0.0503	0.1171	0.1927	0.3561	0.7244	1.5028	3.1135
4000	0.0006	0.0016	0.0022	0.0050	0.0073	0.0395	0.1171	0.1773	0.3561	0.7244	1.5028	3.1135
6000	0.0006	0.0022	0.0022	0.0022	0.0064	0.0370	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
10000	0.0012	0.0022	0.0050	0.0064	0.0097	0.0370	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.88	1.5	1.33	1.53	2.46	3.45	4.51	1.99	1.36	1.62	3.66	9.61
50	1.19	1.08	1.08	1.44	1.75	1.5	1.48	1.78	1.52	2.31	3	5.75
100	1.01	1.07	0.9	1.53	2.1	1.74	1.14	1.98	2.1	2.84	5.09	9.4
500	1.22	1.31	1.36	2.17	1.92	1.77	2.7	5.13	8.57	14.93	30.18	135.91
1000	1.14	1.17	1.19	2.41	2.48	3.2	4.83	8.65	22.45	40.28	119.45	484.84
1500	1.27	1.3	1.13	2.81	2.48	5.87	8.86	14.06	37.59	76.01	196.68	465.58
2000	1.19	1.34	1.22	3.85	1.73	8.29	12.79	22.53	46.14	120.74	265.55	404.97
2500	0.83	1.48	1.5	4.33	2.49	8.3	16	25.77	53.23	150.84	280.6	362.95
3000	0.91	1.32	0.85	4.8	4.53	13.29	18.47	34.36	83.96	173.97	255.15	332.88
4000	1.23	1.34	1.72	2.84	6.88	20.62	26.18	46.78	111.42	207.41	220.39	289.06
6000	1.55	1.47	2.03	6.83	8.51	27.7	47.4	59.41	148.55	176.8	178.52	239.21
10000	1.73	1.54	0.98	6.83	15.01	42.52	56.61	93.5	130.66	134.73	137.75	185.41

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10.75	9.39	7.59	8.47	13.54	18.84	24.22	10.39	6.78	7.74	14.6	33.88
50	6.77	6.7	6.13	7.77	9.26	7.1	5.96	6.4	3.75	5.04	5.6	8.01
100	5.49	5.93	5.04	7.54	10.01	6.53	3.34	4.45	2.82	3.01	3.86	5.26
500	5.11	5.47	5.9	5.61	3.45	1.89	1.89	2.73	2.45	2.75	3.18	3.8
1000	4.27	3.74	3.42	3.29	2.51	1.82	1.79	2.51	3.98	4.07	5.35	8.24
1500	3.71	3.17	2.05	2.79	1.9	1.82	2.15	2.72	4.51	5.74	5.59	9.05
2000	3.29	2.94	1.96	2.81	1.04	2.01	2.36	3.83	4.83	6.47	6.37	8.04
2500	2.27	2.87	1.78	2.42	1.49	2.12	2.93	3.35	5.57	5.88	5.78	7.35
3000	2.26	2.22	0.92	2.14	1.48	2.17	2.68	4.01	5.49	5.39	5.34	6.87
4000	2.59	1.75	1.25	1.34	1.7	2.9	2.94	3.84	4.79	4.75	4.74	6.14
6000	2.5	1.06	0.94	1.7	1.72	2.6	4.01	4.45	3.98	3.99	4	5.27
10000	1.54	0.74	0.42	1.52	1.91	3.12	3.13	3.5	3.21	3.25	3.29	4.31

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20.1	20.1	20.2	20.4	20.9	21.6	22.1	22.5	23
50	20.1	20.2	20.3	20.6	20.8	22.6	24.9	26.6	33.8	36	38.2	43.8
100	20.2	20.5	20.7	21.9	22.4	26.3	31	36.6	47.5	53.5	59.6	67.3
500	21.8	24.3	24.9	33.9	40.7	55.7	67.6	76.6	101.1	115.5	140.8	237.1
1000	23.7	28.6	31.2	47	53.3	76.2	92.3	99.2	120.3	152.1	223.2	454.2
1500	26.5	31.7	40.1	55.2	63.2	99	109.8	116.5	144	189.9	324.8	671.3
2000	27.6	33.9	43	62.1	75.8	109.8	123.7	129.7	164.1	246.6	426.4	888.4
2500	28.1	35.3	48.7	70.2	76.7	106.4	126.6	153.6	173.5	303.2	528	1105.5
3000	30	38.8	51.8	77.9	98.8	130.3	142.6	163.9	226	359.8	629.6	1322.6
4000	31.6	45.3	63	86.7	112.4	146.7	169.4	201.3	294.7	473.1	832.9	1756.8
6000	37.8	62.8	79.2	115.2	128.2	184.8	204	219	432	699.7	1239.3	2625.3
10000	54.6	82.1	96	130.9	176.8	246.4	271	351.7	706.6	1152.8	2052.1	4362.1

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.1	50.2	50.1	50.2	50.1	50.1	50.2	50.2	50.1	50.0
50	50.0	50.3	50.6	50.6	50.6	51.0	50.6	50.7	52.3	52.6	51.6	51.7
100	50.0	50.3	51.1	50.9	50.8	51.6	52.3	53.3	56.7	59.3	57.0	57.8
500	50.1	50.6	52.5	54.6	55.3	64.3	69.0	73.9	86.3	81.9	77.8	77.6
1000	50.3	51.1	53.3	57.4	57.3	73.4	80.6	75.8	72.3	73.3	68.9	65.6
1500	50.2	51.4	54.8	60.0	63.3	78.8	80.4	69.2	70.5	68.3	68.4	64.6
2000	50.4	52.1	56.1	58.6	74.0	76.2	77.8	68.1	69.5	66.8	66.8	65.9
2500	51.1	52.2	55.7	60.1	75.4	71.9	69.1	66.0	67.7	68.0	68.0	67.1
3000	51.1	53.0	57.8	61.5	77.8	74.3	70.8	67.4	69.4	69.2	69.0	68.2
4000	50.9	54.0	58.5	79.3	80.4	72.6	69.1	70.3	71.3	70.9	70.6	69.8
6000	51.0	54.6	61.5	84.1	87.3	77.5	73.6	74.3	74.3	73.6	73.1	72.1
10000	50.7	56.9	74.1	70.7	71.7	73.4	78.4	78.9	78.7	77.6	77.0	75.3

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<745	0<928	0<1092	0<1306	0<1306	0<1306	0<1192	0<1192	0<1306	1<1306	2<1306	8<1306
50	0<679	0<816	0<1005	0<1100	0<1116	0<1192	0<1104	1<1085	1<1306	1<1306	5<1306	12<1306
100	0<651	0<778	0<968	0<1026	0<955	0<1104	0<1104	0<1085	1<1306	1<1306	4<1306	10<1306
500	0<561	0<653	0<759	0<869	0<917	1<1100	1<1112	1<1120	3<1234	12<1251	49<1263	424<1263
1000	0<537	0<622	0<766	0<848	1<935	2<1108	3<1124	8<1141	35<1154	110<1163	627<1163	1417>1150
1500	0<502	0<632	0<772	0<824	1<885	4<1066	8<1081	43<1104	118<1108	414<1112	1979>1108	3395>1092
2000	0<524	0<640	0<752	1<828	2<1011	10<1042	20<1056	75<1070	241<1077	1060<1077	4181>1070	2055>1052
2500	0<604	0<661	1<760	2<819	2<984	19<1029	53<1039	193<1049	413<1052	1896>1049	6292>1043	3949>1023
3000	0<578	1<676	1<782	3<813	3<968	32<1011	84<1023	232<1029	727<1032	2932>1029	7888>1020	20079>999
4000	0<564	1<672	2<749	2<931	5<947	57<984	198<996	400<1002	1549>1002	5460>996	11286>984	28807>963
6000	1<515	6<685	4<738	4<897	9<914	128<950	304<958	624<960	3943>960	9392>950	18661>938	38142>912
10000	13<507	18<723	18<881	38<885	96<895	483<912	881<914	2282>914	8296>908	17641>895	35270>881	71196>856

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<745	0<928	0<1092	0<1306	0<1306	0<1306	0<1192	1<1192	2<1306	3<1306	9<1306	28<1306
50	0<679	0<816	0<1005	0<1100	0<1116	0<1192	1<1104	2<1085	1<1306	2<1306	8<1306	17<1306
100	0<651	0<778	0<968	0<1026	0<955	0<1104	1<1104	1<1085	1<1306	1<1306	3<1306	6<1306
500	0<561	0<653	0<759	0<869	0<917	1<1100	1<1112	1<1120	1<1234	2<1251	5<1263	13<1263
1000	0<537	0<622	0<766	0<848	1<935	1<1108	1<1124	2<1141	6<1154	12<1163	31<1163	96<1150
1500	1<502	0<632	0<772	0<824	1<885	1<1066	2<1081	9<1104	15<1108	34<1112	67<1108	214<1092
2000	1<524	0<640	0<752	1<828	1<1011	2<1042	4<1056	13<1070	27<1077	64<1077	126<1070	314<1052
2500	0<604	1<661	1<760	1<819	1<984	5<1029	10<1039	27<1049	47<1052	87<1049	170<1042	423<1023
3000	0<578	1<676	1<782	1<813	1<968	6<1011	13<1023	29<1029	53<1032	110<1029	216<1020	542<999
4000	1<564	1<672	1<749	1<931	1<947	9<984	24<996	36<1002	78<1002	161<996	317<984	800<963
6000	2<515	4<685	2<738	1<897	2<914	13<950	28<958	52<960	133<960	277<950	547<938	1387>912
10000	12<507	9<723	8<881	9<885	13<895	40<912	56<914	103<914	266<908	555<895	1100>881	2766>856

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00307	0.00198	0.00143	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00370	0.00256	0.00169	0.00141	0.00137	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00403	0.00282	0.00182	0.00162	0.00187	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00542	0.00400	0.00296	0.00226	0.00203	0.00141	0.00138	0.00136	0.00112	0.00109	0.00107	0.00107
1000	0.00591	0.00441	0.00291	0.00237	0.00195	0.00139	0.00135	0.00131	0.00128	0.00126	0.00126	0.00129
1500	0.00677	0.00427	0.00286	0.00251	0.00218	0.00150	0.00146	0.00140	0.00139	0.00138	0.00139	0.00143
2000	0.00621	0.00416	0.00302	0.00249	0.00167	0.00157	0.00153	0.00149	0.00147	0.00147	0.00149	0.00154
2500	0.00468	0.00390	0.00295	0.00254	0.00176	0.00161	0.00158	0.00155	0.00154	0.00155	0.00157	0.00163
3000	0.00511	0.00373	0.00279	0.00258	0.00182	0.00167	0.00163	0.00161	0.00160	0.00161	0.00164	0.00171
4000	0.00536	0.00378	0.00304	0.00197	0.00190	0.00176	0.00172	0.00170	0.00170	0.00172	0.00176	0.00184
6000	0.00644	0.00363	0.00313	0.00212	0.00204	0.00189	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205
10000	0.00664	0.00326	0.00220	0.00218	0.00213	0.00205	0.00204	0.00204	0.00207	0.00213	0.00220	0.00233

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00307	0.00198	0.00143	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00370	0.00256	0.00169	0.00141	0.00137	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00403	0.00282	0.00182	0.00162	0.00187	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00542	0.00400	0.00296	0.00226	0.00203	0.00141	0.00138	0.00136	0.00112	0.00109	0.00107	0.00107
1000	0.00591	0.00441	0.00291	0.00237	0.00195	0.00139	0.00135	0.00131	0.00128	0.00126	0.00126	0.00129
1500	0.00677	0.00427	0.00286	0.00251	0.00218	0.00150	0.00146	0.00140	0.00139	0.00138	0.00139	0.00143
2000	0.00621	0.00416	0.00302	0.00249	0.00167	0.00157	0.00153	0.00149	0.00147	0.00147	0.00149	0.00154
2500	0.00468	0.00390	0.00295	0.00254	0.00176	0.00161	0.00158	0.00155	0.00154	0.00155	0.00157	0.00163
3000	0.00511	0.00373	0.00279	0.00258	0.00182	0.00167	0.00163	0.00161	0.00160	0.00161	0.00164	0.00171
4000	0.00536	0.00378	0.00304	0.00197	0.00190	0.00176	0.00172	0.00170	0.00170	0.00172	0.00176	0.00184
6000	0.00644	0.00363	0.00313	0.00212	0.00204	0.00189	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205
10000	0.00664	0.00326	0.00220	0.00218	0.00213	0.00205	0.00204	0.00204	0.00207	0.00213	0.00220	0.00233

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0006	0.0027	0.0062	0.0308	0.0595	0.4207	1.3696	9.8258	44.8848	115.0159	211.1594	489.9169
50	0.0031	0.0158	0.0241	0.1642	0.3809	3.9232	17.786	41.8707	104.0475	185.2239	520.1021	1279.298
100	0.0088	0.0351	0.0504	0.3189	0.7644	7.2984	29.491	50.092	110.3319	210.9596	457.2913	1046.815
500	0.0357	0.1844	0.2061	1.1019	3.414	23.1235	41.2848	61.9007	123.6813	253.882	498.0842	1636.246
1000	0.0704	0.3783	0.4927	2.147	5.4939	25.6036	46.8928	86.664	183.0335	351.0925	837.758	3272.492
1500	0.1304	0.5129	0.869	2.8253	7.3607	24.8121	46.6895	114.2815	226.3445	451.6039	1256.637	4908.739
2000	0.1441	0.5858	1.0071	3.3384	9.5119	28.2086	53.8819	120.0231	262.9098	602.1386	1675.516	6544.985
2500	0.1438	0.644	1.2392	3.9884	8.6586	39.746	69.1084	158.1292	280.0289	752.6732	2094.395	8181.231
3000	0.1779	0.7931	2.4114	4.5975	6.8935	34.6664	79.4983	157.4576	314.1593	903.2079	2513.274	9817.477
4000	0.2062	1.063	1.8576	5.0626	7.3365	36.7249	96.8552	157.1937	418.879	1204.277	3351.032	13089.97
6000	0.3176	1.8508	2.557	4.1137	8.7821	48.3584	83.7737	157.0796	628.3185	1806.416	5026.548	19634.95
10000	0.6946	2.6844	5.7692	9.0008	13.7132	66.4504	114.3174	261.7994	1047.198	3010.693	8377.58	32724.92

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0002	0.0009	0.0021	0.011	0.0216	0.1612	0.5477	3.5997	16.2639	41.9583	87.4775	196.3495
50	0.0011	0.005	0.0081	0.0579	0.1349	1.4957	7.3908	19.2115	56.7435	114.898	364.4984	1027.485
100	0.003	0.0119	0.0167	0.1167	0.3004	3.2335	14.6037	29.8913	90.5352	203.078	531.6306	1482.504
500	0.0143	0.0738	0.0825	0.6172	2.3046	22.1198	52.4863	89.6414	262.1101	679.9701	1664.899	6029.987
1000	0.0297	0.1766	0.2462	1.7451	5.4416	37.6604	87.6606	182.8221	474.0287	1234.091	2915.807	9181.633
1500	0.0641	0.284	0.5797	2.8383	8.7871	50.5509	108.5181	294.5395	721.5218	1685.411	4717.03	14466.91
2000	0.0726	0.3453	0.7386	4.0511	12.9378	66.2059	142.5352	318.1943	981.1308	2237.841	6287.463	22234.27
2500	0.0736	0.4107	1.0994	5.7395	12.2275	91.7201	184.2778	476.0804	1189.823	3114.622	8729.538	31165.15
3000	0.0968	0.5599	2.2836	7.6161	14.0416	100.174	242.1412	502.0027	1390.971	4067.625	11397.46	41304.96
4000	0.1231	0.8925	2.3147	8.4566	17.5705	111.613	320.015	652.1256	2116.748	6198.249	17366.33	63695.17
6000	0.2274	2.3106	4.2944	9.7821	23.4008	177.877	359.7718	915.2533	3822.992	11213.88	31434.77	115845
10000	0.7514	4.3221	11.6292	22.5655	46.4083	285.402	761.1369	1926.982	8117.164	23836	66964.84	244652.3

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: L-BD1.2P10

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=Low (Q=0.8); Bearing width ratio B/D=1.2; Maximum permissible specific bearing load plim=10 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	14 | 20	17 | 25	24 | 30	40 | 50	50 | 60	90 | 115	140 | 180	300 | 400	500 | 500	700 | 500	1000 | 500	1500 | 500
50	9 | 12	12 | 15	14 | 20	28 | 40	35 | 50	75 | 100	125 | 150	170 | 250	250 | 300	300 | 400	400 | 500	700 | 500
100	10 | 12	12 | 15	12 | 15	24 | 30	30 | 40	60 | 80	105 | 150	120 | 150	150 | 180	180 | 250	250 | 300	350 | 500
500	7 | 10	10 | 12	8 | 10	15 | 20	24 | 30	40 | 50	45 | 60	60 | 80	80 | 100	110 | 150	160 | 200	250 | 300
1000	6 | 8	9 | 12	9 | 12	15 | 20	22 | 30	32 | 40	40 | 50	55 | 70	80 | 100	110 | 150	160 | 200	250 | 300
1500	6 | 8	9 | 12	10 | 12	12 | 15	20 | 25	30 | 40	38 | 50	60 | 80	80 | 100	110 | 150	160 | 200	250 | 300
2000	5 | 6	8 | 10	9 | 12	13 | 20	18 | 25	28 | 40	40 | 50	55 | 70	80 | 100	110 | 150	160 | 200	250 | 300
2500	4 | 5	7 | 10	10 | 12	13 | 20	17 | 25	32 | 40	45 | 60	55 | 70	80 | 100	110 | 150	160 | 200	250 | 300
3000	4 | 5	7 | 10	10 | 12	13 | 20	16 | 20	30 | 40	40 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
4000	5 | 6	7 | 10	9 | 12	12 | 15	15 | 20	28 | 40	37 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
6000	5 | 6	10 | 12	10 | 12	10 | 12	13 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
10000	6 | 8	9 | 12	9 | 12	12 | 15	14 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	68	100	68	46	46	46	46	46	46	46	32	22
50	68	100	68	46	46	46	68	68	68	100	68	46
100	46	68	68	46	46	68	68	100	150	150	150	150
500	32	46	68	68	68	150	220	220	320	220	220	150
1000	32	46	46	68	68	150	150	100	100	68	46	32
1500	32	32	46	100	68	100	100	46	46	46	32	22
2000	32	32	46	68	68	100	68	46	32	32	32	22
2500	32	32	32	68	68	46	32	32	32	22	22	22
3000	32	32	32	68	68	46	32	32	32	22	22	22
4000	22	32	46	68	68	46	32	32	32	22	22	22
6000	15	15	32	68	68	32	32	32	32	22	22	22
10000	10	15	22	22	22	22	22	22	22	22	22	22

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	0	0	0	1	1	0	0	0
50	1	1	1	1	1	1	1	1	1	1	1	0
100	1	1	2	1	1	1	1	1	1	1	0	0
500	1	1	1	1	1	1	1	0	1	2	3	4
1000	1	1	1	1	1	0	0	2	3	3	4	5
1500	1	1	2	1	1	1	2	2	4	4	5	5
2000	1	1	2	1	1	2	2	3	4	4	5	5
2500	2	1	1	1	1	2	2	3	4	5	5	5
3000	1	1	1	1	1	2	3	4	4	5	5	5
4000	2	1	1	2	2	2	3	4	5	5	5	5
6000	1	1	1	2	2	3	3	4	5	5	5	5
10000	1	1	2	2	2	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	2	2	0	0	0	1	3
50	1	1	1	1	1	0	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	0
500	1	1	1	1	0	1	1	1	1	1	1	0
1000	1	0	1	0	1	1	1	0	0	0	0	0
1500	0	0	1	0	1	1	1	0	0	0	0	0
2000	1	0	1	1	1	1	1	0	0	0	0	0
2500	2	1	1	1	1	1	1	0	0	0	0	0
3000	2	1	1	1	1	1	0	0	0	0	0	0
4000	1	1	1	1	1	1	0	0	0	0	0	1
6000	1	2	2	2	1	0	1	0	0	0	0	1
10000	1	2	2	1	1	0	1	0	0	0	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.16	0.26	0.37	0.52	0.79
50	0.02	0.03	0.04	0.07	0.09	0.2	0.33	0.45	0.65	0.79	1.05	1.83
100	0.05	0.06	0.06	0.13	0.16	0.31	0.55	0.63	0.79	0.94	1.31	1.83
500	0.18	0.26	0.21	0.39	0.63	1.05	1.18	1.57	2.09	2.88	4.19	6.54
1000	0.31	0.47	0.47	0.79	1.15	1.68	2.09	2.88	4.19	5.76	8.38	13.09
1500	0.47	0.71	0.79	0.94	1.57	2.36	2.98	4.71	6.28	8.64	12.57	19.63
2000	0.52	0.84	0.94	1.36	1.88	2.93	4.19	5.76	8.38	11.52	16.76	26.18
2500	0.52	0.92	1.31	1.7	2.23	4.19	5.89	7.2	10.47	14.4	20.94	32.72
3000	0.63	1.1	1.57	2.04	2.51	4.71	6.28	7.85	12.57	17.28	25.13	39.27
4000	1.05	1.47	1.88	2.51	3.14	5.86	7.75	10.47	16.76	23.04	33.51	52.36
6000	1.57	3.14	3.14	3.14	4.08	7.85	11	15.71	25.13	34.56	50.27	78.54
10000	3.14	4.71	4.71	6.28	7.33	13.09	18.33	26.18	41.89	57.6	83.78	130.9

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.04	0.12	0.14	0.25	0.33	0.48	0.4	0.17	0.2	0.29	0.4	0.67
50	0.09	0.28	0.36	0.45	0.57	0.67	0.53	0.47	0.67	0.83	1	1.43
100	0.08	0.28	0.56	0.69	0.83	1.04	0.63	1.11	1.85	2.22	2.67	2.86
500	0.14	0.42	1.25	1.67	1.39	2.5	3.7	4.17	6.25	6.06	6.25	6.67
1000	0.21	0.46	0.93	1.67	1.52	3.91	5	5.19	6.25	6.06	6.25	6.67
1500	0.21	0.46	0.83	2.78	2	4.17	5.26	4.17	6.25	6.06	6.25	6.67
2000	0.33	0.62	0.93	1.92	2.22	4.46	5	5.19	6.25	6.06	6.25	6.67
2500	0.5	0.71	0.83	1.92	2.35	3.91	3.7	5.19	6.25	6.06	6.25	6.67
3000	0.5	0.71	0.83	1.92	3.12	4.17	5	6.67	6.25	6.06	6.25	6.67
4000	0.33	0.71	0.93	2.78	3.33	4.46	5.41	6.67	6.25	6.06	6.25	6.67
6000	0.33	0.42	0.83	4.17	3.85	6.67	5.71	6.67	6.25	6.06	6.25	6.67
10000	0.21	0.46	0.93	2.78	3.57	6.67	5.71	6.67	6.25	6.06	6.25	6.67

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	9.4>4.5	8.1>4.5	7.6>4.5	7.3>4.9	7.3>5.2	9.9>6.1	16>7.1	68.5>8.65	88.6>9.41	73.9>9.52	47.8>9.74	30.7>10.05
50	8.2>4.5	7.7>4.5	6.9>4.5	9.4>4.6	10>4.8	18.7>5.58	39.4>6.55	59.5>7.28	57.8>7.89	72.8>8.25	62.4>8.99	34.8>9.69
100	10.2>4.5	8.7>4.5	6.2>4.5	8.1>4.5	8.9>4.65	19.8>5.16	41.5>6.03	35.5>6.3	30.7>6.85	30>7.21	23.3>7.85	25>8.89
500	10.6>4.4	9.2>4.31	5.3>4.37	7>4.21	10.1>4.1	12>4.39	10.8>4.57	10.3>5.11	6.6>5.76	6<6.71	4.5<8.05	2.4<9.49
1000	9.8>4.26	10.8>4.16	7.2>4.16	7.2>4.05	9.6>4.07	6>4.4	4.9>4.86	4.3<5.51	3.1<6.45	2.9<7.5	0.9<9.15	0<10.7
1500	11.3>4.16	10>4.07	7.9>4.05	5.3>4.01	7>4.21	4.4<4.64	3.5<5.2	3.9<6.13	2.2<6.99	2.2<8.25	0<9.9	0<11.25
2000	7.9>4.14	8.1>4.04	7.7>4.01	6.4>4.14	6.9>4.28	3.8<4.91	2.5<5.35	2.3<6.2	1.8<7.55	1.6<8.71	0<10.27	0<11.92
2500	5.6>4.14	6.6>4.02	7.1>4.15	6.1>4.3	6.5>4.45	2.8<5.15	3<5.9	2<6.57	1.5<8.03	0.3<8.99	0<10.64	0<12.7
3000	5.8>4.1	6.6>3.98	7.1>4.21	5.8>4.37	3.2<4.63	2.5<5.13	1.8<5.79	1.5<6.46	1.3<8.2	0<9.27	0<11.02	0<13.58
4000	7.8>3.99	6.6>4.13	7.5>4.28	4<4.63	2.8<4.8	2.1<5.3	1.6<5.86	1.3<7.03	0.9<8.57	0<9.83	0<12	0<15.55
6000	7.1>4.21	8.9>4.8	6.5>4.8	1.8<4.8	2.3<4.95	1.1<5.36	1.3<6.32	1<7.48	0<9.42	0<11.19	0<14.46	0<19.42
10000	9.9>4.8	8.5>4.93	5.6>4.93	2.3<5.19	1.4<5.27	0.9<6	1<6.96	0.6<8.52	0<11.57	0<14.54	0<19.51	0<27.28

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.5<4.5	2.1<4.5	2.1<4.5	2.1<4.9	2<5.2	2.6<6.1	4.3<7.1	20.3>8.65	29.4>9.41	25.6>9.52	20.9>9.74	0.1<10.05
50	2.3<4.5	2.2<4.5	2<4.5	3<4.6	3<4.8	6.1>5.58	13.6>6.55	21.6>7.28	27>7.89	39.8>8.25	32>8.99	25.2>9.69
100	3.5<4.5	2.6<4.5	1.9<4.5	2.7<4.5	2.5<4.65	6.8>5.16	18.6>6.03	16.7>6.3	21.2>6.85	23.5>7.21	25.8>7.85	36.5>8.89
500	4<4.4	3.5<4.31	1.8<4.37	3<4.21	5.9>4.1	11>4.39	11.4>4.57	14>5.11	15.3>5.76	19.3>6.71	26.6>8.05	32.4>9.49
1000	4.1<4.26	5>4.16	3.6<4.16	5.1>4.05	8.3>4.07	8.9>4.4	9.5>4.86	10.8>5.51	13.4>6.45	15.1>7.5	17.6>9.15	20.7>10.7
1500	5.2>4.16	5.5>4.07	5.3>4.05	4.3>4.01	7.5>4.21	8.5>4.64	9.2>5.2	12.2>6.13	11.1>6.99	16.2>8.25	18.3>9.9	21>11.25
2000	3.6<4.14	4.7>4.04	5.5>4.01	6.3>4.14	7.4>4.28	8.9>4.91	9.3>5.35	10.7>6.2	10.8>7.55	15.6>8.71	21.5>10.27	25.2>11.92
2500	3<4.14	4.7>4.02	5.9>4.15	7.1>4.3	7.6>4.45	8.8>5.15	11.1>5.9	10>6.57	12.3>8.03	14.6>8.99	20.1>10.64	28.9>12.7
3000	3.3<4.1	5.3>3.98	6.4>4.21	7.7>4.37	6.1>4.63	8.8>5.13	8.3>5.79	7.9>6.46	13.7>8.2	16.2>9.27	22.3>11.02	32.1>13.58
4000	5.1>3.99	6.2>4.13	7.8>4.28	5.6>4.63	6.4>4.8	9.2>5.3	8.8>5.86	9.4>7.03	16.3>8.57	19.2>9.83	26.2>12	37.8>15.55
6000	5.1>4.21	9.6>4.8	8.9>4.8	4.3<4.8	6.5>4.95	5.9>5.36	10.2>6.32	11.9>7.48	20.6>9.42	24.7>11.19	33.2>14.46	47.4>19.42
10000	9.3>4.8	10.3>4.93	7.3>4.93	5.9>5.19	6.2>5.27	6.6>6	11.4>6.96	13.3>8.52	22.9>11.57	33.2>14.54	44.9>19.51	63.6>27.28

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.8	12.9	19.2	39.3	49.5	89.9	136.5	254.9	413.4	520.8	715.9	1057.8
50	5.1	7.6	11.7	27.0	34.9	73.3	122.9	166.6	226.1	251.2	358.8	520.8
100	4.8	7.0	9.6	22.1	30.0	58.1	104.9	116.6	142.8	179.9	226.7	307.7
500	3.2	4.9	6.5	15.0	22.6	38.8	44.4	56.0	69.1	95.7	120.6	179.9
1000	2.6	4.0	6.6	14.2	20.8	30.8	38.8	54.1	73.5	104.9	141.4	209.3
1500	2.2	4.0	6.0	11.6	19.3	29.8	37.5	57.3	77.8	98.0	134.7	199.1
2000	2.0	3.7	5.8	12.7	17.9	27.1	38.7	52.1	77.1	97.2	122.4	180.9
2500	1.9	3.5	6.3	12.5	16.7	30.5	41.9	52.8	71.6	98.2	123.7	167.9
3000	1.8	3.3	6.1	12.4	15.7	28.7	39.4	49.6	67.4	92.4	116.4	158.0
4000	1.9	3.1	5.4	11.3	14.2	26.0	35.8	45.1	61.2	84.0	105.8	143.6
6000	1.9	3.7	5.7	9.9	12.4	24.8	31.3	39.4	53.5	73.3	92.4	125.4
10000	1.9	3.3	5.6	10.6	13.3	22.8	28.7	36.2	49.1	61.9	77.9	105.8

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
50	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
100	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
1000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
1500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
2000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
2500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
3000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
4000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
6000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
10000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks˜ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.5513	0.5183	0.5556	0.6334	0.7077	0.7796	0.8091	0.6195	0.6456	0.7889	0.9044	0.9591
50	0.5047	0.4994	0.4198	0.5235	0.5963	0.5834	0.5497	0.5169	0.5380	0.5148	0.6879	0.9006
100	0.4929	0.4884	0.4366	0.5832	0.6913	0.5290	0.4359	0.5922	0.5904	0.6668	0.8138	0.8572
500	0.4435	0.5406	0.5524	0.5875	0.5861	0.5842	0.6610	0.7478	0.8520	0.9004	0.9480	0.9821
1000	0.4493	0.4550	0.4518	0.5954	0.5661	0.7353	0.8213	0.8824	0.9397	0.9582	0.9912	0.9999
1500	0.4587	0.4770	0.4482	0.6682	0.6769	0.8070	0.8732	0.9078	0.9606	0.9706	0.9999	0.9999
2000	0.5120	0.5144	0.4331	0.6237	0.5513	0.8291	0.9177	0.9438	0.9702	0.9805	0.9999	0.9999
2500	0.4421	0.5379	0.5179	0.6484	0.5648	0.8944	0.9152	0.9539	0.9756	0.9966	0.9999	0.9999
3000	0.4647	0.5119	0.5250	0.6693	0.7836	0.9022	0.9449	0.9621	0.9800	0.9999	0.9999	0.9999
4000	0.4185	0.5221	0.4697	0.6608	0.8049	0.9164	0.9512	0.9686	0.9865	0.9999	0.9999	0.9999
6000	0.5573	0.5071	0.5816	0.8318	0.8277	0.9527	0.9592	0.9777	0.9999	0.9999	0.9999	0.9999
10000	0.5155	0.4421	0.4522	0.8291	0.9065	0.9651	0.9711	0.9888	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8822	0.8749	0.8750	0.8954	0.9217	0.9421	0.9493	0.8875	0.8823	0.9268	0.9582	0.9999
50	0.8590	0.8563	0.8295	0.8496	0.8806	0.8636	0.8449	0.8245	0.7841	0.7347	0.8401	0.9280
100	0.8261	0.8468	0.8263	0.8608	0.9146	0.8385	0.7468	0.8075	0.7170	0.7394	0.7940	0.7914
500	0.7882	0.8255	0.8506	0.8201	0.7592	0.6193	0.6409	0.6576	0.6586	0.6785	0.6898	0.7578
1000	0.7686	0.7466	0.7243	0.7151	0.6256	0.6085	0.6539	0.7027	0.7391	0.7814	0.8251	0.8714
1500	0.7520	0.7154	0.6262	0.7295	0.6551	0.6254	0.6719	0.7110	0.8008	0.7869	0.8357	0.8827
2000	0.7741	0.7191	0.5940	0.6294	0.5164	0.6040	0.6963	0.7398	0.8164	0.8067	0.8196	0.8690
2500	0.6979	0.6663	0.6027	0.5951	0.4887	0.6644	0.6867	0.7666	0.8008	0.8293	0.8403	0.8583
3000	0.6939	0.6094	0.5688	0.5634	0.5794	0.6508	0.7463	0.8047	0.7863	0.8170	0.8302	0.8498
4000	0.6177	0.5491	0.4522	0.5249	0.5490	0.6274	0.7248	0.7804	0.7608	0.7969	0.8139	0.8355
6000	0.6829	0.4689	0.4305	0.5945	0.5129	0.7507	0.6864	0.7426	0.7223	0.7616	0.7861	0.8150
10000	0.5459	0.3191	0.2912	0.5549	0.5869	0.7438	0.6805	0.7395	0.7238	0.7149	0.7447	0.7816

