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INTERSTATE COUNCIL FOR STANDARDIZATION, METROLOGY AND CERTIFICATION  
(ISC)

3478  
2012

(ISO 15:2011, NEO)  
(ISO 104:2002, NEO)  
(ISO 582:1995, NEO)

Санкт-Петербург  
2014

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 » 1.0—92 « \*  
 1.2—2009 « \*  
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 2 » 307 « \*  
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* < 3166) 004—97	( 3166) 004—97	
	AZ BY Z KG MD RU TJ UZ UA	

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- ISO 15:2011 Rolling bearings — Radial bearings — Boundary dimensions, general plan ( );
- ISO 104:2002 Rolling bearings — Thrust bearings — Boundary dimensions, general plan ( );
- ISO 582:1995 Rolling bearings — Chamfer dimensions — Maximum values ( ).

(NEQ)

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2014

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федеральное агентство  
по техническому регулированию  
и метрологии

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по техническому регулированию  
и метрологии

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по техническому регулированию  
и метрологии

**Rolling bearings. Boundary dimensions**

—2014—01—01

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**831—75**

**2893—82**

**8328—75**

**24955—81**

**25256—82**

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**24955            25256.**

3.1

**(back face):**

3.2

**(mounting chamfer):**

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3.3

(boundary surface):

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3.4

(boundary dimension):

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$\Delta$  —

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$D_{ts\min}$  —

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$d_{ts\max}$  —

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$6_2$  —

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$6_3$  —

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$d_{3t}$  —

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$2$  —

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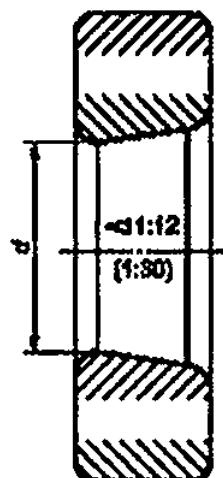
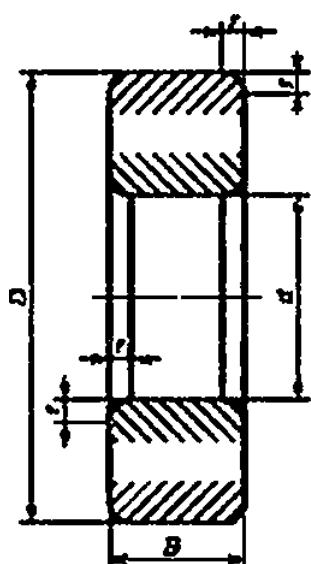
6.3

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6.5

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		78	18	28	38	48	58	68	78	18-68	
190	240	16	24	30	37	50	67	90	1.0	1.5	
200	250	16	24	30	37	50	67	90	1.0	1.5	
220	270	16	24	30	37	50	67	90	1.0	1.5	
240	300	19	28	36	45	60	80	109	1.0	2.0	
260	320	19	28	36	45	60	80	109	1.0	2.0	
260	350	22	33	42	52	69	95	125	1.1	2.0	
300	380	25	38	48	60	80	109	145	1.5	2.1	
320	400	25	38	48	60	80	109	145	1.5	2.1	
340	420	25		48	60	80	109	145	1.5	2.1	
360	440	25	38	48	60	80	109	145	1.5	2.1	
380	480	31	46	60	75	100	136	180	2.0	2.1	
400	500	31	46	60	75	100	136	180	2.0	2.1	
420	520	31	46	60	75	100	136	180	2.0	2.1	
440	540	31	46	60	75	100	136	180	2.0	2.1	
460	580	37	56	72	90	118	160	218	2.1	3.0	
480	600	37	56	72	90	118	160	218	2.1	3.0	
500	620	37	56	72	90	118	160	218	2.1	3.0	
530	650	37	56	72	90	118	160	218	2.1	3.0	
560	680	37	56	72	90	118	160	218	2.1	3.0	
600	730	42	60	78	98	128	175	236	3.0	3.0	
630	780	48	69	88	112	150	200	272	3.0	4.0	
670	820	48	69	88	112	150	200	272	3.0	4.0	
710	870	50	74	95	118	160	218	290	4.0	4.0	
750	920	54	78	100	128	170	230	308	4.0	5.0	
800	980	57	82	106	136	180	243	325	4.0	5.0	
850	1030	57	82	106	136	180	243	325	4.0	5.0	
900	1090	60	85	112	140	190	258	345	5.0	5.0	
950	1150	63	90	11	150	200	272	355	5.0	5.0	
1000	1220	71	100	128	165	218	300	400	5.0	6.0	
1060	1280	71	100	128	165	218	300	400	5.0	6.0	
1120	1360	78	106	140	180	243	325	438	5.0	6.0	
1180	1420	78	106	140	180	243	325	438	5.0	6.0	
1250	1500		112	145	185	250	335	450	6.0	6.0	
1320	1600	88	122	165	206	280	375	500	6.0	6.0	
1400	1700	95	132	175	224	300	400	545	6.0	7.5	
1500	1820		140	185	243	315				7.5	
1600	1950		155	200	265	345				7.5	
1700	2060		160	206	272	355				7.5	
1800	2180		165	218	290	375				9.5	
1900	2300	—	175	230	300	400	—	—	—	9.5	
2000	2430	—	190	250	325	425	—	—	—	9.5	

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		7	t	2		4	5		7	1-3	4-6
		79	19	29	39	49	S9	69	79	19-39	49-69
1.0	4		1.6		2.3					.	
1.5	5		2.0		2.6					0.15	
2.0	6	—	2.3	—	3.0	—	—	—	—	0.15	—
2.5	7		2.5		3.5					0.15	
3.0	8	—	3.0	—	4.0	—	—	—	—	0.15	—
4.0	11		4.0		5.0					0.15	
5.0	13		4.0		6.0	10				0.20	0.15
6.0	15		5.0		7.0	10				0.20	0.15
7.0	17		5.0		7.0	10				0.30	0.15
8.0	19	—	6.0	—	9.0	11	—	—	—	0.30	0.20
9.0	20		6.0		9.0	11				0.30	0.30
10.0	22		6.0	8.0	10.0	13	16	22		0.30	0.30
12.0	24		6.0	8.0	10.0	13	16	22		0.30	0.30
15.0	28		7.0	8.5	10.0	13	1	23		0.30	0.30
17.0	30		7.0	8.5	10.0	13	16	23		0.30	0.30
20.0	37	7	9.0	11.0	13.0	17	23	30	0.3	0.30	0.30
22.0	39	7	9.0	11.0	13.0	17	23	30	0.3	0.30	0.30
25.0	42	7	9.0	11.0	13.0	17	23	30	0.3	0.30	0.30
28.0	45	7	9.0	11.0	13.0	17	23	30	0.3	0.30	0.30
30.0	47	7	9.0	11.0	13.0	17	23	30	0.3	0.30	0.30
32.0	52	7	10.0	13.0	15.0	20	27	36	0.3	0.60	0.60
35.0	55	7	10.0	13.0	15.0	20	27	36	0.3	0.60	0.60
40.0	62	6	12.0	14.0	16.0	22	30	40	0.3	0.60	0.60
45.0	68	8	12.0	14.0	16.0	22	30	40	0.3	0.60	0.60
50.0	72	8	12.0	14.0	16.0	22	30	40	0.3	0.60	0.60
55.0	80	9	13.0	16.0	19.0	25	34	45	0.3	1.00	1.00
60.0	85	9	13.0	16.0	19.0	25	34	45	0.3	1.00	1.00
65.0	90	9	13.0	16.0	19.0	25	34	45	0.3	1.00	1.00
70.0	100	10	16.0	19.0	23.0	30	40	54	0.6	1.00	1.00
75.0	105	10	16.0	19.0	23.0	30	40	54	0.6	1.00	1.0
80.0	110	10	16.0	19.0	23.0	30	40	54	0.6	1.00	1.0
85.0	120	11	18.0	22.0	26.0	35	46	63	0.6	1.10	1.10
90.0	125	11	18.0	22.0	26.0	35	46	63	0.6	1.10	1.10
95.0	130	11	18.0	22.0	26.0	35	46	63	0.6	1.10	1.10
100.0	140	13	20.0	24.0	30.0	40	54	71	0.6	1.10	1.10
105.0	145	13	20.0	24.0	30.0	40	54	71	0.6	1.10	1.10
110.0	150	13	20.0	24.0	30.0	40	54	71	0.6	1.10	1.10
120.0	165	14	22.0	27.0	34.0	45	60	80	0.6	1.10	1.10
130.0	180	16	24.0	30.0	37.0	50	67	90	1.0	1.50	1.50
140.0	190	16	24.0	30.0	37.0	50	67	90	1.0	1.50	1.50
150	210	19	28	36	45	60	80	109	1.0	2.0	2.0
160	220	19	28	36	45	60	80	109	1.0	2.0	2.0
170	230	19	28	36	45	60	80	109	1.0	2.0	2.0
180	250	22	33	42	52	69	95	125	1.1	2.0	2.0
190	260	22	33	42	52	69	95	125	1.1	2.0	2.0

