



# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAS00002XX**  
Revision No:  
**2**

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## This is to certify:

### That the Gears

with type designation(s)  
**Gear Series 300,**

Issued to

**Bonfiglioli Riduttori S.p.A.**  
**Forlì, FC, Italy**

is found to comply with  
**DNV standard DNV-ST-0378 – Standard for offshore and platform lifting appliances**

## Application :

**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Issued at **Høvik** on **2021-03-29**

for **DNV**

This Certificate is valid until **2026-03-28**.

DNV local station: **Italy/Malta CMC**

Approval Engineer: **Khurram Saeed Khaliq**

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**Aldo Matteucci**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



## Product description

### Production places:

1. Bonfiglioli Riduttori S.p.A.  
Via E. Mattei 12 Z.I. Villa Selva,  
47100, Forlì FC,  
ITALY
  
2. Bonfiglioli Slovakia s.r.o.  
Robotnícka 2129  
01701 Považská Bystrica  
SLOVAKIA

The gearboxes series 300 and 700 T with the following information:

Load Spectrums							
L1 - km = 0,1		L2 - km = 0,126		L3 - km = 0,253		L4 - km = 0,647	
Load [%]	Time [%]	Load [%]	Time [%]	Load [%]	Time [%]	Load [%]	Time [%]
100	3	100	5	100	15	100	59
50	35	60	45	75	48	80	41
35	62	50	34	50	37		
		40	16				

Classes of Utilisation								
Class	T1	T2	T3	T4	T5	T6	T7	T8
Hours	400	800	1 600	3 200	6 300	12 500	25 000	50 000

Other constrains		
Speed	15	[r.p.m.]
Type of Load	Monodirectional	
Type of Oil	ISO-VG 150	

Stage	Output Torque [Nm] - Load spectrum L1							
	T1 / M1	T2 / M1	T3 / M2	T4 / M3	T5 / M4	T6 / M5	T7 / M6	T8 / M7
300_SR_3_48	1 210	1 078	962	864	778	700	629	605
300_SR_4_26	1 950	1 752	1 567	1 415	1 280	1 158	1 046	982
300_SR_5_77	1 603	1 417	1 232	1 082	996	868	755	657
300_SR_7_20	1 084	944	820	758	664	578	502	436
301_SR_3_48	2 378	2 119	1 891	1 698	1 529	1 376	1 237	1 189
301_SR_4_26	2 668	2 668	2 578	2 389	2 201	2 023	1 857	1 768
301_SR_5_77	2 668	2 668	2 465	2 166	1 994	1 737	1 510	1 313
301_SR_7_20	2 170	1 890	1 640	1 517	1 327	1 155	1 004	873
303_SR_3_60	3 783	3 398	3 030	2 716	2 445	2 197	1 973	1 891

Stage	Output Torque [Nm] - Load spectrum L1							
	T1 / M1	T2 / M1	T3 / M2	T4 / M3	T5 / M4	T6 / M5	T7 / M6	T8 / M7
303_SR_4_25	4 630	4 223	3 757	3 372	3 036	2 730	2 452	2 307
303_SR_5_33	4 483	4 097	3 635	3 260	2 932	2 635	2 365	2 187
303_SR_6_20	3 939	3 560	3 183	2 882	2 616	2 372	2 085	1 816
303_SR_7_50	3 374	2 938	2 558	2 370	2 070	1 806	1 572	1 369
305_SR_3_60	7 370	6 619	5 902	5 292	4 763	4 281	3 843	3 685
305_SR_4_25	8 329	8 236	7 325	6 575	5 920	5 324	4 780	4 500
305_SR_5_33	8 329	7 986	7 080	6 350	5 714	5 134	4 607	4 260
305_SR_6_20	7 690	6 950	6 214	5 630	5 110	4 633	4 188	3 650
305_SR_7_50	6 760	5 880	5 120	4 750	4 150	3 620	3 150	2 745
306_SR_3_60	17 130	15 720	13 970	12 480	11 190	10 030	8 970	8 590
306_SR_4_25	16 560	15 110	13 420	12 010	10 783	9 680	8 670	8 150
306_SR_5_33	16 034	14 660	12 971	11 607	10 415	9 335	8 357	7 713
306_SR_6_20	13 767	12 465	11 130	10 068	9 128	8 267	7 479	6 605
306_SR_7_50	12 062	10 518	9 171	8 487	7 423	6 482	5 651	4 926
307_SR_3_43	13 160	11 800	10 590	9 553	8 654	7 830	7 075	6 805
307_SR_4_09	24 460	22 310	19 860	17 810	16 020	14 400	12 930	12 220
307_SR_5_25	22 850	20 890	18 580	16 710	15 070	13 580	12 220	11 310
307_SR_6_23	20 430	17 950	15 680	14 330	12 700	11 110	9 700	8 480
309_SR_3_43	19 600	17 570	15 760	14 220	12 880	11 650	10 530	10 120
309_SR_4_09	28 574	28 574	28 574	26 400	23 750	21 350	19 170	18 110
309_SR_5_25	28 574	28 574	27 520	24 760	22 330	20 120	18 110	16 810
309_SR_6_23	28 574	26 932	23 526	21 486	19 051	16 666	14 557	12 713
310M_SR_4_09	42 088	42 088	42 088	38 636	34 770	31 261	28 072	26 533
310M_SR_5_25	42 088	42 088	40 336	36 369	32 875	29 689	26 781	23 916
310M_SR_6_23	42 088	39 910	34 900	32 020	28 260	24 750	21 640	18 910
311M_SR_4_09	61 640	57 550	52 840	48 530	44 650	41 040	37 680	36 030
311M_SR_5_25	61 640	61 640	59 565	55 110	49 630	44 650	40 120	37 190
311M_SR_6_23	61 640	59 590	53 090	48 300	43 010	37 690	32 980	28 850