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00201	0.00082	0.00141	0.00286	0.00583	0.03114	0.173761	1.341664	3.96162	11.22501	41.71894	218.2566
50	0.00134	0.00079	0.00058	0.00386	0.0076	0.04994	0.250691	0.639456	1.020093	1.564847	4.505771	23.76105
100	0.00311	0.00163	0.00063	0.00483	0.01341	0.04725	0.218853	0.331516	0.342097	0.631989	1.729077	4.958035
500	0.00425	0.00478	0.00133	0.00539	0.0172	0.04029	0.058442	0.1364	0.258296	0.689248	2.059537	8.440497
1000	0.0038	0.00552	0.00274	0.00898	0.02034	0.03937	0.079058	0.214226	0.663289	1.838874	5.852306	23.83968
1500	0.00622	0.00727	0.00428	0.00731	0.02496	0.05452	0.113636	0.460164	1.177696	3.04347	9.833491	40.32234
2000	0.00388	0.00609	0.00421	0.01127	0.01502	0.06129	0.188347	0.514032	1.698587	4.443187	13.73327	56.71105
2500	0.00129	0.00437	0.00696	0.01349	0.0158	0.12384	0.351927	0.694699	2.174751	6.049027	18.63862	73.85316
3000	0.00166	0.00436	0.0078	0.01544	0.01825	0.12554	0.325898	0.663422	2.656315	7.406592	23.02076	91.82763
4000	0.00358	0.00508	0.00638	0.01005	0.02015	0.14088	0.358161	0.901824	3.632049	10.2562	32.18056	129.0793
6000	0.00813	0.01663	0.01188	0.01035	0.0206	0.18152	0.469425	1.387309	5.617251	16.02245	51.20223	209.6317
10000	0.01845	0.01251	0.00726	0.02972	0.05059	0.32631	0.850822	2.538437	10.49842	28.23567	91.47274	379.6037

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0115	0.0171	0.0283	0.1036	0.1942	0.6558	1.5814	7.4601	18.6071	34.7234	49.5203	74.1818
50	0.0030	0.0075	0.0115	0.0592	0.0912	0.4778	1.1791	2.6588	4.6703	7.4601	14.9079	34.7234
100	0.0033	0.0075	0.0075	0.0283	0.0631	0.3083	0.9942	1.1329	1.6924	2.8130	4.6703	13.0583
500	0.0020	0.0033	0.0022	0.0122	0.0283	0.1036	0.1757	0.3083	0.5086	1.0404	2.0037	4.6703
1000	0.0014	0.0030	0.0030	0.0122	0.0261	0.0671	0.1036	0.2482	0.5086	1.0404	2.0037	4.6703
1500	0.0014	0.0030	0.0033	0.0075	0.0199	0.0631	0.0986	0.3083	0.5086	1.0404	2.0037	4.6703
2000	0.0009	0.0022	0.0030	0.0107	0.0180	0.0592	0.1036	0.2482	0.5086	1.0404	2.0037	4.6703
2500	0.0006	0.0020	0.0033	0.0107	0.0171	0.0671	0.1757	0.2482	0.5086	1.0404	2.0037	4.6703
3000	0.0006	0.0020	0.0033	0.0107	0.0129	0.0631	0.1036	0.1942	0.5086	1.0404	2.0037	4.6703
4000	0.0009	0.0020	0.0030	0.0075	0.0122	0.0592	0.0962	0.1942	0.5086	1.0404	2.0037	4.6703
6000	0.0009	0.0033	0.0033	0.0033	0.0107	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
10000	0.0014	0.0030	0.0030	0.0075	0.0115	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.56	1.44	1.39	1.96	2.62	3.81	4.55	1.94	1.67	2.47	5.42	14.66
50	1.24	1.15	1.01	1.42	1.86	1.65	1.3	1.43	1.25	1.29	2.49	7
100	1.07	1.1	0.93	1.55	2.65	1.35	1.07	1.61	1.53	2.46	4.5	6.97
500	1.1	1.26	1.37	1.68	1.57	1.56	2.33	3.37	6.26	9.82	19.95	54.55
1000	1.04	1.06	1.04	1.74	1.58	3.06	4.88	8.24	16.8	28.9	64.59	236.49
1500	1.07	1.14	0.92	2.29	2.37	4.58	7.71	10.45	31.05	43.07	118.6	320.09
2000	1.14	1.2	0.98	2.24	1.52	5.55	11.61	18.27	41.94	53.99	154.36	279.25
2500	0.95	1.49	1.16	2.48	1.68	9.06	11.45	24.36	48.15	71.14	187.75	250.28
3000	1.02	1.37	1.19	2.7	3.84	9.89	18.61	32.35	52.84	84.04	197.93	229.54
4000	0.82	1.41	1.11	2.21	4.52	11.92	22.44	39.79	59.66	105.87	170.97	199.32
6000	1.34	1.12	1.48	5.16	5.71	22.95	30.28	50.01	79.86	126.11	138.49	164.94
10000	1.29	1.01	1.05	5.18	10.56	35.72	43.98	61.6	94.6	96.22	106.86	127.85

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.62	8.21	7.68	9.13	12.18	17.67	20.87	8.76	7.31	10.43	20.33	47.41
50	6.85	6.51	5.57	6.54	8.5	7.13	5.75	5.45	3.75	3.18	5.66	10.69
100	4.93	6	5.07	6.76	11.35	5.77	3.51	4.43	2.73	3.34	3.96	4.35
500	4.27	4.91	6.19	5.01	3.41	1.84	2.14	2.3	2.19	2.55	2.51	3.28
1000	3.71	3.36	3.04	2.93	2.03	1.74	2.15	2.69	3.11	4.02	5.02	7.27
1500	3.44	2.93	1.82	2.98	2.16	1.99	2.42	2.88	4.23	4.13	5.46	8.03
2000	3.55	2.85	1.73	2.3	1.35	1.92	2.58	3.15	4.71	4.63	4.82	7.11
2500	2.6	2.52	1.62	1.98	1.31	2.25	2.6	3.57	4.24	5.43	5.67	6.47
3000	2.56	1.97	1.4	1.74	1.52	2.23	3.21	4.22	3.9	4.96	5.23	6
4000	1.74	1.55	1.05	1.25	1.45	2.13	3.08	3.68	3.43	4.37	4.62	5.32
6000	2.35	0.98	0.86	1.56	1.48	3.17	2.73	3.06	2.88	3.65	3.89	4.54
10000	1.43	0.64	0.57	1.39	1.79	3.07	2.67	3.01	2.9	2.97	3.18	3.7

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20.1	20.2	20.3	20.5	21.1	21.6	21.9	22.4
50	20	20.1	20.2	20.4	20.5	21.6	23.6	25.8	29.9	34.1	34.8	41
100	20.1	20.3	20.5	21.3	21.6	24.4	28.5	32.2	42.6	48.1	56.9	65.4
500	21.3	23.1	23.7	30.8	36.5	54.3	62.7	70.4	94.9	104.5	134.5	179.6
1000	22.8	26.8	29	42.3	48.8	77.8	86.6	95.9	120.6	135.4	184.8	339.2
1500	24.8	29.2	36.9	49.6	57.6	87.2	100	105	144.4	171.8	267.2	498.9
2000	25.4	31.2	39.8	55.1	63.5	98.3	113.9	131.3	167.3	193.3	349.6	658.5
2500	28.1	38.7	44.1	62.1	69	111.8	119.4	147.5	191.8	225.5	432	818.1
3000	29.9	42.8	48.7	68.7	90	119.3	137.3	158.1	213.2	266.6	514.4	977.7
4000	31.7	50.1	57.1	79.6	101.7	136.5	158.1	192.3	250.4	348.8	679.1	1296.9
6000	34.5	56.5	72.9	105.6	117.5	160.5	204.7	249.7	351	513.2	1008.7	1935.4
10000	46.9	73.8	90.6	121.1	156.7	228.6	292.5	332.9	571.6	841.9	1667.9	3212.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.2	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.2	50.5	50.5	50.6	50.9	50.8	50.9	51.8	53.0	52.1	51.3
100	50.0	50.2	50.9	50.9	50.7	52.0	52.0	52.8	57.8	58.7	58.2	59.2
500	50.1	50.5	52.0	53.9	54.4	65.9	71.6	72.8	84.1	80.7	80.2	74.8
1000	50.3	51.1	53.1	56.6	59.0	76.2	77.8	73.6	74.7	70.5	66.9	63.9
1500	50.3	51.3	54.6	60.9	60.6	75.9	77.2	68.4	68.9	70.1	65.9	63.0
2000	50.5	51.9	55.9	61.2	70.8	80.0	73.3	70.4	67.5	68.3	67.3	64.1
2500	51.4	52.9	55.2	62.9	74.2	70.6	67.9	68.2	68.9	66.4	65.5	65.0
3000	51.4	53.9	56.1	64.6	73.4	73.3	69.1	69.8	70.3	67.4	66.4	65.8
4000	51.4	55.1	61.2	75.9	77.9	77.3	72.7	72.2	72.6	69.2	67.9	67.1
6000	50.9	54.4	62.0	80.0	85.5	75.0	78.0	76.1	76.5	72.3	70.4	69.0
10000	51.1	62.7	82.6	73.0	75.6	75.8	78.6	76.4	76.3	76.7	74.3	72.3

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<755	0<928	0<1092	0<1306	0<1306	0<1306	0<1192	0<1192	1<1306	1<1306	3<1306	12<1306
50	0<679	0<816	0<1005	0<1100	0<1096	0<1192	0<1104	0<1085	1<1306	1<1306	2<1306	15<1306
100	0<651	0<778	0<968	0<1026	0<943	0<1104	0<1104	0<1085	0<1306	1<1306	3<1306	7<1306
500	0<561	0<653	0<759	0<869	0<917	0<1088	1<1100	1<1120	3<1234	10<1251	44<1263	264<1263
1000	0<537	0<622	0<766	0<848	1<919	1<1096	3<1116	9<1137	31<1154	104<1163	463<1163	3449>1150
1500	0<495	0<632	0<772	0<801	1<885	3<1059	8<1077	33<1100	117<1108	312<1112	1647>1108	8665>1092
2000	0<514	0<640	0<752	1<805	1<1002	6<1033	22<1056	65<1066	261<1077	643<1077	3385>1070	2469>1052
2500	0<585	0<649	1<760	1<798	2<984	21<1023	57<1039	128<1046	439<1052	1231>1049	5827>1043	2497>1023
3000	0<561	1<662	1<757	2<793	4<968	26<1008	74<1020	151<1026	659<1032	1965>1029	8158>1020	20768>999
4000	0<564	1<658	1<736	2<931	6<947	43<982	118<993	306<999	1217>1002	3923>996	11674>984	29796>963
6000	1<515	6<685	5<738	5<897	10<914	91<947	274<958	773<960	3170>960	8841>953	19301>938	39795>912
10000	8<500	12<711	9<865	28<881	60<889	347<908	953>914	2280>914	8581>908	16616>897	36480>881	94326>856

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<755	0<928	0<1092	0<1306	0<1306	0<1306	0<1192	1<1192	2<1306	4<1306	12<1306	39<1306
50	0<679	0<816	0<1005	0<1100	0<1096	0<1192	1<1104	1<1085	2<1306	2<1306	5<1306	22<1306
100	0<651	0<778	0<968	0<1026	0<943	0<1104	1<1104	1<1085	1<1306	1<1306	2<1306	4<1306
500	0<561	0<653	0<759	0<869	0<917	0<1088	0<1100	1<1120	1<1234	3<1251	6<1263	17<1263
1000	0<537	0<622	0<766	0<848	1<919	1<1096	1<1116	3<1137	6<1154	15<1163	39<1163	127<1150
1500	0<495	1<632	0<772	0<801	1<885	2<1059	2<1077	10<1100	17<1108	32<1112	87<1108	285<1092
2000	0<514	1<640	0<752	1<805	1<1002	2<1033	5<1056	12<1066	31<1077	60<1077	127<1070	416<1052
2500	0<585	1<649	1<760	1<798	1<984	5<1023	13<1039	20<1046	42<1052	105<1049	222<1042	558<1023
3000	0<561	1<662	1<757	1<793	1<968	6<1008	14<1020	21<1026	54<1032	133<1029	282<1020	711<999
4000	1<564	1<658	1<736	1<931	2<947	8<982	17<993	31<999	79<1002	195<996	413<984	1041>963
6000	2<515	6<685	3<738	2<897	3<914	13<947	27<958	53<960	138<960	334<953	710<938	1792>912
10000	9<500	8<711	5<865	8<881	11<889	33<908	67<914	133<914	344<908	670<897	1420>881	3568>856

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00299	0.00198	0.00143	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00370	0.00256	0.00169	0.00141	0.00142	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00403	0.00282	0.00182	0.00162	0.00192	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00542	0.00400	0.00296	0.00226	0.00203	0.00144	0.00141	0.00136	0.00112	0.00109	0.00107	0.00107
1000	0.00591	0.00441	0.00291	0.00237	0.00202	0.00142	0.00137	0.00132	0.00128	0.00126	0.00126	0.00129
1500	0.00696	0.00427	0.00286	0.00266	0.00218	0.00152	0.00147	0.00141	0.00139	0.00138	0.00139	0.00143
2000	0.00645	0.00416	0.00302	0.00263	0.00170	0.00160	0.00153	0.00150	0.00147	0.00147	0.00149	0.00154
2500	0.00499	0.00405	0.00295	0.00268	0.00176	0.00163	0.00158	0.00156	0.00154	0.00155	0.00157	0.00163
3000	0.00542	0.00389	0.00298	0.00271	0.00182	0.00168	0.00164	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00536	0.00394	0.00315	0.00197	0.00190	0.00177	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00644	0.00363	0.00313	0.00212	0.00204	0.00190	0.00186	0.00185	0.00185	0.00188	0.00194	0.00205
10000	0.00682	0.00337	0.00228	0.00220	0.00216	0.00207	0.00204	0.00204	0.00207	0.00212	0.00220	0.00233

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00299	0.00198	0.00143	0.00100	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00370	0.00256	0.00169	0.00141	0.00142	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00403	0.00282	0.00182	0.00162	0.00192	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00542	0.00400	0.00296	0.00226	0.00203	0.00144	0.00141	0.00136	0.00112	0.00109	0.00107	0.00107
1000	0.00591	0.00441	0.00291	0.00237	0.00202	0.00142	0.00137	0.00132	0.00128	0.00126	0.00126	0.00129
1500	0.00696	0.00427	0.00286	0.00266	0.00218	0.00152	0.00147	0.00141	0.00139	0.00138	0.00139	0.00143
2000	0.00645	0.00416	0.00302	0.00263	0.00170	0.00160	0.00153	0.00150	0.00147	0.00147	0.00149	0.00154
2500	0.00499	0.00405	0.00295	0.00268	0.00176	0.00163	0.00158	0.00156	0.00154	0.00155	0.00157	0.00163
3000	0.00542	0.00389	0.00298	0.00271	0.00182	0.00168	0.00164	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00536	0.00394	0.00315	0.00197	0.00190	0.00177	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00644	0.00363	0.00313	0.00212	0.00204	0.00190	0.00186	0.00185	0.00185	0.00188	0.00194	0.00205
10000	0.00682	0.00337	0.00228	0.00220	0.00216	0.00207	0.00204	0.00204	0.00207	0.00212	0.00220	0.00233

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0006	0.0024	0.0052	0.0247	0.0523	0.37	1.2479	8.7917	36.4279	85.5448	157.9306	390.57
50	0.0026	0.0131	0.0221	0.1403	0.304	3.0016	13.8799	34.54	101.8533	232.3125	427.1481	1126.816
100	0.0073	0.0296	0.0441	0.2745	0.5847	6.3061	26.0854	48.0343	108.2145	188.9293	377.8768	1038.535
500	0.0329	0.162	0.1789	1.1198	3.4145	20.2793	34.7879	71.6808	142.2388	296.0069	582.1027	1636.246
1000	0.0651	0.3578	0.477	2.3051	6.04	21.413	39.3711	80.0742	190.9917	404.2805	837.758	3272.492
1500	0.1117	0.4891	0.8851	2.6938	7.1961	25.187	47.7336	120.9406	236.1108	531.7897	1256.637	4908.739
2000	0.1117	0.5467	1.0483	3.69	8.4394	29.6183	55.5314	117.4451	279.5382	607.3252	1675.516	6544.985
2500	0.0992	0.4892	1.2596	4.4372	9.547	34.0461	80.8889	134.6007	326.1495	719.9483	2094.395	8181.231
3000	0.1211	0.5948	1.5016	5.1317	7.1766	37.1901	69.35	135.0484	366.6893	863.938	2513.274	9817.477
4000	0.2441	0.7865	1.9641	5.4233	8.4554	44.0621	82.6799	168.5127	437.3626	1151.917	3351.032	13089.97
6000	0.3012	1.91	2.7671	4.4773	10.264	45.9205	111.4208	224.6502	628.3185	1727.876	5026.548	19634.95
10000	0.6327	2.842	3.732	9.1993	14.2761	68.1552	164.3961	305.9229	1047.198	2879.793	8377.58	32724.92

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0002	0.0009	0.002	0.0104	0.0223	0.1631	0.5595	3.8221	15.1275	35.597	76.1193	196.3495
50	0.001	0.0048	0.0078	0.0604	0.1334	1.3314	5.8365	16.3754	52.4939	136.3704	266.7927	878.1526
100	0.0029	0.011	0.0154	0.1189	0.2632	2.7527	12.4494	26.3363	76.5092	157.7896	406.3278	1313.253
500	0.0144	0.0722	0.0756	0.5955	2.1501	18.4706	36.6366	90.2715	258.55	618.8332	1819.551	6087.13
1000	0.0294	0.1749	0.2445	1.6983	5.2447	30.04	64.0851	147.3873	477.7052	1095.832	2854.378	9570.065
1500	0.0544	0.2752	0.5615	2.2911	7.624	41.1151	90.1258	245.1426	646.8031	1771.356	4530.959	15083.46
2000	0.0559	0.3276	0.7073	3.6409	9.083	53.8156	127.9231	304.0399	860.7373	2359.473	6895.602	23108.38
2500	0.0519	0.3651	1.0305	5.0312	11.1425	74.0787	182.5785	367.1517	1194.188	2868.814	8369.457	32069.31
3000	0.0684	0.4843	1.3573	6.5166	12.4396	85.0609	179.9925	380.3491	1563.926	3740.109	10925.1	41883.79
4000	0.1438	0.7446	2.0628	7.585	16.3988	112.348	236.8144	581.368	2390.399	5706.052	16646.32	63793.58
6000	0.2164	2.1121	4.1015	9.0831	21.4955	132.406	383.3253	1055.224	4333.575	10372.31	30360.62	115691.5
10000	0.5925	4.5753	6.9244	19.8403	37.7763	245.166	710.3903	1956.066	8045.086	21984.45	64678.56	246574.6

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=0.4; Maximum permissible specific bearing load plim=5 MPa

ID: H-BD0.4P5

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	13 | 6	16 | 7	22 | 10	37 | 15	50 | 20	85 | 40	130 | 60	250 | 100	500 | 200	700 | 300	700 | 300	1500 | 500
50	8 | 4	12 | 5	13 | 6	28 | 12	35 | 15	70 | 30	135 | 60	160 | 70	220 | 100	300 | 120	350 | 150	700 | 300
100	9 | 4	12 | 5	12 | 5	22 | 10	30 | 12	55 | 25	100 | 40	115 | 50	160 | 70	250 | 100	350 | 150	500 | 200
500	6 | 3	10 | 4	9 | 4	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
1000	6 | 3	12 | 5	10 | 4	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
1500	6 | 3	12 | 5	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
2000	5 | 3	10 | 4	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
2500	5 | 3	10 | 4	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
3000	5 | 3	10 | 4	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
4000	5 | 3	12 | 5	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
6000	6 | 3	13 | 6	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200
10000	7 | 3	13 | 6	12 | 5	16 | 7	24 | 10	50 | 20	75 | 30	100 | 40	160 | 70	250 | 100	350 | 150	500 | 200

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	100	100	100	100	68
100	68	100	100	68	68	100	100	150	150	220	220	220
500	46	68	100	100	100	220	220	320	460	320	220	220
1000	46	68	68	100	100	220	220	150	150	100	68	46
1500	46	46	68	150	100	150	150	68	68	68	46	32
2000	46	46	68	68	100	150	100	46	46	46	32	32
2500	32	32	46	100	100	68	46	46	32	32	32	32
3000	32	32	46	100	100	68	46	32	32	32	32	32
4000	32	46	46	100	100	68	46	32	32	32	32	32
6000	22	22	46	100	100	46	46	32	32	32	32	32
10000	15	22	32	32	32	32	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) — Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	1	1	0	0	0	0	0
50	1	1	1	1	1	0	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	1
500	1	1	1	1	1	0	0	2	2	4	4	5
1000	0	0	1	1	1	1	2	2	4	4	5	5
1500	0	0	0	1	1	2	2	4	4	5	5	5
2000	0	1	0	1	1	2	2	4	5	5	5	5
2500	0	1	1	1	2	2	4	4	5	5	5	5
3000	0	1	1	1	2	2	4	4	5	5	5	5
4000	0	0	1	2	2	4	4	5	5	5	5	5
6000	0	0	1	2	2	4	5	5	5	5	5	5
10000	1	1	2	2	4	5	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3	3	3	3	3	3	3	3	0	0	3	2
50	2	1	2	2	3	3	1	1	0	0	0	0
100	1	1	1	3	3	1	1	1	0	0	0	0
500	1	1	1	1	1	0	0	0	0	0	0	0
1000	1	1	1	1	1	0	0	0	0	0	0	0
1500	1	1	1	1	1	0	0	0	0	0	0	0
2000	1	1	1	1	1	0	0	0	0	0	0	1
2500	1	1	1	1	0	0	0	0	0	0	0	1
3000	1	1	1	1	0	0	0	0	0	0	1	1
4000	1	0	1	1	0	0	0	0	0	0	1	1
6000	1	0	0	1	0	0	0	0	0	1	1	1
10000	1	2	2	1	1	0	0	0	1	1	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) — v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.04	0.07	0.13	0.26	0.37	0.37	0.79
50	0.02	0.03	0.03	0.07	0.09	0.18	0.35	0.42	0.58	0.79	0.92	1.83
100	0.05	0.06	0.06	0.12	0.16	0.29	0.52	0.6	0.84	1.31	1.83	2.62
500	0.16	0.26	0.24	0.42	0.63	1.31	1.96	2.62	4.19	6.54	9.16	13.09
1000	0.31	0.63	0.52	0.84	1.26	2.62	3.93	5.24	8.38	13.09	18.33	26.18
1500	0.47	0.94	0.94	1.26	1.88	3.93	5.89	7.85	12.57	19.63	27.49	39.27
2000	0.52	1.05	1.26	1.68	2.51	5.24	7.85	10.47	16.76	26.18	36.65	52.36
2500	0.65	1.31	1.57	2.09	3.14	6.54	9.82	13.09	20.94	32.72	45.81	65.45
3000	0.79	1.57	1.88	2.51	3.77	7.85	11.78	15.71	25.13	39.27	54.98	78.54
4000	1.05	2.51	2.51	3.35	5.03	10.47	15.71	20.94	33.51	52.36	73.3	104.72
6000	1.88	4.08	3.77	5.03	7.54	15.71	23.56	31.42	50.27	78.54	109.96	157.08
10000	3.67	6.81	6.28	8.38	12.57	26.18	39.27	52.36	83.78	130.9	183.26	261.8

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.13	0.45	0.45	0.9	1	1.47	1.28	0.8	0.5	0.48	0.95	0.67
50	0.31	0.83	1.28	1.49	1.9	2.38	1.23	1.79	2.27	2.78	3.81	2.38
100	0.28	0.83	1.67	2.27	2.78	3.64	2.5	3.48	4.46	4	3.81	5
500	0.56	1.25	2.78	4.46	4.17	5	4.44	5	4.46	4	3.81	5
1000	0.56	0.83	2.5	4.46	4.17	5	4.44	5	4.46	4	3.81	5
1500	0.56	0.83	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
2000	0.67	1.25	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
2500	0.67	1.25	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
3000	0.67	1.25	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
4000	0.67	0.83	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
6000	0.56	0.64	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5
10000	0.48	0.64	1.67	4.46	4.17	5	4.44	5	4.46	4	3.81	5

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) — Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.4<3	1.9<3	2.1<3	1.7<3.3	2.2<3.7	3.2<4.5	5<5.4	11.3>6.8	32>8.1	47.9>8.3	22.5>8.3	39>9
50	2.3<3	2.3<3	1.7<3	2.5<3.1	2.6<3.3	4.6>4.1	12>5.5	12.3>6	13.4>6.5	12.3>7.2	10.8>7.6	19.7>8.8
100	2.8<3	2.6<3	1.8<3	2.2<3	2.2<3.2	4.7>3.8	8.2>4.8	8.4>5.1	7.6>6	9.5>6.9	11.9>8	10.2>8.9
500	2.5<3	2.7<3	2.1<3	2<3	2.6<3	4.6>3.8	5.2>4.7	4.9<5.6	5.6<7.3	5.8<8.8	6.6<10.3	0<11.5
1000	3.4>3	5.1>3	2<3	1.9<3	2.3<3.1	3.7<4.5	4.1<5.5	3.4<6.4	3.7<8.5	3.6<10.1	0<11.4	0<12.8
1500	3.9>3	4.6>3	3.4>3	2<3.1	2.1<3.4	3<4.9	3.4<6.1	2.5<7.1	2.6<9.3	0<10.7	0<12.3	0<14.5
2000	3.9>3	2.9<3	3.4>3.1	1.5<3.3	2<3.8	2.7<5.2	2.8<6.6	2.2<7.8	2.1<9.7	0<11.4	0<13.6	0<16.4
2500	3.6>3	2.6<3.2	3<3.3	1.6<3.5	1.9<4	2.1<5.5	2.4<7.2	2<8.1	0<10.1	0<12.2	0<15	0<18.4
3000	3.7>3	2.6<3.3	3<3.4	1.5<3.8	1.8<4.1	2<5.8	2.2<7.4	1.8<8.3	0<10.5	0<13.1	0<16.3	0.1<20.3
4000	3.9>3	4.7>3.8	2.9<3.8	1.4<4.1	1.6<4.3	1.8<6.4	2<7.8	1.6<8.9	0<11.5	0<15.1	0<19.1	0.1<24.2
6000	3.6>3.4	4.8>4.2	2.7<4.1	1.2<4.3	1.4<4.6	1.6<6.9	1.8<8.6	0.8<10	0<14	0<19	0<24.6	0.1<31.9
10000	3.2<4.1	4.5=4.5	2.3<4.5	0.9<4.8	1.1<5.3	1.3<8	1.4<10.6	0<13.1	0<19.1	0<26.9	0<35.6	0.1<47.4

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8<3	0.6<3	0.7<3	0.5<3.3	0.7<3.7	0.8<4.5	0.4<5.4	3.4<6.8	11.6>8.1	17.2>8.3	7.2<8.3	10.3>9
50	0.7<3	0.7<3	0.6<3	0.9<3.1	0.9<3.3	1.7<4.1	4.6<5.5	5.6<6	7.4>6.5	8.2>7.2	8.1>7.6	16.8>8.8
100	0.9<3	0.9<3	0.6<3	0.8<3	0.7<3.2	1.9<3.8	4.1<4.8	5<5.1	6.2>6	12.2>6.9	18.8>8	20.2>8.9
500	0.9<3	1<3	0.8<3	1.1<3	1.8<3	4.8>3.8	7.6>4.7	10.7>5.6	21.6>7.3	29.7>8.8	39.7>10.3	45.6>11.5
1000	1.4<3	2.6<3	1.1<3	1.7<3	2.7<3.1	6.3>4.5	10.1>5.5	10.9>6.4	20>8.5	26.8>10.1	34.3>11.4	32.2>12.8
1500	1.7<3	2.9<3	2.3<3	2.7<3.1	3.3<3.4	6.6>4.9	10.5>6.1	9.5>7.1	17.6>9.3	27.1>10.7	36.6>12.3	32.9>14.5
2000	1.8<3	2.1<3	2.7<3.1	2<3.3	3.7<3.8	7.4>5.2	10.4>6.6	9.6>7.8	17.8>9.7	27.5>11.4	35.9>13.6	38.6>16.4
2500	1.9<3	2<3.2	2.6<3.3	2.9<3.5	4.1>4	6.1>5.5	8.6>7.2	10.7>8.1	17>10.1	26.3>12.2	40.3>15	44.1>18.4
3000	2.1<3	2.3<3.3	2.9<3.4	3.1<3.8	4.4>4.1	6.6>5.8	9.4>7.4	10.1>8.3	18.7>10.5	28.8>13.1	44.2>16.3	49>20.3
4000	2.5<3	5.1>3.8	3.3<3.8	3.4<4.1	5>4.3	7.5>6.4	10.8>7.8	11.6>8.9	21.5>11.5	33.2>15.1	51>19.1	57.4>24.2
6000	3<3.4	6.1>4.2	4.1<4.1	4<4.3	6>4.6	8.1>6.9	12.9>8.6	14.1>10	26.1>14	40.3>19	62>24.6	70.9>31.9
10000	3.6<4.1	7.6>4.5	4.4<4.5	3.3<4.8	5<5.3	8.9>8	14.4>10.6	17.9>13.1	33.2>19.1	51.5>26.9	79.1>35.6	91.2>47.4

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.0	11.7	17.6	35.9	45.1	82.6	128.1	249.2	410.8	517.5	697.3	1032.5
50	4.7	6.9	10.7	25.1	32.6	69.9	130.6	156.1	211.9	267.0	336.4	517.5
100	4.3	6.4	8.8	20.6	28.2	53.7	98.4	111.8	151.8	173.9	219.1	297.3
500	3.0	4.4	5.9	13.9	21.0	37.5	47.2	54.1	67.1	92.5	128.1	173.9
1000	2.4	3.6	6.2	13.2	19.4	29.7	37.5	51.9	70.4	98.4	140.5	203.9
1500	2.1	3.7	5.7	11.0	18.1	28.6	36.0	57.0	77.3	97.4	131.2	194.3
2000	1.9	3.4	5.5	13.5	16.8	26.0	36.2	55.3	75.1	94.6	130.1	176.6
2500	2.0	3.7	5.9	11.7	15.6	30.3	40.8	51.4	76.1	95.9	120.8	163.9
3000	1.9	3.5	5.8	11.6	14.7	28.5	38.4	52.8	71.6	90.2	113.6	154.2
4000	1.7	2.8	5.8	10.6	13.3	25.9	34.9	47.9	65.0	82.0	103.3	140.1
6000	1.8	3.4	5.5	9.3	11.7	24.2	30.5	41.9	56.8	71.6	90.2	122.4
10000	1.7	3.0	5.4	10.3	13.0	22.2	28.0	35.3	47.9	60.4	76.1	103.3

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
50	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
100	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
1000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
1500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
2000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
2500	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
3000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
4000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
6000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0
10000	2.2	5.0	7.1	15.8	22.4	50.0	70.7	100.0	158.1	223.6	316.2	500.0