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		7»	>9	29	39	49	59	59	79	19-39	49-69
200	280	25	38	48	60	80	109	145	1.5	2.1	2.1
220	300	25	38	48	60	80	109	145	1.5	2.1	2.1
240	320	25	38	48	60	80	109	145	1.5	2.1	2.1
260	360	31	46	60	75	100	136	180	2.0	2.1	2.1
280	380	31	46	60	75	100	136	180	2.0	2.1	2.1
300	420	37	56	72	90	118	160	218	2.1	3.0	3.0
320	440	37	56	72	90	118	160	218	2.1	3.0	3.0
340	460	37	56	72	90	118	160	218	2.1	3.0	3.0
360	480	37	56	72	90	118	160	218	2.1	3.0	3.0
380	520	44	65	82	106	140	190	250	3.0	4.0	4.0
400	640	44	65	82	106	140	190	250	3.0	4.0	4.0
420	560	44	65	82	106	140	190	250	3.0	4.0	4.0
440	600	50	74	95	118	160	218	290	4.0	4.0	4.0
460	620	50	74	95	118	160	218	290	4.0	4.0	4.0
480	650	54	78	100	128	170	230	308	4.0	5.0	5.0
500	670	54	78	100	128	170	230	308	4.0	5.0	5.0
530	710	57	82	106	136	180	243	325	4.0	5.0	5.0
560	750	60	85	112	140	190	258	345	5.0	5.0	5.0
600	800	63	90	118	150	200	272	355	5.0	5.0	5.0
630	850	71	100	128	165	218	300	400	5.0	6.0	6.0
670	900	73	103	136	170	230	308	412	5.0	6.0	6.0
710	950	78	106	140	180	243	325	438	5.0	6.0	6.0
750	1000	80	112	145	185	250	335	450	6.0	6.0	6.0
800	1060	82	115	150	195	258	355	462	6.0	6.0	6.0
850	1120	85	118	155	200	272	365	488	6.0	6.0	6.0
900	1180	88	122	165	206	280	375	500	6.0	6.0	6.0
950	1250	95	132	175	224	300	400	545	6.0	7.5	7.5
1000	1320	103	140	185	236	315	438	580	6.0	7.5	7.5
1060	1400	109	150	195	250	335	462	615	7.5	7.5	7.5
1120	1460	109	150	195	250	335	462	615	7.5	7.5	7.5
1180	1540	115	160	206	272	355	488	650	7.5	7.5	7.5
1250	1630	122	170	218	280	375	515	690	7.5	7.5	7.5
1320	1720	128	175	230	300	400	545	710	7.5	7.5	7.5
1400	1820	—	185	243	315	425	—	—	—	9.5	9.5
1500	1950	—	195	258	335	450	—	—	—	9.5	9.5
1600	2060	—	200	265	345	462	—	—	—	9.5	9.5
1700	2180	—	212	280	355	475	—	—	—	9.5	9.5
1800	2300	—	218	290	375	500	—	—	—	12.0	12.0
1900	2430	—	230	308	400	530	—	—	—	12.0	12.0

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		71	01	21	31	41	51	51	71	01-61
1.5	6		2.5		3.0				0.15	
2.0	7		2.8		3.5				0.15	
2.5	8		2.8		4.0				0.15	
3.0	9		3.0		5.0				0.15	
4.0	12	—	4.0	—	6.0	—	—	—	0.20	
5.0	14		5.0		7.0				0.20	
6.0	17		6.0		9.0				0.30	
7.0	19		6.0	8	10.0				0.30	
8.0	22		7.0	9	11.0	14	19	25	0.30	
9.0	24	—	7.0	10	12.0	15	20	27	—	
10.0	26		8.0	10	12.0	16	21	29	0.30	
12.0	28	7	8.0	10	12.0	16	21	29	0.3	
15.0	32	8	9.0	11	13.0	17	23	30	0.3	
17.0	35	8	10.0	12	14.0	1	24	32	0.3	
20.0	42	6	12.0	14	16.0	22	30	40	0.3	
22.0	44	8	12.0	14	16.0	22	30	40	0.3	
25.0	47	8	12.0	14	16.0	22	30	40	0.3	
28.0	52	8	12.0	15	18.0	24	32	43	0.3	
30.0	55	9	13.0	16	19.0	25	34	45	0.3	
32.0	58	9	13.0	16	20.0	26	35	47	0.3	
35.0	62	9	14.0	17	20.0	27	36	48	0.3	
40.0	68	9	15.0	18	21.0	28	38	50	0.3	
45.0	75	10	16.0	19	23.0	30	40	54	0.6	
50.0	80	10	16.0	19	23.0	30	40	54	0.6	
55.0	90	11	18.0	22	26.0	35	46	63	0.6	
60	95	11	18	22	26	35	46	63	0.6	
65	100	11	18	22	26	35	46	63	0.6	
70	110	13	20	24	30	40	54	71	0.6	
75	115	13	20	24	30	40	54	71	0.6	
80	125	14	22	27	34	45	60	80	0.6	
85	130	14	22	27	34	45	60	80	0.6	
90	140	16	24	30	37	50	67	90	1.0	
95	145	16	24	30	37	50	67	90	1.0	
100	150	16	24	30	37	50	67	90	1.0	
105	160	18	26	33	41	56	75	100	1.0	
110	170	19	28	36	45	60	80	109	1.0	
120	180	19	28	36	46	60	80	109	1.0	
130	200	22	33	42	52	69	95	125	1.1	
140	210	22	33	42	53	69	95	125	1.1	
150	225	24	35	45	56	75	100	136	1.1	
160	240	25	38	48	60	80	109	145	1.5	
170	260	28	42	54	67	90	122	160	1.5	
180	280	31	46	60	74	100	136	180	2.0	
190	290	31	46	60	75	100	136	180	2.0	
<b>200</b>	<b>310</b>	<b>34</b>	<b>51</b>	<b>66</b>	<b>62</b>	<b>109</b>	<b>150</b>	<b>200</b>	<b>2.1</b>	
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		7	0	2	3	4	5	S	7	
		71	01	21	31	41	St	61	71	01—61
220	340	37	56	72	90	118	160	218	2.1	3.0
240	360	37	56	72	92	118	160	218	2.1	3.0
260	400	44	65	82	104	140	190	250	3.0	4.0
280	420	44	65	82	106	140	190	250	3.0	4.0
300	460	50	74	95	118	160	218	290	4.0	4.0
320	480	50	74	95	121	160	218	290	4.0	4.0
340	520	57	82	106	133	180	243	325	4.0	5.0
360	540	57	82	106	134	180	243	325	4.0	5.0
380	560	57	82	106	135	180	243	325	4.0	5.0
400	600	63	90	118	148	200	272	355	5.0	5.0
420	620	63	90	118	150	200	272	355	5.0	5.0
440	650	67	94	122	157	212	280	375	5.0	6.0
460	680	71	100	128	163	218	300	400	5.0	6.0
480	700	71	100	128	165	218	300	400	5.0	6.0
500	720	71	100	128	167	218	300	400	5.0	6.0
530	780	80	112	145	185	250	335	450	6.0	6.0
560	820	82	115	150	195	258	355	462	6.0	6.0
600	870	85	118	155	200	272	365	488	6.0	6.0
630	920	92	128	170	212	290	386	515	6.0	7.5
670	980	100	136	180	230	308	425	560	6.0	7.5
710	1030	103	140	185	236	315	438	580	6.0	7.5
750	1090	109	150	195	250	335	462	615	7.5	7.5
800	1150	112	155	200	258	345	475	630	7.5	7.5
850	1220	118	165	212	272	365	500	670	7.5	7.5
900	1280	122	170	218	280	375	515	690	7.5	7.5
950	1360	132	180	236	300	412	560	730	7.5	7.5
1000	1420	136	185	243	308	412	560	750	7.5	7.5
1060	1500	140	195	250	325	438	600	800	9.5	9.5
1120	1580	145	200	265	345	462	615	825	9.5	9.5
1180	1660	155	212	272	355	475	650	875	9.5	9.5
1250	1750	—	218	290	375	500	—	—	—	9.5
1320	1850	—	230	300	400	530	—	—	—	12.0
1400	1950	—	243	315	412	545	—	—	—	12.0
1500	2120	—	272	355	462	615	—	—	—	12.0
1600	2240	—	280	365	475	630	—	—	—	12.0
1700	2360	—	290	375	500	650	—	—	—	15.0
1800	2500	—	308	400	530	690	—	—	—	15.0