Stage	Output Torque [Nm] - Load spectrum L1							
	T1 / M1	T2 / M1	T3 / M2	T4 / M3	T5 / M4	T6 / M5	T7 / M6	T8 / M7

313M_SR_4_14	94 413	87 224	77 694	69 809	62 905	56 638	50 933	47 956
313M_SR_5_40	94 413	87 501	78 080	70 496	63 805	57 691	51 016	44 681
313M_SR_6_50	76 438	66 919	58 583	54 063	47 471	41 619	36 430	31 885
315M_SR_4_25	119 127	119 127	119 127	117 195	105 095	94 166	84 263	78 639
315M_SR_5_33	119 127	119 127	119 127	110 592	97 985	86 708	76 625	70 057
315M_SR_6_20	119 127	119 127	114 428	104 743	92 793	81 517	71 498	62 705
316M_SR_4_25	119 127	119 127	119 127	119 127	119 127	113 105	101 210	94 455
316M_SR_4_25_R	194 596	177 730	157 415	140 766	126 232	113 105	101 210	94 455
316M_SR_5_33	119 127	119 127	119 127	119 127	117 706	104 159	92 048	84 158
316M_SR_5_33_R	180 187	164 462	150 105	132 849	117 706	104 159	92 048	84 158
317M_SR_4_09	333 065	303 890	269 422	240 772	215 858	193 331	172 932	163 116
317M_SR_5_25	310 465	283 753	251 859	226 031	203 385	182 824	164 150	152 084
317M_SR_6_23	275 393	247 263	217 116	199 996	176 131	154 881	135 984	119 382
318M_SR_4_40	414 102	391 996	344 242	305 049	271 153	240 806	213 553	198 984
709_SR_4_40	46 047	42 030	37 360	33 510	30 141	27 091	24 319	22 822
709_SR_5_25	40 986	37 461	33 328	29 980	27 038	24 361	21 924	19 423
711_SR_4_09	67 158	67 158	60 126	53 588	47 917	42 802	38 183	35 965
711_SR_4_09_R	74 492	68 000	60 126	53 588	47 917	42 802	38 183	35 965
711_SR_5_25	67 158	66 833	59 367	53 321	48 016	43 195	38 814	35 981
711_SR_5_25_R	73 126	66 833	59 367	53 321	48 016	43 195	38 814	35 981
712_SR_4_40	89 544	87 134	77 403	69 382	62 369	56 022	50 256	45 979
714_SR_4_63	133 275	122 016	107 092	94 910	84 368	74 925	66 445	61 612

Stage	Output Torque [Nm] - Load spectrum L2							
	T1 / M1	T2 / M2	T3 / M3	T4 / M4	T5 / M5	T6 / M6	T7 / M7	T8 / M8
300_SR_3_48	1 057	990	889	798	719	647	605	605
300_SR_4_26	1 730	1 608	1 453	1 312	1 188	1 075	985	887
300_SR_5_77	1 368	1 194	1 063	925	899	783	681	593
300_SR_7_20	914	795	708	633	599	521	453	393
301_SR_3_48	2 079	1 946	1 746	1 569	1 414	1 272	1 189	1 189
301_SR_4_26	2 515	2 515	2 410	2 226	2 059	1 897	1 768	1 768
301_SR_5_77	2 515	2 385	2 126	1 850	1 800	1 567	1 363	1 185
301_SR_7_20	1 830	1 590	1 414	1 265	1 198	1 042	906	787
303_SR_3_60	3 327	3 115	2 795	2 509	2 258	2 029	1 891	1 891
303_SR_4_25	4 138	3 847	3 469	3 115	2 805	2 522	2 307	2 307
303_SR_5_33	4 008	3 644	3 354	3 010	2 708	2 433	2 186	2 061
303_SR_6_20	3 527	3 275	2 931	2 554	2 432	2 162	1 883	1 641
303_SR_7_50	2 849	2 481	2 211	2 006	1 870	1 630	1 419	1 236
305_SR_3_60	6 481	6 069	5 446	4 887	4 399	3 954	3 685	3 685
305_SR_4_25	7 849	7 500	6 763	6 074	5 469	4 918	4 499	4 499
305_SR_5_33	7 810	7 100	6 535	5 864	5 274	4 740	4 260	4 120
305_SR_6_20	6 885	6 394	5 780	5 130	4 750	4 307	3 780	3 297
305_SR_7_50	5 710	4 970	4 430	4 020	3 743	3 270	2 846	2 475
306_SR_3_60	15 310	14 310	12 860	11 500	10 310	9 234	8 590	8 590
306_SR_4_25	14 750	13 580	12 360	11 072	9 950	8 924	8 150	8 150
306_SR_5_33	14 280	12 851	11 950	10 693	9 600	8 606	7 715	7 620
306_SR_6_20	12 330	11 452	10 340	9 280	8 480	7 680	6 850	5 970
306_SR_7_50	10 210	8 900	7 940	7 230	6 710	5 860	5 110	4 450
307_SR_3_43	11 660	10 870	9 820	8 870	8 030	7 265	6 805	6 805
307_SR_4_09	21 840	20 370	18 320	16 450	14 800	13 300	12 220	12 220
307_SR_5_25	20 510	18 910	17 180	15 460	13 950	12 570	11 348	10 250
307_SR_6_23	17 450	15 250	13 610	11 940	11 500	10 060	8 780	7 670
Stage	Output Torque [Nm] - Load spectrum L2							
	T1 / M1	T2 / M2	T3 / M3	T4 / M4	T5 / M5	T6 / M6	T7 / M7	T8 / M8

