12.10 SPLIT ROLLER BEARINGS

Our company currently devotes special attention to particular bearings, designed primarily for heavy industrial applications. Here we refer to split roller bearings, whose design and production technology are validated at Dunlop BTL on special cylindrical roller bearings and spherical roller bearings up to an outer diameter of 1600 mm. We are constantly expanding our product line, and Dunlop BTL ranks among the world's leading manufacturers.

Split roller bearings are preferred in settings, where axial installation of bearings in housings is unfeasible, which applies, for example, to multiple bearing shafts, crankshafts, long transmission shafting, or in cases, where installation of the bearing in the housing would be too time-consuming and where any prolonged shutdown of equipment could lead to large disruptions in operations.

The most commonly used split roller bearings in the world are single row cylindrical roller (fig. 12.10.1) and double row spherical roller bearings (fig. 12.10.2). Dunlop BTL includes both of the specified assemblies in its production program. These bearings have a radially split outer ring, inner ring, and cage for guiding rolling elements. Cages are usually made of massive brass. Both halves of the cage are connected to withstand dynamic forces, which the cage is exposed to during operation. Both halves of the inner ring are secured on the shaft by means of clamping rings with a screw lock element to prevent their release. The separating gap between the halves of the outer ring may be perpendicular to the face of the ring. The dividing plane of the inner ring, in contrast, should be inclined at an angle to prevent shock in the loaded zone at the edge of the dividing plane when the elements are rolling.

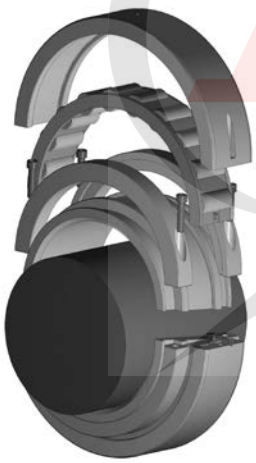

Fig. 12.10.1

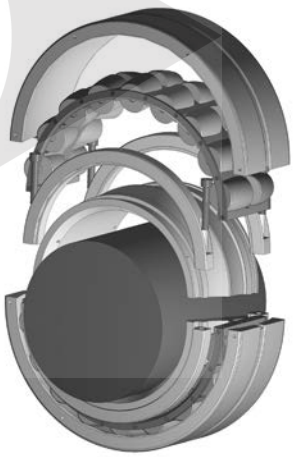

Fig. 12.10.2

Size range of split roller and spherical roller bearings

The size of special split roller bearings ranges, in the internal ring bore from d = 150 mm to 1 200 mm and in the outer ring diameter up to 1 600 mm.

Dunlop BTL split roller bearings can be designed to manage either radial and axial loads, or only radial loads.

Dunlop BTL split spherical roller bearings are able to carry primarily radial, but also partial axial external loads in both directions.

Split spherical roller and roller bearings are designed with clamping rings that fit in the circular grooves of the inner rings. The screw assemblies of the split raceways are connected with special screws and the manufacturer specifies the tightening torque for individual sizes.

Installing bearings

When installing bearings with split rings, we recommend that the shaft diameter have an h6, or in extreme cases, an h7 to h9 tolerance rating. Shape variations of loading surfaces can be utilized at a maximum of up to 50% of the fitting tolerance. IT6 precision of loading surfaces is most often required. Prior to installing the bearings into the housing, we recommend that fitting paste be sparingly applied to loading surfaces to limit the formation of contact-borne corrosion. Installation of bearings into the loading should be performed by trained and experienced work personnel.

Lubrication of split bearings

Split bearing lubrication is subject to normal roller bearing requirements. Either an oil or grease lubricant may be used. The type of lubricant is selected, based on the operating conditions, the given maximum speed, the operating temperature, and the magnitude of the external load. The Technical and Consultation Services Department can assist in selecting a suitable lubricant.