a	0										
		7	1	2	3	4	5	6	7	1-6	
		77	17	27	37	47	67	67	77	17-67	
320	540	71	100	128	176	218	300	400	5.0	5.0	
340	580	78	106	140	190	243	325	438	5.0	5.0	
360	600	78	106	140	192	243	325	438	5.0	5.0	
380	620	78	106	140	194	243	325	438	5.0	5.0	
400	650		112	145	200	250	335	450	6.0	6.0	
420	700	88	122	165	224	280	375	500	6.0	6.0	
440	720	88	122	165	226	280	375	500	6.0	6.0	
460	760	95	132	175	240	300	400	545	6.0	7.5	
480	790	100	136	160	248	308	425	560	6.0	7.5	
500	830	106	145	190	264	325	450	600	7.5	7.5	
530	870	109	150	195	272	335	462	615	7.5	7.5	
560	920	115	160	206	280	355	488	650	7.5	7.5	
600	980	122	170	218	300	375	515	690	7.5	7.5	
630	1030	128	175	230	315	400	545	710	7.5	7.5	
670	1090	136	185	243	336	412	560	750	7.5	7.5	
710	1150	140	195	250	345	438	600	800	9.5	9.5	
750	1220	150	206	272	365	475	630		9.5	9.5	
800	1280	155	212	272	375	475	650		9.5	9.5	
850	1360	165	224	290	400	500	690		12.0	12.0	
900	1420	165	230	300	412	515	710	—	12.0	12.0	
950	1500	175	243	315	438	545	750		12.0	12.0	
1000	1580	185	258	335	462	580	775		12.0	12.0	
1060	1660	190	265	345	475	600	800		12.0	15.0	
1120	1750		280	365	475	630				15.0	
1180	1850	—	290	388	500	670	—	—	—	15.0	
1250	1950		308	400	530	710				15.0	
1320	2060		325	425	560	750				15.0	
1400	2180		345	450	580	775				19.0	
1500	2300	—	355	462	600	800	—	—	—	19.0	

d	0											
		2				6	2			2 5		
		8	0	1	0	3	4	S	6	8	06	
		62	02	12	05	32	42	62	62	82	02-62	
		3	10	2.5	4	—	—	5.0	—	—	0.10	0.15
4	13	3.0	5	—	—	7.0	—	—	—	—	0.15	0.20
5	16	3.5	5	—	—	8.0	—	—	—	—	0.15	0.30
6	19	4.0	6	—	—	10.0	—	18	23	—	0.20	0.30
7	22	5.0	7	—	—	110	—	20	27	—	0.30	0.30



## 6

J	0									rtMn
		2		\$	2			2 5		
		8	0	1	0		4	S		8
		82	02	12	05	22	42	52	82	82
										02-62
380	680		95	132	175	240	300	400	545	6.0
400	720	—	103	140	185	256	315	438	580	6.0
420	760	—	109	150	195	272	335	462	615	7.5
440	790	—	112	155	200	280	345	475	630	7.5
460	830	—	118	165	212	296	365	500	670	7.5
480	870		125	170	224	310	388	530	710	7.5
500	920	—	136	185	243	336	412	560	750	7.5
530	980	—	145	200	258	355	450	600	—	9.5
560	1030	—	150	206	272	365	475	630	—	9.5
600	1090	—	155	212	280	388	488	670	—	9.5
630	1150		165	230	300	412	515	710		12.0
670	1220	—	175	24	315	438	545	750	—	12.0
710	1280	—	180	250	325	450	560	775	—	12.0
750	1360	—	195	265	345	475	615	825	—	15.0
800	1420	—	200	272	355	488	615	—	—	15.0
850	1500	—	206	280	375	515	650	—	—	15.0
900	1580	—	218	300	388	515	670	—	—	15.0
950	1660	—	230	315	412	530	710	—	—	15.0
1000	1750		243	330	425	560	750	—	—	15.0

## 7—

## 3

a								r*mm
						3	3	
		8	0	1	0	3		0-3
		62	03	13	08	33	83	03-33
3	13		5			7.0		0.2
4	16		5			9.0		0.3
5	19		6			10.0		0.3
6	22		7		11	13.0		0.3
7	26	—	9	—	13	15.0	—	0.3
8	28		9		13	15.0		0.3
9	30		10		14	16.0		0.6
10	35	9	11		17	19.0	0.3	0.6
12	37	9	12	—	17	19.0	0.3	1.0
<b>15</b>	42	<b>9</b>	<b>13</b>	—	<b>17</b>	<b>19.0</b>	<b>0.3</b>	<b>1.0</b>



d	o								
		3				3	3		
		8	0	1	0	3	8	0-3	
		83	03	13		33	83	03-33	
		480	980	160	218	290	375	9.5	
500	1030			170	230	300	388	12.0	
530	1090			180	243	325	412	12.0	
560	1150			190	258	335	438	12.0	
600	1220			200	272	355	462	—	15.0
630	1280			206	280	375	488	15.0	
670	1360			218	300	400	515	15.0	
710	1420			224	308	412	530	15.0	
750	1500			236	325	438	560	15.0	
800	1600			258	355	462	600	15.0	
850	1700			272	375	488	630	19.0	
900	1780			280	388	500	650	19.0	
950	1850			290	400	515	670	19.0	
1000	1950	—		300	412	545	710	19.0	