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8864	0.8909	0.8809	0.9205	0.9117	0.9246	0.9359	0.9246	0.8720	0.8631	0.9357	0.9480
50	0.8556	0.8566	0.8611	0.8810	0.9014	0.8913	0.8734	0.8941	0.8780	0.9179	0.9385	0.9437
100	0.8539	0.8554	0.8456	0.8887	0.9284	0.8819	0.8832	0.8993	0.9055	0.9241	0.9319	0.9591
500	0.8565	0.8728	0.8450	0.8915	0.9020	0.8801	0.9037	0.9308	0.9409	0.9610	0.9686	0.9999
1000	0.8156	0.8002	0.8629	0.9021	0.9074	0.8991	0.9232	0.9521	0.9673	0.9797	0.9999	0.9999
1500	0.8209	0.8149	0.8022	0.9022	0.9205	0.9255	0.9422	0.9667	0.9792	0.9999	0.9999	0.9999
2000	0.7667	0.8575	0.8080	0.9300	0.9067	0.9354	0.9541	0.9728	0.9838	0.9999	0.9999	0.9999
2500	0.7076	0.8645	0.8319	0.9274	0.9163	0.9516	0.9630	0.9762	0.9999	0.9999	0.9999	0.9999
3000	0.7215	0.8587	0.8358	0.9320	0.9232	0.9557	0.9664	0.9800	0.9999	0.9999	0.9999	0.9999
4000	0.7210	0.7792	0.8437	0.9159	0.9325	0.9612	0.9713	0.9833	0.9999	0.9999	0.9999	0.9999
6000	0.8166	0.7964	0.8566	0.9301	0.9450	0.9691	0.9772	0.9919	0.9999	0.9999	0.9999	0.9999
10000	0.8690	0.7870	0.8433	0.9535	0.9619	0.9775	0.9839	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9640	0.9679	0.9620	0.9768	0.9721	0.9816	0.9946	0.9773	0.9538	0.9509	0.9794	0.9863
50	0.9554	0.9554	0.9559	0.9599	0.9668	0.9601	0.9509	0.9520	0.9329	0.9456	0.9540	0.9519
100	0.9526	0.9522	0.9486	0.9612	0.9776	0.9527	0.9408	0.9399	0.9227	0.9023	0.8929	0.9190
500	0.9492	0.9498	0.9375	0.9393	0.9328	0.8743	0.8603	0.8491	0.7734	0.8007	0.8125	0.8542
1000	0.9233	0.8969	0.9268	0.9155	0.8933	0.8307	0.8124	0.8457	0.8213	0.8501	0.8668	0.9159
1500	0.9193	0.8854	0.8644	0.8703	0.8741	0.8345	0.8186	0.8758	0.8574	0.8636	0.8725	0.9235
2000	0.8919	0.8962	0.8456	0.9044	0.8308	0.8217	0.8313	0.8820	0.8650	0.8714	0.8848	0.9175
2500	0.8449	0.8949	0.8537	0.8669	0.8183	0.8607	0.8653	0.8747	0.8777	0.8837	0.8783	0.9113
3000	0.8434	0.8776	0.8413	0.8574	0.8076	0.8539	0.8593	0.8868	0.8717	0.8786	0.8725	0.9061
4000	0.8238	0.7622	0.8201	0.7988	0.7893	0.8424	0.8483	0.8777	0.8620	0.8704	0.8639	0.8988
6000	0.8444	0.7375	0.7838	0.7716	0.7641	0.8427	0.8318	0.8645	0.8490	0.8581	0.8519	0.8884
10000	0.8489	0.6401	0.7025	0.8236	0.8187	0.8418	0.8327	0.8466	0.8302	0.8408	0.8344	0.8750

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0029	0.00148	0.00178	0.00409	0.00682	0.02672	0.143798	0.819966	3.545758	9.301853	12.30304	157.5602
50	0.00199	0.00122	0.00074	0.00561	0.00982	0.03754	0.319085	0.427005	0.515191	1.200673	2.046817	17.83914
100	0.00535	0.00238	0.00081	0.00486	0.01723	0.03193	0.143493	0.208557	0.304961	0.980189	2.809571	7.885062
500	0.00545	0.00755	0.00183	0.00571	0.01559	0.05741	0.176426	0.387657	1.261377	4.590157	14.06999	41.76867
1000	0.0065	0.01279	0.00398	0.0093	0.02253	0.09957	0.311858	0.764242	3.228786	12.12736	38.33261	119.4427
1500	0.01056	0.01649	0.00657	0.01146	0.03202	0.16185	0.513363	1.340043	5.742953	20.84261	65.13178	206.8634
2000	0.00529	0.01203	0.00798	0.01846	0.03008	0.22037	0.74405	1.939786	8.361866	30.49125	97.61974	293.397
2500	0.0032	0.01393	0.01059	0.01969	0.03735	0.31494	1.05566	2.488266	11.40051	41.77384	127.1147	383.1808
3000	0.00412	0.01338	0.01207	0.02308	0.04482	0.38386	1.295782	3.226103	14.07848	51.84329	157.2662	475.7304
4000	0.00495	0.01735	0.01498	0.01997	0.05968	0.52539	1.784295	4.463244	19.61501	72.91532	221.5849	674.9018
6000	0.01658	0.03551	0.02053	0.02984	0.09024	0.85084	2.793416	7.063549	31.60048	117.4667	360.5739	1101.222
10000	0.05946	0.03855	0.02081	0.06019	0.18494	1.55992	5.211457	12.65326	57.24137	215.4729	661.8819	2040.266

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0032	0.0045	0.0087	0.0289	0.0647	0.2158	0.4901	1.5568	7.4428	20.8340	20.8340	74.1818
50	0.0009	0.0025	0.0032	0.0178	0.0274	0.1341	0.5086	0.7013	1.3718	2.2380	3.9175	20.8340
100	0.0010	0.0025	0.0025	0.0087	0.0189	0.0886	0.2528	0.3622	0.7013	1.5568	3.9175	7.4428
500	0.0005	0.0011	0.0010	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
1000	0.0005	0.0025	0.0011	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
1500	0.0005	0.0025	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
2000	0.0004	0.0011	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
2500	0.0004	0.0011	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
3000	0.0004	0.0011	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
4000	0.0004	0.0025	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
6000	0.0005	0.0032	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428
10000	0.0006	0.0032	0.0025	0.0045	0.0094	0.0647	0.1433	0.2528	0.7013	1.5568	3.9175	7.4428

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	4.12	4.09	3.77	5.64	4.91	7.29	9.29	6.03	2.77	2.74	8.59	9.61
50	3.16	2.41	2.99	3.49	4.59	4.02	3.31	4.27	3.64	5.35	9.23	10.53
100	2.57	2.37	2.13	4.16	6.55	3.82	3.26	4.53	4.92	5.97	7.79	17
500	3.19	2.81	2.31	4.12	4.49	3.11	4.4	6.95	9.96	18.35	25.75	62.5
1000	2.02	1.39	2.45	4.72	4.82	4.12	5.87	12.78	25.14	33.04	65.51	272.53
1500	2.14	1.56	1.42	4.73	5.82	6.14	9.54	22.81	35.28	61.19	112.98	336.78
2000	1.74	2.29	1.48	7.6	4.78	7.88	13.72	27.56	39.04	89.95	160.2	298.56
2500	1.22	2.5	1.84	7.13	5.41	12.53	19.91	30.28	58.02	121.25	183.75	270.49
3000	1.33	2.32	1.92	8.01	6.13	14.62	22.59	33.3	70.89	138.62	170.02	248.63
4000	1.32	1.2	2.08	5.64	7.66	18.53	26.39	35.93	92.52	143.52	148.95	219.98
6000	2.05	1.53	2.41	7.63	10.65	24.64	31.04	42.38	118.56	117.32	123.86	183.61
10000	2.96	1.43	2.07	14.44	19.77	31.34	36.38	66.88	90.77	91.64	96.96	145.6

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	23.49	25.65	21.49	31.09	27.04	39.83	49.94	31.14	13.54	12.89	34.78	33.88
50	17.97	14.97	16.91	18.68	24.26	18.86	13.22	13.64	8.54	10.49	14.47	13.36
100	14.06	13.2	11.77	20.81	31.42	14.45	9.16	9.68	6.42	4.32	4.1	5.44
500	13.77	11.86	9.28	9.58	7.72	2.86	2.37	2.09	1.22	1.33	1.59	2.2
1000	7.63	4.19	6.32	5.61	3.99	1.72	1.46	2.01	1.77	2.11	2.88	5.19
1500	7	3.57	2.66	3.11	3.04	1.79	1.54	2.92	2.63	2.47	3.11	5.89
2000	5.47	3.95	2.13	4.86	1.82	1.58	1.73	3.2	2.9	2.75	3.68	5.31
2500	3.34	3.88	2.32	2.97	1.62	2.38	2.53	2.88	3.43	3.28	3.36	4.89
3000	3.29	3	2.03	2.63	1.48	2.2	2.34	3.44	3.17	3.05	3.11	4.55
4000	2.71	1.06	1.64	1.47	1.29	1.94	2.07	3.01	2.79	2.71	2.77	4.1
6000	2.78	1.05	1.24	1.21	1.08	1.95	1.73	2.5	2.37	2.3	2.38	3.52
10000	2.29	0.55	0.7	1.81	1.62	1.93	1.75	2.03	1.93	1.91	1.96	2.89

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20.1	20.2	20.4	21	21.8	22.4	22.3	23
50	20.1	20.2	20.2	20.6	20.7	22.6	25	29	34.7	37.9	42.2	45.7
100	20.2	20.4	20.6	21.6	22.1	26.8	31.6	37.4	48	61.4	68.7	82.1
500	21.3	24	25.7	35.3	41	59.2	72.2	90.4	127.3	152.4	162	200.8
1000	23.5	29.5	32.6	49.3	58.6	85	102.5	120.7	164.4	174.4	209.7	381.7
1500	25.9	32.7	38.9	65.3	71.8	97.9	122.5	133.8	169	223.6	304.6	562.5
2000	26.7	38.4	44.7	64.8	86.6	115	137.9	149.3	183.5	291.4	399.4	743.4
2500	28	40	46.5	79.2	97	115.9	143.9	165.5	222.6	359.3	494.3	924.2
3000	29.8	44.4	51.2	87.9	107	129.6	160	168.5	263.1	427.2	589.1	1105.1
4000	33.7	55.4	59.7	105.2	126.6	154.9	186.6	189.8	344.2	562.9	778.8	1466.8
6000	42	63.8	74.2	133.1	162.3	191.9	229.1	233.9	506.2	834.3	1158.2	2190.1
10000	58.8	89.4	99.2	161.1	202.1	240	276.6	376.5	830.4	1377.2	1917	3636.9

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.0	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.1	50.3	50.3	50.3	50.8	50.5	50.9	52.3	52.6	52.8	51.7
100	50.0	50.1	50.6	50.6	50.3	52.0	52.2	53.3	56.8	59.1	59.0	59.4
500	50.1	50.3	51.6	53.4	54.0	64.8	65.8	71.0	81.0	76.5	70.8	70.4
1000	50.1	50.7	52.0	56.0	58.3	75.0	76.3	71.9	71.8	66.8	61.8	59.9
1500	50.1	50.9	53.7	61.3	60.7	74.1	75.0	65.2	64.9	64.1	61.2	58.7
2000	50.3	51.3	54.9	57.2	68.3	77.3	72.2	64.2	63.8	62.9	59.8	59.6
2500	50.7	51.3	54.3	61.7	70.8	67.6	64.7	65.4	62.1	61.3	60.6	60.5
3000	50.7	51.8	55.2	63.1	72.8	69.3	66.0	63.5	62.9	62.0	61.2	61.3
4000	51.0	54.7	56.8	74.3	76.2	72.1	68.4	64.9	64.2	63.0	62.2	62.3
6000	50.6	53.6	59.5	79.5	81.3	72.0	72.1	67.3	66.3	65.2	63.9	63.9
10000	50.4	57.9	67.8	69.5	70.7	72.2	71.9	71.6	70.0	68.7	67.0	65.9

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<729	0<887	0<1023	0<1229	0<1306	0<1306	0<1192	0<1192	0<1306	1<1306	1<1306	8<1306
50	0<651	0<793	0<943	0<1059	0<1056	0<1192	0<1104	0<1085	0<1306	1<1306	2<1306	13<1306
100	0<628	0<757	0<928	0<965	0<914	0<1081	0<1104	0<1085	1<1306	2<1306	6<1306	20<1306
500	0<541	0<639	0<753	0<850	0<885	1<1059	2<1085	6<1096	27<1197	136<1197	383<1187	364>1168
1000	0<527	0<631	0<755	0<829	1<899	3<1074	12<1092	42<1100	230<1104	802<1092	3111>1077	437>1056
1500	0<487	0<640	0<772	1<816	2<881	10<1036	40<1049	153<1056	659<1052	2911>1036	0207>1024	0392>996
2000	0<505	0<644	0<766	2<807	3<971	22<1011	96<1020	305<1023	1198>1017	6785>999	22435>975	8553>955
2500	0<588	1<665	1<759	2<798	6<958	52<990	209<999	494<999	2573>990	12971>971	35938>950	7888>926
3000	0<564	1<679	1<754	4<792	9<945	84<973	324<979	751<979	4221>968	19574>947	45568>928	8163>903
4000	0<551	2<691	2<745	6<903	19<926	175<947	623<950	1330>947	8708>935	32095>912	65667>893	2156>867
6000	2<514	10<688	6<732	16<879	56<897	475<912	1480>912	3136>906	20777>889	53308>867	10008>843	8596>819
10000	11<497	27<724	17<836	78<848	259<861	1477>869	4187>863	11269>856	39117>836	01372>812	209429>796	7153>764

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<729	0<887	0<1023	0<1229	0<1306	0<1306	0<1192	0<1192	2<1306	3<1306	4<1306	28<1306
50	0<651	0<793	0<943	0<1059	0<1056	0<1192	1<1104	1<1085	1<1306	2<1306	3<1306	17<1306
100	0<628	0<757	0<928	0<965	0<914	0<1081	1<1104	1<1085	1<1306	2<1306	3<1306	7<1306
500	0<541	0<639	0<753	0<850	0<885	1<1059	1<1085	2<1096	4<1197	10<1197	25<1187	53<1168
1000	0<527	0<631	0<755	0<829	1<899	1<1074	3<1092	7<1100	17<1104	55<1092	151<1077	409<1056
1500	0<487	1<640	0<772	0<816	1<881	3<1036	7<1049	21<1056	53<1052	131<1036	330<1020	928<996
2000	0<505	1<644	1<766	1<807	1<971	5<1011	13<1020	38<1023	97<1017	242<999	640<979	1367>955
2500	0<588	1<665	1<759	1<798	2<958	10<990	28<999	51<999	170<990	426<971	860<950	1847>926
3000	0<564	1<679	1<754	1<792	2<945	13<973	36<979	84<979	216<968	542<947	1093>928	2358>903
4000	1<551	2<691	2<745	2<903	3<926	20<947	53<950	122<947	316<935	795<912	1602>893	3479>867
6000	2<514	7<688	3<732	3<879	6<897	41<912	92<912	208<906	544<889	1370>867	2767>845	6000>819
10000	8<497	11<724	6<836	10<848	23<861	102<869	232<863	417<856	1089>836	2762>812	5544>790	11898>764

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00321	0.00217	0.00163	0.00113	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00271	0.00192	0.00152	0.00153	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00433	0.00298	0.00198	0.00183	0.00204	0.00146	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00583	0.00418	0.00301	0.00236	0.00218	0.00152	0.00145	0.00142	0.00119	0.00119	0.00121	0.00125
1000	0.00613	0.00428	0.00299	0.00248	0.00211	0.00148	0.00143	0.00141	0.00140	0.00143	0.00147	0.00153
1500	0.00719	0.00416	0.00286	0.00256	0.00220	0.00159	0.00155	0.00153	0.00154	0.00159	0.00164	0.00172
2000	0.00669	0.00411	0.00291	0.00262	0.00181	0.00167	0.00164	0.00163	0.00165	0.00171	0.00178	0.00187
2500	0.00493	0.00386	0.00296	0.00268	0.00186	0.00174	0.00171	0.00171	0.00174	0.00181	0.00189	0.00199
3000	0.00536	0.00370	0.00300	0.00272	0.00191	0.00180	0.00178	0.00178	0.00182	0.00190	0.00198	0.00209
4000	0.00561	0.00357	0.00307	0.00209	0.00199	0.00190	0.00189	0.00190	0.00195	0.00205	0.00214	0.00227
6000	0.00646	0.00360	0.00318	0.00221	0.00212	0.00205	0.00205	0.00208	0.00216	0.00227	0.00239	0.00254
10000	0.00690	0.00325	0.00244	0.00237	0.00230	0.00226	0.00229	0.00233	0.00244	0.00259	0.00273	0.00292

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00321	0.00217	0.00163	0.00113	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00271	0.00192	0.00152	0.00153	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00433	0.00298	0.00198	0.00183	0.00204	0.00146	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00583	0.00418	0.00301	0.00236	0.00218	0.00152	0.00145	0.00142	0.00119	0.00119	0.00121	0.00125
1000	0.00613	0.00428	0.00299	0.00248	0.00211	0.00148	0.00143	0.00141	0.00140	0.00143	0.00147	0.00153
1500	0.00719	0.00416	0.00286	0.00256	0.00220	0.00159	0.00155	0.00153	0.00154	0.00159	0.00164	0.00172
2000	0.00669	0.00411	0.00291	0.00262	0.00181	0.00167	0.00164	0.00163	0.00165	0.00171	0.00178	0.00187
2500	0.00493	0.00386	0.00296	0.00268	0.00186	0.00174	0.00171	0.00171	0.00174	0.00181	0.00189	0.00199
3000	0.00536	0.00370	0.00300	0.00272	0.00191	0.00180	0.00178	0.00178	0.00182	0.00190	0.00198	0.00209
4000	0.00561	0.00357	0.00307	0.00209	0.00199	0.00190	0.00189	0.00190	0.00195	0.00205	0.00214	0.00227
6000	0.00646	0.00360	0.00318	0.00221	0.00212	0.00205	0.00205	0.00208	0.00216	0.00227	0.00239	0.00254
10000	0.00690	0.00325	0.00244	0.00237	0.00230	0.00226	0.00229	0.00233	0.00244	0.00259	0.00273	0.00292

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0004	0.0018	0.0038	0.0173	0.0465	0.2865	0.9263	4.7658	32.9934	91.5393	89.4242	489.9169
50	0.0019	0.0117	0.0152	0.1217	0.2574	2.2071	11.0177	23.301	60.3087	129.8344	214.8309	994.9552
100	0.0053	0.0261	0.0382	0.2031	0.4615	4.2748	16.9625	32.2227	72.3203	199.8455	470.8903	1123.793
500	0.02	0.137	0.1978	0.9694	2.5739	23.5574	54.9447	103.4359	277.2029	638.4925	1372.025	3272.492
1000	0.0559	0.5789	0.4299	1.8549	4.7297	39.069	86.7662	147.8276	373.2012	744.3841	1832.596	6544.985
1500	0.0949	0.7734	1.147	2.8686	6.3558	46.7952	107.8577	167.1787	385.0328	981.7477	2748.894	9817.477
2000	0.1089	0.6279	1.5027	2.8353	8.168	57.0939	124.0098	189.8965	422.6734	1308.997	3665.191	13089.97
2500	0.13	0.6823	1.6147	3.7474	9.4429	57.6145	130.3486	213.728	523.5988	1636.246	4581.489	16362.46
3000	0.1599	0.8357	1.8991	4.2997	10.6716	65.8472	147.2028	218.1301	628.3185	1963.495	5497.787	19634.95
4000	0.2236	2.1521	2.4146	5.3962	13.0794	81.0535	175.2665	249.4197	837.758	2617.994	7330.383	26179.94
6000	0.3512	2.7635	3.2978	7.1604	17.4557	103.282	219.9145	314.1593	1256.637	3926.991	10995.57	39269.91
10000	0.6037	4.3766	4.8168	8.9344	22.336	132.176	269.8491	523.5988	2094.395	6544.985	18325.96	65449.85

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0006	0.0014	0.005	0.015	0.1113	0.3403	1.4211	12.6906	35.3455	36.6519	196.3495
50	0.0006	0.0038	0.0053	0.0443	0.092	0.8688	4.6237	11.2459	34.5059	88.0088	166.3726	866.0819
100	0.0018	0.009	0.0128	0.0773	0.1424	1.8561	8.8522	19.8114	59.3648	256.0013	726.2389	2135.696
500	0.0078	0.0571	0.0818	0.5626	1.7833	24.6198	80.4844	236.5109	1145.299	3541.595	8505.318	24723.11
1000	0.0237	0.265	0.2304	1.6081	5.3948	72.6397	238.7296	485.2538	2044.712	5893.235	13077.99	33939.43
1500	0.0437	0.4267	0.6892	3.719	9.8311	113.43	373.4352	587.9144	2464.976	8515.083	20986.3	52015.28
2000	0.0514	0.4459	1.1242	3.8334	15.9493	175.274	480.807	797.0914	3320.134	11340.84	27656.52	81382.74
2500	0.0655	0.5295	1.3181	6.6516	22.509	160.223	449.46	1104.606	3992.16	13651.01	38618.71	116228.7
3000	0.0862	0.7012	1.8104	8.7107	29.6713	214.336	599.3584	1258.023	5236.019	17863.96	50676.96	154594.6
4000	0.1355	2.3411	2.9346	14.1073	45.5964	336.994	951.9357	1918.18	8028.715	27423.34	77825.35	240239.6
6000	0.2897	3.6575	5.6261	25.7235	82.7448	544.071	1795.43	3530.156	14915.61	51657.59	145091.1	442676.5
10000	0.7189	8.7702	10.7566	34.0149	111.014	1008.14	3317.535	7951.287	33203.34	116592.8	324675.1	940533.6

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=0.8; Maximum permissible specific bearing load plim=5 MPa

ID: H-BD0.8P5

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10 | 8	13 | 12	17 | 15	30 | 25	37 | 30	70 | 60	105 | 100	200 | 180	350 | 300	500 | 400	700 | 500	1000 | 500
50	7 | 6	9 | 8	12 | 10	20 | 20	28 | 25	60 | 50	105 | 100	150 | 120	170 | 150	220 | 180	350 | 300	500 | 400
100	7 | 6	9 | 8	9 | 8	17 | 15	24 | 20	50 | 40	80 | 70	90 | 80	125 | 100	160 | 150	250 | 200	400 | 350
500	5 | 4	8 | 7	6 | 5	12 | 10	17 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
1000	5 | 4	8 | 7	7 | 6	12 | 10	18 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
1500	5 | 4	8 | 7	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
2000	4 | 4	8 | 7	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
2500	4 | 4	8 | 7	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
3000	4 | 4	8 | 7	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
4000	4 | 4	8 | 7	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
6000	4 | 4	9 | 8	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350
10000	5 | 4	9 | 8	8 | 7	12 | 10	16 | 15	37 | 30	50 | 40	75 | 60	115 | 100	160 | 150	250 | 200	400 | 350

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	68	100	100	68	68
100	68	100	100	68	68	68	100	150	150	220	150	150
500	46	68	100	100	100	150	220	320	460	320	220	220
1000	46	68	68	100	68	150	220	150	100	100	68	46
1500	32	46	68	100	100	150	150	68	68	46	46	32
2000	32	46	68	68	100	100	100	46	46	32	32	32
2500	32	32	46	68	100	68	46	32	32	32	32	32
3000	32	32	46	68	100	68	46	32	32	32	32	32
4000	22	32	46	100	100	46	32	32	32	32	32	32
6000	22	22	46	100	100	46	32	32	32	32	32	32
10000	10	15	22	22	22	22	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) — Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	1	1	0	0	0	0	0	0	0	0
500	1	0	1	1	0	0	0	0	1	2	3	4
1000	0	1	1	0	0	0	1	2	3	4	5	5
1500	0	1	1	1	1	2	2	3	4	4	5	5
2000	0	1	1	1	1	2	2	3	4	5	5	5
2500	1	1	0	1	1	2	3	4	5	5	5	5
3000	1	1	0	1	2	2	3	4	5	5	5	5
4000	1	1	0	1	2	3	4	4	5	5	5	5
6000	0	1	1	2	2	3	4	5	5	5	5	5
10000	1	1	1	2	3	5	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3	2	2	3	3	3	3	2	0	0	1	3
50	1	2	1	2	2	1	0	0	0	0	0	0
100	1	1	1	2	3	2	0	0	0	0	0	0
500	1	1	2	1	1	0	0	0	1	1	1	1
1000	1	1	1	1	1	0	0	0	0	0	0	0
1500	1	1	1	1	0	1	0	0	0	0	0	0
2000	1	0	1	1	0	0	0	0	0	0	0	0
2500	1	0	1	1	1	0	0	0	0	0	0	1
3000	1	0	1	1	1	0	0	0	0	0	0	1
4000	1	0	0	1	1	0	0	0	0	0	0	1
6000	1	1	1	1	1	0	0	0	0	0	1	1
10000	1	1	1	1	0	0	0	0	1	2	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) — v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.02	0.04	0.05	0.1	0.18	0.26	0.37	0.52
50	0.02	0.02	0.03	0.05	0.07	0.16	0.27	0.39	0.45	0.58	0.92	1.31
100	0.04	0.05	0.05	0.09	0.13	0.26	0.42	0.47	0.65	0.84	1.31	2.09
500	0.13	0.21	0.16	0.31	0.45	0.97	1.31	1.96	3.01	4.19	6.54	10.47
1000	0.26	0.42	0.37	0.63	0.94	1.94	2.62	3.93	6.02	8.38	13.09	20.94
1500	0.39	0.63	0.63	0.94	1.26	2.91	3.93	5.89	9.03	12.57	19.63	31.42
2000	0.42	0.84	0.84	1.26	1.68	3.87	5.24	7.85	12.04	16.76	26.18	41.89
2500	0.52	1.05	1.05	1.57	2.09	4.84	6.54	9.82	15.05	20.94	32.72	52.36
3000	0.63	1.26	1.26	1.88	2.51	5.81	7.85	11.78	18.06	25.13	39.27	62.83
4000	0.84	1.68	1.68	2.51	3.35	7.75	10.47	15.71	24.09	33.51	52.36	83.78
6000	1.26	2.83	2.51	3.77	5.03	11.62	15.71	23.56	36.13	50.27	78.54	125.66
10000	2.62	4.71	4.19	6.28	8.38	19.37	26.18	39.27	60.21	83.78	130.9	209.44

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.12	0.32	0.39	0.67	0.9	1.19	0.95	0.56	0.48	0.5	0.57	1
50	0.24	0.69	0.83	1.25	1.43	1.67	0.95	1.11	1.96	2.53	1.9	2.5
100	0.24	0.69	1.39	1.96	2.08	2.5	1.79	2.78	4	4.17	4	3.57
500	0.5	0.89	3.33	4.17	3.92	4.5	5	4.44	4.35	4.17	4	3.57
1000	0.5	0.89	2.38	4.17	3.7	4.5	5	4.44	4.35	4.17	4	3.57
1500	0.5	0.89	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
2000	0.62	0.89	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
2500	0.62	0.89	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
3000	0.62	0.89	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
4000	0.62	0.89	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
6000	0.62	0.69	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57
10000	0.5	0.69	1.79	4.17	4.17	4.5	5	4.44	4.35	4.17	4	3.57

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) — Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.5<3	3=3	2.6<3	2.6<3.2	2.7<3.3	4.5>4.1	7.6>4.9	20.7>6.3	41.2>7.6	52.3>8.1	45.7>8.3	25>8.6
50	3.4>3	3.3>3	3.2>3	3.3>3	4>3.1	8>3.9	19.9>4.9	20>5.8	19.9>6.1	17.7>6.5	24.4>7.6	20.4>8.3
100	3.8>3	3.7>3	2.6<3	2.8<3	3.4>3	6.5>3.7	15.7>4.4	14.2>4.6	12.2>5.3	14.2>6	12.2>6.9	17.1>8.5
500	3=3	4.9>3	1.9<3	2.9<3	4>3	5.7>3.3	6.5>3.8	8.1>4.7	8.7>6.1	7.2<7.3	6.6<8.8	8.9<11
1000	4.5>3	6.3>3	2.5<3	3=3	3.5>3	4.8>3.8	5.1>4.5	4.9<5.5	4.2<6.9	4.1<8.5	2.3<10.1	0<12.1
1500	4>3	5.8>3	4.4>3	2.9<3	2.6<3.1	4.1<4.3	3.7<4.9	3.3<6.1	3.2<7.8	2.5<9.3	0<10.7	0<13.2
2000	3.7>3	6.1>3	4.4>3	2.3<3.1	2.7<3.3	3.2<4.5	3<5.2	2.8<6.6	2.7<8.3	1.2<9.7	0<11.4	0<14.8
2500	4.2>3	5.4>3	3.8>3	2.2<3.3	2.5<3.5	2.5<4.7	2.3<5.5	2.5<7.2	2<8.6	0<10.1	0<12.2	0<16.4
3000	4.4>3	5.5>3.1	3.8>3.1	2.1<3.4	2.3<3.8	2.3<4.9	2.1<5.8	2.3<7.4	1.7<8.9	0<10.5	0<13.1	0<17.9
4000	3.9>3	5.5>3.3	3.7>3.3	2.5<3.8	2<4.1	2<5.2	1.8<6.4	2<7.8	1.2<9.5	0<11.5	0<15.1	0<21.1
6000	4>3.1	5.9>3.9	3.4<3.8	2.1<4.1	1.6<4.3	1.7<5.8	1.6<6.9	1.5<8.6	0<11	0<14	0<19	0<27.3
10000	3.6<3.8	5.1>4.2	2.8<4.2	1.2<4.5	1<4.8	1.3<6.6	1.2<8	0.9<10.6	0<14.6	0<19.1	0<26.9	0.1<39.9

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.7<3	0.7<3	0.7<3	0.7<3.2	0.8<3.3	1.2<4.1	2<4.9	5.6<6.3	11.7>7.6	15.6>8.1	15.8>8.3	4.4<8.6
50	0.9<3	0.8<3	0.8<3	0.8<3	1.1<3.1	2.3<3.9	6.1>4.9	7.1>5.8	9>6.1	9>6.5	13.5>7.6	15.1>8.3
100	1<3	1<3	0.7<3	0.8<3	1<3	2.1<3.7	6.6>4.4	6.6>4.6	7.8>5.3	13>6	15.6>6.9	28.5>8.5
500	1<3	1.5<3	0.6<3	1.2<3	1.8<3	5.1>3.3	7.6>3.8	14.9>4.7	25.9>6.1	34.8>7.3	45>8.8	81.7>11
1000	1.6<3	2.6<3	1.2<3	1.9<3	2.5<3	7.5>3.8	10.8>4.5	15.2>5.5	20.8>6.9	31.4>8.5	36>10.1	55.6>12.1
1500	1.5<3	2.8<3	2.3<3	2.5<3	3.6>3.1	9.1>4.3	11.3>4.9	12.5>6.1	20.6>7.8	26.3>9.3	38.3>10.7	57.3>13.2
2000	1.5<3	3.5>3	2.8<3	2.3<3.1	4.5>3.3	8.9>4.5	11>5.2	12.5>6.6	20.6>8.3	25.4>9.7	37.3>11.4	67>14.8
2500	2.1<3	3.3>3	2.7<3	2.6<3.3	5>3.5	8.1>4.7	8.6>5.5	11.8>7.2	19.3>8.6	28.8>10.1	42.1>12.2	75.8>16.4
3000	2.3<3	3.9>3.1	3<3.1	2.9<3.4	5.4>3.8	8.9>4.9	9.5>5.8	13.1>7.4	21.3>8.9	32>10.5	46.3>13.1	84>17.9
4000	2.2<3	4.7>3.3	3.6>3.3	4.3>3.8	6.1>4.1	9>5.2	9.3>6.4	15.3>7.8	25>9.5	37.7>11.5	54.1>15.1	98.5>21.1
6000	2.8<3.1	6.5>3.9	4.6>3.8	5>4.1	7.1>4.3	11.1>5.8	11.6>6.9	19.1>8.6	31.3>11	47.2>14	67.6>19	123.5>27.3
10000	3<3.8	7>4.2	4.2=4.2	3.6<4.5	5.3>4.8	10.4>6.6	15.3>8	24.9>10.6	40.8>14.6	61.4>19.1	88.9>26.9	162.3>39.9

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.4	9.3	13.9	28.5	35.8	65.5	101.7	197.8	326.0	410.8	553.5	819.5
50	3.7	5.5	8.5	19.9	25.8	55.5	103.7	140.5	168.2	211.9	302.7	410.8
100	3.4	5.1	7.0	16.3	22.4	49.0	78.1	88.8	120.5	138.0	191.2	259.5
500	2.3	3.5	4.7	11.0	16.7	32.7	37.5	42.9	53.3	73.4	101.7	138.0
1000	1.9	2.9	4.9	10.5	17.5	26.0	29.7	41.2	62.0	78.1	111.5	161.8
1500	1.9	3.0	4.5	9.8	14.3	22.7	28.6	45.2	61.4	82.7	104.2	154.2
2000	1.7	2.7	4.4	10.7	13.3	22.8	28.8	43.9	59.6	82.0	103.3	140.1
2500	1.6	2.9	4.7	10.5	12.4	24.0	32.4	44.5	60.4	76.1	95.9	130.1
3000	1.5	2.8	4.6	10.4	11.7	22.6	30.5	41.9	56.8	71.6	90.2	122.4
4000	1.6	2.6	4.6	8.4	10.6	22.0	30.2	38.0	51.6	65.0	82.0	111.2
6000	1.4	2.7	4.4	7.3	9.3	19.2	26.4	33.2	45.1	56.8	71.6	97.2
10000	1.6	2.8	4.7	8.9	11.2	19.2	22.2	28.0	38.0	47.9	60.4	82.0

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
50	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
100	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
3000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
4000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
6000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
10000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks˜ε>0.96