309_SR_3_43	17 360	16 180	14 610	13 200	11 950	10 810	10 120	10 120
309_SR_4_09	28 574	28 574	27 160	24 380	21 940	19 720	18 110	18 110
309_SR_5_25	28 574	28 020	25 440	22 900	20 660	18 620	16 810	15 370
309_SR_6_23	26 180	22 870	20 410	17 910	17 240	15 080	13 170	11 510
310M_SR_4_09	42 088	42 088	39 740	35 680	32 120	28 880	26 530	26 530
310M_SR_5_25	42 088	41 430	37 360	33 480	30 470	27 520	24 770	21 680
310M_SR_6_23	38 830	33 950	30 310	26 680	25 600	22 410	19 590	17 130
311M_SR_4_09	58 093	43 000	43 000	43 000	41 930	38 540	36 030	36 030
311M_SR_5_25	58 093	58 093	55 670	50 920	45 870	41 260	37 190	35 280
311M_SR_6_23	58 093	51 680	46 170	40 740	38 980	34 160	29 880	26 140
313M_SR_4_14	85 586	79 826	71 772	64 536	58 172	52 375	47 956	47 956
313M_SR_5_40	86 365	79 815	71 340	62 485	59 189	52 826	46 267	40 521
313M_SR_6_50	65 168	57 047	50 975	45 505	43 036	37 729	33 023	28 901
315M_SR_4_25	119 127	119 127	119 127	107 941	96 834	86 762	78 639	78 639
315M_SR_5_33	119 127	119 127	114 219	100 933	89 449	79 158	70 057	70 057
315M_SR_6_20	119 127	111 613	99 829	88 795	84 250	74 008	64 907	56 921
316M_SR_4_25	119 127	119 127	119 127	119 127	116 310	104 212	94 455	94 455
316M_SR_4_25_R	173 059	157 428	144 887	129 651	116 310	104 212	94 455	94 455
316M_SR_5_33	119 127	119 127	119 127	119 127	107 452	95 091	84 158	84 158
316M_SR_5_33_R	164 003	144 311	137 206	121 247	107 452	95 091	84 158	84 158
317M_SR_4_09	295 764	271 737	247 924	221 733	198 828	178 080	163 116	163 116
317M_SR_5_25	277 720	253 472	232 449	208 701	187 849	168 870	152 084	142 071
317M_SR_6_23	241 384	211 947	189 661	169 322	160 033	140 720	123 542	108 454
318M_SR_4_40	375 865	332 158	314 759	279 122	248 200	220 411	198 984	198 984
709_SR_4_40	41 128	38 011	34 466	30 937	27 838	25 020	22 822	21 076
709_SR_5_25	36 792	33 887	30 813	27 729	25 016	22 541	20 121	17 592
711_SR_4_09	65 889	59 941	55 219	49 252	44 049	39 347	35 965	35 965
711_SR_4_09_R	65 889	59 941	55 219	49 252	44 049	39 347	35 965	35 965
<b>Stage</b>	<b>Output Torque [Nm] - Load spectrum L2</b>							
	<b>T1 / M1</b>	<b>T2 / M3</b>	<b>T3 / M4</b>	<b>T4 / M5</b>	<b>T5 / M6</b>	<b>T6 / M7</b>	<b>T7 / M8</b>	<b>T8 / M8</b>
711_SR_5_25	65 490	59 969	54 824	49 261	44 374	39 921	35 981	33 394
711_SR_5_25_R	65 490	59 969	54 824	49 261	44 374	39 921	35 981	33 394

712_SR_4_40	85 181	78 555	71 375	64 025	57 575	51 713	47 146	41 708
714_SR_4_63	116 991	103 348	97 918	86 839	77 222	68 577	61 612	61 612