Housings for split bearings

Comprehensive bearing loading solutions can be designed for individual split bearings and loadings, which consists of a split bearing, the bearing housing, the lubrication system, and bearing diagnostics per customer specifications. Comprehensive solutions may be applied to both new loadings, which are in the prototype design phase, as well as for existing loadings that require substitution of a regular non-split bearing for a split bearing. Complete specifications are needed in both cases to achieve the optimal loading design. A complete specifications form, on the basis of which we produce an optimal structural design of the given loading, is available from the supplier upon request or, as necessary, following consultation by the Dunlop BTL Technical and Consultation Services Department.

Recommendations

Manufacturing of split bearings is a demanding process, and Dunlop BTL achieves this by mastering specialized steel heat-treatment procedures and individual component separation techniques, which eliminate any undesired stress and subsequent deformation of the material. The special approach in designing personal loadings and creating installation procedures demands close cooperation with the customer. For example, the standard equations usually cannot be used when calculating the bearing durability without first determining the correcting factors. We therefore recommend that the loading design and installation procedures always be consulted with Dunlop BTL Technical and Consultation Department personnel. Split roller bearings may also be offered in different types and designs (e.g. radial ball, thrust ball, etc.).

When substituting an original non-split bearing with a split bearing, we recommend that the customer also contacts Dunlop BTL Technical Office personnel.

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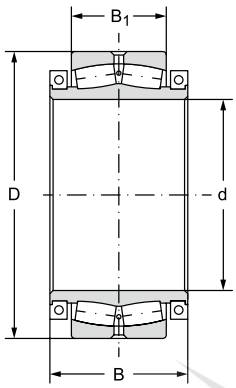
Split spherical roller bearings d = 25 to 1120 mm

d = 280 to 850 mm



12.10.1

Main dimensions				Basic load rating	
d	D	B	B_1	Dynamic C_r	Static C_{or}
mm				kN	
280	500	260	176	2760	4890
300	500	240	160	2790	5100
360	540	220	134	2340	4650
400	600	240	148	3020	5970
420	620	238	150	2940	6140
460	700	245	165	3380	6810
470	720	270	167	3710	7730
560	800	230	150	3500	8310
	870	330	200	5160	1160
600	920	310	212	5810	12500
	980	515	375	10800	22200
630	920	310	212	5920	12200
670	980	350	230	6570	14700
	1150	500	345	13000	23500
710	950	375	243	5920	15900
	1030	360	236	7300	16100
750	1000	360	250	6380	17200
	1090	475	335	10100	25200
800	1060	370	258	7100	19300
	1150	490	325	13000	31900
850	1120	390	272	7730	21200
	1180	331	206	6570	17900
	1280	430	280	10400	24100
	1280	540	375	12900	31900

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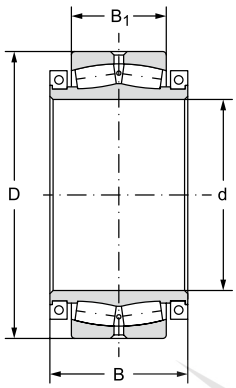
Fatique load limit	Weight	Bearing designation
P_u	~	
kN	kg	
396	175	**PLC512-40**
410	150	**PLC512-41**
361	155	**PLC512-42**
449	205	**PLC512-43**
457	215	**PLC512-44**
490	340	**PLC512-45**
552	375	**PLC512-46**
570	320	**PLC512-47**
78	580	**PLC512-48**
830	690	**PLC512-49**
1460	1350	**PLC512-50**
805	630	**PLC512-51**
952	800	**PLC512-52**
1480	1710	**PLC512-39**
1030	700	**PLC512-53**
1030	880	**PLC512-54**
1090	1220	**PLC512-37**
1580	1300	**PLC512-56**
1210	810	**PLC512-57**
1960	1980	**PLC512-58**
1300	830	**PLC512-59**
1090	880	**PLC512-60**
1450	1550	**PLC512-61**
1910	2350	**PLC512-62**

DUNLOP

Split spherical roller bearings

d = 900 to 1120 mm



12.10.1

Main dimensions				Basic load rating	
d	D	B	B_1	Dynamic C_r	Static C_{or}
mm				kN	
900	1180	400	280	8580	23300
	1340	490	325	12600	31500
950	1250	300	220	6400	20000
	1250	420	300	9240	26500
1000	1470	530	345	15200	37600
1020	1280	352	218	6280	20000
1060	1460	500	335	11700	35100
1060,355	1400	490	335	11600	33300
1120	1460	500	335	12000	34600
	1540	525	335	14000	39800