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8558	0.8101	0.8383	0.8692	0.8702	0.8710	0.8793	0.8277	0.7646	0.7908	0.8694	0.9500
50	0.7702	0.7600	0.7357	0.8240	0.8350	0.7771	0.7289	0.8160	0.7659	0.8394	0.8605	0.9185
100	0.7654	0.7518	0.7499	0.8396	0.8742	0.8312	0.7203	0.7827	0.8043	0.8230	0.9022	0.9144
500	0.8038	0.7221	0.8221	0.8183	0.8112	0.8056	0.8294	0.8518	0.8746	0.9245	0.9555	0.9636
1000	0.7178	0.6664	0.7916	0.8183	0.8371	0.8305	0.8613	0.9081	0.9477	0.9638	0.9871	0.9999
1500	0.7875	0.6871	0.6713	0.8312	0.8731	0.8646	0.9058	0.9435	0.9635	0.9795	0.9999	0.9999
2000	0.7355	0.6513	0.6743	0.8666	0.8253	0.9000	0.9284	0.9540	0.9717	0.9911	0.9999	0.9999
2500	0.5978	0.6724	0.7212	0.8764	0.8440	0.9231	0.9475	0.9615	0.9793	0.9999	0.9999	0.9999
3000	0.6118	0.6520	0.7254	0.8852	0.8580	0.9307	0.9523	0.9657	0.9833	0.9999	0.9999	0.9999
4000	0.6699	0.6557	0.7392	0.8125	0.8804	0.9443	0.9612	0.9720	0.9890	0.9999	0.9999	0.9999
6000	0.7135	0.6722	0.7642	0.8455	0.9101	0.9549	0.9696	0.9803	0.9999	0.9999	0.9999	0.9999
10000	0.8013	0.6849	0.7274	0.9168	0.9483	0.9685	0.9795	0.9892	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9609	0.9545	0.9576	0.9641	0.9641	0.9647	0.9681	0.9535	0.9332	0.9374	0.9548	0.9912
50	0.9409	0.9435	0.9302	0.9544	0.9552	0.9354	0.9172	0.9344	0.8937	0.9181	0.9231	0.9397
100	0.9374	0.9357	0.9352	0.9557	0.9614	0.9462	0.8817	0.8984	0.8749	0.8379	0.8753	0.8575
500	0.9373	0.9161	0.9431	0.9281	0.9160	0.8258	0.7991	0.7269	0.6278	0.6347	0.6972	0.6650
1000	0.9000	0.8633	0.9017	0.8858	0.8818	0.7374	0.7078	0.7173	0.7416	0.7195	0.7984	0.8134
1500	0.9174	0.8466	0.8235	0.8545	0.8243	0.7000	0.7152	0.7854	0.7664	0.7868	0.8074	0.8284
2000	0.8902	0.7999	0.7914	0.8686	0.7088	0.7207	0.7359	0.7964	0.7807	0.8079	0.8254	0.8149
2500	0.7985	0.7982	0.8044	0.8517	0.6852	0.7551	0.8016	0.8152	0.8051	0.7932	0.8141	0.8025
3000	0.7944	0.7556	0.7815	0.8374	0.6652	0.7375	0.7889	0.8044	0.7927	0.7803	0.8049	0.7921
4000	0.8135	0.7090	0.7417	0.6705	0.6361	0.7473	0.8034	0.7847	0.7719	0.7584	0.7891	0.7751
6000	0.8037	0.6384	0.6808	0.6327	0.6001	0.7097	0.7733	0.7518	0.7407	0.7271	0.7618	0.7470
10000	0.8336	0.5704	0.5909	0.7532	0.7228	0.7505	0.7293	0.7099	0.6991	0.6855	0.7255	0.7102

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00142	0.00057	0.00102	0.00266	0.00304	0.01378	0.06742	0.391848	1.26932	3.487414	11.6657	43.70357
50	0.00104	0.00056	0.00054	0.00263	0.00609	0.02466	0.163428	0.480106	0.312676	0.665936	3.003081	8.489336
100	0.00215	0.00107	0.00046	0.00295	0.00969	0.03355	0.093818	0.131992	0.202917	0.426842	1.586374	6.636817
500	0.00279	0.00339	0.00073	0.00322	0.00839	0.03853	0.085041	0.24403	0.655343	1.841591	7.018425	29.61323
1000	0.00338	0.00485	0.00194	0.00561	0.01633	0.06413	0.143079	0.474103	1.820061	4.954765	19.71944	91.27798
1500	0.00731	0.00639	0.00319	0.00794	0.01689	0.09644	0.233318	0.859121	3.10072	9.058829	33.37438	157.4692
2000	0.00341	0.0064	0.0039	0.01119	0.01374	0.13946	0.337607	1.234683	4.505346	13.3803	49.32941	222.3356
2500	0.00171	0.0075	0.00514	0.0136	0.01702	0.19066	0.488859	1.663073	6.183583	17.23048	64.02707	288.818
3000	0.00218	0.00744	0.00583	0.01598	0.02015	0.22864	0.593947	2.037722	7.56531	21.19916	79.43312	358.6267
4000	0.00334	0.00881	0.0072	0.01143	0.02643	0.32493	0.856684	2.790609	10.41245	29.28698	111.409	504.7066
6000	0.00562	0.01611	0.00969	0.01685	0.03932	0.49225	1.318998	4.306068	16.35591	46.3977	177.4246	807.6707
10000	0.02231	0.02038	0.00948	0.03679	0.08682	0.9611	2.260838	7.503061	28.71275	81.93346	319.1803	1459.789

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0022	0.0064	0.0103	0.0395	0.0577	0.2682	0.6628	2.2473	7.8350	14.8857	34.7234	49.5203
50	0.0012	0.0020	0.0050	0.0159	0.0370	0.1927	0.6628	1.1283	1.5953	2.4692	7.8350	14.8857
100	0.0012	0.0020	0.0020	0.0103	0.0189	0.1295	0.3561	0.4562	0.7861	1.5028	3.1135	10.4355
500	0.0006	0.0016	0.0009	0.0050	0.0103	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
1000	0.0006	0.0016	0.0012	0.0050	0.0108	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
1500	0.0006	0.0016	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
2000	0.0005	0.0016	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
2500	0.0005	0.0016	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
3000	0.0005	0.0016	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
4000	0.0005	0.0016	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
6000	0.0005	0.0020	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355
10000	0.0006	0.0020	0.0016	0.0050	0.0097	0.0577	0.1295	0.2867	0.7244	1.5028	3.1135	10.4355

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	4.85	3.62	4.41	5.7	5.65	5.91	6.87	4.09	2.55	2.79	5.07	14.17
50	2.63	2.58	2.13	4.31	4.33	2.66	2.36	3.37	2.64	4.22	5.33	9.58
100	2.56	2.47	2.44	4.47	5.98	3.84	2.07	2.93	3.07	4.06	7.63	9.4
500	3.06	2.09	3.67	3.55	3.52	3.14	3.78	4.67	6.18	11.53	22.49	31.34
1000	1.87	1.58	3	3.55	4.19	3.86	5.13	8.21	17.59	32.24	55.06	97.63
1500	2.73	1.76	1.62	3.96	6.41	5.35	7.97	15.36	31.15	49.3	97.09	162.58
2000	2.55	1.47	1.65	5.55	4.14	7.52	11.47	21.25	40.25	61.14	139.31	197.14
2500	1.3	1.63	2.08	6.11	4.87	10.48	16.88	28.32	48.22	77.59	161.8	179.85
3000	1.41	1.47	2.12	6.64	5.55	12.04	19.84	32.78	52.21	92.22	164.38	165.9
4000	1.88	1.5	2.27	3.39	6.86	15.7	27.98	39.75	57.95	113.84	143.52	146.25
6000	2.3	1.66	2.6	4.52	9.18	22.06	37.08	48.3	74.12	110.65	117.32	121.03
10000	3.01	1.77	2.14	9.52	18.42	35.96	47.5	57.17	82.7	84.72	91.64	95.63

B. Sommerfeld number So (TEST_SoX)

▼n, ►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	27.7	22.73	25.2	31.41	31.16	32.32	37.17	21.67	12.92	13.57	20.88	50.87
50	14.95	16.04	12.08	23.31	23.06	13.29	10.26	12.82	7.45	9.63	10.76	14.17
100	13.97	13.76	13.63	23.49	28.6	16.36	6.63	7.86	5.87	4.62	5.89	5.26
500	13.54	9.65	15.48	11.61	9.68	3.7	2.96	1.95	1.29	1.46	1.68	1.57
1000	7.45	5.56	7.96	6.69	6.43	2.09	1.77	1.86	2.29	2.22	2.94	3.56
1500	9.39	4.74	3.86	4.93	4.11	1.73	1.84	2.7	2.61	3.15	3.15	4.02
2000	7.85	3.23	3.05	5.66	2.1	1.92	2.04	2.9	2.84	3.61	3.65	3.6
2500	3.56	3.19	3.33	4.8	1.88	2.29	3.01	3.35	3.33	3.27	3.32	3.29
3000	3.48	2.48	2.87	4.2	1.71	2.09	2.75	3.08	3.06	3.03	3.09	3.07
4000	3.96	1.96	2.31	1.53	1.47	2.2	3.05	2.68	2.7	2.69	2.76	2.76
6000	3.7	1.4	1.7	1.25	1.22	1.82	2.5	2.22	2.28	2.3	2.35	2.37
10000	3.92	1	1.08	2.33	2.25	2.24	1.98	1.79	1.85	1.88	1.94	1.97

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20.1	20.2	20.3	20.6	21.3	21.9	22.1	22.7
50	20.1	20.2	20.2	20.4	20.7	21.8	23.7	25.8	31.8	35.4	36.9	42.8
100	20.2	20.4	20.6	20.9	22.3	24.3	29.7	34	41.2	52.5	59.6	67.3
500	20.9	22.8	25.1	29.8	32.8	52.5	63.5	81.4	109	127.9	153.1	178
1000	22.6	27.1	32.3	40.4	43.8	75.7	91.7	105.9	132.1	172.7	193.7	256.7
1500	23.5	29.7	34.7	49.6	66.2	94.5	107.7	117.9	162.7	197.8	280.5	375.1
2000	25.6	33.8	39.7	53.5	78.2	104.2	120.7	139.1	191	223.2	367.4	493.5
2500	28	35.1	41.3	60.3	88.7	110.3	124.7	156.7	206.9	274	454.2	611.9
3000	30	38.6	45.4	66.6	98.6	123.1	141.2	177.5	228.5	324.8	541.1	730.2
4000	31.6	45	53	85.9	116.7	143.1	167.1	214.4	265.7	426.4	714.7	967
6000	37.9	57.3	66.4	108.1	147.5	190.4	221	275.5	359.8	629.6	1062.1	1440.5
10000	41.3	74.2	82.7	120.9	176	262.1	309	375.5	586.4	1036.1	1756.8	2387.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.3	50.2	50.1	50.2	50.2	50.1	50.1
50	50.0	50.2	50.4	50.4	50.5	51.1	50.8	50.7	52.9	53.0	52.0	52.2
100	50.0	50.2	50.7	50.7	50.6	51.5	52.7	54.0	57.6	60.2	57.8	57.8
500	50.1	50.5	52.0	54.1	54.6	62.1	66.2	71.4	82.8	78.7	72.6	72.5
1000	50.2	51.0	52.5	56.8	56.1	70.4	76.5	72.5	68.8	69.2	63.2	60.4
1500	50.1	51.2	53.8	58.7	60.5	74.6	75.5	65.7	66.5	63.8	62.5	59.5
2000	50.3	51.9	54.9	57.8	69.7	72.1	73.0	64.7	65.3	62.3	61.1	60.3
2500	51.0	51.9	54.4	58.9	72.1	68.6	66.0	63.0	63.3	63.4	62.0	61.1
3000	51.0	52.6	55.2	59.9	74.3	70.4	67.3	63.9	64.3	64.3	62.7	61.8
4000	50.8	53.5	56.7	75.7	78.0	69.3	65.8	65.8	66.0	66.0	64.0	63.0
6000	50.9	54.0	59.3	81.2	83.4	73.4	68.9	68.9	68.8	68.6	66.3	65.1
10000	50.5	55.9	65.1	66.9	68.4	69.0	73.8	73.3	73.1	72.6	69.6	68.0

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<695	0<841	0<947	0<1137	0<1229	0<1306	0<1192	0<1192	0<1306	0<1306	1<1306	3<1306
50	0<637	0<745	0<921	0<960	0<996	0<1192	0<1104	0<1085	0<1306	0<1306	2<1306	6<1306
100	0<605	0<716	0<856	0<903	0<873	0<1056	0<1104	0<1085	0<1306	1<1306	3<1306	10<1306
500	0<529	0<619	0<695	0<799	0<826	0<1036	1<1059	2<1085	9<1187	34<1197	166<1197	637<1182
1000	0<517	0<599	0<706	0<783	0<848	2<1052	4<1074	17<1092	87<1104	315<1104	1320>1092	3188>1070
1500	0<479	0<608	0<717	0<772	1<816	5<1020	13<1036	65<1049	312<1056	968<1052	4460>1036	9285>1011
2000	0<493	0<625	0<711	1<766	1<943	12<996	32<1011	149<1020	660<1023	1960>1017	10050>999	25916>971
2500	0<570	0<643	0<706	1<759	2<928	26<979	70<990	294<999	1159>996	3572>990	16410>971	48095>943
3000	0<548	1<657	0<703	2<754	4<919	41<965	113<973	465<979	1713>976	5669>968	22310>947	60720>919
4000	0<536	1<651	1<696	2<885	7<903	90<943	263<947	922<950	3096>945	10954>935	32095>912	87773>883
6000	1<493	4<655	2<687	6<863	21<879	257<910	702<912	2237>912	7660>901	20777>889	53308>867	146690>836
10000	5<483	14<686	7<815	31<836	106<848	1016>869	2146>869	6207>863	19545>850	39117>836	101372>813	230554>780

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<695	0<841	0<947	0<1137	0<1229	0<1306	0<1192	0<1192	1<1306	2<1306	4<1306	12<1306
50	0<637	0<745	0<921	0<960	0<996	0<1192	1<1104	1<1085	1<1306	1<1306	4<1306	9<1306
100	0<605	0<716	0<856	0<903	0<873	0<1056	0<1104	0<1085	1<1306	1<1306	2<1306	6<1306
500	0<529	0<619	0<695	0<799	0<826	0<1036	1<1059	1<1085	2<1187	5<1197	13<1197	35<1182
1000	0<517	0<599	0<706	0<783	1<848	1<1052	1<1074	4<1092	12<1104	23<1104	77<1092	257<1070
1500	0<479	0<608	0<717	0<772	1<816	2<1020	3<1036	12<1049	28<1056	68<1052	167<1036	584<1011
2000	0<493	1<625	0<711	1<766	1<943	3<996	6<1011	22<1020	51<1023	129<1017	321<999	857<971
2500	0<570	1<643	1<706	1<759	1<928	6<979	13<990	37<999	89<996	174<990	431<971	1153>943
3000	0<548	1<657	1<703	1<754	1<919	7<965	17<973	47<979	113<976	222<968	549<947	1473>919
4000	1<536	1<651	1<696	1<885	2<903	13<943	31<947	69<950	165<945	326<935	808<912	2173>883
6000	1<493	4<655	1<687	2<863	3<879	23<910	53<912	118<912	285<901	565<889	1397>867	3761>836
10000	6<483	8<686	4<815	8<836	14<848	72<869	105<869	237<863	572<850	1136>836	2807>812	7560>780

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00353	0.00241	0.00190	0.00132	0.00113	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00420	0.00307	0.00201	0.00185	0.00172	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00466	0.00333	0.00233	0.00209	0.00224	0.00153	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00609	0.00445	0.00353	0.00267	0.00250	0.00159	0.00152	0.00145	0.00121	0.00119	0.00119	0.00122
1000	0.00638	0.00475	0.00342	0.00278	0.00237	0.00154	0.00148	0.00143	0.00140	0.00140	0.00143	0.00149
1500	0.00744	0.00462	0.00332	0.00286	0.00256	0.00164	0.00159	0.00155	0.00153	0.00154	0.00159	0.00167
2000	0.00701	0.00437	0.00337	0.00291	0.00192	0.00172	0.00167	0.00164	0.00163	0.00165	0.00171	0.00181
2500	0.00525	0.00412	0.00342	0.00296	0.00198	0.00178	0.00174	0.00171	0.00172	0.00174	0.00181	0.00192
3000	0.00568	0.00395	0.00345	0.00300	0.00202	0.00183	0.00180	0.00178	0.00179	0.00182	0.00190	0.00202
4000	0.00593	0.00402	0.00352	0.00218	0.00209	0.00192	0.00190	0.00189	0.00191	0.00195	0.00205	0.00219
6000	0.00701	0.00398	0.00361	0.00229	0.00221	0.00206	0.00205	0.00205	0.00210	0.00216	0.00227	0.00244
10000	0.00732	0.00362	0.00257	0.00244	0.00237	0.00226	0.00226	0.00229	0.00236	0.00244	0.00259	0.00280

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00353	0.00241	0.00190	0.00132	0.00113	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00420	0.00307	0.00201	0.00185	0.00172	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00466	0.00333	0.00233	0.00209	0.00224	0.00153	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00609	0.00445	0.00353	0.00267	0.00250	0.00159	0.00152	0.00145	0.00121	0.00119	0.00119	0.00122
1000	0.00638	0.00475	0.00342	0.00278	0.00237	0.00154	0.00148	0.00143	0.00140	0.00140	0.00143	0.00149
1500	0.00744	0.00462	0.00332	0.00286	0.00256	0.00164	0.00159	0.00155	0.00153	0.00154	0.00159	0.00167
2000	0.00701	0.00437	0.00337	0.00291	0.00192	0.00172	0.00167	0.00164	0.00163	0.00165	0.00171	0.00181
2500	0.00525	0.00412	0.00342	0.00296	0.00198	0.00178	0.00174	0.00171	0.00172	0.00174	0.00181	0.00192
3000	0.00568	0.00395	0.00345	0.00300	0.00202	0.00183	0.00180	0.00178	0.00179	0.00182	0.00190	0.00202
4000	0.00593	0.00402	0.00352	0.00218	0.00209	0.00192	0.00190	0.00189	0.00191	0.00195	0.00205	0.00219
6000	0.00701	0.00398	0.00361	0.00229	0.00221	0.00206	0.00205	0.00205	0.00210	0.00216	0.00227	0.00244
10000	0.00732	0.00362	0.00257	0.00244	0.00237	0.00226	0.00226	0.00229	0.00236	0.00244	0.00259	0.00280

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0014	0.0026	0.0142	0.0303	0.2447	0.7946	4.0461	20.0577	54.5442	110.2164	221.2738
50	0.0016	0.0078	0.0157	0.0738	0.197	2.0128	8.6753	21.0419	47.2773	93.1103	258.4628	654.3032
100	0.0037	0.0174	0.0245	0.1432	0.3752	3.4245	14.725	27.0338	63.975	134.0305	298.4343	1046.815
500	0.0156	0.1163	0.0967	0.7446	1.9622	14.8059	34.3429	87.4512	236.5183	444.8067	1003.208	3493.783
1000	0.046	0.2995	0.2461	1.5508	3.6119	25.3768	56.6038	122.4	298.0014	629.3704	1308.997	5235.988
1500	0.0618	0.4076	0.6173	2.2445	4.0385	33.9325	69.2426	139.5128	379.2792	733.1387	1963.495	7853.982
2000	0.062	0.5798	0.8272	2.5389	5.0944	38.3249	79.5055	169.7682	454.4642	837.758	2617.994	10471.98
2500	0.0888	0.636	0.8967	3.0613	6.0115	41.1184	82.6422	194.8059	496.7009	1047.198	3272.492	13089.97
3000	0.1105	0.7844	1.0699	3.5401	6.8769	46.963	95.6902	224.3857	554.1108	1256.637	3926.991	15707.96
4000	0.1283	1.0513	1.3887	5.0016	8.4551	56.0638	116.1324	277.0512	653.1413	1675.516	5235.988	20943.95
6000	0.199	1.6334	1.9531	6.6886	11.1505	77.593	158.6685	364.1625	903.2079	2513.274	7853.982	31415.93
10000	0.3801	2.3736	2.6392	7.6551	13.6419	110.24	228.1342	506.6048	1505.347	4188.79	13089.97	52359.88

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0005	0.001	0.0057	0.0121	0.0986	0.3245	1.6222	7.7371	21.5471	49.4892	130.8997
50	0.0006	0.0027	0.0056	0.03	0.0795	0.7838	3.6367	9.7009	25.6233	57.2871	171.3114	524.5288
100	0.0014	0.0064	0.009	0.0583	0.1621	1.4773	7.3001	15.2104	44.4016	125.0437	354.4676	1482.504
500	0.0066	0.0459	0.0421	0.3773	1.0939	13.4164	39.9001	151.9539	629.5922	1544.171	4617.061	19328.06
1000	0.0193	0.1367	0.1387	1.0892	2.8535	37.8891	110.5976	310.0925	989.1229	2761.465	7532.248	27399.6
1500	0.0295	0.217	0.3492	1.9934	5.1166	69.0265	173.6755	389.7777	1482.6	3614.272	12021.67	42884.27
2000	0.0325	0.3414	0.5457	2.5122	7.8486	89.7592	226.0365	522.9575	1990.847	4737.767	15780.1	66108.11
2500	0.0468	0.4053	0.6552	3.4892	10.9129	102.667	225.6015	622.6624	2370.448	6642.119	22095.94	92741.67
3000	0.0617	0.5512	0.8727	4.565	14.2499	135.019	297.0645	819.5431	3122.158	8755.819	29089.73	122275.2
4000	0.0793	0.8785	1.3764	8.5632	21.5948	182.194	390.7648	1270.986	4831.124	13528.35	45074.25	189331.9
6000	0.1467	1.8315	2.6021	15.4082	38.4876	335.057	723.3012	2355.549	8932.031	24963.83	83802.91	351289.2
10000	0.3237	3.4266	4.151	17.951	46.2763	529.931	1564.546	5092.943	19266.01	53731.39	181886.3	761432

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: H-BD1.2P5

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=1.2; Maximum permissible specific bearing load plim=5 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10 | 12	13 | 20	17 | 25	30 | 40	37 | 50	70 | 100	105 | 150	200 | 250	350 | 500	400 | 500	700 | 500	1000 | 500
50	7 | 10	9 | 12	12 | 15	20 | 25	28 | 40	55 | 70	95 | 115	125 | 150	170 | 250	200 | 250	300 | 400	400 | 500
100	8 | 10	9 | 12	9 | 12	17 | 25	24 | 30	45 | 60	80 | 100	90 | 115	110 | 150	135 | 180	200 | 250	300 | 400
500	5 | 6	8 | 10	6 | 8	12 | 15	17 | 25	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
1000	5 | 6	7 | 10	7 | 10	12 | 15	16 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
1500	5 | 6	7 | 10	7 | 10	10 | 12	15 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
2000	4 | 5	6 | 8	7 | 10	10 | 12	14 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
2500	3 | 4	6 | 8	7 | 10	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
3000	3 | 4	6 | 8	8 | 10	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
4000	4 | 5	7 | 10	7 | 10	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
6000	4 | 5	8 | 10	7 | 10	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400
10000	5 | 6	8 | 10	7 | 10	10 | 12	13 | 20	30 | 40	45 | 60	60 | 80	95 | 115	130 | 180	200 | 250	300 | 400

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	68	100	68	46	46	46	46	46	46	46	32	22
50	68	100	68	46	46	46	68	68	68	100	68	46
100	46	68	68	46	46	68	68	100	150	150	150	150
500	32	46	68	68	68	150	220	220	320	220	220	150
1000	32	46	46	68	68	150	150	100	100	68	46	32
1500	32	32	46	100	68	100	100	46	46	46	32	22
2000	32	32	46	68	68	100	68	46	32	32	32	22
2500	32	32	32	68	68	46	32	32	32	22	22	22
3000	32	32	32	68	68	46	32	32	32	22	22	22
4000	22	32	46	68	68	46	32	32	32	22	22	22
6000	15	15	32	68	68	32	32	32	32	22	22	22
10000	10	15	22	22	22	22	22	22	22	22	22	22

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0	0	0	0	0	0	0	0	1	0	0	1
50	1	1	1	0	0	0	1	0	1	0	0	0
100	1	1	1	0	0	0	1	1	1	0	0	0
500	0	1	1	0	1	0	0	0	1	1	3	4
1000	1	1	1	0	0	0	0	1	3	3	4	5
1500	1	1	1	1	0	0	1	2	3	4	5	5
2000	1	1	1	1	0	2	2	3	4	5	5	5
2500	1	1	1	1	1	2	2	3	4	5	5	5
3000	1	1	1	1	1	2	3	3	5	5	5	5
4000	1	1	1	1	2	3	3	4	5	5	5	5
6000	1	1	1	2	2	3	3	5	5	5	5	5
10000	1	1	3	2	2	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2	2	2	2	2	2	3	2	0	1	2	3
50	1	2	1	2	2	1	0	0	0	0	0	1
100	1	1	1	2	2	1	0	0	0	0	0	0
500	1	1	1	1	1	0	1	1	1	1	1	1
1000	1	1	1	1	0	1	1	1	0	0	0	0
1500	1	1	1	1	0	1	1	0	0	0	0	0
2000	1	1	0	1	1	1	1	0	0	0	0	0
2500	1	1	1	1	1	0	0	0	0	0	0	0
3000	1	0	0	1	1	1	0	0	0	0	0	1
4000	0	1	1	1	1	1	1	1	0	0	0	1
6000	1	1	1	1	1	1	1	1	1	0	1	1
10000	0	2	2	2	1	1	1	1	1	2	2	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.02	0.04	0.05	0.1	0.18	0.21	0.37	0.52
50	0.02	0.02	0.03	0.05	0.07	0.14	0.25	0.33	0.45	0.52	0.79	1.05
100	0.04	0.05	0.05	0.09	0.13	0.24	0.42	0.47	0.58	0.71	1.05	1.57
500	0.13	0.21	0.16	0.31	0.45	0.79	1.18	1.57	2.49	3.4	5.24	7.85
1000	0.26	0.37	0.37	0.63	0.84	1.57	2.36	3.14	4.97	6.81	10.47	15.71
1500	0.39	0.55	0.55	0.79	1.18	2.36	3.53	4.71	7.46	10.21	15.71	23.56
2000	0.42	0.63	0.73	1.05	1.47	3.14	4.71	6.28	9.95	13.61	20.94	31.42
2500	0.39	0.79	0.92	1.31	1.7	3.93	5.89	7.85	12.44	17.02	26.18	39.27
3000	0.47	0.94	1.26	1.57	2.04	4.71	7.07	9.42	14.92	20.42	31.42	47.12
4000	0.84	1.47	1.47	2.09	2.72	6.28	9.42	12.57	19.9	27.23	41.89	62.83
6000	1.26	2.51	2.2	3.14	4.08	9.42	14.14	18.85	29.85	40.84	62.83	94.25
10000	2.62	4.19	3.67	5.24	6.81	15.71	23.56	31.42	49.74	68.07	104.72	157.08

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.08	0.19	0.24	0.42	0.54	0.71	0.63	0.4	0.29	0.5	0.57	1
50	0.14	0.46	0.56	1	0.89	1.3	0.92	1.07	1.18	2	1.67	2.5
100	0.12	0.46	0.93	1.18	1.39	1.85	1.25	1.93	3.03	4.12	4	4.17
500	0.33	0.62	2.08	2.78	2.35	4.17	3.7	4.17	4.58	4.27	4	4.17
1000	0.33	0.71	1.43	2.78	3.12	4.17	3.7	4.17	4.58	4.27	4	4.17
1500	0.33	0.71	1.43	4.17	3.33	4.17	3.7	4.17	4.58	4.27	4	4.17
2000	0.5	1.04	1.43	4.17	3.57	4.17	3.7	4.17	4.58	4.27	4	4.17
2500	0.83	1.04	1.43	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17
3000	0.83	1.04	1.25	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17
4000	0.5	0.71	1.43	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17
6000	0.5	0.62	1.43	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17
10000	0.33	0.62	1.43	4.17	3.85	4.17	3.7	4.17	4.58	4.27	4	4.17

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3=3	4.2>3	3.6>3	3.2=3.2	3.6>3.3	5.9>4.1	8.7>4.9	22.3>6.3	61.2>7.6	40.3>8	32.1>8.3	20.1>8.6
50	5>3	4.1>3	4.1>3	3=3	5.1>3.1	8.5>3.8	22.5>4.7	23.9>5.3	33.4>6.1	28.5>6.3	32.1>7.2	18.7>8
100	6.5>3	4.7>3	3.4>3	3.9>3	4.1>3	9.8>3.5	20.6>4.4	19.8>4.6	20.7>5	15>5.5	15.9>6.4	14.7>7.5
500	3.8>3	6.1>3	2.7<3	4>3	6.6>3	7>3.2	10.4>3.6	9.7>4.2	9.3>5.4	8.1>6.5	7.6<8	6.5<9.6
1000	5.9>3	6.4>3	4.2>3	4.4>3	3.6>3	5.7>3.4	7.1>4.2	5.9>5	4.4<6.2	3.9<7.5	3.7<9.4	0<10.7
1500	6.9>3	5.9>3	4.5>3	2.6<3	3.2>3.1	4.2>3.8	5.2>4.7	3.6<5.4	3.1<6.9	3<8.4	1.1<9.9	0<11.5
2000	5>3	4.3>3	4.5>3	2.1<3	3.5>3.2	3.6<4.2	3.7<4.9	3.1<5.8	2.5<7.6	2.2<8.7	0<10.4	0<12.4
2500	3.5>3	4.6>3	3.8>3	1.9<3.2	3.2<3.4	2.5<4.3	2.8<5.2	2.6<6.3	2.2<7.9	1.5<9.1	0<11	0<13.6
3000	3.7>3	4.7>3	5.3>3.1	1.8<3.3	3<3.5	2.3<4.4	2.6<5.4	2.4<6.7	1.9<8.2	0.8<9.4	0<11.5	0<14.7
4000	5.1>3	6.5>3.2	4.2>3.2	2<3.5	2.6<3.9	2<4.7	2.3<6	2.2<7.1	1.4<8.6	0<10.1	0<13.1	0<17.1
6000	4.5>3.1	6.7>3.8	3.3<3.6	1.7<4	2.1<4.2	1.5<5.2	2<6.5	1.8<7.7	0.8<9.6	0<12	0<16.3	0<21.8
10000	6.4>3.8	6.7>4.2	3.2<4.1	1<4.3	1.3<4.5	1.3<5.9	1.6<7.4	1.3<9.1	0<12.6	0<16.1	0<22.5	0<31.2

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.7<3	0.9<3	0.8<3	0.9<3.2	1<3.3	1.6<4.1	2.4<4.9	6<6.3	16.5>7.6	11.2>8	12.8>8.3	0<8.6
50	1.1<3	0.9<3	1<3	0.8<3	1.3<3.1	2.4<3.8	6.2>4.7	7>5.3	12.7>6.1	12.4>6.3	15.3>7.2	10.8>8
100	1.9<3	1.1<3	0.8<3	1<3	1.2<3	2.7<3.5	7.6>4.4	8.1>4.6	10.7>5	10.1>5.5	15.1>6.4	22.2>7.5
500	1.2<3	1.9<3	0.7<3	1.3<3	2.5<3	5.5>3.2	11.5>3.6	14>4.2	22.2>5.4	29.5>6.5	45.5>8	59.3>9.6
1000	2.1<3	2.6<3	1.8<3	2.4<3	3=3	8.4>3.4	13.4>4.2	14.1>5	20>6.2	24.1>7.5	31>9.4	36.7>10.7
1500	2.7<3	2.8<3	2.5<3	2.4<3	3.5>3.1	8.7>3.8	13.9>4.7	11.8>5.4	16.5>6.9	25.6>8.4	31.7>9.9	37.4>11.5
2000	2.1<3	2.2<3	3.1>3	2.2<3	4.3>3.2	9.9>4.2	13.3>4.9	14.1>5.8	15.9>7.6	24.4>8.7	37.8>10.4	44.3>12.4
2500	1.4<3	2.7<3	2.8<3	2.5<3.2	4.4>3.4	7.9>4.3	10.8>5.2	13.1>6.3	18.2>7.9	22.3>9.1	34.6>11	50.4>13.6
3000	1.6<3	3.2>3	4>3.1	2.8<3.3	4.9>3.5	8.8>4.4	12.1>5.4	14.6>6.7	20.4>8.2	25>9.4	38.5>11.5	56.1>14.7
4000	3=3	6.2>3.2	4.9>3.2	3.7>3.5	5.6>3.9	10.2>4.7	14.2>6	17.3>7.1	24.2>8.6	30.1>10.1	46>13.1	66.9>17.1
6000	2.8<3.1	6.2>3.8	5.1>3.6	4.4>4	6.6>4.2	10.7>5.2	17.3>6.5	21.4>7.7	30.3>9.6	38.5>12	59>16.3	85.7>21.8
10000	5.3>3.8	8.2>4.2	5.4>4.1	3.8<4.3	5.8>4.5	11.9>5.9	19.2>7.4	23.8>9.1	33.6>12.6	51.2>16.1	78.8>22.5	116>31.2

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.5	9.5	14.2	29.0	36.4	66.2	100.6	187.8	304.6	383.8	527.5	779.4
50	3.8	5.6	8.6	19.9	25.7	54.0	90.6	122.7	166.6	185.1	264.4	383.8
100	3.5	5.2	7.1	16.3	22.1	42.8	77.3	85.9	105.2	132.6	167.0	226.7
500	2.4	3.6	4.8	11.0	16.7	28.6	32.7	41.2	50.9	70.5	88.8	132.6
1000	1.9	2.9	4.9	10.5	15.3	22.7	28.6	39.9	54.1	77.3	104.2	154.2
1500	1.7	3.0	4.5	8.5	14.2	21.9	27.7	42.2	57.3	72.2	99.3	146.7
2000	1.5	2.7	4.2	9.4	13.2	19.9	28.5	38.4	56.8	71.6	90.2	133.3
2500	1.4	2.6	4.6	9.2	12.3	22.4	30.8	38.9	52.8	72.3	91.2	123.7
3000	1.3	2.4	4.5	9.1	11.5	21.1	29.0	36.6	49.6	68.1	85.8	116.4
4000	1.4	2.3	4.0	8.3	10.5	19.2	26.4	33.2	45.1	61.9	77.9	105.8
6000	1.4	2.7	4.2	7.3	9.2	18.3	23.0	29.0	39.4	54.0	68.1	92.4
10000	1.4	2.4	4.1	7.8	9.8	16.8	21.2	26.7	36.2	45.6	57.4	77.9