8—

4

d	D				d	o						
		0	2	0-2			0	2	0-2			
		04	24	$\omega \rightarrow *$			04	24	04-24			
8	30	10	14	0.6	170	420	92	145	5.0			
9	32	11	15	0.6	180	440	95	150	6.0			
10	37	12	16	0.6	190	460	98	155	6.0			
12	42	13	19	1.0	200	480	102	160	6.0			
15	52	15	24	1.1	220	540	115	180	6.0			
17	62	17	29	1.1	240	580	122	190	6.0			
20	72	19	33	1.1	260	620	132	206	7.5			
25	80	21	36	1.5	280	670	140	224	7.5			
30	90	23	40	1.5	300	710	150	236	7.5			
35	100	25	43	1.5	320	750	155	250	9.5			
40	110	27	46	2.0	340	800	165	265	9.5			
45	120	29	50	2.0	360	850	180	280	9.5			
50	130	31	53	2.1	380	900	190	300	9.5			
55	140	33	57	2.1	400	950	200	315	12.0			
60	150	35	60	2.1	420	980	206	325	12.0			
65	160	37	64	2.1	440	1030	212	335	12.0			
70	180	42	74	3.0	460	1060	218	345	12.0			
75	190	45	77	3.0	480	1120	230	365	15.0			
	200	48	80	3.0	500	1150	236	375	15.0			
85	210	52	86	4.0	530	1220	250	400	15.0			

6	0			's mil	d				> 1		
		0	2	0-2			0	2	0-2		
		04	24	0-2			04	2 4	04-24		
90	225	54	90	40	560	1280	258	412	15.0		
95	240	55	95	40			272	438	15.0		
100	250	58	98	40			280	450	15.0		
105	260	60	100	40			290	475	15.0		
110	280	65	108	40							
120	310	72	118	50							
130	340	70	128	50							
140	360	82	132	50							
150	380	85	138	50							
160	400	88	142	50							

7

7.1

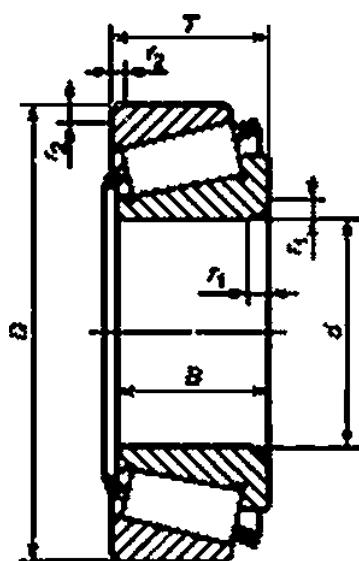
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9—13.



· *d* =

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<b>d</b>	0	»		I» «			
		<b>2</b>					
		2d	39				
20	37	12.0	14	0.3	0.3		
25	42	12.0	14	0.3	0.3		
30	47	12.0	14	0.3	0.3		
35	55	14.0	16	0.6	0.6		
40	62	15.0	17	0.6	0.6		
45	68	15.0	17	0.6	0.6		
50	72	15.0	17	0.6	0.6		
55	80	17.0	20	1.0	1.0		
60	85	17.0	20	1.0	1.0		
65	90	17.0	20	1.0	1.0		
70	100	20.0	24	1.0	1.0		
75	105	20.0	24	1.0	1.0		
80	110	20.0	24	1.0	1.0		
85	120	23.0	27	1.5	1.5		
90	125	23.0	27	1.5	1.5		
95	130	23.0	27	1.5	1.5		
100	140	25.0	31	1.5	1.5		
105	145	25.0	31	1.5	1.5		
110	150	25.0	31	1.5	1.5		
120	165	29.0	36	1.5	1.5		
130	180	32,0	39	2.0	1.5		
140	190	32.0	39	2.0	1.5		
150	210	38.0	47	2.5	2.0		
160	220	38.0	—	2.5	2.0		
170	230	38.0	—	2.5	2.0		
180	250	45.0		2.5	2.0		
190	260	45.0	—	2.5	2.0		
200	280	51.0	—	3.0	2.5		
220	300	51.0	—	3.0	2.5		
240	320	51.0	—	3.0	2.5		
260	360	63.5		3.0	2.5		
280	380	63.5	—	3.0	2.5		
300	420	76.0	—	4.0	3.0		
320	440	76.0	—	4.0	3.0		
340	460	76.0	—	4.0	3.0		
360	480	76.0	—	4.0	3.0		

D	»	2		2»«	
		2t	31		
12	28	11	13	0.3	0.3
15	32	12	14	0.3	0.3
17	35	13	15	0.3	0.3
20	42	15	17	0.6	0.6
22	44	15	—	0.6	0.6
25	47	15	17	0.6	0.6
28	52	16		1.0	1.0
30	55	17	20	1.0	1.0
32	58	17		1.0	1.0
35	62	18	21	1.0	1.0
40	68	19	22	1.0	1.0
45	75	20	24	1.0	1.0
50	80	20	24	1.0	1.0
55	90	23	27	1.5	1.5
60	95	23	27	1.5	1.5
65	100	23	27	1.5	1.5
70	110	25	31	1.5	1.5
75	115	25	31	1.5	1.5
80	125	29	36	1.5	1.5
85	130	29	36	1.5	1.5
90	140	32	39	2.0	1.5
95	145	32	39	2.0	1.5
100	150	32	39	2.0	1.5
105	160	35	43	2.5	2.0
110	170	38	47	2.5	2.0
120	180	38	48	2.5	2.0
130	200	45	55	2.5	2.0
140	210	45	56	2.5	2.0
150	225	48	59	3.0	2.5
160	240	51	—	3.0	2.5
170	260	57		3.0	2.5
180	280	64		3.0	2.5
190	290	64		3.0	2.5
200		70		3.0	2.5
220	340	76	—	4.0	3.0
240	360	76		4.0	3.0
260	400	87		5.0	4.0
280	420	87		5.0	4.0
300	460	100		5.0	4.0
320	480	100	—	5.0	4.0

11—

7

d	D	- 7	%	r2sMn	d	0	» 7	1* 1	2» min
		3							
		37					37		
40	75	26	1.5	1.5	80	130	37	2.0	1.5
45	80	26	1.5	1.5	85	140	41	2.5	2.0
50	85	26	1.5	1.5	90	150	45	2.5	2.0
55	95	30	1.5	1.5	95	160	49	2.5	2.0
60	100	30	1.5	1.5	100	165	52	2.5	2.0
65	110	34	1.5	1.5	105	171	56	2.5	2.0
70	120	37	2.0	1.5	110	160	56	2.5	2.0
75	125	37	2.0	1.5	120	200	62	2.5	2.0

12—

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d	0		7		7	» 7	'2smr>	
			2	5	2			
			0	0	3			
			02	05	32			
10	30	9	9.75	14	14.70		0.6	0.6
12	32	10	10.75	14	14.75		0.6	0.6
15	35	11	11.75	14	14.75		0.6	0.6
17	40	12	13.25	16	17.25		1.0	1.0
20	47	14	15.25	18	19.25	—	1.0	1.0
22	50	14	15.25	18	19.25		1.0	1.0
25	52	15	16.25	18	19.25	22	1.0	1.0
28	58	16	17.25	19	20.25	24	1.0	1.0
30	62	16	17.25	20	21.25	25	1.0	1.0
32	65	17	18.25	21	22.25	26	1.5	1.5
35	72	17	18.25	23	24.25	28	1.5	1.5
40	80	18	19.75	23	24.75	32	1.5	1.5
45	85	19	20.75	23	24.75	32	1.5	1.5
50	90	20	21.75	23	24.75	32	1.5	1.5
55	100	21	22.75	25	26.75	35	2.0	1.5
60	110	22	23.75	28	29.75	38	2.0	1.5
65	120	23	24.75	31	32.75	41	2.0	1.5
70	125	24	26.25	31	33.25	41	2.0	1.5
75	130	25	27.25	31	33.25	41	2.0	1.5
80	140	26	28.25	33	35.25	46	2.5	2.0
85	150	28	30.50	36	38.50	49	2.5	2.0
90	160	30	32.50	40	42.50	55	2.5	2.0
95	170	32	34.50	43	45.50	58	3.0	2.5
100	180	34	37.00	46	49.00	63	3.0	2.5
105	190	36	39.00	50	53.00	68	3.0	2.5