Stage	Output Torque [Nm] - Load spectrum L3							
	T1 / M1	T2 / M3	T3 / M4	T4 / M5	T5 / M6	T6 / M7	T7 / M8	T8 / M8
300_SR_3_48	873	806	750	674	607	605	605	605
300_SR_4_26	1 435	1 313	1 236	1 102	1 004	939	818	752
300_SR_5_77	1 110	974	847	737	721	628	546	542
300_SR_7_20	746	648	563	507	479	417	380	380
301_SR_3_48	1 716	1 585	1 474	1 325	1 193	1 189	1 189	1 189
301_SR_4_26	2 163	2 163	2 068	1 933	1 800	1 768	1 636	1 506
301_SR_5_77	2 163	1 948	1 694	1 473	1 442	1 256	1 092	1 085
301_SR_7_20	1 491	1 296	1 127	1 013	958	834	759	759
303_SR_3_60	2 743	2 522	2 355	2 115	1 903	1 891	1 891	1 891
303_SR_4_25	3 405	3 074	2 926	2 628	2 365	2 307	2 307	2 305
303_SR_5_33	3 290	2 952	2 824	2 535	2 282	2 180	1 904	1 854
303_SR_6_20	2 930	2 654	2 340	2 040	1 990	1 737	1 530	1 530
303_SR_7_50	2 325	2 026	1 764	1 606	1 500	1 310	1 202	1 202
305_SR_3_60	5 344	4 913	4 590	4 120	3 707	3 685	3 685	3 685
305_SR_4_25	6 642	5 994	5 704	5 124	4 614	4 499	4 499	4 499
305_SR_5_33	6 410	5 752	5 503	4 939	4 443	4 259	3 805	3 708
305_SR_6_20	5 721	5 182	4 694	4 094	3 997	3 488	3 071	3 071
305_SR_7_50	4 659	4 058	3 534	3 218	3 008	2 624	2 413	2 413
306_SR_3_60	12 567	11 453	10 772	9 637	8 643	8 588	8 588	8 588
306_SR_4_25	12 110	10 860	10 383	9 304	8 360	8 150	8 150	8 150
Stage	Output Torque [Nm] - Load spectrum L3							
	T1 / M1	T2 / M3	T3 / M4	T4 / M5	T5 / M6	T6 / M7	T7 / M8	T8 / M8
306_SR_5_33	11 690	10 463	10 027	8 976	8 056	7 715	7 040	6 860
306_SR_6_20	10 227	9 250	8 490	7 415	7 230	6 320	5 570	5 570
306_SR_7_50	8 340	7 270	6 340	5 780	5 400	4 710	4 340	4 340
307_SR_3_43	9 700	9 064	8 360	7 555	6 840	6 805	6 805	6 805
307_SR_4_09	17 980	16 301	15 440	13 860	12 479	12 220	12 220	11 580

307_SR_5_25	16 910	15 210	14 520	12 690	11 800	10 830	9 470	9 200
307_SR_6_23	14 270	12 470	10 890	9 569	9 280	8 110	7 170	7 170
309_SR_3_43	14 440	13 491	12 440	11 240	10 180	10 120	10 120	10 120
309_SR_4_09	26 653	24 169	22 885	20 545	18 490	18 114	18 114	17 556
309_SR_5_25	25 044	22 540	21 534	19 038	17 488	16 250	14 207	13 799
309_SR_6_23	21 407	18 698	16 332	14 353	13 914	12 171	10 749	10 749
310M_SR_4_09	39 017	35 386	33 504	30 086	27 083	26 533	26 080	23 838
310M_SR_5_25	36 849	33 239	30 665	26 835	25 877	22 911	20 048	19 476
310M_SR_6_23	31 761	27 768	24 275	21 352	20 687	18 112	16 009	16 009
311M_SR_4_09	43 000	43 000	43 000	39 808	36 624	36 033	36 033	36 033
311M_SR_5_25	49 963	49 963	47 772	42 979	38 714	37 192	32 646	31 720
311M_SR_6_23	48 335	42 290	37 001	32 623	31 539	27 635	24 444	24 444
313M_SR_4_14	70 573	63 942	60 647	54 536	49 161	47 956	47 956	45 362
313M_SR_5_40	71 491	64 570	57 243	50 134	48 806	42 813	37 495	36 675
313M_SR_6_50	53 346	46 698	40 875	36 361	34 847	30 546	27 292	27 292
315M_SR_4_25	118 000	105 568	101 149	90 513	81 198	78 638	78 639	78 639
315M_SR_5_33	110 123	97 300	93 345	82 975	73 530	70 057	68 784	67 113
315M_SR_6_20	104 281	91 469	80 227	70 972	68 437	60 111	53 229	53 229
316M_SR_4_25	119 127	119 127	119 127	108 717	97 529	94 455	94 455	94 455
316M_SR_4_25_R	141 733	126 801	121 493	108 717	97 529	94 455	94 455	94 455
316M_SR_5_33	119 127	116 883	112 133	99 675	88 330	84 158	80 616	80 616
316M_SR_5_33_R	132 287	116 883	112 133	99 675	88 330	84 158	80 616	80 616
317M_SR_4_09	242 368	217 584	207 721	185 804	166 621	163 116	163 116	154 358
<b>Stage</b>	<b>Output Torque [Nm] - Load spectrum L3</b>							
	<b>T1 / M3</b>	<b>T2 / M4</b>	<b>T3 / M5</b>	<b>T4 / M6</b>	<b>T5 / M7</b>	<b>T6 / M8</b>	<b>T7 / M8</b>	<b>T8 / M8</b>
317M_SR_5_25	228 198	204 869	195 956	175 342	158 357	149 892	131 729	128 093
317M_SR_6_23	197 940	173 795	152 589	135 447	130 207	114 481	101 586	101 586
318M_SR_4_40	304 734	270 181	260 179	230 727	205 169	198 984	187 525	184 566
709_SR_4_40	33 828	30 451	29 043	26 070	23 459	22 281	19 487	19 167
709_SR_5_25	30 323	27 287	24 925	22 230	21 167	18 601	16 701	16 701
711_SR_4_09	53 818	48 001	46 068	41 096	36 756	35 965	35 965	35 398
711_SR_4_09_R	53 818	48 001	46 068	41 096	36 756	35 965	35 965	35 398

711_SR_5_25	53 866	48 397	46 274	41 319	37 454	35 284	30 899	30 023
711_SR_5_25_R	53 866	48 397	46 274	41 319	37 454	35 284	30 899	30 023
712_SR_4_40	70 004	62 846	58 889	51 592	48 469	44 062	38 600	37 974
714_SR_4_63	94 812	84 060	80 948	71 788	63 836	61 612	61 612	61 612