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
50	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
100	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
1000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
1500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
2000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
2500	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
3000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
4000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
6000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7
10000	1.3	2.9	4.1	9.1	12.9	28.9	40.8	57.7	91.3	129.1	182.6	288.7

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8299	0.7327	0.7792	0.8368	0.8295	0.8312	0.8620	0.8143	0.6501	0.7987	0.9082	0.9599
50	0.6623	0.6997	0.6611	0.8357	0.7876	0.7428	0.6617	0.7366	0.6068	0.7155	0.7857	0.9066
100	0.6349	0.6834	0.6804	0.7812	0.8479	0.7288	0.6323	0.6966	0.6233	0.7785	0.8412	0.9020
500	0.7475	0.6596	0.7450	0.7510	0.6899	0.7177	0.7018	0.7830	0.8399	0.8962	0.9357	0.9638
1000	0.6298	0.6256	0.6483	0.7360	0.8180	0.7608	0.7886	0.8662	0.9349	0.9574	0.9739	0.9999
1500	0.6271	0.6483	0.6340	0.8269	0.8380	0.8345	0.8553	0.9235	0.9582	0.9696	0.9926	0.9999
2000	0.6420	0.6980	0.6352	0.8678	0.7440	0.8637	0.9030	0.9367	0.9676	0.9797	0.9999	0.9999
2500	0.5946	0.6599	0.6940	0.8793	0.7584	0.9095	0.9284	0.9497	0.9730	0.9870	0.9999	0.9999
3000	0.6023	0.6372	0.6166	0.8894	0.7822	0.9196	0.9364	0.9546	0.9776	0.9935	0.9999	0.9999
4000	0.5721	0.5546	0.6733	0.8223	0.8153	0.9326	0.9470	0.9612	0.9844	0.9999	0.9999	0.9999
6000	0.6821	0.5953	0.7468	0.8562	0.8556	0.9512	0.9571	0.9702	0.9921	0.9999	0.9999	0.9999
10000	0.6491	0.5563	0.6519	0.9173	0.9196	0.9631	0.9686	0.9815	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9581	0.9456	0.9513	0.9559	0.9545	0.9552	0.9621	0.9498	0.9055	0.9441	0.9634	0.9999
50	0.9250	0.9344	0.9208	0.9548	0.9454	0.9284	0.9063	0.9227	0.8511	0.8759	0.8980	0.9461
100	0.8956	0.9276	0.9268	0.9439	0.9554	0.9259	0.8636	0.8760	0.8050	0.8498	0.8489	0.8518
500	0.9237	0.8950	0.9305	0.9171	0.8817	0.7764	0.6714	0.6871	0.6163	0.6212	0.6148	0.6705
1000	0.8659	0.8475	0.8473	0.8571	0.8473	0.6483	0.6036	0.6777	0.7017	0.7357	0.7798	0.8314
1500	0.8549	0.8318	0.7991	0.8442	0.8204	0.6567	0.6142	0.7494	0.7741	0.7424	0.7966	0.8451
2000	0.8525	0.8460	0.7510	0.8598	0.6848	0.6263	0.6497	0.7157	0.7946	0.7709	0.7749	0.8302
2500	0.8351	0.8018	0.7757	0.8406	0.6667	0.7106	0.7246	0.7461	0.7755	0.8017	0.8046	0.8182
3000	0.8303	0.7543	0.7110	0.8236	0.6410	0.6878	0.7032	0.7275	0.7588	0.7862	0.7928	0.8071
4000	0.7446	0.5778	0.6213	0.6720	0.6044	0.6525	0.6683	0.6949	0.7321	0.7591	0.7699	0.7867
6000	0.7977	0.6215	0.6142	0.6236	0.5528	0.6584	0.6247	0.6520	0.6916	0.7207	0.7331	0.7548
10000	0.7085	0.4541	0.4140	0.6985	0.6320	0.6506	0.6222	0.6508	0.6949	0.6703	0.6860	0.7093

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00169	0.00065	0.00118	0.0029	0.00335	0.01552	0.07826	0.47151	1.460893	2.269636	15.17041	59.07466
50	0.00109	0.00064	0.00065	0.00308	0.00673	0.02246	0.120943	0.294594	0.36894	0.553613	2.040795	5.444234
100	0.0026	0.00126	0.00054	0.0032	0.01083	0.02809	0.111685	0.15353	0.157275	0.302936	0.962752	3.279002
500	0.00285	0.00363	0.00084	0.00385	0.0097	0.02491	0.067425	0.156365	0.436545	1.161811	3.989101	15.14856
1000	0.00342	0.00389	0.00202	0.00658	0.01343	0.03945	0.11692	0.302076	1.151895	3.214266	12.19286	46.04931
1500	0.00548	0.00523	0.00264	0.00572	0.0167	0.06336	0.190413	0.542397	2.097603	5.319514	20.73569	78.34024
2000	0.00293	0.0038	0.00317	0.00804	0.01083	0.08429	0.284163	0.723084	3.050964	7.915902	28.85131	110.3196
2500	0.00095	0.00378	0.00424	0.00977	0.01119	0.12433	0.413125	0.985602	3.889869	10.91347	39.68396	144.004
3000	0.00119	0.00383	0.00621	0.01146	0.01316	0.14804	0.496237	1.197447	4.74257	13.32125	49.17131	178.2793
4000	0.00288	0.00577	0.00503	0.00835	0.01709	0.19483	0.657974	1.605543	6.492498	18.2289	68.20078	248.7843
6000	0.00632	0.01382	0.00761	0.01207	0.02465	0.31616	0.993083	2.445854	9.994657	28.58675	107.2301	397.9914
10000	0.01692	0.01382	0.00573	0.0241	0.05006	0.56525	1.816968	4.505452	18.76269	49.90098	189.4922	710.3729

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0033	0.0107	0.0171	0.0631	0.0962	0.4470	0.9942	3.1212	13.0583	14.9079	34.7234	49.5203
50	0.0020	0.0030	0.0075	0.0199	0.0592	0.2482	0.6913	1.1791	2.6588	3.1212	7.4601	14.9079
100	0.0022	0.0030	0.0030	0.0171	0.0283	0.1757	0.5086	0.6558	1.0404	1.5259	3.1212	7.4601
500	0.0009	0.0022	0.0014	0.0075	0.0171	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
1000	0.0009	0.0020	0.0020	0.0075	0.0129	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
1500	0.0009	0.0020	0.0020	0.0033	0.0122	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
2000	0.0006	0.0014	0.0020	0.0033	0.0115	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
2500	0.0004	0.0014	0.0020	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
3000	0.0004	0.0014	0.0022	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
4000	0.0006	0.0020	0.0020	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
6000	0.0006	0.0022	0.0020	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601
10000	0.0009	0.0022	0.0020	0.0033	0.0107	0.0631	0.1757	0.3083	0.6913	1.4704	3.1212	7.4601

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	5.08	3.48	4.16	5.69	5.41	5.64	7.26	4.63	2.35	4.18	7.61	21.82
50	2.47	2.74	2.22	5.46	4.26	3.2	2.16	2.97	2	2.8	4.05	10.06
100	1.97	2.56	2.53	4.2	6.05	3.1	1.95	2.62	2.01	3.89	5.71	9.87
500	3.13	2.2	3.33	3.28	2.83	2.96	2.77	3.99	5.54	9.54	15.64	34.87
1000	1.85	2.12	2.33	3.07	4.77	3.58	4.11	7.29	15.26	28.17	46.31	121.41
1500	1.82	2.33	2.2	4.96	5.75	5.58	6.64	13	28.17	41.95	66.17	187.22
2000	2.04	2.72	2.21	7.04	3.47	7.14	9.97	16.2	38.7	53.26	90.95	220.73
2500	1.74	2.32	2.82	7.79	3.88	10.65	14.1	21.25	45.01	61.01	117.86	201.5
3000	1.8	2.1	1.81	8.5	4.32	12.22	16.12	25.25	49.91	67.95	133.84	184.65
4000	1.48	1.58	2.59	4.79	5.24	15.12	19.78	32	57.07	86.4	141.3	160.73
6000	2.43	1.64	3.51	6.34	7.12	22.36	27.71	42.43	65.24	109.81	115.02	133.18
10000	2.02	1.39	2.37	11.36	12.79	34.15	40.53	54.9	86.68	86.23	89.02	104.14

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	28.04	19.88	22.95	26.49	25.22	26.15	33.42	21.04	10.45	18.3	29.07	71.18
50	13.61	15.57	12.2	25.11	19.42	13.93	9.9	12.37	6.71	7.73	9.54	19.07
100	9.15	13.91	13.75	18.99	25.67	13.53	6.94	7.81	4.58	6.34	6.1	6.44
500	12.57	9.1	14.59	11.52	8.7	3.85	2.43	2.6	1.75	2.02	1.8	2.43
1000	6.91	6.42	6.41	6.55	6.02	2.21	1.81	2.5	2.57	3.28	3.77	5.46
1500	6.27	5.66	4.54	5.72	5.02	2.29	1.89	3.4	3.58	3.38	4.13	6.09
2000	6.29	6.13	3.58	6.55	2.71	2	2.22	2.93	4	3.84	3.68	5.41
2500	5.61	4.44	4.01	5.54	2.67	2.87	3.05	3.35	3.6	4.53	4.35	4.95
3000	5.41	3.47	2.75	4.84	2.41	2.61	2.78	3.09	3.32	4.15	4.05	4.58
4000	3.18	1.72	2.08	2.24	2.06	2.25	2.4	2.69	2.94	3.64	3.59	4.07
6000	4.16	1.86	2.01	1.79	1.68	2.3	1.99	2.24	2.46	3.08	3.03	3.48
10000	2.62	0.99	0.99	2.51	2.32	2.23	1.96	2.23	2.5	2.5	2.47	2.85

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20	20.1	20.2	20.4	20.8	21.1	21.6	22.2
50	20.1	20.1	20.2	20.3	20.5	21.4	23	24.5	28.3	32.4	34.3	36.9
100	20.1	20.3	20.4	20.7	21.7	24.1	27.3	31.1	38.6	45	53.2	64.7
500	20.7	22.1	24	27.9	30.4	51.4	62.3	70.1	95.5	109.3	134.9	165.2
1000	22	27.5	29.9	37.2	48.2	74	84.9	92.1	121.7	142.1	175.1	257.6
1500	23.5	30.4	35.6	51.5	57.5	87.2	101.3	105.2	145	181.7	216.5	376.5
2000	25.5	32.1	41.1	55.9	65	103.4	111.5	126	169.3	205.6	282.1	495.3
2500	24.9	35.7	43.1	63.2	70	105.9	119.6	139.8	195.3	222.3	347.6	614.1
3000	26.2	39.2	41.9	69.9	77.6	119.1	134.6	159.9	218	252.4	413.1	732.9
4000	31.2	49.9	60	82.9	91.8	143.7	163.2	197.7	257.1	329.9	544.1	970.6
6000	34.9	47.6	71.4	105.7	117.9	182.4	222.1	264.9	324	484.8	806.2	1445.9
10000	41.6	66	95.2	129.6	147.9	265	324.3	371.2	497.9	794.7	1330.3	2396.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.2	50.2	50.1	50.2	50.2	50.1	50.1
50	50.0	50.1	50.3	50.3	50.4	51.1	51.0	51.0	52.4	53.6	52.6	52.2
100	50.0	50.2	50.6	50.7	50.5	51.9	52.1	53.4	58.9	59.7	59.3	59.9
500	50.1	50.4	51.8	53.3	54.1	64.0	69.0	70.2	80.3	77.1	76.4	71.9
1000	50.2	51.0	52.6	55.5	56.7	73.5	75.2	71.0	71.2	67.3	63.3	61.0
1500	50.2	51.1	53.6	59.3	58.7	72.7	74.1	65.8	65.6	66.9	62.3	60.3
2000	50.4	51.7	54.6	58.4	67.3	75.8	70.8	68.0	64.2	65.1	63.6	61.1
2500	51.1	52.3	54.0	59.5	70.0	68.3	65.4	66.0	65.5	63.2	61.8	61.8
3000	51.1	53.1	54.7	60.6	72.1	70.1	66.8	67.2	66.7	64.1	62.5	62.5
4000	51.1	54.5	58.2	71.4	75.5	73.1	69.3	69.6	68.7	65.8	63.9	63.7
6000	50.7	53.2	58.5	76.4	80.9	72.6	73.1	73.3	72.0	68.4	66.2	65.7
10000	50.8	57.2	71.1	69.1	72.9	73.3	73.3	73.4	71.7	72.3	69.6	68.8

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<695	0<841	0<947	0<1137	0<1229	0<1306	0<1192	0<1192	0<1306	0<1306	2<1306	5<1306
50	0<637	0<745	0<921	0<960	0<996	0<1192	0<1104	0<1085	0<1306	0<1306	1<1306	4<1306
100	0<617	0<716	0<856	0<903	0<873	0<1029	0<1104	0<1085	0<1306	0<1306	1<1306	5<1306
500	0<529	0<619	0<695	0<799	0<826	0<1017	1<1049	1<1070	5<1182	18<1192	76<1202	351<1192
1000	0<517	0<589	0<706	0<783	0<829	1<1036	4<1066	10<1081	49<1100	181<1104	729<1100	3811>1085
1500	0<479	0<597	0<699	0<747	1<805	4<1008	12<1032	37<1042	184<1052	539<1056	2063>1046	098>1029
2000	0<493	0<600	0<694	1<741	1<931	8<984	30<1005	78<1017	417<1023	1118>1020	4495>1008	20151>990
2500	0<547	0<617	0<690	1<735	1<912	18<968	63<987	152<996	711<999	1877>993	8309>982	36962>960
3000	0<527	0<629	1<703	1<730	2<903	29<955	100<971	246<976	1075>979	2840>973	12455>958	53928>938
4000	0<536	1<639	1<681	2<871	4<889	61<935	204<947	512<950	1998>947	5744>943	20728>923	78736>903
6000	1<493	4<644	3<673	5<852	11<867	184<903	573<912	1350>912	4530>908	13633>897	34356>879	81498>856
10000	5<483	9<674	7<805	25<828	52<840	682<867	1985>869	4115>867	13525>857	26163>845	65033>824	65068>801

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<695	0<841	0<947	0<1137	0<1229	0<1306	0<1192	0<1192	1<1306	1<1306	6<1306	17<1306
50	0<637	0<745	0<921	0<960	0<996	0<1192	0<1104	1<1085	1<1306	1<1306	3<1306	7<1306
100	0<617	0<716	0<856	0<903	0<873	0<1029	1<1104	1<1085	0<1306	1<1306	1<1306	3<1306
500	0<529	0<619	0<695	0<799	0<826	0<1017	1<1049	1<1070	2<1182	4<1192	9<1202	26<1192
1000	0<517	0<589	0<706	0<783	0<829	1<1036	2<1066	4<1081	9<1100	22<1104	64<1100	196<1085
1500	0<479	0<597	0<699	0<747	1<805	2<1008	3<1032	10<1042	25<1052	47<1056	143<1046	442<1029
2000	0<493	0<600	0<694	0<741	1<931	2<984	7<1005	15<1017	47<1023	89<1020	211<1008	646<990
2500	0<547	1<617	1<690	1<735	1<912	5<968	14<987	25<996	62<999	156<993	369<982	868<960
3000	0<527	1<629	1<703	1<730	1<903	7<955	18<971	32<976	80<979	197<973	471<958	1104>938
4000	1<536	1<639	1<681	1<871	2<889	10<935	27<947	47<950	117<947	288<943	690<923	1617>903
6000	2<493	4<644	2<673	2<852	3<867	21<903	46<912	81<912	202<908	496<897	1185>879	2789>856
10000	6<483	6<674	3<805	6<828	10<840	51<867	114<869	203<867	508<857	989>845	2361>824	5562>801

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00353	0.00241	0.00190	0.00132	0.00113	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00420	0.00307	0.00201	0.00185	0.00172	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00448	0.00333	0.00233	0.00209	0.00224	0.00161	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00609	0.00445	0.00353	0.00267	0.00250	0.00165	0.00155	0.00149	0.00122	0.00120	0.00118	0.00120
1000	0.00638	0.00492	0.00342	0.00278	0.00248	0.00159	0.00150	0.00146	0.00141	0.00140	0.00141	0.00145
1500	0.00744	0.00479	0.00349	0.00306	0.00263	0.00168	0.00160	0.00157	0.00154	0.00153	0.00156	0.00161
2000	0.00701	0.00474	0.00354	0.00311	0.00197	0.00176	0.00169	0.00165	0.00163	0.00164	0.00168	0.00174
2500	0.00570	0.00448	0.00358	0.00316	0.00205	0.00182	0.00175	0.00172	0.00171	0.00173	0.00177	0.00185
3000	0.00613	0.00431	0.00345	0.00320	0.00209	0.00187	0.00181	0.00179	0.00178	0.00180	0.00186	0.00194
4000	0.00593	0.00418	0.00368	0.00225	0.00216	0.00195	0.00190	0.00189	0.00190	0.00192	0.00200	0.00209
6000	0.00701	0.00411	0.00377	0.00235	0.00227	0.00209	0.00205	0.00205	0.00207	0.00212	0.00221	0.00233
10000	0.00732	0.00375	0.00263	0.00249	0.00242	0.00227	0.00226	0.00227	0.00232	0.00239	0.00251	0.00266

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00353	0.00241	0.00190	0.00132	0.00113	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00420	0.00307	0.00201	0.00185	0.00172	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00448	0.00333	0.00233	0.00209	0.00224	0.00161	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00609	0.00445	0.00353	0.00267	0.00250	0.00165	0.00155	0.00149	0.00122	0.00120	0.00118	0.00120
1000	0.00638	0.00492	0.00342	0.00278	0.00248	0.00159	0.00150	0.00146	0.00141	0.00140	0.00141	0.00145
1500	0.00744	0.00479	0.00349	0.00306	0.00263	0.00168	0.00160	0.00157	0.00154	0.00153	0.00156	0.00161
2000	0.00701	0.00474	0.00354	0.00311	0.00197	0.00176	0.00169	0.00165	0.00163	0.00164	0.00168	0.00174
2500	0.00570	0.00448	0.00358	0.00316	0.00205	0.00182	0.00175	0.00172	0.00171	0.00173	0.00177	0.00185
3000	0.00613	0.00431	0.00345	0.00320	0.00209	0.00187	0.00181	0.00179	0.00178	0.00180	0.00186	0.00194
4000	0.00593	0.00418	0.00368	0.00225	0.00216	0.00195	0.00190	0.00189	0.00190	0.00192	0.00200	0.00209
6000	0.00701	0.00411	0.00377	0.00235	0.00227	0.00209	0.00205	0.00205	0.00207	0.00212	0.00221	0.00233
10000	0.00732	0.00375	0.00263	0.00249	0.00242	0.00227	0.00226	0.00227	0.00232	0.00239	0.00251	0.00266

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0013	0.0025	0.0131	0.0282	0.2296	0.7332	3.5413	18.7478	31.2466	84.8622	184.0714
50	0.0015	0.0069	0.0138	0.0628	0.1828	1.5077	7.8295	17.5179	49.5424	99.3563	236.8928	487.7753
100	0.0044	0.0155	0.0219	0.1354	0.3473	3.3431	13.8798	26.8696	65.3131	108.9768	265.6678	738.8916
500	0.0143	0.1024	0.0937	0.7232	2.0268	11.7487	34.4757	71.1737	196.4609	392.1155	917.9774	2398.692
1000	0.0413	0.1961	0.2576	1.5689	2.8867	20.2367	52.83	102.512	264.497	536.3839	1239.262	3926.991
1500	0.0729	0.2706	0.4085	1.6477	3.8859	25.1643	66.1821	121.1846	325.2395	710.2836	1570.796	5890.486
2000	0.0676	0.2839	0.5509	1.8765	4.7037	31.2297	74.4883	150.7952	388.532	815.6231	2094.395	7853.982
2500	0.0555	0.3695	0.6033	2.2595	5.2666	32.1989	81.0681	170.3124	456.2062	888.6708	2617.994	9817.477
3000	0.0703	0.4523	1.0704	2.6104	6.0656	37.1368	93.2999	198.9205	515.1747	1021.018	3141.593	11780.97
4000	0.1373	0.7816	1.0432	3.2898	7.5542	46.344	116.6253	252.6561	616.7808	1361.357	4188.79	15707.96
6000	0.1824	1.3506	1.3408	4.4806	10.3029	60.8576	164.5299	348.308	790.8516	2042.035	6283.185	23561.94
10000	0.4493	2.2479	1.9636	5.7303	13.4659	91.777	247.7249	499.389	1243.547	3403.392	10471.98	39269.91

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0005	0.001	0.006	0.0129	0.1062	0.3429	1.5945	8.3092	14.226	42.3379	130.8997
50	0.0006	0.0027	0.0053	0.0287	0.0828	0.685	3.2825	8.0112	25.578	57.1614	150.9733	347.8704
100	0.0019	0.0062	0.0088	0.0618	0.1653	1.5242	6.7648	14.8085	40.3662	84.5889	257.2935	932.5576
500	0.0067	0.0463	0.0428	0.3649	1.1249	10.0504	37.2204	91.7387	386.7514	920.112	3066.454	9627.88
1000	0.0194	0.1062	0.1478	1.0365	2.57	27.0076	85.7751	184.1183	707.4943	1613.804	4686.995	14653.49
1500	0.0357	0.1646	0.2685	1.535	4.1532	41.9087	133.6474	247.2345	945.804	2600.453	7364.732	23140.24
2000	0.0355	0.181	0.4153	1.9451	5.4339	63.3358	171.5972	377.7837	1249.267	3448.336	11335.12	35327.15
2500	0.0284	0.2519	0.4918	2.6825	6.5073	65.9857	183.6151	455.2857	1742.833	4143.691	13536.95	49090.97
3000	0.0373	0.335	0.8322	3.491	8.4439	86.2096	240.6801	596.6636	2288.024	5431.684	17790.34	64273.54
4000	0.0872	0.7456	1.1859	5.187	12.693	131.078	368.062	912.4201	3508.926	8332.253	27390.78	98729.16
6000	0.1319	1.2576	1.855	9.2979	22.2494	207.647	666.6887	1655.658	6399.873	15217.81	50280.41	180830.4
10000	0.3823	2.8753	3.5105	13.3602	33.2838	383.302	1233.328	3064.579	11851.56	32400.02	107735.3	387087.2

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: H-BD0.4P10

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=0.4; Maximum permissible specific bearing load plim=10 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	13 | 6	16 | 7	22 | 10	37 | 15	50 | 20	85 | 40	130 | 60	250 | 100	500 | 200	700 | 300	700 | 300	1500 | 500
50	8 | 4	12 | 5	13 | 6	28 | 12	35 | 15	70 | 30	135 | 60	160 | 70	220 | 100	300 | 120	350 | 150	700 | 300
100	9 | 4	12 | 5	12 | 5	22 | 10	30 | 12	55 | 25	100 | 40	115 | 50	160 | 70	180 | 80	250 | 100	400 | 180
500	6 | 3	9 | 4	8 | 4	14 | 6	22 | 10	38 | 20	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
1000	6 | 3	8 | 4	9 | 4	14 | 6	20 | 8	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
1500	6 | 3	9 | 4	9 | 4	12 | 5	20 | 8	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
2000	5 | 3	8 | 4	9 | 4	14 | 6	17 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
2500	5 | 3	8 | 4	9 | 4	12 | 5	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
3000	4 | 3	8 | 4	10 | 4	12 | 5	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
4000	4 | 3	8 | 4	10 | 4	12 | 5	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
6000	5 | 3	9 | 4	9 | 4	12 | 5	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180
10000	6 | 3	9 | 4	9 | 4	12 | 5	16 | 7	37 | 15	50 | 20	75 | 30	115 | 50	160 | 70	250 | 100	400 | 180

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	100	100	100	100	68
100	68	100	100	68	68	100	100	150	150	220	220	220
500	46	68	100	100	100	220	220	320	460	320	220	220
1000	46	68	68	100	100	220	220	150	150	100	68	46
1500	46	46	68	150	100	150	150	68	68	68	46	32
2000	46	46	68	68	100	150	100	46	46	46	32	32
2500	32	32	46	100	100	68	46	46	32	32	32	32
3000	32	32	46	100	100	68	46	32	32	32	32	32
4000	32	46	46	100	100	68	46	32	32	32	32	32
6000	22	22	46	100	100	46	46	32	32	32	32	32
10000	15	22	32	32	32	32	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	1	1	1	1	1	1	0	0	0	0	0
50	1	1	1	1	1	0	0	0	0	0	0	0
100	1	1	1	1	1	0	0	0	0	1	2	2
500	1	1	1	1	1	0	1	1	2	4	4	4
1000	0	0	1	1	1	1	2	2	4	4	5	5
1500	0	1	1	1	1	2	2	4	4	5	5	5
2000	0	1	1	1	1	2	4	4	4	5	5	5
2500	1	1	1	1	2	4	4	4	5	5	5	5
3000	0	1	1	1	2	4	4	4	5	5	5	5
4000	0	1	1	1	2	4	4	4	5	5	5	5
6000	0	1	1	2	3	4	4	5	5	5	5	5
10000	1	1	2	2	4	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3	3	2	3	3	3	3	3	0	0	3	2
50	2	1	1	2	3	3	1	1	0	0	0	0
100	1	1	1	2	3	1	1	1	0	0	0	0
500	1	1	1	1	1	0	1	0	0	0	0	0
1000	1	1	1	1	1	1	1	0	0	0	0	0
1500	1	1	1	1	1	1	1	1	0	0	0	0
2000	1	1	1	1	1	1	1	1	1	0	0	0
2500	1	1	1	1	1	1	1	1	1	0	0	1
3000	1	1	1	1	1	1	1	1	1	0	0	1
4000	1	1	1	1	1	1	1	1	0	0	0	1
6000	1	1	1	1	1	1	1	1	0	0	1	1
10000	1	1	1	1	1	1	1	1	0	1	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.03	0.04	0.07	0.13	0.26	0.37	0.37	0.79
50	0.02	0.03	0.03	0.07	0.09	0.18	0.35	0.42	0.58	0.79	0.92	1.83
100	0.05	0.06	0.06	0.12	0.16	0.29	0.52	0.6	0.84	0.94	1.31	2.09
500	0.16	0.24	0.21	0.37	0.58	0.99	1.31	1.96	3.01	4.19	6.54	10.47
1000	0.31	0.42	0.47	0.73	1.05	1.94	2.62	3.93	6.02	8.38	13.09	20.94
1500	0.47	0.71	0.71	0.94	1.57	2.91	3.93	5.89	9.03	12.57	19.63	31.42
2000	0.52	0.84	0.94	1.47	1.78	3.87	5.24	7.85	12.04	16.76	26.18	41.89
2500	0.65	1.05	1.18	1.57	2.09	4.84	6.54	9.82	15.05	20.94	32.72	52.36
3000	0.63	1.26	1.57	1.88	2.51	5.81	7.85	11.78	18.06	25.13	39.27	62.83
4000	0.84	1.68	2.09	2.51	3.35	7.75	10.47	15.71	24.09	33.51	52.36	83.78
6000	1.57	2.83	2.83	3.77	5.03	11.62	15.71	23.56	36.13	50.27	78.54	125.66
10000	3.14	4.71	4.71	6.28	8.38	19.37	26.18	39.27	60.21	83.78	130.9	209.44

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.13	0.45	0.45	0.9	1	1.47	1.28	0.8	0.5	0.48	0.95	0.67
50	0.31	0.83	1.28	1.49	1.9	2.38	1.23	1.79	2.27	2.78	3.81	2.38
100	0.28	0.83	1.67	2.27	2.78	3.64	2.5	3.48	4.46	6.94	8	6.94
500	0.56	1.39	3.12	5.95	4.55	6.58	10	8.89	8.7	8.93	8	6.94
1000	0.56	1.56	2.78	5.95	6.25	9.01	10	8.89	8.7	8.93	8	6.94
1500	0.56	1.39	2.78	8.33	6.25	9.01	10	8.89	8.7	8.93	8	6.94
2000	0.67	1.56	2.78	5.95	8.4	9.01	10	8.89	8.7	8.93	8	6.94
2500	0.67	1.56	2.78	8.33	8.93	9.01	10	8.89	8.7	8.93	8	6.94
3000	0.83	1.56	2.5	8.33	8.93	9.01	10	8.89	8.7	8.93	8	6.94
4000	0.83	1.56	2.5	8.33	8.93	9.01	10	8.89	8.7	8.93	8	6.94
6000	0.67	1.39	2.78	8.33	8.93	9.01	10	8.89	8.7	8.93	8	6.94
10000	0.56	1.39	2.78	8.33	8.93	9.01	10	8.89	8.7	8.93	8	6.94

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.4<3	1.9<3	2.2<3	1.8<3.3	2.2<3.7	3.2<4.5	5<5.4	11.3>6.8	32>8.1	47.9>8.3	22.5>8.3	39>9
50	2.3<3	2.4<3	1.8<3	2.6<3.1	2.7<3.3	4.6>4.1	12>5.5	12.3>6	13.4>6.5	12.3>7.2	10.8>7.6	19.7>8.8
100	2.9<3	2.6<3	1.9<3	2.3<3	2.2<3.2	4.8>3.8	8.2>4.8	8.4>5.1	7.6>6	6<6.2	5.3<6.9	8.1<8.5
500	2.5<3	2.5<3	2<3	1.6<3	2.6<3	3.8>3.4	2.5<3.8	3.1<4.7	3.4<6.1	2.9<7.3	1.9<8.8	0<11
1000	3.4>3	3=3	2<3	1.6<3	1.8<3	2<3.8	2.1<4.5	2.1<5.5	2.2<6.9	0<8.5	0<10.1	0<12.1
1500	3.9>3	2.8<3	2.1<3	1.3<3	1.6<3.3	1.7<4.3	1.6<4.9	1.6<6.1	1.4<7.8	0<9.3	0<10.7	0<13.2
2000	3.9>3	2.9<3	2.1<3	1.2<3.2	1.4<3.4	1.5<4.5	1.4<5.2	1.4<6.6	0<8.3	0<9.7	0<11.4	0<14.8
2500	3.6>3	2.6<3	1.9<3.1	1.1<3.3	0.9<3.5	1.2<4.7	1.1<5.5	1.3<7.2	0<8.6	0<10.1	0<12.2	0<16.4
3000	3.1>3	2.6<3.1	1.8<3.3	1<3.4	0.9<3.8	1.1<4.9	1.1<5.8	1.1<7.4	0<8.9	0<10.5	0<13.1	0<17.9
4000	3.2>3	2.9<3.3	1.7<3.5	1<3.8	0.8<4.1	1<5.2	1<6.4	0.6<7.8	0<9.5	0<11.5	0<15.1	0<21.1
6000	3.4>3.3	2.3<3.9	1.6<3.9	0.9<4.1	0.7<4.3	0.9<5.8	0.8<6.9	0<8.6	0<11	0<14	0<19	0<27.3
10000	3.2<4	2.2<4.2	1.4<4.2	0.6<4.5	0.5<4.8	0.7<6.6	0<8	0<10.6	0<14.6	0<19.1	0<26.9	0.1<39.9

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8<3	0.6<3	0.7<3	0.6<3.3	0.7<3.7	0.8<4.5	0.4<5.4	3.4<6.8	11.6>8.1	17.2>8.3	7.2<8.3	10.3>9
50	0.7<3	0.7<3	0.5<3	0.9<3.1	0.9<3.3	1.7<4.1	4.6<5.5	5.6<6	7.4>6.5	8.2>7.2	8.1>7.6	16.8>8.8
100	0.9<3	0.9<3	0.6<3	0.8<3	0.8<3.2	1.9<3.8	4.1<4.8	5<5.1	6.2>6	6.3>6.2	7.5>6.9	14.2>8.5
500	0.9<3	0.9<3	0.7<3	0.8<3	1.6<3	3.8>3.4	2.9<3.8	5.6>4.7	9.8>6.1	12.2>7.3	16.6>8.8	32.4>11
1000	1.4<3	1.3<3	1<3	1.2<3	1.6<3	3.2<3.8	4<4.5	5.7>5.5	9.4>6.9	11>8.5	13.7>10.1	22.5>12.1
1500	1.8<3	1.5<3	1.3<3	1.2<3	2<3.3	3.4<4.3	4.2<4.9	4.8<6.1	8>7.8	10.9>9.3	14.5>10.7	23.4>13.2
2000	1.9<3	1.7<3	1.6<3	1.4<3.2	1.7<3.4	3.8<4.5	4.1<5.2	4.8<6.6	8<8.3	10.8>9.7	14.2>11.4	27.2>14.8
2500	1.9<3	1.6<3	1.5<3.1	1.3<3.3	1.8<3.5	3.1<4.7	3.3<5.5	5.5<7.2	7.4<8.6	10.2>10.1	16>12.2	30.7>16.4
3000	1.7<3	1.9<3.1	1.8<3.3	1.4<3.4	1.9<3.8	3.4<4.9	3.7<5.8	5<7.4	8.3<8.9	11.2>10.5	17.7>13.1	34.2>17.9
4000	2<3	2.7<3.3	2.1<3.5	1.6<3.8	2.2<4.1	3.9<5.2	4.3<6.4	5.9<7.8	9.8>9.5	13.3>11.5	20.9>15.1	40.5>21.1
6000	2.5<3.3	2.5<3.9	2.4<3.9	1.9<4.1	2.5<4.3	4.2<5.8	5.2<6.9	7.3<8.6	12.2>11	16.6>14	26>19	50.5>27.3
10000	3.3<4	3.4<4.2	2.6<4.2	1.6<4.5	2.2<4.8	4.6<6.6	5.8<8	9.3<10.6	15.6>14.6	21.5>19.1	33.5>26.9	65.3>39.9