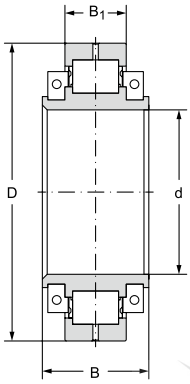
DUNLOP

Fatique load limit	Weight	Bearing designation
P_u	~	
kN	kg	
1410	1100	**PLC512-63**
1860	1800	**PLC512-64**
1190	987	**PLC512-55**
1570	1300	**PLC512-65**
2160	3000	**PLC512-66**
1170	950	**PLC512-67**
2000	2470	**PLC512-68**
1910	1800	**PLC512-69**
1960	2070	**PLC512-70**
2230	2950	**PLC512-71**

DUNLOP

Split cylindrical roller bearings d = 150 to 600 mm

d = 150 to 238 mm



12.10.2

Main dimensions				Basic load rating	
d	D	B	B_1	Dynamic C_r	Static C_{or}
mm				kN	
150	254	98,4	55,6	454	653
	292,1	123,8	68,3	810	1090
	330,2	160	81	1180	1520
155	254	98,4	55,6	454	652
	292,1	123,8	68,3	810	1090
160	273,05	109	60,3	513	750
	317,5	140	83,3	854	1120
	355,6	171	103,2	1370	1960
165	317,5	140	83,3	854	1120
170	285,75	109	55,5	551	840
	355,6	171	103,2	1370	1960
180	285,75	109	55,5	551	841
	330,2	140	83,3	942	1290
	374,65	178	92,1	1480	2130
190	311,15	109	60,3	576	936
	368,3	156	90,5	1100	1570
	419,1	191	97,7	1580	2530
195	368,3	156	90,5	1100	1570
200	311,15	109	60,3	576	936
	419,1	191	97,7	1580	2530
203,2	368,36	156	90,5	1040	1520
218	393,76	156	90,5	1200	1760
220	393,76	156	90,5	1200	1760
	342,9	115	63,5	623	1040
	469,9	212	109,6	1900	2700
238	440,07	156	90,5	1250	1920

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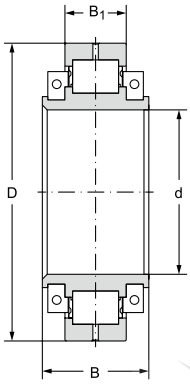
Fatique load limit	Weight	Bearing designation
P_u	~	
kN	kg	
65	16,6	**PLC410-49**
105	64,0	**PLC411-36**
143	57,0	**PLC411-43**
64	16,6	**PLC410-50**
104	64,0	**PLC411-37**
73	20,0	**PLC411-29**
105	39,0	**PLC411-38**
180	72,0	**PLC411-44**
105	39,0	**PLC411-39**
80	23,0	**PLC411-30**
179	72,0	**PLC411-45**
80	23,0	**PLC411-31**
119	45,0	**PLC411-40**
191	79,0	**PLC411-46**
87	25,0	**PLC411-32**
141	59,0	**PLC411-41**
221	105	**PLC412-43**
140	59,0	**PLC411-42**
86	25,0	**PLC411-33**
220	105	**PLC412-44**
135	62,0	**PLC411-28**
153	83,8	**PLC411-27-1**
153	83,0	**PLC411-27**
93	32,0	**PLC411-34**
227	145	**PLC412-45**
162	92,0	**PLC412-7-1**