12

J						-	1*	r2»W		
		2		5		2				
		0		0						
		02		05		32				
110	200	38	41.00	53	56.00		3.0	2.5		
120	215	40	43.50	58	61.50		3.0	2.5		
130	230	40	43.75	64	67.75		4.0	3.0		
140	250	42	45.75	68	71.75		4.0	3.0		
150	270	45	49.00	73	77.00	—	4.0	3.0		
160	290	48	52.00		84.00		4.0	3.0		
170	310	52	57.00	86	91.00		5.0	4.0		
180	320	52	57.00	86	91.00		5.0	4.0		
190	340	55	60.00	92	97.00		5.0	4.0		
200	360	58	64.00	98	104.00	—	5.0	4.0		
220	400	65	72	108	114		5	4		
240	440	72	79	120	127		5	4		
260	480	80	89				6	5		
280	500	80	89				6	5		
300	540	85	96	—	—	—	6	5		
320	580	92	104	—	—	—	6	5		

13—

3 6

d							r2%			
		3		6						
		0		1		0				
		03		13						
10	35	11	11.90			17	17.90	0.6		
12	37	12	12.90			17	17.90	1.0		
15	42	13	14.25			17	18.25	1.0		
17	47	14	15.25			19	20.25	1.0		
20	52	15	16.25	—	—	21	22.25	1.5		
22	56	16	17.25			21	22.25	1.5		
25	62	17	18.25	17	18.25	24	25.25	1.5		
28	68	18	19.75			24	25.75	1.5		
30	72	19	20.75	19	20.75	27	28.75	1.5		
32	75	20	21.75	—	—	28	29.75	1.5		
35	80	21	22.75	21	22.75	31	32.75	2.0		
40	90	23	25.25	23	25.25	33	35.25	2.0		
45	100	25	27.25	25	27.25	36	38.25	2.0		
50	110	27	29.25	27	29.25	40	42.25	2.5		
55	120	29	31.50	29	31.50	43	45.50	2.5		

d								r <sub>U</sub> »	r <sub>2t</sub>		
		3	3	6							
		0			0						
		03		13		06					
60	130	21	33.50	31	33.5	46	48.50	3.0	2.5		
65	140	33	36.00	33	36.0	48	51.00	3.0	2.5		
70	150	35	38.00	35	38.0	51	51.00	3.0	2.5		
75	160	37	40.00	37	40.0	55	58.00	3.0	2.5		
60	170	39	42.50	39	42.5	58	61.50	3.0	2.5		
65	180	41	44.50	41	44.5	60	63.50	3.0	2.5		
90	190	43	46.50	43	46.5	64	67.50	4.0	3.0		
95	200	45	49.50	45	49.5	67	71.50	4.0	3.0		
100	215	47	51.50	51	56.5	73	77.50	4.0	3.0		
105	225	49	53.50	53	58.0	77	81.50	4.0	3.0		
110	240	50	54.50	57	63.0	80	84.50	4.0	3.0		
120	260	55	59.50	62	68.0	86	90.50	4.0	3.0		
130	280	58	63.75	66	72.0	93	98.75	5.0	4.0		
140	300	62	67.75	70	77.0	102	107.75	5.0	4.0		
150	320	65	72.00	75	82.0	108	114.00	5.0	4.0		
160	340	68	75.00	79	87.0	114	121.00	5.0	4.0		
170	360	72	80.00	84	92.0			5.0	4.0		
180	380	75	83.00	88	97.0			5.0	4.0		
190	400	78	86.00	92	101.0			6.0	5.0		
200	420	80	89.00	97	107.0	—	—	6.0	5.0		
220	460	88	97.00	106	117.0			6.0	5.0		
240	500	98	105.00	114	125.0			6.0	5.0		
260	540	102	113.00	123	135.0						
280	560	108	119.00	132	145.0	—	—	—	—		
300	620	—	—	140	154.0	—	—	—	—		

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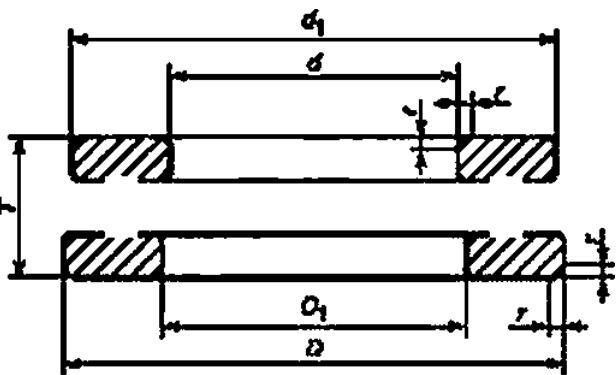
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d —

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9

d	0				%	d				t			
		7	9	1			7	9	1				
		79	99	19			79	99	19				
4	12	4	—	6	0.3	260	290	14	—	22	10		
6	16	5	—	7	0.3	280	310	14	—	22	10		
	18	5	—	7	0.3	300	340	18	24	30	10		
10	20	5	—	7	0.3	320	360	18	24	30	10		
12	22	5	—	7	0.3	340	380	18	24	30	10		
15	26	5	—	7	0.3	360	400	18	24	30	10		
17	28	5	—	7	0.3	360	420	18	24	30	10		
20	32	6	—	8	0.3	400	440	18	24	30	10		
25	37	6	—	8	0.3	420	460	18	24	30	10		
30	42	6	—	8	0.3	440	480	18	24	30	10		
35	47	6	—	8	0.3	460	500	18	24	30	10		
40	52	6	—	9	0.3	480	520	18	24	30	10		
45	60	7	—	10	0.3	500	540	18	24	30	10		
50	65	7	—	10	0.3	530	580	23	30	38	11		
55	70	7	—	10	0.3	560	610	23	30	38	11		
60	75	7	—	10	0.3	600	650	23	30	38	11		
65	80	7	—	10	0.3	630	680	23	30	—	11		
70	85	7	—	10	0.3	670	730	27	36	45	1.5		
75	90	7	—	10	0.3	710	780	32	42	53	1.5		
	95	7	—	10	0.3	750	820	32	42	53	1.5		
65	100	7	—	10	0.3	600	870	32	42	53	1.5		
90	105	7	—	10	0.3	650	920	32	42	53	1.5		
100	120	9	—	14	0.6	900	980	36	48	63	2.0		
110	130	9	—	14	0.6	950	1030	36	48	63	2.0		
120	140	9	—	14	0.6	1000	1090	41	54	70	2.1		
130	150	9	—	14	0.6	1060	1150	41	54	70	2.1		
140	160	9	—	14	0.6	1120	1220	45	60	80	2.1		
150	170	9	—	14	0.6	1180	1280	45	60	80	2.1		
160	180	9	—	14	0.6	1250	1360	50	67	85	3.0		
170	190	9	—	14	0.6	1320	1440	—	—	95	3.0		
180	200	9	—	14	0.6	1400	1520	—	—	95	3.0		
190	215	11	—	17	1.0	1500	1630	—	—	105	4.0		
200	225	11	—	17	1.0	1600	1730	—	—	105	4.0		
220	250	14	—	22	1.0	1700	1840	—	—	112	4.0		
240	270	14	—	22	1.0	1800	1950	—	—	120	4.0		