Stage	Output Torque [Nm] - Load spectrum L4							
	T1 / M3	T2 / M4	T3 / M5	T4 / M6	T5 / M7	T6 / M8	T7 / M8	T8 / M8
300_SR_3_48	752	676	607	605	605	605	605	605
300_SR_4_26	1 232	1 120	1 012	938	819	752	752	735
300_SR_5_77	914	795	692	627	547	542	542	542
300_SR_7_20	609	529	474	417	380	380	380	380
301_SR_3_48	1 478	1 328	1 193	1 189	1 189	1 189	1 189	1 189
301_SR_4_26	1 750	1 750	1 750	1 750	1 639	1 506	1 506	1 471
301_SR_5_77	1 829	1 591	1 383	1 254	1 094	1 085	1 085	1 085
301_SR_7_20	1 217	1 058	949	833	759	759	759	759
303_SR_3_60	2 361	2 120	1 903	1 891	1 891	1 891	1 891	1 891
303_SR_4_25	2 884	2 634	2 366	2 307	2 307	2 307	2 307	2 294
303_SR_5_33	2 765	2 542	2 281	2 178	1 906	1 854	1 854	1 854
303_SR_6_20	2 486	2 195	1 912	1 735	1 529	1 529	1 529	1 529
303_SR_7_50	1 901	1 655	1 501	1 307	1 204	1 204	1 204	1 204
305_SR_3_60	4 601	4 131	3 708	3 685	3 685	3 685	3 685	3 685
Stage	Output Torque [Nm] - Load spectrum L4							
	T1 / M3	T2 / M4	T3 / M5	T4 / M6	T5 / M7	T6 / M8	T7 / M8	T8 / M8
305_SR_4_25	5 623	5 137	4 614	4 499	4 499	4 499	4 499	4 499
305_SR_5_33	5 387	4 952	4 444	4 259	3 812	3 708	3 708	3 708
305_SR_6_20	4 854	4 406	3 839	3 484	3 071	3 071	3 071	3 071
305_SR_7_50	3 809	3 317	3 009	2 620	2 413	2 413	2 413	2 413
306_SR_3_60	10 736	9 663	8 644	8 588	8 588	8 588	8 588	8 588
306_SR_4_25	10 185	9 331	8 362	8 148	8 148	8 148	8 148	8 148
306_SR_5_33	9 800	8 999	8 056	7 713	7 053	6 863	6 863	6 863
306_SR_6_20	8 664	7 970	6 964	6 312	5 570	5 570	5 570	5 570
306_SR_7_50	6 825	5 950	5 400	4 707	4 338	4 338	4 338	4 338

307_SR_3_43	8 379	7 572	6 842	6 804	6 804	6 804	6 804	6 804
307_SR_4_09	15 267	13 897	12 477	12 221	12 221	11 584	11 584	11 510
307_SR_5_25	14 248	13 116	11 803	10 819	9 488	9 199	9 199	9 199
307_SR_6_23	11 700	10 220	8 960	8 100	7 170	7 170	7 170	7 170
309_SR_3_43	12 470	11 270	10 180	10 120	10 120	10 120	10 120	10 120
309_SR_4_09	22 624	20 600	18 490	18 110	18 110	17 560	17 560	17 380
309_SR_5_25	21 110	19 430	17 490	16 230	14 230	13 800	13 800	13 800
309_SR_6_23	17 540	15 320	13 440	12 150	10 750	10 750	10 750	10 750
310M_SR_4_09	33 170	30 160	27 090	26 530	26 120	23 840	23 840	23 690
310M_SR_5_25	31 130	28 690	25 170	22 880	20 080	19 480	19 480	19 480
310M_SR_6_23	26 050	22 774	20 024	18 088	16 009	16 009	16 009	16 009
311M_SR_4_09	43 032	39 890	36 628	36 033	36 033	36 033	36 033	36 033
311M_SR_5_25	43 032	43 032	38 720	37 192	32 701	31 720	31 720	31 720
311M_SR_6_23	39 671	34 709	30 592	27 598	24 444	24 444	24 444	24 444
313M_SR_4_14	59 929	54 677	49 169	47 956	47 956	45 362	45 362	45 362
313M_SR_5_40	60 482	53 690	47 023	42 757	37 558	36 675	36 675	36 675
313M_SR_6_50	43 803	38 342	34 145	30 505	27 292	27 292	27 292	27 292
315M_SR_4_25	98 863	90 756	81 211	78 639	78 639	78 639	78 639	78 639
315M_SR_5_33	91 176	83 224	73 544	70 057	68 899	67 113	67 113	67 113
<b>Stage</b>	<b>Output Torque [Nm] - Load spectrum L4</b>							
	<b>T1 / M3</b>	<b>T2 / M4</b>	<b>T3 / M5</b>	<b>T4 / M6</b>	<b>T5 / M7</b>	<b>T6 / M8</b>	<b>T7 / M8</b>	<b>T8 / M8</b>
315M_SR_6_20	85 778	75 237	66 465	60 032	53 229	53 229	53 229	53 229
316M_SR_4_25	118 747	109 010	97 545	94 455	94 455	94 455	94 455	94 455
316M_SR_4_25_R	118 747	109 010	97 545	94 455	94 455	94 455	94 455	94 455
316M_SR_5_33	109 526	99 975	88 347	84 158	80 616	80 616	80 616	80 616
316M_SR_5_33_R	109 526	99 975	88 347	84 158	80 616	80 616	80 616	80 616
317M_SR_4_09	203 826	186 305	166 649	163 116	163 116	154 358	154 358	154 358
317M_SR_5_25	191 854	176 404	158 383	149 700	131 947	128 093	128 093	128 093
317M_SR_6_23	162 964	143 081	126 823	114 332	101 585	101 585	101 585	101 585
318M_SR_4_40	253 123	231 401	205 206	198 984	187 832	184 566	184 566	184 566
709_SR_4_40	28 548	26 138	23 463	22 251	19 520	19 167	19 167	19 167
709_SR_5_25	25 555	23 383	20 876	18 576	16 701	16 701	16 701	16 701