DUNLOP

Split cylindrical roller bearings

d = 240 to 420 mm



12.10.2

Main dimensions				Basic load rating	
d	D	B	B_1	Dynamic C_r	Static C_{or}
mm				kN	
240	374,65	122	66,7	691	1240
	440,07	156	90,5	1250	1920
	482,6	211	105,6	2120	3190
260	431,8	170	96,8	1140	1940
	406,4	128	69	783	1410
	482,6	211	105,6	2120	3190
280	406,4	128	69	783	1410
	463,55	186	101,6	1520	2320
	495,3	244	139,7	2450	4040
300	438,15	143	74,6	8230	1540
	495,3	193	103,2	1620	2600
	558,8	244	139,7	2520	4140
320	622,37	272	160,4	3100	4950
	463,55	136	74,6	915	1740
	527,05	192	106,4	1730	2830
340	488,95	136	74,6	940	1890
	565,15	200	115,9	1920	3180
	615,95	279	158	3190	5490
360	520,7	140	76,2	1010	2050
	565,15	200	115,9	1920	3180
	615,95	279	158	3190	5490
380	520,7	140	76,2	1010	2050
	584,2	200	111,1	2020	3510
	685,8	292	166,7	3530	6000
400	546,1	140	76,2	1050	2200
	615,95	200	115,9	2120	3710
	685,8	292	166,7	3530	6000
420	571,5	140	76,2	1070	2360
	647,7	200	119,1	2230	4000
	700	284	160	4020	7510

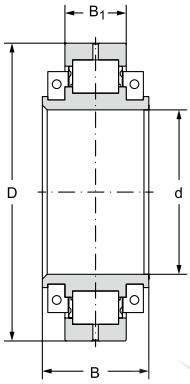
DUNLOP

Fatique load limit	Weight	Bearing designation
P_u	~	
kN	kg	
108	40,0	**PLC411-35**
162	92,0	**PLC412-7**
265	150	**PLC412-46**
163	86,5	**PLC412-11**
120	50,0	**PLC412-61**
262	150	**PLC412-47**
119	50,0	**PLC412-13**
191	86,0	**PLC412-28**
328	182	**PLC412-48**
127	60,0	**PLC412-14**
210	123	**PLC412-29**
326	238	**PLC412-49**
379	353	**PLC412-8**
141	72,0	**PLC412-15**
224	150	**PLC412-30**
150	78,0	**PLC412-16**
247	182	**PLC412-31**
419	318	**PLC412-50**
160	86,0	**PLC412-17**
245	182	**PLC412-32**
416	318	**PLC412-51**
159	86,0	**PLC412-18**
267	186	**PLC412-33**
443	431	**PLC412-52**
168	95,0	**PLC412-19**
278	209	**PLC412-34**
440	431	**PLC412-53**
178	104	**PLC412-20**
295	241	**PLC412-35**
546	395	**PLC412-54**

DUNLOP

Split cylindrical roller bearings

d = 440 to 600 mm



12.10.2

Main dimensions				Basic load rating	
d	D	B	B_1	Dynamic C_r	Static C_{or}
mm				kN	
440	596,9	140	76,2	1110	2510
	666,75	200	115,9	2370	4380
	700	284	160	4020	7510
460	596,9	140	76,2	1110	2510
	666,75	200	115,9	2370	4380
	740	294	170	4270	7700
480	628,65	144	81	1150	2580
	698,5	223	119,1	2500	4770
500	654,05	168	80,2	1190	2750
	717,55	226	115,9	2600	5160
	850,9	300	187,4	4790	8800
530	692,15	168	81	1230	2920
	762	229	119,1	2850	5550
	850,9	300	187,4	4790	8800
560	717,55	168	81	1270	3090
	793,75	233	122,2	2970	6000
	863,6	310	196,9	5380	10600
600	774,7	172	84,1	1400	3510
	838,2	214	119,1	3070	6470
	890	310	184	5610	11400

DUNLOP

Fatique load limit	Weight	Bearing designation
P_u	~	
kN	kg	
187	114	**PLC412-21**
320	250	**PLC412-36**
543	395	**PLC412-55**
186	114	**PLC412-22**
318	250	**PLC412-37**
549	431	**PLC412-56**
188	128	**PLC412-23**
342	263	**PLC412-38**
198	136	**PLC412-24**
366	272	**PLC412-39**
605	730	**PLC412-57**
207	164	**PLC412-25**
387	309	**PLC412-40**
601	730	**PLC412-58**
216	175	**PLC412-26**
412	336	**PLC412-41**
717	635	**PLC412-59**
240	210	**PLC412-27**
437	381	**PLC412-42**
761	680	**PLC412-60**