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	8.0	11.7	17.6	35.9	45.1	82.6	128.1	249.2	410.8	517.5	697.3	1032.5
50	4.7	6.9	10.7	25.1	32.6	69.9	130.6	156.1	211.9	267.0	336.4	517.5
100	4.3	6.4	8.8	20.6	28.2	53.7	98.4	111.8	151.8	173.9	219.1	297.3
500	3.0	4.4	5.9	13.9	21.0	37.5	47.2	54.1	67.1	92.5	128.1	173.9
1000	2.4	3.6	6.2	13.2	19.4	29.7	37.5	51.9	70.4	98.4	140.5	203.9
1500	2.1	3.7	5.7	11.0	18.1	28.6	36.0	57.0	77.3	97.4	131.2	194.3
2000	1.9	3.4	5.5	13.5	16.8	26.0	36.2	55.3	75.1	94.6	130.1	176.6
2500	2.0	3.7	5.9	11.7	15.6	30.3	40.8	51.4	76.1	95.9	120.8	163.9
3000	1.9	3.5	5.8	11.6	14.7	28.5	38.4	52.8	71.6	90.2	113.6	154.2
4000	1.7	2.8	5.8	10.6	13.3	25.9	34.9	47.9	65.0	82.0	103.3	140.1
6000	1.8	3.4	5.5	9.3	11.7	24.2	30.5	41.9	56.8	71.6	90.2	122.4
10000	1.7	3.0	5.4	10.3	13.0	22.2	28.0	35.3	47.9	60.4	76.1	103.3

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
50	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
100	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
1500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
2500	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
3000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
4000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
6000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5
10000	1.6	3.5	5.0	11.2	15.8	35.4	50.0	70.7	111.8	158.1	223.6	353.5

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8793	0.8815	0.8700	0.9088	0.9117	0.9246	0.9359	0.9246	0.8720	0.8631	0.9357	0.9480
50	0.8481	0.8468	0.8478	0.8701	0.8901	0.8913	0.8734	0.8941	0.8780	0.9179	0.9385	0.9437
100	0.8469	0.8457	0.8299	0.8772	0.9228	0.8755	0.8832	0.8993	0.9055	0.9331	0.9578	0.9593
500	0.8504	0.8633	0.8294	0.9013	0.8867	0.8623	0.9278	0.9374	0.9455	0.9657	0.9861	0.9999
1000	0.8082	0.8351	0.8460	0.9072	0.9157	0.9208	0.9387	0.9557	0.9697	0.9999	0.9999	0.9999
1500	0.8151	0.8530	0.8445	0.9174	0.9254	0.9394	0.9541	0.9695	0.9818	0.9999	0.9999	0.9999
2000	0.7562	0.8264	0.8472	0.9315	0.9049	0.9481	0.9627	0.9754	0.9999	0.9999	0.9999	0.9999
2500	0.6903	0.8353	0.8656	0.9359	0.9359	0.9600	0.9710	0.9783	0.9999	0.9999	0.9999	0.9999
3000	0.7144	0.8250	0.8783	0.9394	0.9411	0.9633	0.9737	0.9819	0.9999	0.9999	0.9999	0.9999
4000	0.7144	0.8063	0.8854	0.9168	0.9490	0.9682	0.9777	0.9899	0.9999	0.9999	0.9999	0.9999
6000	0.7878	0.8626	0.8874	0.9296	0.9572	0.9753	0.9825	0.9999	0.9999	0.9999	0.9999	0.9999
10000	0.8440	0.8546	0.8603	0.9538	0.9711	0.9825	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9616	0.9644	0.9586	0.9709	0.9721	0.9816	0.9946	0.9773	0.9538	0.9509	0.9794	0.9863
50	0.9534	0.9526	0.9522	0.9565	0.9627	0.9601	0.9509	0.9520	0.9329	0.9456	0.9540	0.9519
100	0.9501	0.9487	0.9426	0.9577	0.9732	0.9506	0.9408	0.9399	0.9227	0.9296	0.9401	0.9292
500	0.9468	0.9499	0.9369	0.9503	0.9301	0.8636	0.9173	0.8886	0.8431	0.8578	0.8756	0.8527
1000	0.9199	0.9304	0.9239	0.9301	0.9245	0.8740	0.8803	0.8831	0.8703	0.8910	0.9150	0.9161
1500	0.9160	0.9207	0.9021	0.9251	0.9072	0.8760	0.8823	0.9080	0.8994	0.9022	0.9186	0.9221
2000	0.8852	0.8983	0.8840	0.9232	0.8857	0.8663	0.8901	0.9135	0.9055	0.9093	0.9261	0.9167
2500	0.8348	0.8961	0.8905	0.9222	0.8762	0.8956	0.9163	0.9056	0.9165	0.9190	0.9215	0.9113
3000	0.8461	0.8723	0.8774	0.9149	0.8687	0.8895	0.9099	0.9168	0.9108	0.9146	0.9174	0.9060
4000	0.8261	0.8237	0.8614	0.8619	0.8572	0.8797	0.9004	0.9074	0.9010	0.9059	0.9092	0.8972
6000	0.8443	0.8489	0.8370	0.8452	0.8408	0.8791	0.8879	0.8947	0.8881	0.8929	0.8987	0.8853
10000	0.8395	0.7751	0.7466	0.8757	0.8721	0.8776	0.8869	0.8792	0.8724	0.8778	0.8851	0.8704

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00254	0.00123	0.00145	0.00321	0.00682	0.02672	0.143798	0.819966	3.545758	9.301853	12.30304	157.5602
50	0.00175	0.00104	0.0006	0.0046	0.00807	0.03754	0.319085	0.427005	0.515191	1.200673	2.046817	17.83914
100	0.00471	0.00204	0.00066	0.00405	0.01465	0.02933	0.143493	0.208557	0.304961	0.418542	1.032161	4.538234
500	0.00489	0.00538	0.0013	0.0034	0.01076	0.02914	0.054813	0.162552	0.468902	1.271228	4.570831	20.83375
1000	0.00586	0.00571	0.00286	0.0057	0.01293	0.04041	0.095189	0.310858	1.142637	3.200556	12.06595	58.01502
1500	0.00963	0.00927	0.00359	0.00523	0.01837	0.06487	0.153144	0.538124	2.006066	5.427793	20.25386	99.30094
2000	0.00478	0.00691	0.00429	0.01132	0.01084	0.08841	0.220157	0.776487	2.891516	7.879857	29.77712	141.4052
2500	0.0028	0.00798	0.00568	0.00887	0.01197	0.12353	0.308661	0.986845	3.923289	10.64964	38.80504	184.8395
3000	0.00233	0.00767	0.0077	0.01037	0.01435	0.15013	0.374808	1.271633	4.812181	13.17947	48.26992	230.5351
4000	0.00281	0.00757	0.00944	0.00814	0.01923	0.20419	0.513177	1.752069	6.693351	18.47512	67.87155	326.4013
6000	0.00998	0.01688	0.01064	0.01224	0.02919	0.32882	0.80434	2.75869	10.69888	29.68929	110.6069	532.9985
10000	0.02785	0.01779	0.00949	0.02366	0.05655	0.59858	1.474312	4.915419	19.40362	54.34951	203.1261	987.038

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0032	0.0045	0.0087	0.0289	0.0647	0.2158	0.4901	1.5568	7.4428	20.8340	20.8340	74.1818
50	0.0009	0.0025	0.0032	0.0178	0.0274	0.1341	0.5086	0.7013	1.3718	2.2380	3.9175	20.8340
100	0.0010	0.0025	0.0025	0.0087	0.0189	0.0886	0.2528	0.3622	0.7013	0.9001	1.5568	5.3668
500	0.0005	0.0010	0.0009	0.0034	0.0087	0.0395	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
1000	0.0005	0.0009	0.0010	0.0034	0.0064	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
1500	0.0005	0.0010	0.0010	0.0025	0.0064	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
2000	0.0004	0.0009	0.0010	0.0034	0.0048	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
2500	0.0004	0.0009	0.0010	0.0025	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
3000	0.0004	0.0009	0.0011	0.0025	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
4000	0.0004	0.0009	0.0011	0.0025	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
6000	0.0004	0.0010	0.0010	0.0025	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668
10000	0.0005	0.0010	0.0010	0.0025	0.0045	0.0289	0.0647	0.1433	0.3622	0.7013	1.5568	5.3668

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3.76	3.62	3.28	4.78	4.91	7.29	9.29	6.03	2.77	2.74	8.59	9.61
50	2.9	2.15	2.55	3.01	3.96	4.02	3.31	4.27	3.64	5.35	9.23	10.53
100	2.36	2.13	1.8	3.6	5.81	3.52	3.26	4.53	4.92	8.36	16	19.06
500	2.97	2.9	2.34	4.58	4.06	3.57	6.46	8.34	11.14	23.82	38.05	67.69
1000	1.89	2.5	2.34	4.93	5.18	5.68	8.66	14.66	26.98	63.28	199.01	291.58
1500	2.01	2.54	2.29	5.51	6.14	8.92	13.69	24.96	37.23	142.94	294.86	355.75
2000	1.63	2.27	2.37	7.72	4.62	11.35	19.67	29.63	59.97	198.61	323.98	315.06
2500	1.11	2.51	2.98	8.38	8.82	17.81	26.18	31.96	90.43	251.92	290.36	283.93
3000	1.72	2.24	3.03	9.2	10.02	20.34	28.29	34.81	108.89	273.38	266.3	261.86
4000	1.72	1.85	3.37	5.46	12.34	24.21	31.48	40.91	141.12	236.14	231.25	230.1
6000	2.02	2.87	3.98	7.09	16.98	29.82	35.32	64.11	176.8	191.27	191.36	191.31
10000	2.76	2.59	2.79	14.03	28.37	35.61	50.36	98.29	134.73	147.59	148.33	150.61

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	21.49	22.67	18.69	26.35	27.04	39.83	49.94	31.14	13.54	12.89	34.78	33.88
50	16.48	13.37	14.39	16.1	20.94	18.86	13.22	13.64	8.54	10.49	14.47	13.36
100	12.92	11.83	9.98	18.01	27.89	13.34	9.16	9.68	6.42	7.67	8.99	7.7
500	12.8	12.82	10.14	12.69	7.98	3.62	5.29	3.53	2.2	2.64	2.92	2.59
1000	7.09	8.86	6.69	7.43	6.01	2.91	3.12	3.26	3.08	4.1	5.13	5.82
1500	6.56	6.26	4.78	6.38	4.62	2.99	3.22	4.67	4.54	4.73	5.41	6.53
2000	5.09	5.07	3.8	6.33	3.53	2.61	3.61	5.03	4.89	5.14	6.22	5.89
2500	3.01	4.96	4.14	6.01	3.37	3.98	5.22	4.52	5.66	5.96	5.68	5.4
3000	4.21	3.83	2.99	5.31	3.04	3.64	4.79	5.26	5.21	5.52	5.3	5.06
4000	3.47	2.21	2.4	2.58	2.62	3.15	4.2	4.63	4.63	4.94	4.75	4.57
6000	3.32	2.42	2.12	2.12	2.16	3.13	3.5	3.87	3.91	4.2	4.1	3.93
10000	2.62	1.26	1.05	3.11	3.19	3.06	3.44	3.07	3.17	3.44	3.35	3.24

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20.1	20.1	20.2	20.4	21	21.8	22.4	22.3	23
50	20.1	20.2	20.2	20.6	20.7	22.6	25	29	34.7	37.9	42.2	45.7
100	20.2	20.4	20.7	21.6	22.2	26.8	31.6	37.4	48	56.8	68.2	76.2
500	21.3	23.3	24.6	32.6	38.9	58.3	64	83	112.7	135.8	155.7	201.5
1000	23.6	26.8	30.9	44.9	51.2	80.9	92.6	109.6	141.4	182.1	291.4	383
1500	26	31.3	36.9	52.9	62.9	95.4	110.1	118.4	142.2	263.1	427.2	564.4
2000	26.8	33.3	42.4	58.9	67.6	111.9	123	129.7	183	344.2	562.9	745.9
2500	28.1	34.7	44.4	64.5	90.3	112.6	122	143.2	223.7	425.2	698.6	927.4
3000	30.1	38.1	52.9	71.3	100	125.1	133.3	144.1	264.5	506.2	834.3	1108.9
4000	34.1	47.8	62.3	85.4	117.9	146.1	151.9	169.3	346	668.3	1105.8	1471.8
6000	37.4	56.6	72.7	106.8	151.3	173.9	180.3	244	508.9	992.5	1648.7	2197.7
10000	52	78.5	95.7	126.1	177.7	208.4	237.9	393.4	834.9	1640.8	2734.4	3649.5

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.0
50	50.0	50.1	50.3	50.3	50.4	50.8	50.5	50.9	52.3	52.6	52.8	51.7
100	50.0	50.2	50.7	50.7	50.4	52.2	52.2	53.3	56.8	60.0	60.7	60.2
500	50.1	50.3	51.7	54.3	54.9	67.1	69.1	74.5	85.0	80.6	75.8	74.3
1000	50.1	50.7	52.3	57.2	59.0	77.9	79.8	75.9	76.5	72.3	66.6	62.5
1500	50.2	50.8	53.6	62.0	62.1	77.4	79.2	69.4	69.7	69.8	65.7	61.4
2000	50.4	51.4	54.8	58.3	71.4	80.3	76.9	68.0	68.4	68.2	63.9	62.4
2500	50.8	51.5	54.3	62.7	73.7	72.2	69.4	70.0	65.8	65.8	65.0	63.4
3000	50.8	52.1	55.1	64.4	75.6	73.8	71.2	67.2	67.2	66.9	66.0	64.3
4000	51.1	54.0	56.6	77.3	78.8	76.4	73.9	69.5	69.4	69.0	67.9	65.9
6000	50.7	52.9	59.0	83.4	84.6	76.6	77.6	72.8	72.3	71.9	70.3	67.9
10000	50.7	56.9	69.9	73.5	74.7	77.0	77.9	76.9	76.0	75.5	73.5	70.7

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<745	0<914	0<1059	0<1281	0<1306	0<1306	0<1192	0<1192	0<1306	1<1306	1<1306	8<1306
50	0<666	0<816	0<982	0<1100	0<1096	0<1192	0<1104	0<1085	0<1306	1<1306	2<1306	13<1306
100	0<641	0<778	0<968	0<1002	0<943	0<1104	0<1104	0<1085	1<1306	1<1306	3<1306	10<1306
500	0<551	0<643	0<759	0<856	0<901	0<1085	1<1108	2<1132	9<1251	36<1263	156<1263	773<1245
1000	0<537	0<612	0<766	0<836	0<901	1<1108	4<1128	17<1150	74<1163	318<1163	2488>1150	809>1128
1500	0<495	0<632	0<758	0<801	1<885	5<1074	12<1092	59<1108	209<1112	1393>1108	6916>1092	545>1066
2000	0<514	0<640	0<752	1<816	1<996	10<1049	30<1063	116<1074	548<1077	3058>1070	2055>1052	665>1023
2500	0<604	0<661	0<747	1<786	2<979	24<1033	60<1042	186<1052	1193>1049	5493>1042	5949>1024	3336>993
3000	0<561	1<676	1<757	1<782	3<968	39<1017	90<1026	281<1032	1942>1029	7888>1020	20079>999	4708>968
4000	0<548	1<672	2<749	2<931	7<950	77<993	166<999	543<1002	3990>996	11286>984	28807>963	8956>931
6000	1<515	4<675	3<726	5<910	20<926	195<958	380<960	1677>960	9392>950	18661>938	48142>912	2261>881
10000	6<500	11<711	8<865	25<881	85<895	576<914	1316>914	5871>910	17641>895	35270>881	91196>856	2499>823

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<745	0<914	0<1059	0<1281	0<1306	0<1306	0<1192	0<1192	2<1306	3<1306	4<1306	28<1306
50	0<666	0<816	0<982	0<1100	0<1096	0<1192	1<1104	1<1085	1<1306	2<1306	3<1306	17<1306
100	0<641	0<778	0<968	0<1002	0<943	0<1104	1<1104	1<1085	1<1306	1<1306	2<1306	4<1306
500	0<551	0<643	0<759	0<856	0<901	0<1085	1<1108	1<1132	2<1251	4<1263	13<1263	32<1245
1000	0<537	0<612	0<766	0<836	0<901	1<1108	1<1128	4<1150	9<1163	22<1163	75<1150	241<1128
1500	0<495	0<632	0<758	0<801	1<885	2<1074	3<1092	11<1108	27<1112	53<1108	160<1092	543<1066
2000	0<514	0<640	0<752	1<816	1<996	2<1049	6<1063	21<1074	49<1077	95<1070	303<1052	800<1023
2500	0<604	1<661	1<747	1<786	1<979	6<1033	12<1042	28<1052	83<1049	164<1042	409<1023	1080>993
3000	0<561	1<676	1<757	1<782	1<968	7<1017	16<1026	45<1032	106<1029	209<1020	523<999	1386>968
4000	0<548	1<672	1<749	1<931	2<950	11<993	24<999	66<1002	157<996	309<984	775<963	2052>931
6000	2<515	3<675	2<726	2<910	3<926	22<958	41<960	114<960	272<950	536<938	1348>912	3560>881
10000	6<500	5<711	3<865	6<881	10<895	54<914	101<914	226<910	542<895	1073>881	2690>856	7109>823

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00307	0.00204	0.00152	0.00104	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00385	0.00256	0.00177	0.00141	0.00142	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00415	0.00282	0.00182	0.00170	0.00192	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00562	0.00412	0.00296	0.00233	0.00210	0.00145	0.00139	0.00133	0.00109	0.00107	0.00107	0.00110
1000	0.00591	0.00455	0.00291	0.00244	0.00210	0.00139	0.00134	0.00129	0.00126	0.00126	0.00129	0.00134
1500	0.00696	0.00427	0.00297	0.00266	0.00218	0.00148	0.00143	0.00139	0.00138	0.00139	0.00143	0.00150
2000	0.00645	0.00416	0.00302	0.00256	0.00172	0.00155	0.00151	0.00148	0.00147	0.00149	0.00154	0.00163
2500	0.00468	0.00390	0.00306	0.00276	0.00178	0.00160	0.00157	0.00154	0.00155	0.00157	0.00163	0.00173
3000	0.00542	0.00373	0.00298	0.00279	0.00182	0.00165	0.00162	0.00160	0.00161	0.00164	0.00171	0.00182
4000	0.00567	0.00378	0.00304	0.00197	0.00189	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184	0.00197
6000	0.00644	0.00374	0.00324	0.00206	0.00199	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205	0.00220
10000	0.00682	0.00337	0.00228	0.00220	0.00213	0.00204	0.00204	0.00206	0.00213	0.00220	0.00233	0.00252

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00307	0.00204	0.00152	0.00104	0.00100	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00385	0.00256	0.00177	0.00141	0.00142	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00415	0.00282	0.00182	0.00170	0.00192	0.00140	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00562	0.00412	0.00296	0.00233	0.00210	0.00145	0.00139	0.00133	0.00109	0.00107	0.00107	0.00110
1000	0.00591	0.00455	0.00291	0.00244	0.00210	0.00139	0.00134	0.00129	0.00126	0.00126	0.00129	0.00134
1500	0.00696	0.00427	0.00297	0.00266	0.00218	0.00148	0.00143	0.00139	0.00138	0.00139	0.00143	0.00150
2000	0.00645	0.00416	0.00302	0.00256	0.00172	0.00155	0.00151	0.00148	0.00147	0.00149	0.00154	0.00163
2500	0.00468	0.00390	0.00306	0.00276	0.00178	0.00160	0.00157	0.00154	0.00155	0.00157	0.00163	0.00173
3000	0.00542	0.00373	0.00298	0.00279	0.00182	0.00165	0.00162	0.00160	0.00161	0.00164	0.00171	0.00182
4000	0.00567	0.00378	0.00304	0.00197	0.00189	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184	0.00197
6000	0.00644	0.00374	0.00324	0.00206	0.00199	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205	0.00220
10000	0.00682	0.00337	0.00228	0.00220	0.00213	0.00204	0.00204	0.00206	0.00213	0.00220	0.00233	0.00252

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0004	0.0018	0.0039	0.0182	0.0465	0.2865	0.9263	4.7658	32.9934	91.5393	89.4242	489.9169
50	0.0019	0.0122	0.0155	0.1224	0.2639	2.2071	11.0177	23.301	60.3087	129.8344	214.8309	994.9552
100	0.0054	0.0272	0.0404	0.2064	0.4689	4.3023	16.9625	32.2227	72.3203	115.3217	232.4568	810.9413
500	0.0201	0.1163	0.1636	0.7848	2.3678	14.5898	26.4215	66.2438	171.2206	299.3823	654.4985	2617.994
1000	0.0567	0.2418	0.3792	1.5515	3.7346	21.2	43.6488	94.2357	224.2456	418.879	1308.997	5235.988
1500	0.0955	0.392	0.5887	1.9984	5.135	26.2239	54.1353	103.5047	225.802	628.3185	1963.495	7853.982
2000	0.1105	0.4695	0.7784	2.4221	5.6634	31.9807	61.9079	115.372	301.0693	837.758	2617.994	10471.98
2500	0.1324	0.5175	0.849	2.7064	4.4497	32.2268	61.2915	129.6302	376.3366	1047.198	3272.492	13089.97
3000	0.1009	0.6377	1.1238	3.1218	5.0686	36.5662	68.0652	130.5138	451.6039	1256.637	3926.991	15707.96
4000	0.1407	0.9804	1.4473	3.9755	6.1974	43.8939	79.2502	157.0796	602.1386	1675.516	5235.988	20943.95
6000	0.2829	1.2737	1.8312	5.2791	8.3161	53.5388	96.3066	235.6194	903.2079	2513.274	7853.982	31415.93
10000	0.5112	2.0352	2.6317	6.4549	9.9896	65.5411	130.8997	392.6991	1505.347	4188.79	13089.97	52359.88

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0006	0.0014	0.006	0.015	0.1113	0.3403	1.4211	12.6906	35.3455	36.6519	196.3495
50	0.0006	0.0039	0.0053	0.0445	0.0962	0.8688	4.6237	11.2459	34.5059	88.0088	166.3726	866.0819
100	0.0019	0.0091	0.013	0.0778	0.1648	1.8507	8.8522	19.8114	59.3648	120.6879	319.363	1331.984
500	0.0079	0.0462	0.064	0.4156	1.5045	14.4591	30.3295	115.7536	481.8348	1137.566	3430.992	14722.9
1000	0.0237	0.1074	0.1888	1.1761	3.3423	32.9471	82.9578	234.5229	883.9356	2078.041	5783.484	20960.68
1500	0.0438	0.2162	0.3697	1.8102	6.383	51.8364	130.8295	302.7101	1148.714	3115.272	9205.015	32752.66
2000	0.0524	0.2794	0.5848	2.7008	6.7332	78.3721	172.9256	404.8531	1539.88	4147.918	11985.31	50614.83
2500	0.0661	0.3341	0.7024	3.2542	8.2547	79.6548	173.2285	572.5033	1797.504	4880.141	16856.62	71453.69
3000	0.056	0.4599	1.1309	4.3164	10.7019	104.08	230.7233	632.0429	2392.988	6450.908	22360.78	95476.15
4000	0.0871	0.8697	1.778	6.4704	16.1657	157.261	356.577	993.0707	3762.026	10149.98	35171.34	149751
6000	0.206	1.4232	2.7465	11.9858	29.6496	254.654	647.5477	1831.159	6939.986	18890.78	65180.19	277002.8
10000	0.5269	3.5421	5.4715	16.2031	40.7475	470.793	1199.809	3856.926	14717.75	40336.71	139018.8	591983

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: H-BD0.8P10

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=0.8; Maximum permissible specific bearing load plim=10 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10 | 8	13 | 12	17 | 15	30 | 25	37 | 30	70 | 60	105 | 100	200 | 180	350 | 300	500 | 400	700 | 500	1000 | 500
50	7 | 6	9 | 8	12 | 10	20 | 20	28 | 25	60 | 50	105 | 100	150 | 120	170 | 150	220 | 180	350 | 300	500 | 400
100	7 | 6	9 | 8	9 | 8	17 | 15	24 | 20	50 | 40	80 | 70	90 | 80	125 | 100	140 | 115	200 | 180	300 | 250
500	5 | 4	8 | 7	6 | 5	12 | 10	17 | 15	35 | 30	38 | 40	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
1000	5 | 4	7 | 6	7 | 6	12 | 10	18 | 15	28 | 25	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
1500	5 | 4	7 | 6	7 | 6	10 | 8	15 | 12	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
2000	4 | 4	6 | 5	7 | 6	12 | 10	14 | 12	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
2500	4 | 4	6 | 5	8 | 7	12 | 10	13 | 12	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
3000	4 | 4	6 | 5	8 | 7	12 | 10	12 | 10	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
4000	4 | 4	6 | 5	8 | 7	9 | 8	12 | 10	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
6000	4 | 4	7 | 6	7 | 6	8 | 7	12 | 10	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200
10000	5 | 4	7 | 6	8 | 7	9 | 8	12 | 10	25 | 20	37 | 30	50 | 40	80 | 70	115 | 100	160 | 150	250 | 200

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	100	150	100	68	68	68	68	68	68	68	46	32
50	100	150	100	68	68	68	68	68	100	100	68	68
100	68	100	100	68	68	68	100	150	150	220	150	150
500	46	68	100	100	100	150	220	320	460	320	220	220
1000	46	68	68	100	68	150	220	150	100	100	68	46
1500	32	46	68	100	100	150	150	68	68	46	46	32
2000	32	46	68	68	100	100	100	46	46	32	32	32
2500	32	32	46	68	100	68	46	32	32	32	32	32
3000	32	32	46	68	100	68	46	32	32	32	32	32
4000	22	32	46	100	100	46	32	32	32	32	32	32
6000	22	22	46	100	100	46	32	32	32	32	32	32
10000	10	15	22	22	22	22	32	32	32	32	32	32

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1	0	1	1	1	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	1	1	0	0	0	0	0	0	0	1
500	0	0	1	1	0	0	0	1	2	2	4	4
1000	0	0	1	0	0	1	1	2	3	4	4	5
1500	0	0	1	1	1	1	2	3	4	4	5	5
2000	0	1	1	1	1	2	3	4	4	4	5	5
2500	1	1	1	1	1	3	3	4	4	5	5	5
3000	1	1	0	1	1	3	4	4	4	5	5	5
4000	1	1	0	1	2	3	4	4	5	5	5	5
6000	1	1	1	2	2	4	4	4	5	5	5	5
10000	1	1	2	2	3	4	4	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2	2	2	3	2	3	3	2	0	0	1	3
50	1	1	1	2	2	1	0	0	0	0	0	0
100	1	1	1	2	2	1	0	0	0	0	0	0
500	1	1	1	1	1	0	0	0	0	0	0	0
1000	1	1	1	1	1	0	0	0	0	0	0	0
1500	1	1	1	1	1	1	0	1	0	0	0	0
2000	1	1	1	1	1	1	0	1	0	0	0	0
2500	1	1	1	1	1	1	1	1	0	0	0	0
3000	1	1	1	1	1	1	1	1	0	0	0	0
4000	1	1	0	1	1	1	1	1	0	0	0	0
6000	1	1	1	1	1	1	1	0	0	0	0	1
10000	1	2	3	1	1	1	0	0	0	0	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.02	0.04	0.05	0.1	0.18	0.26	0.37	0.52
50	0.02	0.02	0.03	0.05	0.07	0.16	0.27	0.39	0.45	0.58	0.92	1.31
100	0.04	0.05	0.05	0.09	0.13	0.26	0.42	0.47	0.65	0.73	1.05	1.57
500	0.13	0.21	0.16	0.31	0.45	0.92	0.99	1.31	2.09	3.01	4.19	6.54
1000	0.26	0.37	0.37	0.63	0.94	1.47	1.94	2.62	4.19	6.02	8.38	13.09
1500	0.39	0.55	0.55	0.79	1.18	1.96	2.91	3.93	6.28	9.03	12.57	19.63
2000	0.42	0.63	0.73	1.26	1.47	2.62	3.87	5.24	8.38	12.04	16.76	26.18
2500	0.52	0.79	1.05	1.57	1.7	3.27	4.84	6.54	10.47	15.05	20.94	32.72
3000	0.63	0.94	1.26	1.88	1.88	3.93	5.81	7.85	12.57	18.06	25.13	39.27
4000	0.84	1.26	1.68	1.88	2.51	5.24	7.75	10.47	16.76	24.09	33.51	52.36
6000	1.26	2.2	2.2	2.51	3.77	7.85	11.62	15.71	25.13	36.13	50.27	78.54
10000	2.62	3.67	4.19	4.71	6.28	13.09	19.37	26.18	41.89	60.21	83.78	130.9

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.12	0.32	0.39	0.67	0.9	1.19	0.95	0.56	0.48	0.5	0.57	1
50	0.24	0.69	0.83	1.25	1.43	1.67	0.95	1.11	1.96	2.53	1.9	2.5
100	0.24	0.69	1.39	1.96	2.08	2.5	1.79	2.78	4	6.21	5.56	6.67
500	0.5	0.89	3.33	4.17	3.92	4.76	6.58	10	8.93	8.7	8.33	10
1000	0.5	1.19	2.38	4.17	3.7	7.14	9.01	10	8.93	8.7	8.33	10
1500	0.5	1.19	2.38	6.25	5.56	10	9.01	10	8.93	8.7	8.33	10
2000	0.62	1.67	2.38	4.17	5.95	10	9.01	10	8.93	8.7	8.33	10
2500	0.62	1.67	1.79	4.17	6.41	10	9.01	10	8.93	8.7	8.33	10
3000	0.62	1.67	1.79	4.17	8.33	10	9.01	10	8.93	8.7	8.33	10
4000	0.62	1.67	1.79	6.94	8.33	10	9.01	10	8.93	8.7	8.33	10
6000	0.62	1.19	2.38	8.93	8.33	10	9.01	10	8.93	8.7	8.33	10
10000	0.5	1.19	1.79	6.94	8.33	10	9.01	10	8.93	8.7	8.33	10

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2.6<3	3.1>3	2.7<3	2.7<3.2	2.8<3.3	4.5>4.1	7.6>4.9	20.7>6.3	41.2>7.6	52.3>8.1	45.7>8.3	25>8.6
50	3.5>3	3.4>3	3.3>3	3.4>3	4.1>3.1	8>3.9	19.9>4.9	20>5.8	19.9>6.1	17.7>6.5	24.4>7.6	20.4>8.3
100	3.9>3	3.8>3	2.7<3	2.9<3	3.5>3	6.6>3.7	15.7>4.4	14.2>4.6	12.2>5.3	9>5.6	9.4>6.4	7.7>7.5
500	3=3	5>3	1.9<3	3=3	4.1>3	5.9>3.3	5>3.4	3.5<3.8	4.2<4.9	3.7<6.1	3.3<7.3	0<8.8
1000	4.6>3	4>3	2.6<3	3.1>3	3.5>3	3.1<3.3	2.6<3.8	2.2<4.5	2.1<5.7	2<6.9	0<8.5	0<10.1
1500	4>3	3.6>3	2.6<3	1.6<3	1.9<3.1	1.9<3.5	1.9<4.3	1.5<4.9	1.5<6.3	0<7.8	0<9.3	0<10.7
2000	3.8>3	2.7<3	2.6<3	2.4<3.1	2.1<3.2	1.5<3.8	1.5<4.5	1.3<5.2	1.1<6.9	0<8.3	0<9.7	0<11.4
2500	4.2>3	2.4<3	3.9>3	2.3<3.3	1.9<3.4	1.2<4.1	1.2<4.7	1<5.5	0<7.4	0<8.6	0<10.1	0<12.2
3000	4.4>3	2.5<3	3.9>3.1	2.2<3.4	1.4<3.4	1.1<4.2	1.1<4.9	0.9<5.8	0<7.6	0<8.9	0<10.5	0<13.1
4000	3.9>3	2.5<3.1	3.7>3.3	1.4<3.4	1.2<3.8	1<4.4	0.9<5.2	0.7<6.4	0<8	0<9.5	0<11.5	0<15.1
6000	4.1>3.1	2.8<3.6	1.9<3.6	1<3.8	1<4.1	0.8<4.7	0.7<5.8	0.4<6.9	0<8.9	0<11	0<14	0<19
10000	3.7<3.8	2.4<4.1	2.9<4.2	0.7<4.2	0.6<4.5	0.5<5.4	0.4<6.6	0<8	0<11.1	0<14.6	0<19.1	0<26.9