711_SR_4_09	44 956	41 210	36 763	35 965	35 965	35 398	35 398	35 313
711_SR_4_09_R	44 956	41 210	36 763	35 965	35 965	35 398	35 398	35 313
711_SR_5_25	45 323	41 689	37 460	35 238	30 952	30 023	30 023	30 023
711_SR_5_25_R	45 323	41 689	37 460	35 238	30 952	30 023	30 023	30 023
712_SR_4_40	58 933	54 040	48 389	44 004	38 665	37 974	37 974	37 974
714_SR_4_63	78 754	71 996	63 847	61 612	61 612	61 612	61 612	61 612

**Max Static torque**

Stage	Static Torque [Nm]
300_SR_3_48	2 078
300_SR_4_26	3 186
300_SR_5_77	2 729
300_SR_7_20	2 823
301_SR_3_48	3 370
301_SR_4_26	3 370
301_SR_5_77	3 370
301_SR_7_20	2 545
303_SR_3_60	6 570
Stage	Static Torque [Nm]
303_SR_4_25	7 979
303_SR_5_33	7 631
303_SR_6_20	6 218
303_SR_7_50	6 738
305_SR_3_60	10 520
305_SR_4_25	10 520
305_SR_5_33	10 520
305_SR_6_20	10 520
305_SR_7_50	10 520
306_SR_3_60	20 556
306_SR_4_25	20 556
306_SR_5_33	20 556
306_SR_6_20	20 556
306_SR_7_50	20 505

307_SR_3_43	21 940
307_SR_4_09	34 289
307_SR_5_25	34 289
307_SR_6_23	32 113
309_SR_3_43	32 690
309_SR_4_09	34 289
309_SR_5_25	34 289
309_SR_6_23	34 289
310M_SR_4_09	50 505
310M_SR_5_25	50 505
310M_SR_6_23	50 505
311M_SR_4_09	85 176
311M_SR_5_25	85 176
311M_SR_6_23	85 176
313M_SR_4_14	113 295
<b>Stage</b>	<b>Static Torque [Nm]</b>
313M_SR_5_40	113 295
313M_SR_6_50	113 295
315M_SR_4_25	142 953
315M_SR_5_33	142 953
315M_SR_6_20	142 953
316M_SR_4_25	142 953
316M_SR_4_25_R	254 557
316M_SR_5_33	142 953
316M_SR_5_33_R	257 315
317M_SR_4_09	444 174
317M_SR_5_25	498 196
317M_SR_6_23	442 404
318M_SR_4_40	498 196
709_SR_4_40	62 664
709_SR_5_25	54 600
711_SR_4_09	80 590



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711_SR_4_09_R	107 453
711_SR_5_25	80 590
711_SR_5_25_R	107 453
712_SR_4_40	107 453
714_SR_4_63	217 728

**Max SOLAS torque**

Stage	Solas Torque [Nm]
300_SR_3_48	665
300_SR_4_26	1 020
300_SR_5_77	785
300_SR_7_20	862
301_SR_3_48	1 308
301_SR_4_26	2 011
301_SR_5_77	1 717
301_SR_7_20	796
303_SR_3_60	2 102
303_SR_4_25	2 553
303_SR_5_33	2 442
303_SR_6_20	1 990
303_SR_7_50	2 156
305_SR_3_60	3 865
305_SR_4_25	4 553
305_SR_5_33	4 636
305_SR_6_20	3 884
305_SR_7_50	3 450
306_SR_3_60	9 949
306_SR_4_25	9 268
306_SR_5_33	8 865
306_SR_6_20	7 016
306_SR_7_50	6 513
307_SR_3_43	7 021
307_SR_4_09	12 067
307_SR_5_25	12 270
307_SR_6_23	10 276
309_SR_3_43	10 461
Stage	Solas Torque [Nm]
309_SR_4_09	13 456

309_SR_5_25	12 965
309_SR_6_23	12 387
310M_SR_4_09	26 394
310M_SR_5_25	26 218
310M_SR_6_23	22 554
311M_SR_4_09	30 931
311M_SR_5_25	40 963
311M_SR_6_23	33 221

### Application/Limitation

- Our gear calculations are based on that optimum hardening depths have been achieved according to recognized standards and manufacturer's experience. Load distribution factors as stated by the manufacturer (based on his experience) have been used and we have not considered these.
- The bearing lifetime for the gears has not been evaluated in this Type Approval. It is assumed that the manufacturer delivers bearings with sufficient capacity for the class of utilization they are intended for.
- The relevance of the class of utilisation and load spectrum is not evaluated by us.
- When a gearbox is delivered for an application according to DNVGL-ST-0378, the brake torque for the specific application shall be calculated taking into consideration the factor as given in
- Materials with 3.1 certificates are to be used when manufacturing load carrying parts. Traceability is assumed taken care of by the manufacturer's quality system.
- Upon final installation of gear unit to foundation/frame the fastening bolts are to be pre-stressed according to procedures acceptable to the attending surveyor. We have assumed that the load-carrying bolts are of 8.8 quality or higher where indicated.
- The approval is based on min steel grade ME (ref. IOSO6336-5) for all main structural gearing components.
- The brakes have not formed a part of this approval