d	0	X			r*mtn	
		7		1		
1900	2060				130	5
2000	2160	-		-	130	5
2120	2300	-			140	5
2240	2430	-		-	150	5
2360	2550	-		-	150	5
2500	2700	-		-	160	5

d	D	X			r*mm	tf	t $\bowtie$	X			*1«	»	rtnxn						
		7	9	0				7	9	0									
		71	91	01				71	91	01									
10	24	6		9	24	11	0.3	220	270	23	30	37	267	223	11				
12	26	6	—	9	26	13	0.3	240	300	27	36	45	297	243	1.5				
15	28	6	—	9	28	16	0.3	260	320	27	36	45	317	263	1.5				
17	30	6	—	9	30	18	0.3	280	350	32	42	53	347	283	1.5				
20	35	7	—	10	35	21	0.3	300	380	36	48	62	376	304	20				
25	42	8		11	42	26	0.6	320	400	36	48	63	396	324	20				
30	47		—	11	47	32	0.6	340	420	36	48	64	416	344	20				
35	52	8	—	12	52	37	0.6	360	440	36	48	65	436	364	20				
40	60	9	—	13	60	42	0.6	380	460	36	48	65	456	384	20				
45	65	9	—	14	65	47	0.6	400	480	36	48	65	476	404	20				
50	70	9		14	70	52	0.6	420	500	36	48	65	495	424	20				
55	78	10	—	16	78	57	0.6	440	540	45	60	80	535	444	21				
60	85	11	—	17	85	62	1.0	460	560	45	60	80	555	464	21				
65	90	11	—	18	90	67	1.0	480	580	45	60	80	575	484	21				
70	95	11	—	18	95	72	1.0	500	600	45	60	80	595	504	21				
75	100	11		19	100	77	1.0	530	640	50	67	85	635	534	3.0				
60	105	11	—	19	105	82	1.0	560	670	50	67	85	665	564	3.0				
65	110	11	—	19	110	87	1.0	600	710	50	67	85	705	604	3.0				
90	120	14	—	22	120	92	1.0	630	750	54	73	95	745	634	3.0				
100	135	16	21	25	135	102	1.0	670	800	58	78	105	795	674	4.0				
110	145	16	21	25	145	112	1.0	710	850	63	85	112	845	714	4.0				
120	155	16	21	25	155	122	1.0	750	900	67	90	120	895	755	4.0				
130	170	18	24	30	170	132	1.0	800	950	67	90	120	945	805	4.0				
140	180	18	24	31	178	142	1.0	850	1000	67	90	120	995	855	4.0				
150	190	18	24	31	188	152	1.0	900	1060	73	95	130	1055	905	5.0				
160	200	18	24	31	198	162	1.0	950	1120	78	103	135	1115	955	5.0				
170	215	20	27	34	213	172	1.1	1000	1160	82	109	140	1175	1005	5.0				
180	225	20	27	34	222	183	1.1	1060	1250	85	115	150	1245	1065	5.0				
190	240	23	30	37	237	193	1.1	1120	1320	90	122	160	1315	1125	5.0				
200	250	23	30	37	247	203	1.1	1180	1400	100	132	175	1395	1185	5.0				

## 15

a					λ <sub>max</sub>	λ <sub>ianan</sub>	'a mm	d		T			λ <sub>1</sub>	λ <sub>2</sub>	λ <sub>3</sub>	*				
		7	9	0	7	9				7	9	0	7	9	01					
		71	91	0t	71	91				71	91	01	71	91	01					
		1250	1460	175	1455	1255				2240	2570	258	2560	2250	9.5					
		1320	1540	175	1535	1325				2360	2700	265	2690	2370	9.5					
1400	1630			180	1620	1410	60	2500	2850			272	2840	2510	9.5					
1500	1750			195	1740	1510	60													
1600	1850	—	—	195	1840	1610	60													
1700	1970			212	1960	1710	7.5													
1800	2080			220	2070	1810	7.5													
1900	2180			220	2170	1910	7.5													
2000	2300			236	2290	2010	7.5													
2120	2430	—	—	243	2420	2130	7.5													

## 16—

## 2

d		7			λ <sub>1</sub>	λ <sub>2</sub>	'em*	d		**1			λ <sub>1</sub>	λ <sub>2</sub>	λ	λ				
		7	9	0	7	9				7	9	0	7	9	02					
		72	92	02	72	92				72	92	02	72	92	02					
		4	16	6	8	16	4	0.3	130	190	27	36	45	187	133	1.5				
		6	20	6	—	9	20	6	140	200	27	36	46	197	143	1.5				
10	26	22	28	6	—	9	22	8	150	215	29	39	50	212	153	1.5				
12	26	26	28	7	—	11	26	12	160	225	29	39	51	222	163	1.5				
15	32	35	38	6	—	12	32	17	180	250	32	42	56	247	183	1.5				
17	35	40	47	8	—	12	35	19	190	270	36	48	62	267	194	2.0				
20	40	47	52	9	—	14	40	22	200	280	36	48	62	277	204	2.0				
25	47	52	10	10	—	15	47	27	220	300	36	48	63	297	224	2.0				
30	52	52	10	10	—	16	52	32	240	340	45	60	78	335	244	2.1				
35	62	68	73	12	—	18	62	37	10	260	360	45	60	79	355	264	2.1			
40	68	73	78	13	—	19	68	42	10	280	380	45	60	80	375	284	2.1			
45	73	78	83	13	—	20	73	47	10	300	420	54	73	95	415	304	3.0			
50	78	83	89	13	—	22	78	52	10	320	440	54	73	95	435	325	3.0			
55	90	90	96	16	21	25	90	57	10	340	460	54	73	96	455	345	3.0			
60	95	100	105	16	21	26	95	62	10	360	500	63	85	110	495	365	4.0			
65	100	105	110	16	21	27	100	67	10	380	520	63	85	112	515	385	4.0			
70	105	110	115	16	21	27	105	72	10	400	540	63	85	112	535	405	4.0			
75	110	115	120	16	21	27	110	77	10	420	580	73	95	130	575	425	5.0			
80	115	115	120	16	21	28	115	82	10	440	600	73	95	130	595	445	5.0			
85	125	125	130	18	24	31	125	88	10	460	620	73	95	130	615	465	5.0			
90	135	135	135	20	27	35	135	93	11	480	650	78	103	135	645	485	5.0			
100	150	150	150	23	30	38	150	103	11	500	670	78	103	135	665	505	5.0			
110	160	160	160	23	30	38	160	113	11	530	710	82	109	140	705	535	5.0			
120	170	170	170	23	30	39	170	123	11	560	750	85	115	150	745	565	5.0			