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.7<3	0.7<3	0.7<3	0.7<3.2	0.8<3.3	1.2<4.1	2<4.9	5.6<6.3	11.7>7.6	15.6>8.1	15.8>8.3	4.4<8.6
50	0.9<3	0.8<3	0.9<3	0.9<3	1.1<3.1	2.3<3.9	6.1>4.9	7.1>5.8	9>6.1	9>6.5	13.5>7.6	15.1>8.3
100	1<3	1<3	0.7<3	0.8<3	1.1<3	2.1<3.7	6.6>4.4	6.6>4.6	7.8>5.3	7.6>5.6	9.6>6.4	11.9>7.5
500	1<3	1.5<3	0.6<3	1.2<3	1.8<3	4.8>3.3	5.4>3.4	5.4>3.8	11>4.9	14.1>6.1	18.1>7.3	22.8>8.8
1000	1.7<3	1.8<3	1.2<3	2<3	2.6<3	4.2>3.3	5.2>3.8	5.5>4.5	8.4>5.7	12.3>6.9	14.7>8.5	14.8>10.1
1500	1.6<3	2<3	1.7<3	1.4<3	2.6<3.1	3.4<3.5	5.4>4.3	4.6<4.9	8.4>6.3	10.6>7.8	15.7>9.3	15.2>10.7
2000	1.6<3	1.6<3	2<3	2.3<3.1	2.8<3.2	3.3<3.8	5.3>4.5	4.6<5.2	8.5>6.9	10.2>8.3	15.2>9.7	18>11.4
2500	2.2<3	1.5<3	2.7<3	2.7<3.3	2.9<3.4	3<4.1	4.2<4.7	4.3<5.5	8>7.4	11.6>8.6	17.3>10.1	20.6>12.2
3000	2.4<3	1.8<3	3.1=3.1	3<3.4	2.3<3.4	3.3<4.2	4.7<4.9	4.8<5.8	8.8>7.6	12.9>8.9	19.2>10.5	23.2>13.1
4000	2.3<3	2.1<3.1	3.7>3.3	2.3<3.4	2.6<3.8	3.4<4.4	4.6<5.2	5.7<6.4	10.4>8	15.1>9.5	22.4>11.5	27.7>15.1
6000	2.8<3.1	3.4<3.6	3.3<3.6	2.1<3.8	3.2<4.1	4.1<4.7	5.7<5.8	7.1>6.9	12.8>8.9	18.7>11	27.7>14	34.8>19
10000	3.1<3.8	4<4.1	4.1<4.2	1.9<4.2	2.2<4.5	3.9<5.4	7.4>6.6	9.1>8	16.6>11.1	24.3>14.6	36.3>19.1	45.6>26.9

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.4	9.3	13.9	28.5	35.8	65.5	101.7	197.8	326.0	410.8	553.5	819.5
50	3.7	5.5	8.5	19.9	25.8	55.5	103.7	140.5	168.2	211.9	302.7	410.8
100	3.4	5.1	7.0	16.3	22.4	49.0	78.1	88.8	120.5	138.0	191.2	259.5
500	2.3	3.5	4.7	11.0	16.7	32.7	37.5	42.9	53.3	73.4	101.7	138.0
1000	1.9	2.9	4.9	10.5	17.5	26.0	29.7	41.2	62.0	78.1	111.5	161.8
1500	1.9	3.0	4.5	9.8	14.3	22.7	28.6	45.2	61.4	82.7	104.2	154.2
2000	1.7	2.7	4.4	10.7	13.3	22.8	28.8	43.9	59.6	82.0	103.3	140.1
2500	1.6	2.9	4.7	10.5	12.4	24.0	32.4	44.5	60.4	76.1	95.9	130.1
3000	1.5	2.8	4.6	10.4	11.7	22.6	30.5	41.9	56.8	71.6	90.2	122.4
4000	1.6	2.6	4.6	8.4	10.6	22.0	30.2	38.0	51.6	65.0	82.0	111.2
6000	1.4	2.7	4.4	7.3	9.3	19.2	26.4	33.2	45.1	56.8	71.6	97.2
10000	1.6	2.8	4.7	8.9	11.2	19.2	22.2	28.0	38.0	47.9	60.4	82.0

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
50	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
100	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
1000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
1500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
2000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
2500	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
3000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
4000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
6000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0
10000	1.1	2.5	3.5	7.9	11.2	25.0	35.4	50.0	79.1	111.8	158.1	250.0

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8470	0.7922	0.8232	0.8549	0.8534	0.8710	0.8793	0.8277	0.7646	0.7908	0.8694	0.9500
50	0.7543	0.7381	0.7051	0.8048	0.8194	0.7771	0.7289	0.8160	0.7659	0.8394	0.8605	0.9185
100	0.7499	0.7300	0.7181	0.8238	0.8630	0.8142	0.7203	0.7827	0.8043	0.8718	0.9061	0.9489
500	0.7937	0.7050	0.8071	0.8008	0.7933	0.7720	0.8172	0.8980	0.9073	0.9405	0.9619	0.9999
1000	0.7037	0.7564	0.7727	0.8010	0.8210	0.8486	0.8986	0.9335	0.9587	0.9717	0.9999	0.9999
1500	0.7778	0.7773	0.7726	0.8895	0.8943	0.9036	0.9288	0.9573	0.9734	0.9999	0.9999	0.9999
2000	0.7208	0.7975	0.7803	0.8524	0.8341	0.9263	0.9462	0.9659	0.9814	0.9999	0.9999	0.9999
2500	0.5772	0.8118	0.6971	0.8627	0.8392	0.9431	0.9584	0.9733	0.9995	0.9999	0.9999	0.9999
3000	0.5947	0.7983	0.7019	0.8712	0.8775	0.9489	0.9624	0.9771	0.9999	0.9999	0.9999	0.9999
4000	0.6523	0.8012	0.7144	0.8499	0.8964	0.9571	0.9708	0.9831	0.9999	0.9999	0.9999	0.9999
6000	0.6980	0.8039	0.8479	0.8883	0.9182	0.9653	0.9793	0.9915	0.9999	0.9999	0.9999	0.9999
10000	0.7917	0.8122	0.6915	0.9353	0.9531	0.9796	0.9885	0.9999	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9586	0.9513	0.9542	0.9602	0.9595	0.9647	0.9681	0.9535	0.9332	0.9374	0.9548	0.9912
50	0.9363	0.9379	0.9217	0.9505	0.9518	0.9354	0.9172	0.9344	0.8937	0.9181	0.9231	0.9397
100	0.9329	0.9297	0.9265	0.9522	0.9585	0.9397	0.8817	0.8984	0.8749	0.8917	0.9036	0.9204
500	0.9334	0.9101	0.9374	0.9209	0.9071	0.8127	0.8031	0.8447	0.7539	0.7754	0.7882	0.8299
1000	0.8922	0.8934	0.8900	0.8729	0.8681	0.7924	0.7994	0.8353	0.8357	0.8302	0.8540	0.9084
1500	0.9134	0.8759	0.8543	0.9004	0.8602	0.8267	0.8028	0.8717	0.8492	0.8670	0.8587	0.9150
2000	0.8822	0.8818	0.8290	0.8559	0.7742	0.8371	0.8160	0.8782	0.8561	0.8795	0.8725	0.9066
2500	0.7820	0.8800	0.7863	0.8389	0.7572	0.8557	0.8572	0.8917	0.8709	0.8695	0.8621	0.8988
3000	0.7788	0.8542	0.7611	0.8235	0.8032	0.8461	0.8474	0.8816	0.8619	0.8605	0.8538	0.8914
4000	0.8012	0.8277	0.7174	0.7481	0.7802	0.8497	0.8565	0.8670	0.8478	0.8472	0.8408	0.8795
6000	0.7918	0.7557	0.7341	0.7646	0.7443	0.8265	0.8348	0.8470	0.8272	0.8282	0.8214	0.8641
10000	0.8252	0.6880	0.5565	0.8117	0.8340	0.8477	0.8052	0.8207	0.7990	0.8017	0.7940	0.8435

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00125	0.00048	0.00084	0.00218	0.00244	0.01378	0.06742	0.391848	1.26932	3.487414	11.6657	43.70357
50	0.00091	0.00048	0.00045	0.00221	0.00521	0.02466	0.163428	0.480106	0.312676	0.665936	3.003081	8.489336
100	0.0019	0.00093	0.00038	0.00252	0.00851	0.02909	0.093818	0.131992	0.202917	0.284981	0.894945	2.928022
500	0.00251	0.00304	0.00065	0.00288	0.00754	0.03027	0.041191	0.080843	0.245446	0.728287	2.050208	7.483834
1000	0.00305	0.00353	0.00171	0.00504	0.01455	0.02974	0.061888	0.153531	0.632273	1.823698	5.30943	20.30565
1500	0.00669	0.0046	0.00223	0.00487	0.01285	0.03344	0.099352	0.260967	1.051818	3.173437	8.848235	34.18799
2000	0.00309	0.00319	0.00274	0.01007	0.00873	0.04711	0.141562	0.371611	1.499668	4.600556	12.92082	48.32386
2500	0.00151	0.00371	0.00457	0.01229	0.00918	0.06269	0.195415	0.494508	2.012064	5.96426	16.74534	63.11111
3000	0.00194	0.00375	0.00519	0.0144	0.00901	0.07619	0.237801	0.601531	2.47176	7.326617	20.72542	78.55673
4000	0.00299	0.00453	0.00635	0.00532	0.01195	0.10639	0.337634	0.825485	3.422997	10.21936	29.08185	110.6979
6000	0.0051	0.00951	0.00683	0.00601	0.01774	0.16283	0.525061	1.295926	5.41229	16.36355	46.74155	180.7893
10000	0.02025	0.01196	0.00795	0.01627	0.03642	0.30646	0.916212	2.285117	9.681616	29.5623	84.99152	332.3313

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0022	0.0064	0.0103	0.0395	0.0577	0.2682	0.6628	2.2473	7.8350	14.8857	34.7234	49.5203
50	0.0012	0.0020	0.0050	0.0159	0.0370	0.1927	0.6628	1.1283	1.5953	2.4692	7.8350	14.8857
100	0.0012	0.0020	0.0020	0.0103	0.0189	0.1295	0.3561	0.4562	0.7861	1.0104	2.2473	4.6626
500	0.0006	0.0016	0.0009	0.0050	0.0103	0.0547	0.0789	0.1295	0.3561	0.7244	1.5028	3.1135
1000	0.0006	0.0012	0.0012	0.0050	0.0108	0.0370	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
1500	0.0006	0.0012	0.0012	0.0022	0.0073	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
2000	0.0005	0.0009	0.0012	0.0050	0.0069	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
2500	0.0005	0.0009	0.0016	0.0050	0.0064	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
3000	0.0005	0.0009	0.0016	0.0050	0.0050	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
4000	0.0005	0.0009	0.0016	0.0020	0.0050	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
6000	0.0005	0.0012	0.0012	0.0016	0.0050	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135
10000	0.0006	0.0012	0.0016	0.0020	0.0050	0.0196	0.0577	0.1295	0.3561	0.7244	1.5028	3.1135

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	4.45	3.21	3.87	4.95	4.79	5.91	6.87	4.09	2.55	2.79	5.07	14.17
50	2.41	2.3	1.82	3.73	3.79	2.66	2.36	3.37	2.64	4.22	5.33	9.58
100	2.36	2.21	2.08	3.89	5.36	3.32	2.07	2.93	3.07	5.78	8.58	17.91
500	2.85	1.92	3.25	3.11	3.11	2.66	4.23	7.3	8.57	14.93	30.18	135.91
1000	1.74	2.44	2.67	3.11	3.63	4.9	7.4	12.59	26.27	40.28	119.45	484.84
1500	2.57	2.74	2.67	6.76	7.05	7.76	11.63	24.21	42.15	76.01	196.68	465.58
2000	2.38	3.04	2.79	4.83	4.16	11.03	16.43	32.98	50.37	120.74	265.55	404.97
2500	1.18	3.38	1.85	5.34	4.62	15.21	25.37	41.21	68.65	150.84	280.6	362.95
3000	1.28	3.06	1.89	5.81	6.18	17.57	29.37	45.12	83.96	173.97	255.15	332.88
4000	1.73	3.12	2.01	4.94	7.37	23.98	38.62	51.08	111.42	207.41	220.39	289.06
6000	2.14	3.26	4.73	7.05	9.74	32.43	47.4	59.41	148.55	176.8	178.52	239.21
10000	2.81	3.47	1.79	13.65	20.78	47.54	56.61	93.5	130.66	134.73	137.75	185.41

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	25.4	20.17	22.12	27.29	26.41	32.32	37.17	21.67	12.92	13.57	20.88	50.87
50	13.69	14.32	10.36	20.18	20.23	13.29	10.26	12.82	7.45	9.63	10.76	14.17
100	12.85	12.32	11.64	20.5	25.66	14.17	6.63	7.86	5.87	6.99	8.36	10.11
500	12.58	8.86	13.78	10.21	8.58	3.48	3.83	4.36	2.45	2.75	3.18	3.8
1000	6.92	7.29	7.07	5.91	5.63	3.13	3.01	3.98	4.29	4.07	5.35	8.24
1500	8.82	6.2	5.02	7.48	5.07	3.69	3.08	5.68	4.85	5.74	5.59	9.05
2000	7.3	6.43	3.97	5	2.69	4.05	3.41	6.06	5.19	6.47	6.37	8.04
2500	3.23	6.32	2.95	4.25	2.63	4.85	4.97	6.89	5.98	5.88	5.78	7.35
3000	3.17	4.91	2.55	3.71	3.16	4.41	4.52	6.26	5.49	5.39	5.34	6.87
4000	3.63	3.85	2.04	2.42	2.71	4.57	4.93	5.42	4.79	4.75	4.74	6.14
6000	3.42	2.43	2.17	2.6	2.22	3.68	4.01	4.45	3.98	3.99	4	5.27
10000	3.64	1.73	0.92	3.56	4.07	4.48	3.13	3.5	3.21	3.25	3.29	4.31

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_TepI) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20.1	20.2	20.3	20.6	21.3	21.9	22.1	22.7
50	20.1	20.2	20.2	20.4	20.7	21.8	23.7	25.8	31.8	35.4	36.9	42.8
100	20.2	20.4	20.6	20.9	22.3	24.4	29.7	34	41.2	51.6	54.9	67.9
500	20.9	22.8	25.1	29.9	33	51.2	62	74.2	101.1	115.5	140.8	237.1
1000	22.6	29.7	32.4	40.6	44	72.9	88.7	96.5	125	152.1	223.2	454.2
1500	23.5	33	39	52.4	63.7	83.9	105.1	108.8	147.4	189.9	324.8	671.3
2000	25.6	34.6	44.9	53.5	72.4	92.9	117	126.8	166.2	246.6	426.4	888.4
2500	28.1	36.1	41.6	60.5	77.8	97.7	123.9	137.7	191.7	303.2	528	1105.5
3000	30	39.7	45.8	66.9	82.1	109	139.8	152.5	226	359.8	629.6	1322.6
4000	31.7	46.3	53.4	84.8	95.9	128.7	160.7	177.5	294.7	473.1	832.9	1756.8
6000	38.1	61	78	98.6	121	168.7	204	219	432	699.7	1239.3	2625.3
10000	41.5	79.5	83.8	120	140.6	213.1	271	351.7	706.6	1152.8	2052.1	4362.1

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TepIX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.2	50.3	50.2	50.1	50.2	50.2	50.1	50.1
50	50.0	50.2	50.4	50.5	50.5	51.1	50.8	50.7	52.9	53.0	52.0	52.2
100	50.0	50.2	50.8	50.8	50.7	51.8	52.7	54.0	57.6	60.8	58.7	59.0
500	50.1	50.5	52.3	54.6	55.1	63.8	69.5	74.6	86.3	81.9	77.8	77.6
1000	50.2	51.0	52.9	57.5	56.8	73.3	79.5	76.2	73.0	73.3	68.9	65.6
1500	50.2	51.2	54.1	59.3	61.4	77.5	78.9	70.5	71.1	68.3	68.4	64.6
2000	50.4	52.0	55.1	58.6	71.7	75.6	76.6	69.5	70.2	66.8	66.8	65.9
2500	51.1	52.0	55.1	59.8	74.7	72.6	70.2	67.6	68.3	68.0	68.0	67.1
3000	51.1	52.6	55.9	61.0	76.1	74.1	71.6	69.1	69.4	69.2	69.0	68.2
4000	50.9	53.4	57.6	78.2	79.9	73.5	70.3	71.2	71.3	70.9	70.6	69.8
6000	51.0	53.7	59.6	83.7	86.0	77.5	73.6	74.3	74.3	73.6	73.1	72.1
10000	50.6	55.6	68.0	69.9	71.5	73.8	78.4	78.9	78.7	77.6	77.0	75.3

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<710	0<867	0<979	0<1178	0<1281	0<1306	0<1192	0<1192	0<1306	0<1306	1<1306	3<1306
50	0<651	0<767	0<958	0<996	0<1029	0<1192	0<1104	0<1085	0<1306	0<1306	2<1306	6<1306
100	0<618	0<736	0<891	0<935	0<897	0<1096	0<1104	0<1085	0<1306	0<1306	1<1306	6<1306
500	0<539	0<633	0<717	0<828	0<854	0<1077	0<1085	1<1108	3<1234	12<1251	49<1263	424<1263
1000	0<527	0<602	0<729	0<812	0<881	1<1085	2<1108	5<1128	34<1154	110<1163	627<1163	1417<1150
1500	0<486	0<611	0<722	0<772	1<836	2<1046	6<1074	22<1092	111<1108	414<1112	1979>1108	3395>1092
2000	0<502	0<615	0<717	1<793	1<979	4<1026	15<1049	50<1063	219<1077	1060<1077	4181>1070	6055>1052
2500	0<585	0<634	0<730	1<786	1<963	8<1011	35<1033	93<1042	439<1052	1896>1049	6292>1042	8949>1023
3000	0<561	0<647	0<727	2<782	1<945	13<996	55<1017	141<1026	727<1032	2932>1029	7888>1020	10079>999
4000	0<548	1<643	1<721	1<908	2<931	31<976	122<993	265<999	1549>1002	5460>996	11286>984	8807>963
6000	1<503	3<651	2<696	2<881	7<910	86<947	304<958	624<960	3943>960	9392>950	18661>938	8142>912
10000	5<492	9<685	7<857	16<865	37<881	311<908	881<914	2282>914	8296>908	17641>895	35270>881	1196>856

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<710	0<867	0<979	0<1178	0<1281	0<1306	0<1192	0<1192	1<1306	2<1306	4<1306	12<1306
50	0<651	0<767	0<958	0<996	0<1029	0<1192	1<1104	1<1085	1<1306	1<1306	4<1306	9<1306
100	0<618	0<736	0<891	0<935	0<897	0<1096	0<1104	0<1085	1<1306	1<1306	1<1306	3<1306
500	0<539	0<633	0<717	0<828	0<854	0<1077	0<1085	0<1108	1<1234	2<1251	5<1263	13<1263
1000	0<527	0<602	0<729	0<812	1<881	1<1085	1<1108	2<1128	6<1154	12<1163	31<1163	96<1150
1500	0<486	0<611	0<722	0<772	0<836	1<1046	2<1074	5<1092	14<1108	34<1112	67<1108	214<1092
2000	0<502	0<615	0<717	1<793	0<979	1<1026	3<1049	10<1063	24<1077	64<1077	126<1070	314<1052
2500	0<585	0<634	0<730	1<786	1<963	3<1011	7<1033	16<1042	42<1052	87<1049	170<1042	423<1023
3000	0<561	1<647	1<727	1<782	1<945	3<996	9<1017	21<1026	53<1032	110<1029	216<1020	542<999
4000	1<548	1<643	1<721	1<908	1<931	6<976	17<993	30<999	78<1002	161<996	317<984	800<963
6000	1<503	2<651	1<696	1<881	2<910	10<947	28<958	52<960	133<960	277<950	547<938	1387>912
10000	6<492	5<685	3<857	4<865	8<881	32<908	56<914	103<914	266<908	555<895	1100>881	2766>856

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00338	0.00227	0.00178	0.00123	0.00104	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00290	0.00186	0.00172	0.00161	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00447	0.00315	0.00215	0.00195	0.00212	0.00142	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00587	0.00426	0.00332	0.00249	0.00234	0.00147	0.00145	0.00139	0.00112	0.00109	0.00107	0.00107
1000	0.00615	0.00471	0.00321	0.00259	0.00220	0.00145	0.00139	0.00134	0.00128	0.00126	0.00126	0.00129
1500	0.00721	0.00457	0.00327	0.00286	0.00244	0.00156	0.00148	0.00143	0.00139	0.00138	0.00139	0.00143
2000	0.00676	0.00451	0.00332	0.00271	0.00178	0.00162	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154
2500	0.00499	0.00424	0.00320	0.00276	0.00184	0.00167	0.00160	0.00157	0.00154	0.00155	0.00157	0.00163
3000	0.00542	0.00407	0.00323	0.00279	0.00191	0.00172	0.00165	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00567	0.00413	0.00328	0.00207	0.00197	0.00179	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00674	0.00402	0.00352	0.00220	0.00206	0.00190	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205
10000	0.00705	0.00364	0.00232	0.00228	0.00220	0.00207	0.00204	0.00204	0.00207	0.00213	0.00220	0.00233

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00338	0.00227	0.00178	0.00123	0.00104	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00290	0.00186	0.00172	0.00161	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00447	0.00315	0.00215	0.00195	0.00212	0.00142	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00587	0.00426	0.00332	0.00249	0.00234	0.00147	0.00145	0.00139	0.00112	0.00109	0.00107	0.00107
1000	0.00615	0.00471	0.00321	0.00259	0.00220	0.00145	0.00139	0.00134	0.00128	0.00126	0.00126	0.00129
1500	0.00721	0.00457	0.00327	0.00286	0.00244	0.00156	0.00148	0.00143	0.00139	0.00138	0.00139	0.00143
2000	0.00676	0.00451	0.00332	0.00271	0.00178	0.00162	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154
2500	0.00499	0.00424	0.00320	0.00276	0.00184	0.00167	0.00160	0.00157	0.00154	0.00155	0.00157	0.00163
3000	0.00542	0.00407	0.00323	0.00279	0.00191	0.00172	0.00165	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00567	0.00413	0.00328	0.00207	0.00197	0.00179	0.00173	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00674	0.00402	0.00352	0.00220	0.00206	0.00190	0.00186	0.00185	0.00185	0.00189	0.00194	0.00205
10000	0.00705	0.00364	0.00232	0.00228	0.00220	0.00207	0.00204	0.00204	0.00207	0.00213	0.00220	0.00233

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0014	0.0026	0.0143	0.0305	0.2447	0.7946	4.0461	20.0577	54.5442	110.2164	221.2738
50	0.0017	0.008	0.0162	0.0746	0.1987	2.0128	8.6753	21.0419	47.2773	93.1103	258.4628	654.3032
100	0.0038	0.0178	0.0252	0.1443	0.3769	3.4653	14.725	27.0338	63.975	99.7942	220.0991	552.6348
500	0.0158	0.1179	0.0977	0.7535	1.9845	14.3282	22.0302	42.7511	123.6813	253.882	498.0842	1636.246
1000	0.0466	0.1947	0.2496	1.566	3.6333	15.535	31.295	60.4086	160.1343	351.0925	837.758	3272.492
1500	0.0625	0.2616	0.3815	1.3985	3.4681	17.2717	38.7436	70.1108	194.3523	451.6039	1256.637	4908.739
2000	0.0625	0.277	0.5006	2.5456	4.2059	19.706	44.1621	84.2812	222.977	602.1386	1675.516	6544.985
2500	0.0894	0.305	0.9096	3.0721	4.6922	20.9979	47.3349	92.9189	261.7994	752.6732	2094.395	8181.231
3000	0.1111	0.3738	1.0846	3.5623	4.7111	24.0394	54.5538	104.6136	314.1593	903.2079	2513.274	9817.477
4000	0.1295	0.4988	1.4071	2.8419	5.7614	29.3781	64.0581	124.3253	418.879	1204.277	3351.032	13089.97
6000	0.2006	0.8228	1.1648	3.3075	7.663	40.18	83.7737	157.0796	628.3185	1806.416	5026.548	19634.95
10000	0.383	1.1953	2.6869	4.3809	9.1542	52.1808	114.3174	261.7994	1047.198	3010.693	8377.58	32724.92

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0005	0.001	0.0057	0.0121	0.0986	0.3245	1.6222	7.7371	21.5471	49.4892	130.8997
50	0.0006	0.0027	0.0056	0.0295	0.0783	0.7838	3.6367	9.7009	25.6233	57.2871	171.3114	524.5288
100	0.0014	0.0064	0.009	0.0574	0.1615	1.4898	7.3001	15.2104	44.4016	88.7786	223.9683	760.5666
500	0.0066	0.0461	0.0424	0.3768	1.0962	12.0385	23.3442	57.9989	262.1101	679.9701	1664.899	6029.987
1000	0.0197	0.101	0.1408	1.0921	2.8567	20.136	53.3205	117.4753	423.0919	1234.091	2915.807	9181.633
1500	0.0296	0.1633	0.2618	1.297	4.2236	26.8096	83.7789	155.139	644.5222	1685.411	4717.03	14466.91
2000	0.0327	0.181	0.4022	2.5007	5.5025	35.1737	109.8909	210.6064	877.8863	2237.841	6287.463	22234.27
2500	0.0474	0.2149	0.6619	3.4739	6.6011	41.1245	114.781	252.3582	1064.769	3114.622	8729.538	31165.15
3000	0.0624	0.2841	0.884	4.5519	6.8617	53.43	149.5367	332.504	1390.971	4067.625	11397.46	41304.96
4000	0.0799	0.4398	1.3933	4.3872	10.437	72.7899	199.3263	507.4409	2116.748	6198.249	17366.33	63695.17
6000	0.148	0.9997	1.8902	5.9425	18.7665	130.756	359.7718	915.2533	3822.992	11213.88	31434.77	115845
10000	0.3256	1.9072	4.1481	9.4019	22.6974	212.667	761.1369	1926.982	8117.164	23836	66964.84	244652.3

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C

Tables of calculation results for monitored parameters (calculation and calculation parameters are based on ISO 7902).

ID: H-BD1.2P10

Description: All tables are based on the speed ▼n [/min] and the load ►F [N] for the bearing. (The design notes are at the end)

Input parameters (changing): Level of manufacturing precision=High (Q=2); Bearing width ratio B/D=1.2; Maximum permissible specific bearing load plim=10 MPa

Common tables for convection cooling and oil pressure cooling

Table1 Bearing dimensions: Diameter D [mm] | Width B [mm] (TEST_Dim)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	10 | 12	13 | 20	17 | 25	30 | 40	37 | 50	70 | 100	105 | 150	200 | 250	350 | 500	400 | 500	700 | 500	1000 | 500
50	7 | 10	9 | 12	12 | 15	20 | 25	28 | 40	55 | 70	95 | 115	125 | 150	170 | 250	200 | 250	300 | 400	400 | 500
100	8 | 10	9 | 12	9 | 12	17 | 25	24 | 30	45 | 60	80 | 100	90 | 115	110 | 150	135 | 180	170 | 250	250 | 300
500	5 | 6	8 | 10	6 | 8	12 | 15	17 | 25	30 | 40	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
1000	5 | 6	7 | 10	7 | 10	12 | 15	16 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
1500	5 | 6	7 | 10	7 | 10	9 | 12	15 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
2000	4 | 5	6 | 8	7 | 10	10 | 12	14 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
2500	3 | 4	6 | 8	7 | 10	10 | 12	13 | 20	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
3000	3 | 4	5 | 6	8 | 10	10 | 12	12 | 15	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
4000	4 | 5	6 | 8	7 | 10	9 | 12	12 | 15	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
6000	4 | 5	7 | 10	7 | 10	8 | 10	12 | 15	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300
10000	5 | 6	7 | 10	7 | 10	8 | 10	12 | 15	25 | 30	35 | 50	50 | 60	80 | 100	110 | 150	160 | 200	250 | 300

Table2 Lubricant viscosity grade VG (TEST_VisIndex)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	68	100	68	46	46	46	46	46	46	46	32	22
50	68	100	68	46	46	46	68	68	68	100	68	46
100	46	68	68	46	46	68	68	100	150	150	150	150
500	32	46	68	68	68	150	220	220	320	220	220	150
1000	32	46	46	68	68	150	150	100	100	68	46	32
1500	32	32	46	100	68	100	100	46	46	46	32	22
2000	32	32	46	68	68	100	68	46	32	32	32	22
2500	32	32	32	68	68	46	32	32	32	22	22	22
3000	32	32	32	68	68	46	32	32	32	22	22	22
4000	22	32	46	68	68	46	32	32	32	22	22	22
6000	15	15	32	68	68	32	32	32	32	22	22	22
10000	10	15	22	22	22	22	22	22	22	22	22	22

Number of warnings (A ... Convection cooling, B ... Oil pressure cooling)

A. Number of warnings (TEST_Warnings) Note: 0-Valid bearing; 1-2 Easily optimized; 3-5 Not recommendet

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0	0	0	0	0	0	0	0	1	0	0	1
50	1	1	1	0	0	0	1	0	1	0	0	0
100	1	1	1	0	0	1	1	1	1	0	0	1
500	0	1	1	0	1	1	0	0	1	1	3	4
1000	1	1	1	0	0	0	0	2	3	3	4	5
1500	1	1	1	1	0	1	2	3	4	4	5	5
2000	1	1	1	1	1	2	2	3	4	4	5	5
2500	1	1	1	1	0	2	3	3	4	5	5	5
3000	1	1	1	1	1	2	3	4	4	5	5	5
4000	1	1	1	1	1	3	3	4	5	5	5	5
6000	1	1	1	2	2	3	3	4	5	5	5	5
10000	1	1	3	2	2	4	5	5	5	5	5	5

B. Number of warnings (TEST_WarningsX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	2	2	2	2	2	2	3	2	0	1	2	3
50	1	1	1	2	2	1	0	0	0	0	0	1
100	1	1	1	2	2	1	0	0	0	0	0	0
500	1	1	1	1	1	0	0	0	1	1	1	0
1000	1	1	1	1	0	0	1	0	0	0	0	0
1500	1	1	1	1	0	0	1	0	0	0	0	0
2000	1	1	0	1	1	0	0	0	0	0	0	0
2500	1	1	1	1	1	0	0	0	0	0	0	0
3000	1	1	1	1	1	0	0	0	0	0	0	0
4000	0	1	1	2	2	0	0	0	0	0	0	1
6000	1	1	1	2	1	0	1	0	0	0	0	1
10000	1	1	2	1	1	0	1	0	0	0	1	1

Common tables for convection cooling and oil pressure cooling

Table3 Speed v [m/s] (TEST_SpeedV) v < 0.5 | 0.5 < v < 10 | 10 < v < 50 | 50 < v

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.01	0.01	0.01	0.02	0.02	0.04	0.05	0.1	0.18	0.21	0.37	0.52
50	0.02	0.02	0.03	0.05	0.07	0.14	0.25	0.33	0.45	0.52	0.79	1.05
100	0.04	0.05	0.05	0.09	0.13	0.24	0.42	0.47	0.58	0.71	0.89	1.31
500	0.13	0.21	0.16	0.31	0.45	0.79	0.92	1.31	2.09	2.88	4.19	6.54
1000	0.26	0.37	0.37	0.63	0.84	1.31	1.83	2.62	4.19	5.76	8.38	13.09
1500	0.39	0.55	0.55	0.71	1.18	1.96	2.75	3.93	6.28	8.64	12.57	19.63
2000	0.42	0.63	0.73	1.05	1.47	2.62	3.67	5.24	8.38	11.52	16.76	26.18
2500	0.39	0.79	0.92	1.31	1.7	3.27	4.58	6.54	10.47	14.4	20.94	32.72
3000	0.47	0.79	1.26	1.57	1.88	3.93	5.5	7.85	12.57	17.28	25.13	39.27
4000	0.84	1.26	1.47	1.88	2.51	5.24	7.33	10.47	16.76	23.04	33.51	52.36
6000	1.26	2.2	2.2	2.51	3.77	7.85	11	15.71	25.13	34.56	50.27	78.54
10000	2.62	3.67	3.67	4.19	6.28	13.09	18.33	26.18	41.89	57.6	83.78	130.9