### Type Approval documentation

<u>Drawing No</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
303_SR_6_20	-	Drawings set	AP
303_SR_5_33	-	Drawings set	AP
303_SR_3_60	-	Drawings set	AP
303_SR_7_50	-	Drawings set	AP
303_SR_4_25	-	Drawings set	AP
TA 300 DNVGL - Reduction Stages	-	Reduction Stages	AP
306_SR_7_50	-	306_SR_7_50	AP
		309_SR_6_23	AP
6641000480	C	Alt toothed ring	AP
<u>Drawing No</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
R74896 - L1T1		Calculation report	FI
R74895 - L4T8		Calculation report	FI
305_4_25_sungear_dynamic		Calculation report	FI
305_4_25_spline_planet_carrier		Calculation report	FI
305_SR_4_25_gears_SOLAS		Calculation report	FI
305_4_25_sungear_SOLAS		Calculation report	FI
Calculation_method		Calculation_method	FI

Reduction Stage 305_SR_4_25		Drawing list	FI
317M_SR_4_09	-	Drawings Ser	AP
317M_SR_6_23	-	Drawings Ser	AP
317M_SR_5_25	-	Drawings Ser	AP
316M_SR_5_33	-	Drawings Ser	AP
316M_SR_4_25	-	Drawings Ser	AP
318M_SR_4_40	-	Drawings Ser	AP
709_SR_4_40	-	Drawings Ser	AP
709_SR_5_25	-	Drawings Ser	AP
712_SR_4_40	-	Drawings Ser	AP
714_SR_4_63	-	Drawings Ser	AP
711_SR_4_09	-	Drawings Ser	AP
711_SR_5_25	-	Drawings Ser	AP
313M_SR_6_50	-	Drawings Ser	AP
313M_SR_4_14	-	Drawings Ser	AP
315M_SR_4_25	-	Drawings Ser	AP
315M_SR_5_33	-	Drawings Ser	AP
315M_SR_6_20	-	Drawings Ser	AP
313M_SR_5_40	-	Drawings Ser	AP
301_SR_7_20	-	Drawings set	AP
301_SR_3_48	_	Drawings set	AP
301_SR_4_26	-	Drawings set	AP
301_SR_5_77	-	Drawings set	AP
300_SR_7_20	-	Drawings set	AP
300_SR_3_48	-	Drawings set	AP
300_SR_4_26	-	Drawings set	AP
300_SR_5_77	-	Drawings set	AP
305_SR_3_60	-	Drawings set	AP
305_SR_4_25	-	Drawings set	AP
305_SR_5_33	-	Drawings set	AP
305_SR_6_20	-	Drawings set	AP
305_SR_3_60	-	Drawings set	AP
306_SR_4_25	-	Drawings set	AP
306_SR_3_60	-	Drawings set	AP
<b><u>Drawing No</u></b>	<b><u>Rev.</u></b>	<b><u>Title</u></b>	<b><u>Status</u></b>
306_SR_5_33	-	Drawings set	AP
307_SR_3_43	-	Drawings set	AP
307_SR_5_25	-	Drawings set	AP
307_SR_6_23	-	Drawings set	AP
307_SR_4_09	-	Drawings set	AP
309_SR_4_09	-	Drawings set	AP
309_SR_3_43	-	Drawings set	AP
309_SR_6_23	-	Drawings set	AP
309_SR_5_25	-	Drawings set	AP
311M_SR_6_23	-	Drawings set	AP

311M_SR_5_25	-	Drawings set	AP
310M_SR_4_09	-	Drawings set	AP
310M_SR_5_25	-	Drawings set	AP
310M_SR_6_23	-	Drawings set	AP
311M_SR_4_09	-	Drawings set	AP
309_SR_5_25	1	Drawings set	AP
309_SR_6_23	1	Drawings set	AP
311M_SR_4_09	1	Drawings set	AP
311M_SR_5_25	1	Drawings set	AP
311M_SR_6_23	1	Drawings set	AP
309_SR_3_43	1	Drawings set	AP
309_SR_4_09	1	Drawings set	AP
310M_SR_4_09	1	Drawings set	AP
310M_SR_6_23	1	Drawings set	AP
310M_SR_5_25	1	Drawings set	AP
305_SR_7_50	1	Drawings set	AP
306_SR_6_20	1	Drawings set	AP
301_SR_7_20	1	Drawings set	AP
709_SR_5_25	1	Drawings set	AP
712_SR_4_40	1	Drawings set	AP
714_SR_4_63	1	Drawings set	AP
711_SR_5_25_R	A	Drawings set - REDUCTION KIT	AP
305_SR_7_50	-	Drawings set-Group reduction	AP
306_SR_6_20	-	Drawings set-Group reduction	AP
307_SR_5_25	-	Drawings Set-Group reduction	AP
316M_SR_4_25_R	-	Drawings set-Group reduction	AP
316M_SR_5_33_R	-	Drawings set-Group reduction	AP
711_SR_5_25	1	Drawings set-Group reduction	AP
711_SR_4_09_R	-	Drawings set-Reduction Kit	AP
711_SR_4_09	1	Drawings set-Reduction Kit	AP
Gears_300i3.48_STATIC		Calculations	FI
<b><u>Drawing No</u></b>	<b><u>Rev.</u></b>	<b><u>Title</u></b>	<b><u>Status</u></b>
Gears_301i3.48_STATIC		Calculations	FI
Gears_303i3.60_STATIC		Calculations	FI
Gears_306i3.60_STATIC		Calculations	FI
Gears_307i3.43_STATIC		Calculations	FI
Gears_309i3.43_STATIC		Calculations	FI
Gears_310i4.09_STATIC		Calculations	FI
Gears_310i4.09_STATIC		Calculations	FI
Gears_311i4.09_STATIC		Calculations	FI
Gears_313i4.14_STATIC		Calculations	FI
Gears_314i4.25_STATIC		Calculations	FI
Gears_316i4.25_STATIC		Calculations	FI
Gears_317i4.09_STATIC		Calculations	FI
Gears_318i4.40_STATIC		Calculations	FI