d		4isnu<				DWI	d	0	7			RUI	**					
									7									
		7		0					9									
									0									
72	92	02				72	92	02	72	92	02							
600	800	90	122	160	795	605	5.0	1060	1400	155	<b>206</b>	265	1395	1065	9.5			
630	850	100	132	175	845	635	6.0	1120	1460	—	<b>206</b>	—	—	—	9.5			
670	900	103	140	180	895	675	6.0	1180	1520	—	<b>206</b>	—	—	—	9.5			
710	950	109	145	190	945	715	6.0	1250	1610	—	216	—	—	—	9.5			
750	1000	112	150	195	995	755	6.0	1320	1700	228	234	—	—	—	9.5			
800	1060	118	155	205	1055	805	7.5	1400	1790	—	252	—	—	—	12.0			
850	1120	122	160	212	1115	855	7.5	1500	1920	—	264	—	—	—	12.0			
900	1180	125	170	220	1175	905	7.5	1600	2040	—	276	—	—	—	15.0			
950	1250	136	180	236	1245	955	7.5	1700	2160	288	—	—	—	—	15.0			
1000	1320	145	190	250	1315	1005	9.5	1800	2280	—	—	—	—	—	15.0			

d	D	4 <				riffin	d	0	7			4 <	**					
									7									
		7		9					0									
									9			0						
75	93	03				75	93	03	73	63	03							
4	20	7	—	11	20	4	0.6	260	420	73	95	130	415	265	5.0			
6	24	8	—	12	24	6	0.6	280	440	73	95	130	435	285	5.0			
8	26	8	—	12	26	8	0.6	300	480	82	109	140	475	305	5.0			
10	30	9	—	14	30	10	0.6	320	500	82	109	140	495	325	5.0			
12	32	9	—	14	32	12	0.6	340	540	90	122	160	535	345	5.0			
15	37	10	—	15	37	15	0.6	360	560	90	122	160	555	365	5.0			
17	40	10	—	16	40	19	0.6	380	600	100	132	175	595	385	6.0			
20	47	12	—	18	47	22	1.0	400	620	100	132	175	615	405	6.0			
25	52	12	—	18	52	27	1.0	420	650	103	140	180	645	425	6.0			
30	60	14	18	21	60	32	1.0	440	680	109	145	190	675	445	6.0			
35	68	15	20	24	68	37	1.0	460	710	112	150	195	705	465	6.0			
40	78	17	22	26	78	42	1.0	480	730	112	150	195	725	485	6.0			
45	85	18	24	28	85	47	1.0	500	750	112	150	195	745	505	6.0			
50	95	20	27	31	95	52	1.1	530	800	122	160	212	795	535	7.5			
55	105	23	30	35	105	57	1.1	560	50	132	175	224	845	565	7.5			
60	110	23	30	35	110	62	1.1	600	900	136	180	236	895	605	7.5			
65	115	23	30	36	115	67	1.1	630	950	145	190	250	945	635	9.5			
70	125	25	34	40	125	72	1.1	670	1000	150	200	258	995	675	9.5			
75	135	27	36	44	135	77	1.5	710	1060	160	212	272	1055	715	9.5			
80	140	27	36	44	140	82	1.5	750	1120	165	224	290	1115	755	9.5			
85	150	29	39	49	150	88	1.5	800	1180	170	230	300	1175	805	9.5			
90	155	29	39	50	155	93	1.5	850	1250	180	243	315	1245	855	12.0			
100	170	32	42	55	170	103	1.5	900	1320	190	250	335	1315	905	12.0			
110	190	36	48	63	187	113	2.0	950	1400	200	272	355	1395	955	12.0			
120	210	41	54	70	205	123	2.1	1000	1460	—	276	—	—	—	12.0			
130	225	42	58	75	220	134	2.1	1060	1540	—	288	—	—	—	15.0			
140	240	45	60	80	235	144	2.1	1120	1630	—	306	—	—	—	15.0			
150	250	45	60	80	245	154	2.1	1180	1710	—	318	—	—	—	15.0			
160	270	50	67	87	265	164	3.0	1250	1800	—	330	—	—	—	19.0			
170	280	50	67	87	275	174	3.0	1320	1900	—	348	—	—	—	19.0			
180	300	54	73	95	295	184	3.0	1400	2000	—	360	—	—	—	19.0			
190	320	58	78	105	315	195	4.0	1500	2140	—	384	—	—	—	19.0			
200	340	63	85	110	335	205	4.0	1600	2270	—	402	—	—	—	19.0			
220	360	63	85	112	355	225	4.0	—	—	—	—	—	—	—	19.0			
240	380	63	85	112	375	245	4.0	—	—	—	—	—	—	—	19.0			

					^lamax		'a nun	<b>d</b>					^						
		7	9	0															
		74	94	04						74	94	04							
25	60	16	21	24	60	27	10	320	580	118	155	205	575	325	7.5				
30	70	18	24	28	70	32	10	340	620	125	170	220	615	345	7.5				
35	80	20	27	32	80	37	11	360	640	125	170	220	635	365	7.5				
40	90	23	30	36	90	42	11	380	670	132	175	224	665	385	7.5				
45	100	25	34	39	100	47	11	400	710	140	165	243	705	405	7.5				
50	110	27	36	43	110	52	1.5	420	730	140	185	243	725	425	7.5				
55	120	29	39	48	120	57	1.5	440	780	155	206	265	775	445	9.5				
60	130	32	42	51	130	62	1.5	460	800	155	206	265	795	465	9.5				
65	140	34	45	56	140	68	20	480	850	165	224	290	845	485	9.5				
70	150	36	48		150	73	20	500	870	165	224	290	865	505	9.5				
75	160	38	51	65	160	78	20	530	920	175	236	308	915	535	9.5				
80	170	41	54	68	170	83	21	560	980	190	250	335	975	565	12.0				
85	180	42	58	72	177	88	21	600	1030	195	258	335	1025	605	12.0				
90	190	45	60	77	187	93	21	630	1090	206	280	365	1085	635	12.0				
100	210	50	67	85	205	103	3.0	670	1150	218	290	375	1145	675	15.0				
110	230	54	73	95	225	113	3.0	710	1220	230	308	400	1215	715	15.0				
120	250	58	78	102	245	123	4.0	750	1280	236	315	412	1275	755	15.0				
130	270	63	85	110	265	134	4.0	800	1360	250	335	438	1355	805	15.0				
140	280	63	85	112	275	144	4.0	850	1440		354				15.0				
150	300	67	90	120	295	154	4.0	900	1520	—	372	—	—	—	15.0				
160	320	73	95	130	315	164	5.0	950	1600		390				15.0				
170	340	78	103	135	335	174	5.0	1000	1670		402				15.0				
180	360	82	109	140	355	184	5.0	1060	1770		426				15.0				
190	380	85	115	150	375	195	5.0	1120	1860		444				15.0				
200	400	90	122	155	395	205	5.0	1180	1950	—	462	—	—	—	19.0				
220	420	90	122	160	415	225	6.0	1250	2050		480				19.0				
240	440	90	122	160	435	245	6.0	1320	2160		505				19.0				
260	480	100	132	175	475	265	6.0	1400	2280		530				19.0				
280	520	109	145	190	515	285	6.0												
300	540	109	145	190	535	305	6.0												

					'a nun	<b>d</b>					'a										
		9																			
		96																			
		95																			
17	52	21	10	40	110	42								1.5							
20	60	24	10	45	120	45								2.0							
25	73	29	11	50	135	51								2.0							
30	85	34	11	55	150	58								2.1							
35	100	39	11	60	160	60								2.1							

19

<b>d</b>		7	'*	<b>d</b>	<b>D</b>		<b>r*m*</b>
		9				9	
		9S				95	
65	170	63	2.1	280	620	206	9.5
70	180	67	3.0	300	670	224	9.5
75	190	69	3.0	320	710	236	9.5
80	200	73	3.0	340	750	243	12.0
85	215	78	4.0	360	780	250	12.0
90	225	82	4.0	380	820	265	12.0
100	250	90	4.0	400	850	272	12.0
110	270	95	5.0	420	900	290	15.0
120	300	109	5.0	440	950	308	15.0
130	320	115	5.0	460	980	315	15.0
140	340	122	5.0	480	1000	315	15.0
150	360	125	6.0	500	1060	335	15.0
160	380	132	6.0	530	1090	335	15.0
170	400	140	6.0	560	1150	355	15.0
180	420	145	6.0	600	1220	375	15.0
190	440	150	6.0	630	1280	388	15.0
200	460	155	7.5	670	1320	388	15.0
220	500	170	7.5	710	1400	412	15.0
240	540	180	7.5				
260	580	190	9.5				

9

9.1

4.  
20—22.