Table4 Pressure p [Mpa] |(TEST_PressP)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.08	0.19	0.24	0.42	0.54	0.71	0.63	0.4	0.29	0.5	0.57	1
50	0.14	0.46	0.56	1	0.89	1.3	0.92	1.07	1.18	2	1.67	2.5
100	0.12	0.46	0.93	1.18	1.39	1.85	1.25	1.93	3.03	4.12	4.71	6.67
500	0.33	0.62	2.08	2.78	2.35	4.17	5.71	6.67	6.25	6.06	6.25	6.67
1000	0.33	0.71	1.43	2.78	3.12	6.67	5.71	6.67	6.25	6.06	6.25	6.67
1500	0.33	0.71	1.43	4.63	3.33	6.67	5.71	6.67	6.25	6.06	6.25	6.67
2000	0.5	1.04	1.43	4.17	3.57	6.67	5.71	6.67	6.25	6.06	6.25	6.67
2500	0.83	1.04	1.43	4.17	3.85	6.67	5.71	6.67	6.25	6.06	6.25	6.67
3000	0.83	1.67	1.25	4.17	5.56	6.67	5.71	6.67	6.25	6.06	6.25	6.67
4000	0.5	1.04	1.43	4.63	5.56	6.67	5.71	6.67	6.25	6.06	6.25	6.67
6000	0.5	0.71	1.43	6.25	5.56	6.67	5.71	6.67	6.25	6.06	6.25	6.67
10000	0.33	0.71	1.43	6.25	5.56	6.67	5.71	6.67	6.25	6.06	6.25	6.67

Minimum lubricant film tickness (A ... Convection cooling, B ... Oil pressure cooling)

A. Minimum lubricant film tickness hmin | hlim [µm] (TEST_Hmin) Calculated hmin is lower than recommendet hlim from ISO 7902-3

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	3.1>3	4.4>3	3.8>3	3.4>3.2	3.7>3.3	5.9>4.1	8.7>4.9	22.3>6.3	61.2>7.6	40.3>8	32.1>8.3	20.1>8.6
50	5>3	4.3>3	4.2>3	3.2>3	5.4>3.1	8.5>3.8	22.5>4.7	23.9>5.3	33.4>6.1	28.5>6.3	32.1>7.2	18.7>8
100	6.6>3	4.9>3	3.5>3	4.1>3	4.2>3	10.3>3.5	20.6>4.4	19.8>4.6	20.7>5	15>5.5	12.3>6.1	7.5>6.9
500	3.9>3	6.1>3	2.8<3	4.2>3	6.8>3	7.3>3.2	7.1>3.3	5.7>3.8	6.6>4.9	6>5.9	4.5<7.3	2.4<8.8
1000	5.9>3	6.5>3	4.3>3	4.6>3	3.7>3	3.9>3.2	4.9>3.7	3.3<4.5	3.1<5.7	2.9<6.8	0.9<8.5	0<10.1
1500	7>3	6>3	4.5>3	2.6<3	3.3>3.1	3<3.5	3.5<4.2	2.2<4.9	2.2<6.3	2.2<7.6	0<9.3	0<10.7
2000	5.1>3	4.4>3	4.6>3	2.1<3	3.8>3.2	2.6<3.8	2.5<4.4	1.9<5.2	1.8<6.9	1.6<8.1	0<9.7	0<11.4
2500	3.5>3	4.6>3	3.9>3	2<3.2	3.5>3.4	1.8<4.1	1.9<4.6	1.6<5.5	1.5<7.4	0.3<8.4	0<10.1	0<12.2
3000	3.7>3	3=3	5.3>3.1	1.9<3.3	2.1<3.4	1.6<4.2	1.7<4.7	1.5<5.8	1.3<7.6	0<8.7	0<10.5	0<13.1
4000	5.1>3	4.7>3.1	4.3>3.2	2.1<3.4	1.9<3.8	1.4<4.4	1.5<5.1	1.3<6.4	0.9<8	0<9.3	0<11.5	0<15.1
6000	4.5>3.1	5>3.6	3.5<3.6	1.4<3.8	1.5<4.1	1.1<4.7	1.3<5.7	1<6.9	0<8.9	0<10.7	0<14	0<19
10000	6.5>3.8	4.9>4.1	3.3<4.1	0.8<4.2	0.9<4.5	0.9<5.4	1<6.4	0.6<8	0<11.1	0<14.1	0<19.1	0<26.9

B. Minimum lubricant film tickness hmin | hlim [µm] (TEST_HminX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.7<3	0.9<3	0.8<3	0.9<3.2	1<3.3	1.6<4.1	2.4<4.9	6<6.3	16.5>7.6	11.2>8	12.8>8.3	0<8.6
50	1.1<3	0.9<3	1<3	0.8<3	1.4<3.1	2.4<3.8	6.2>4.7	7>5.3	12.7>6.1	12.4>6.3	15.3>7.2	10.8>8
100	2<3	1.1<3	0.8<3	1.1<3	1.2<3	2.8<3.5	7.6>4.4	8.1>4.6	10.7>5	10.1>5.5	11.6>6.1	11.1>6.9
500	1.2<3	2<3	0.8<3	1.4<3	2.6<3	5.7>3.2	6.4>3.3	7.5>3.8	15.3>4.9	19.3>5.9	26.6>7.3	32.4>8.8
1000	2.2<3	2.7<3	1.9<3	2.5<3	3.1>3	4.6>3.2	7.9>3.7	7.6>4.5	13.4>5.7	15.1>6.8	17.6>8.5	20.7>10.1
1500	2.7<3	2.9<3	2.6<3	2.1<3	3.6>3.1	4.7>3.5	8.2>4.2	6.4>4.9	11.1>6.3	16.2>7.6	18.3>9.3	21>10.7
2000	2.1<3	2.2<3	3.2>3	2.2<3	4.4>3.2	5.6>3.8	7.6>4.4	7.6>5.2	10.8>6.9	15.6>8.1	21.5>9.7	25.2>11.4
2500	1.4<3	2.8<3	2.9<3	2.6<3.2	4.4>3.4	4.3>4.1	6>4.6	7.1>5.5	12.3>7.4	14.6>8.4	20.1>10.1	28.9>12.2
3000	1.6<3	1.7<3	4.1>3.1	2.9<3.3	3.1<3.4	4.7>4.2	6.8>4.7	7.9>5.8	13.7>7.6	16.2>8.7	22.3>10.5	32.1>13.1
4000	3.1>3	4>3.1	4.9>3.2	3.2<3.4	3.7<3.8	5.6>4.4	8.1>5.1	9.4>6.4	16.3>8	19.2>9.3	26.2>11.5	37.8>15.1
6000	2.9<3.1	5.4>3.6	5.1>3.6	2.7<3.8	4.4>4.1	5.9>4.7	10.2>5.7	11.9>6.9	20.6>8.9	24.7>10.7	33.2>14	47.4>19
10000	5.4>3.8	7.1>4.1	5.2>4.1	2.2<4.2	3.7<4.5	6.6>5.4	11.4>6.4	13.3>8	22.9>11.1	33.2>14.1	44.9>19.1	63.6>26.9

Common tables for convection cooling and oil pressure cooling

Table5 Proposal of D [mm] is based on flow (TEST_DPropA) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	6.5	9.5	14.2	29.0	36.4	66.2	100.6	187.8	304.6	383.8	527.5	779.4
50	3.8	5.6	8.6	19.9	25.7	54.0	90.6	122.7	166.6	185.1	264.4	383.8
100	3.5	5.2	7.1	16.3	22.1	42.8	77.3	85.9	105.2	132.6	167.0	226.7
500	2.4	3.6	4.8	11.0	16.7	28.6	32.7	41.2	50.9	70.5	88.8	132.6
1000	1.9	2.9	4.9	10.5	15.3	22.7	28.6	39.9	54.1	77.3	104.2	154.2
1500	1.7	3.0	4.5	8.5	14.2	21.9	27.7	42.2	57.3	72.2	99.3	146.7
2000	1.5	2.7	4.2	9.4	13.2	19.9	28.5	38.4	56.8	71.6	90.2	133.3
2500	1.4	2.6	4.6	9.2	12.3	22.4	30.8	38.9	52.8	72.3	91.2	123.7
3000	1.3	2.4	4.5	9.1	11.5	21.1	29.0	36.6	49.6	68.1	85.8	116.4
4000	1.4	2.3	4.0	8.3	10.5	19.2	26.4	33.2	45.1	61.9	77.9	105.8
6000	1.4	2.7	4.2	7.3	9.2	18.3	23.0	29.0	39.4	54.0	68.1	92.4
10000	1.4	2.4	4.1	7.8	9.8	16.8	21.2	26.7	36.2	45.6	57.4	77.9

Table6 Proposal of D [mm] is based on plim (TEST_DPropB) — Used for calculation

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
50	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
100	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
1000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
1500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
2000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
2500	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
3000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
4000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
6000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1
10000	0.9	2.0	2.9	6.5	9.1	20.4	28.9	40.8	64.5	91.3	129.1	204.1

Relative eccentricity (A ... Convection cooling, B ... Oil pressure cooling)

A. Relative eccentricity ε [~] (TEST_Epsilon) — Unsteady running ε<0.7 — Limit friction between roughness peaks ε>0.96

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.8186	0.7031	0.7509	0.8180	0.8060	0.8312	0.8620	0.8143	0.6501	0.7987	0.9082	0.9599
50	0.6414	0.6726	0.6265	0.8168	0.7601	0.7428	0.6617	0.7366	0.6068	0.7155	0.7857	0.9066
100	0.6171	0.6573	0.6430	0.7513	0.8346	0.6962	0.6323	0.6966	0.6233	0.7785	0.8550	0.9397
500	0.7315	0.6401	0.7173	0.7211	0.6588	0.6790	0.7236	0.8363	0.8520	0.9004	0.9480	0.9821
1000	0.6147	0.6065	0.6199	0.7056	0.7976	0.7871	0.8005	0.9003	0.9397	0.9582	0.9912	0.9999
1500	0.6143	0.6271	0.6056	0.8030	0.8182	0.8486	0.8649	0.9393	0.9606	0.9706	0.9999	0.9999
2000	0.6264	0.6754	0.6074	0.8529	0.6989	0.8731	0.9089	0.9497	0.9702	0.9805	0.9999	0.9999
2500	0.5711	0.6358	0.6635	0.8641	0.7089	0.9154	0.9334	0.9581	0.9756	0.9966	0.9999	0.9999
3000	0.5810	0.7254	0.5899	0.8740	0.8184	0.9243	0.9408	0.9621	0.9800	0.9999	0.9999	0.9999
4000	0.5491	0.6170	0.6432	0.7745	0.8425	0.9361	0.9501	0.9686	0.9865	0.9999	0.9999	0.9999
6000	0.6648	0.6421	0.7164	0.8429	0.8755	0.9527	0.9592	0.9777	0.9999	0.9999	0.9999	0.9999
10000	0.6336	0.6116	0.6069	0.9116	0.9285	0.9651	0.9711	0.9888	0.9999	0.9999	0.9999	0.9999

B. Relative eccentricity ε [~] (TEST_EpsilonX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.9557	0.9394	0.9467	0.9520	0.9497	0.9552	0.9621	0.9498	0.9055	0.9441	0.9634	0.9999
50	0.9195	0.9275	0.9100	0.9508	0.9385	0.9284	0.9063	0.9227	0.8511	0.8759	0.8980	0.9461
100	0.8857	0.9209	0.9169	0.9365	0.9525	0.9173	0.8636	0.8760	0.8050	0.8498	0.8634	0.9114
500	0.9191	0.8847	0.9234	0.9070	0.8673	0.7471	0.7522	0.7843	0.6586	0.6785	0.6898	0.7578
1000	0.8577	0.8369	0.8323	0.8421	0.8319	0.7501	0.6769	0.7719	0.7391	0.7814	0.8251	0.8714
1500	0.8477	0.8193	0.7764	0.8465	0.8009	0.7566	0.6867	0.8203	0.8008	0.7869	0.8357	0.8827
2000	0.8440	0.8342	0.7238	0.8465	0.6486	0.7250	0.7181	0.7995	0.8164	0.8067	0.8196	0.8690
2500	0.8223	0.7833	0.7493	0.8259	0.6287	0.7962	0.7865	0.8185	0.8008	0.8293	0.8403	0.8583
3000	0.8181	0.8407	0.6832	0.8070	0.7269	0.7795	0.7672	0.8047	0.7863	0.8170	0.8302	0.8498
4000	0.7247	0.6736	0.5953	0.6549	0.6906	0.7487	0.7339	0.7804	0.7608	0.7969	0.8139	0.8355
6000	0.7841	0.6179	0.5869	0.6894	0.6427	0.7507	0.6864	0.7426	0.7223	0.7616	0.7861	0.8150
10000	0.6915	0.4400	0.3785	0.7605	0.7160	0.7438	0.6805	0.7395	0.7238	0.7149	0.7447	0.7816

Common tables for convection cooling and oil pressure cooling

Table7 Lubricant flow rate Q [l/min] (TEST_Q)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00148	0.00055	0.00098	0.00239	0.0027	0.01552	0.07826	0.47151	1.460893	2.269636	15.17041	59.07466
50	0.00095	0.00055	0.00054	0.00258	0.00575	0.02246	0.120943	0.294594	0.36894	0.553613	2.040795	5.444234
100	0.00229	0.00108	0.00045	0.00273	0.00953	0.02472	0.111685	0.15353	0.157275	0.302936	0.623769	1.969936
500	0.00257	0.00325	0.00075	0.00343	0.00869	0.0218	0.033948	0.092145	0.258296	0.689248	2.059537	8.440497
1000	0.00308	0.00352	0.00179	0.0059	0.01206	0.02354	0.058082	0.17455	0.663289	1.838874	5.852306	23.83968
1500	0.00502	0.00471	0.00233	0.00416	0.01492	0.03758	0.094054	0.299691	1.177696	3.04347	9.833491	40.32234
2000	0.00266	0.00343	0.0028	0.00729	0.00924	0.0497	0.136477	0.409177	1.698587	4.443187	13.73327	56.71105
2500	0.00084	0.00339	0.00374	0.00885	0.00947	0.07106	0.195087	0.546907	2.174751	6.049027	18.63862	73.85316
3000	0.00106	0.00254	0.00547	0.01034	0.01001	0.08568	0.234906	0.663422	2.656315	7.406592	23.02076	91.82763
4000	0.00256	0.00405	0.00445	0.00564	0.01304	0.11368	0.313337	0.901824	3.632049	10.2562	32.18056	129.0793
6000	0.00572	0.0092	0.00671	0.00648	0.01898	0.18152	0.469425	1.387309	5.617251	16.02245	51.20223	209.6317
10000	0.01531	0.00902	0.00471	0.01269	0.03781	0.32631	0.850822	2.538437	10.49842	28.23567	91.47274	379.6037

Table8 Mass of the bearing m [kg] (TEST_Mass)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0033	0.0107	0.0171	0.0631	0.0962	0.4470	0.9942	3.1212	13.0583	14.9079	34.7234	49.5203
50	0.0020	0.0030	0.0075	0.0199	0.0592	0.2482	0.6913	1.1791	2.6588	3.1212	7.4601	14.9079
100	0.0022	0.0030	0.0030	0.0171	0.0283	0.1757	0.5086	0.6558	1.0404	1.5259	2.6588	4.6703
500	0.0009	0.0022	0.0014	0.0075	0.0171	0.0631	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
1000	0.0009	0.0020	0.0020	0.0075	0.0129	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
1500	0.0009	0.0020	0.0020	0.0030	0.0122	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
2000	0.0006	0.0014	0.0020	0.0033	0.0115	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
2500	0.0004	0.0014	0.0020	0.0033	0.0107	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
3000	0.0004	0.0009	0.0022	0.0033	0.0075	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
4000	0.0006	0.0014	0.0020	0.0030	0.0075	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
6000	0.0006	0.0020	0.0020	0.0022	0.0075	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703
10000	0.0009	0.0020	0.0020	0.0022	0.0075	0.0294	0.0912	0.1942	0.5086	1.0404	2.0037	4.6703

Sommerfeld number (A ... Convection cooling, B ... Oil pressure cooling)

A. Sommerfeld number So (TEST_So) — Unsteady running So<1 — Limit friction between roughness peaks So>15

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	4.66	3.09	3.65	4.94	4.59	5.64	7.26	4.63	2.35	4.18	7.61	21.82
50	2.27	2.45	1.9	4.72	3.73	3.2	2.16	2.97	2	2.8	4.05	10.06
100	1.82	2.29	2.15	3.65	5.42	2.7	1.95	2.62	2.01	3.89	6.94	16.57
500	2.91	2.02	2.95	2.87	2.5	2.51	3.18	5.35	6.26	9.82	19.95	54.55
1000	1.72	1.94	2.06	2.69	4.16	3.81	4.58	9.33	16.8	28.9	64.59	236.49
1500	1.72	2.13	1.94	4.47	4.95	5.94	7.44	16.44	31.05	43.07	118.6	320.09
2000	1.9	2.48	1.95	6.16	2.88	7.37	10.84	20.75	41.94	53.99	154.36	279.25
2500	1.57	2.09	2.49	6.8	3.16	11.06	15.63	28.09	48.15	71.14	187.75	250.28
3000	1.64	2.83	1.6	7.43	4.78	12.72	17.73	32.35	52.84	84.04	197.93	229.54
4000	1.36	1.92	2.28	3.82	5.78	15.54	21.92	39.79	59.66	105.87	170.97	199.32
6000	2.25	2.27	3.09	5.8	7.71	22.95	30.28	50.01	79.86	126.11	138.49	164.94
10000	1.88	1.99	1.95	10.68	13.88	35.72	43.98	61.6	94.6	96.22	106.86	127.85

B. Sommerfeld number So (TEST_SoX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	25.7	17.64	20.14	23.01	21.37	26.15	33.42	21.04	10.45	18.3	29.07	71.18
50	12.47	13.9	10.46	21.73	17.04	13.93	9.9	12.37	6.71	7.73	9.54	19.07
100	8.43	12.46	11.74	16.57	23.03	11.81	6.94	7.81	4.58	6.34	7.44	10.47
500	11.68	8.35	12.97	10.11	7.7	3.36	3.6	3.75	2.19	2.55	2.51	3.28
1000	6.43	5.9	5.69	5.76	5.3	3.16	2.63	3.51	3.11	4.02	5.02	7.27
1500	5.89	5.17	4.03	6.16	4.41	3.26	2.73	4.72	4.23	4.13	5.46	8.03
2000	5.85	5.57	3.19	5.83	2.34	2.82	3.11	4.1	4.71	4.63	4.82	7.11
2500	5.09	4	3.55	4.92	2.29	4.02	4.23	4.65	4.24	5.43	5.67	6.47
3000	4.94	5.55	2.44	4.29	2.95	3.66	3.85	4.22	3.9	4.96	5.23	6
4000	2.92	2.46	1.85	2.27	2.52	3.14	3.33	3.68	3.43	4.37	4.62	5.32
6000	3.85	2.05	1.79	2.51	2.04	3.17	2.73	3.06	2.88	3.65	3.89	4.54
10000	2.44	1.08	0.87	3.43	2.81	3.07	2.67	3.01	2.9	2.97	3.18	3.7

Temperature comparison (A ... Convection cooling, B ... Oil pressure cooling)

A: Calculated bearing temperature TB,1 [°C] (TEST_Tepl) — Temperature that exceeds 90°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	20	20	20	20	20	20.1	20.2	20.4	20.8	21.1	21.6	22.2
50	20.1	20.1	20.2	20.3	20.5	21.4	23	24.5	28.3	32.4	34.3	36.9
100	20.1	20.3	20.4	20.7	21.7	24.2	27.3	31.1	38.6	45	53.9	65.9
500	20.7	22.1	24	28	30.5	51.7	58.2	69.1	94.9	104.5	134.5	179.6
1000	22	27.5	29.9	37.4	48.3	67.1	79.3	90.3	120.6	135.4	184.8	339.2
1500	23.5	30.4	35.7	48.3	57.5	78.8	94.6	103	144.4	171.8	267.2	498.9
2000	25.6	32.2	41.2	55.9	65.4	93	103.7	123.5	167.3	193.3	349.6	658.5
2500	24.9	35.8	43.3	63.3	70.4	94.5	110.7	139.2	191.8	225.5	432	818.1
3000	26.2	35.5	42	70.2	74.9	106.1	124.4	158.1	213.2	266.6	514.4	977.7
4000	31.3	45.9	60.2	77.5	88.7	127.1	151.2	192.3	250.4	348.8	679.1	1296.9
6000	35	55.3	71.7	91.2	113.4	160.5	204.7	249.7	351	513.2	1008.7	1935.4
10000	41.7	77.5	95.8	109.8	140.8	228.6	292.5	332.9	571.6	841.9	1667.9	3212.4

B: Calculated lubricant temperature at bearing exit Tex,1 [°C] (TEST_TeplX) — Temperature that exceeds 100°C

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	50.0	50.0	50.0	50.1	50.2	50.2	50.2	50.1	50.2	50.2	50.1	50.1
50	50.0	50.2	50.3	50.4	50.5	51.1	51.0	51.0	52.4	53.6	52.6	52.2
100	50.0	50.2	50.7	50.8	50.6	52.1	52.1	53.4	58.9	59.7	60.8	60.6
500	50.1	50.5	52.0	53.7	54.5	65.8	71.8	71.8	84.1	80.7	80.2	74.8
1000	50.2	51.1	52.9	56.1	57.4	75.1	79.0	73.0	74.7	70.5	66.9	63.9
1500	50.2	51.2	54.0	60.6	59.6	74.4	77.9	68.2	68.9	70.1	65.9	63.0
2000	50.5	51.8	55.2	59.2	70.0	77.9	74.8	70.3	67.5	68.3	67.3	64.1
2500	51.2	52.6	54.6	60.4	73.2	70.4	69.0	68.4	68.9	66.4	65.5	65.0
3000	51.2	53.0	55.3	61.6	72.8	72.1	70.5	69.8	70.3	67.4	66.4	65.8
4000	51.2	54.5	59.2	75.3	76.4	75.3	73.4	72.2	72.6	69.2	67.9	67.1
6000	50.8	53.7	59.6	79.6	82.1	75.0	78.0	76.1	76.5	72.3	70.4	69.0
10000	50.9	58.6	76.4	72.1	73.8	75.8	78.6	76.4	76.3	76.7	74.3	72.3

Reynolds Number (A ... Convection cooling, B ... Oil pressure cooling)

A. Reynolds Number Re [~] (TEST_Reynold) — The Re marks, that the laminar flow is disrupted

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<710	0<867	0<979	0<1178	0<1281	0<1306	0<1192	0<1192	0<1306	0<1306	2<1306	5<1306
50	0<651	0<767	0<958	0<996	0<1029	0<1192	0<1104	0<1085	0<1306	0<1306	1<1306	4<1306
100	0<630	0<736	0<891	0<935	0<897	0<1066	0<1104	0<1085	0<1306	0<1306	1<1306	4<1306
500	0<539	0<633	0<717	0<828	0<854	0<1063	0<1077	1<1108	3<1234	10<1251	44<1263	264<1263
1000	0<527	0<602	0<729	0<812	0<859	1<1074	2<1104	6<1128	31<1154	104<1163	463<1163	3449>1150
1500	0<486	0<611	0<722	0<758	1<836	2<1046	6<1070	23<1092	117<1108	312<1112	1647>1108	8665>1092
2000	0<502	0<615	0<717	0<766	1<979	4<1026	14<1049	47<1063	261<1077	643<1077	3385>1070	2469>1052
2500	0<561	0<634	0<714	1<760	1<963	9<1011	30<1029	95<1042	439<1052	1231>1049	5827>1042	3497>1023
3000	0<540	0<629	1<727	1<757	1<945	15<996	47<1014	151<1026	659<1032	1965>1029	8158>1020	0768>999
4000	0<548	1<643	1<704	1<908	3<931	30<976	97<990	306<999	1217>1002	3923>996	11674>984	9796>963
6000	1<503	3<651	3<696	2<881	8<910	91<947	274<958	773<960	3170>960	8841>953	19301>938	9795>912
10000	5<492	9<685	7<848	11<857	37<881	347<908	953>914	2280>914	8581>908	16616>897	36480>881	4326>856

B. Reynolds Number Re [~] (TEST_ReynoldX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0<710	0<867	0<979	0<1178	0<1281	0<1306	0<1192	0<1192	1<1306	1<1306	6<1306	17<1306
50	0<651	0<767	0<958	0<996	0<1029	0<1192	0<1104	1<1085	1<1306	1<1306	3<1306	7<1306
100	0<630	0<736	0<891	0<935	0<897	0<1066	1<1104	1<1085	0<1306	1<1306	1<1306	2<1306
500	0<539	0<633	0<717	0<828	0<854	0<1063	0<1077	1<1108	1<1234	3<1251	6<1263	17<1263
1000	0<527	0<602	0<729	0<812	0<859	0<1074	1<1104	2<1128	6<1154	15<1163	39<1163	127<1150
1500	0<486	0<611	0<722	0<758	1<836	1<1046	2<1070	7<1092	17<1108	32<1112	87<1108	285<1092
2000	0<502	0<615	0<717	0<766	1<979	2<1026	4<1049	10<1063	31<1077	60<1077	127<1070	416<1052
2500	0<561	0<634	1<714	1<760	1<963	3<1011	8<1029	17<1042	42<1052	105<1049	222<1042	558<1023
3000	0<540	0<629	1<727	1<757	1<945	4<996	11<1014	21<1026	54<1032	133<1029	282<1020	711<999
4000	1<548	1<643	1<704	1<908	1<931	6<976	16<990	31<999	79<1002	195<996	413<984	1041>963
6000	2<503	3<651	2<696	1<881	2<910	13<947	27<958	53<960	138<960	334<953	710<938	1792>912
10000	6<492	5<685	3<848	4<857	8<881	33<908	67<914	133<914	344<908	670<897	1420>881	3568>856

Effective relative bearing clearance (A ... Convection cooling, B ... Oil pressure cooling)

A. Effective relative bearing clearance ψeff [~] — ψeff<0.0015 | 0.0015<ψeff<0.0035 | 0.0035<ψeff<0.0055 | 0.0055<ψeff

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00338	0.00227	0.00178	0.00123	0.00104	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00290	0.00186	0.00172	0.00161	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00430	0.00315	0.00215	0.00195	0.00212	0.00150	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00587	0.00426	0.00332	0.00249	0.00234	0.00151	0.00147	0.00139	0.00112	0.00109	0.00107	0.00107
1000	0.00615	0.00471	0.00321	0.00259	0.00231	0.00148	0.00140	0.00134	0.00128	0.00126	0.00126	0.00129
1500	0.00721	0.00457	0.00327	0.00297	0.00244	0.00156	0.00149	0.00143	0.00139	0.00138	0.00139	0.00143
2000	0.00676	0.00451	0.00332	0.00291	0.00178	0.00162	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154
2500	0.00542	0.00424	0.00335	0.00295	0.00184	0.00167	0.00161	0.00157	0.00154	0.00155	0.00157	0.00163
3000	0.00585	0.00431	0.00323	0.00298	0.00191	0.00172	0.00166	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00567	0.00413	0.00344	0.00207	0.00197	0.00179	0.00174	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00674	0.00402	0.00352	0.00220	0.00206	0.00190	0.00186	0.00185	0.00185	0.00188	0.00194	0.00205
10000	0.00705	0.00364	0.00237	0.00232	0.00220	0.00207	0.00204	0.00204	0.00207	0.00212	0.00220	0.00233

B. Effective relative bearing clearance ψeff [~] (TEST_PsiX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.00338	0.00227	0.00178	0.00123	0.00104	0.00100	0.00120	0.00120	0.00100	0.00100	0.00100	0.00100
50	0.00402	0.00290	0.00186	0.00172	0.00161	0.00120	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
100	0.00430	0.00315	0.00215	0.00195	0.00212	0.00150	0.00140	0.00145	0.00100	0.00100	0.00100	0.00100
500	0.00587	0.00426	0.00332	0.00249	0.00234	0.00151	0.00147	0.00139	0.00112	0.00109	0.00107	0.00107
1000	0.00615	0.00471	0.00321	0.00259	0.00231	0.00148	0.00140	0.00134	0.00128	0.00126	0.00126	0.00129
1500	0.00721	0.00457	0.00327	0.00297	0.00244	0.00156	0.00149	0.00143	0.00139	0.00138	0.00139	0.00143
2000	0.00676	0.00451	0.00332	0.00291	0.00178	0.00162	0.00155	0.00151	0.00147	0.00147	0.00149	0.00154
2500	0.00542	0.00424	0.00335	0.00295	0.00184	0.00167	0.00161	0.00157	0.00154	0.00155	0.00157	0.00163
3000	0.00585	0.00431	0.00323	0.00298	0.00191	0.00172	0.00166	0.00162	0.00160	0.00161	0.00164	0.00171
4000	0.00567	0.00413	0.00344	0.00207	0.00197	0.00179	0.00174	0.00171	0.00170	0.00172	0.00176	0.00184
6000	0.00674	0.00402	0.00352	0.00220	0.00206	0.00190	0.00186	0.00185	0.00185	0.00188	0.00194	0.00205
10000	0.00705	0.00364	0.00237	0.00232	0.00220	0.00207	0.00204	0.00204	0.00207	0.00212	0.00220	0.00233

Heat flow rate due to frictional power (A ... Convection cooling, B ... Oil pressure cooling)

A. Heat flow rate due to frictional power Pth,f [W] (TEST_Pthf)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0003	0.0013	0.0025	0.0131	0.0283	0.2296	0.7332	3.5413	18.7478	31.2466	84.8622	184.0714
50	0.0015	0.0069	0.014	0.0628	0.1845	1.5077	7.8295	17.5179	49.5424	99.3563	236.8928	487.7753
100	0.0044	0.0157	0.0222	0.1365	0.347	3.3832	13.8798	26.8696	65.3131	108.9768	201.5013	470.6166
500	0.0144	0.1033	0.0946	0.7314	2.0437	11.8606	23.0706	48.0402	142.2388	296.0069	582.1027	1636.246
1000	0.0416	0.1969	0.2596	1.5837	2.8983	15.389	35.7413	68.7031	190.9917	404.2805	837.758	3272.492
1500	0.0732	0.2722	0.4109	1.497	3.8851	19.2082	44.978	81.1474	236.1108	531.7897	1256.637	4908.739
2000	0.0681	0.286	0.5539	1.876	4.7438	23.8569	50.5095	101.2515	279.5382	607.3252	1675.516	6544.985
2500	0.0558	0.3721	0.608	2.2627	5.3035	24.3405	54.6887	116.551	326.1495	719.9483	2094.395	8181.231
3000	0.0706	0.3224	1.0762	2.6222	4.9955	28.1292	62.9527	135.0484	366.6893	863.938	2513.274	9817.477
4000	0.1381	0.6089	1.05	3.0422	6.246	34.991	79.1492	168.5127	437.3626	1151.917	3351.032	13089.97
6000	0.1836	0.9228	1.3488	3.4814	8.4932	45.9205	111.4208	224.6502	628.3185	1727.876	5026.548	19634.95
10000	0.452	1.5024	1.9792	4.3875	10.9884	68.1552	164.3961	305.9229	1047.198	2879.793	8377.58	32724.92

B. Heat flow rate due to frictional power Pth,f [W] (TEST_PthfX)

▼n,►F	10	50	100	500	1000	5000	10000	20000	50000	100000	200000	500000
10	0.0001	0.0005	0.001	0.0059	0.0127	0.1062	0.3429	1.5945	8.3092	14.226	42.3379	130.8997
50	0.0006	0.0027	0.0053	0.0282	0.0833	0.685	3.2825	8.0112	25.578	57.1614	150.9733	347.8704
100	0.0019	0.0062	0.0087	0.0622	0.1632	1.5137	6.7648	14.8085	40.3662	84.5889	194.7939	599.03
500	0.0067	0.0467	0.0428	0.3635	1.1212	9.9668	21.4901	58.3378	258.55	618.8332	1819.551	6087.13
1000	0.0194	0.1059	0.1468	1.028	2.5478	17.2221	49.1812	116.9675	477.7052	1095.832	2854.378	9570.065
1500	0.0356	0.1642	0.269	1.2731	4.1284	26.7139	76.7081	158.1017	646.8031	1771.356	4530.959	15083.46
2000	0.0355	0.1804	0.4166	1.9278	5.3602	40.4304	98.5856	240.7623	860.7373	2359.473	6895.602	23108.38
2500	0.0283	0.253	0.4934	2.6584	6.3781	42.0785	107.2771	291.3037	1194.188	2868.814	8369.457	32069.31
3000	0.0373	0.2194	0.8377	3.4679	6.6243	54.9724	140.0493	380.3491	1563.926	3740.109	10925.1	41883.79
4000	0.0879	0.5261	1.181	4.1493	10.029	83.6319	212.9138	581.368	2390.399	5706.052	16646.32	63793.58
6000	0.1327	0.9799	1.847	5.6182	17.8588	132.406	383.3253	1055.224	4333.575	10372.31	30360.62	115691.5
10000	0.3853	2.2343	3.6209	8.1609	26.1921	245.166	710.3903	1956.066	8045.086	21984.45	64678.56	246574.6

Notes: Standard bearings with one lubrication hole is used. Lubricant feed pressure pen=0.1 MPa. Angular span of bearing segment Ω=360°. Bearing dimensions are selected from ISO 3547-1

Notes: Shaft and bearing have the same heat expansion coefficient; Outer heat transmission coeff kA=20 W/m²/K; Ambient temperature Tamb=20 °C; Lubricant temperature at bearing entrance Ten=50 °C