Gears_709Ti4.40_STATIC		Calculations	FI
Gears_711Ti4.09_STATIC		Calculations	FI
Gears_712Ti4.40_STATIC		Calculations	FI
Gears_714Ti4.63_STATIC		Calculations	FI
Reduction Stages	1	List of drawings	FI
6634510441	C	Pin	AP
6655500353	A	Planet carrier	AP
6642000070	C	Planet gear	AP
TA 300 DNVGL - Project Data + Gear Data	-	Project Data	FI
R79060		Calculations	FI
R79062		Calculations	FI
R79112		Calculations	FI
R79113		Calculations	FI
R79114		Calculations	FI
R79115		Calculations	FI
R79131		Calculations	FI
R79132		Calculations	FI
R79133		Calculations	FI
R79134		Calculations	FI
R79135		Calculations	FI
R79140		Calculations	FI
R79180		Calculations	FI
R79181		Calculations	FI
R79184		Calculations	FI
R79186		Calculations	FI
R79188		Calculations	FI
R79190		Calculations	FI
<b><u>Drawing No</u></b>	<b><u>Rev.</u></b>	<b><u>Title</u></b>	<b><u>Status</u></b>
R79192		Calculations	FI
R79193		Calculations	FI
R79194		Calculations	FI
R79195		Calculations	FI
R79196		Calculations	FI
R79197		Calculations	FI
R79198		Calculations	FI
R79200		Calculations	FI
R79202		Calculations	FI
R79203		Calculations	FI
R79203		Calculations	FI
R79204		Calculations	FI
R79204		Calculations	FI
R79205		Calculations	FI
R79206		Calculations	FI
R79207		Calculations	FI

R79382		Calculations	FI
R79383		Calculations	FI
R79384		Calculations	FI
R79385		Calculations	FI
R81483		Calculations	FI
R81484		Calculations	FI
R81485		Calculations	FI
R81487		Calculations	FI
R81488		Calculations	FI
R81489		Calculations	FI
R81490		Calculations	FI
R81491		Calculations	FI
R81492		Calculations	FI
R81494		Calculations	FI
R81495		Calculations	FI
R81496		Calculations	FI
R81496		Calculations	FI
R81497		Calculations	FI
R81498		Calculations	FI
R81499		Calculations	FI
R81587		Calculations	FI
R81588		Calculations	FI
R81589		Calculations	FI
R81590		Calculations	FI
R81591		Calculations	FI
<b><u>Drawing No</u></b>	<b><u>Rev.</u></b>	<b><u>Title</u></b>	<b><u>Status</u></b>
R81592		Calculations	FI
R81593		Calculations	FI
R81594		Calculations	FI
R81603		Calculations	FI
R81604		Calculations	FI
R81614		Calculations	FI
R81785		Calculations	FI
R81787		Calculations	FI
R81800		Calculations	FI
R81893		Calculations	FI
R81894		Calculations	FI
R81895		Calculations	FI
R81897		Calculations	FI
R81898		Calculations	FI
R81899		Calculations	FI
R81900		Calculations	FI
R81901		Calculations	FI
R81902		Calculations	FI
R81903		Calculations	FI

R81904		Calculations	FI
R81905		Calculations	FI
R81906		Calculations	FI
R81907		Calculations	FI
R81908		Calculations	FI
R81909		Calculations	FI
R81912		Calculations	FI
R82057		Calculations	FI
R82058		Calculations	FI
R82059		Calculations	FI
R82060		Calculations	FI
R82905		Calculations	FI
R82906		Calculations	FI
2T235533020	-	Reduction stage drawing	AP
SOLAS_calculation_method		SOLAS_calculation_method	FI
6643000090	A	Sun gear	AP
TA 300 DNVGL - Project Data		TA 300 DNVGL - Project Data	FI
TA 300 DNVGL - Project Data - Calc-Gear data 01		TA 300 DNVGL - Project Data - Calc-Gear data 01	FI
TA 300 DNVGL - Project Data - Calc-Gear data 02		TA 300 DNVGL - Project Data - Calc-Gear data 02	FI
TA 300 DNVGL - Reduction Stages		TA 300 DNVGL - Reduction Stages	AP
6641000250	E	Toothed ring	AP

### Tests carried out

After completion the gearboxes are to be functionally, and pressure tested prior to issuance of a DNVGL product certificate. Final brake capacity is to be verified by testing when brake is fitted.

### Marking of product

The product is to be marked with manufacturer's name/trademark and type number identification.

### Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.

END OF CERTIFICATE