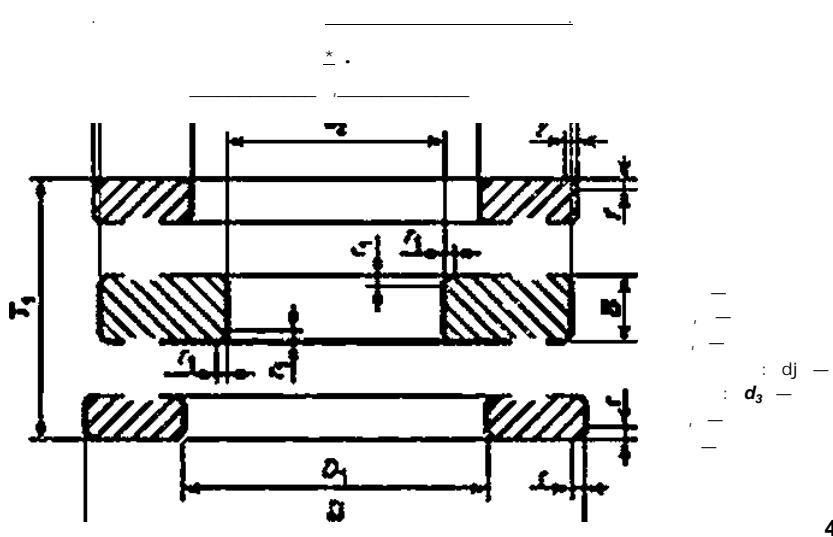
9.2

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20-22

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2.

02

*2	<fi'	D	r1		**3* max		'»	'it OWI
10	15	32	22	5	32.0	17	0.6	0.3
15	20	40	26	6	40.0	22	0.6	0.3
20	25	47	28	7	47.0	27	0.6	0.3
25	30	52	29	7	52.0	32	0.6	0.3
30	35	62	34	8	62.0	37	1.0	0.3
30	40	68	36	9	68.0	42	1.0	0.6
35	45	73	37	9	73.0	47	1.0	0.6
40	50	78	39	9	78.0	52	1.0	0.6
45	55	90	45	10	90.0	57	1.0	0.6
50	60	95	46	10	95.0	62	1.0	0.6
55	65	100	47	10	100.0	67	1.0	0.6
55	70	105	47	10	105.0	72	1.0	1.0
60	75	110	47	10	110.0	77	1.0	1.0
65	80	115	48	10	115.0	82	1.0	1.0
70	85	125	55	12	125.0	88	1.0	1.0
75	90	135	62	14	135.0	93	1.1	1.0
65	100	150	67	15	150.0	103	1.1	1.0
95	110	160	67	15	160.0	113	1.1	1.0
100	120	170	68	15	170.0	123	1.1	1.1
110	130	190	80	18	189.5	133	1.5	1.1
120	140	200	81	18	199.5	143	1.5	1.1
130	150	215	89	20	214.5	153	1.5	1.1
140	160	225	90	20	224.5	163	1.5	1.1
150	170	240	97	21	239.5	173	1.5	1.1
150	180	250	98	21	249.0	183	1.5	2.0
160	190	270	109	24	269.0	194	2.0	2.0
170	200	280	109	24	279.0	204	2.0	2.0
190	220	300	110	24	299.0	224	2.0	2.0
**d—								
* 16.								
2								

21—

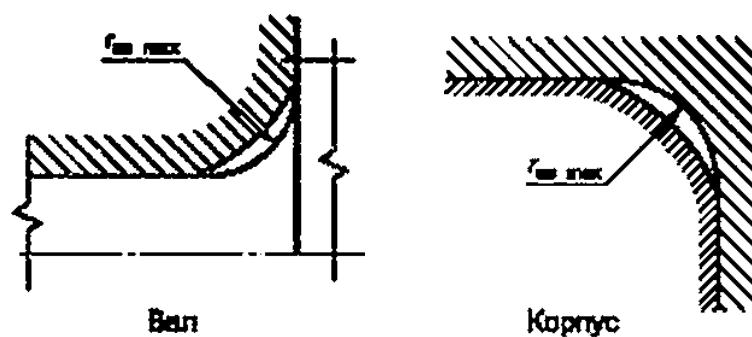
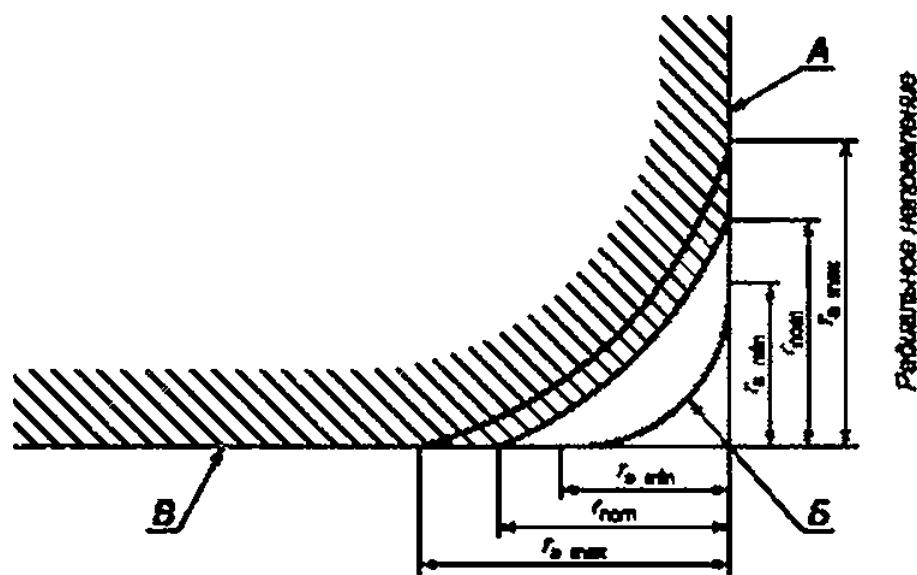
3.

03

*2			.		*	®Umin	r«	r* m«
20	25	52	34	8	52.0	27	1 0	0.3
25	30	60	38	9	60.0	32	1 0	0.3
30	35	68	44	10	68.0	37	1 0	0.3
30	40	78	49	12	78.0	42	1 0	0.6
35	45	85	52	12	85.0	47	1 0	0.6
40	50	95	58	14	95.0	52	1 1	0.6
45	55	105	64	15	105.0	57	1 1	0.6
50	60	110	64	15	110.0	62	1 1	0.6
55	65	115	65	15	115.0	67	1 1	0.6
55	70	125	72	16	125.0	72	1 1	1 0
60	75	135	79	18	135.0	77	1.5	1 0
65	80	140	79	18	140.0	82	1.5	1 0
70	85	150	87	19	150.0	88	1.5	1 0
75	90	155	88	19	155.0	93	1.5	1 0
65	100	170	97	21	170.0	103	1.5	1 0

		0			*3smai	BWV	«	
95	110	190	110	24	189.5	113	20	10
100	120	210	123	27	209.5	123	21	11
110	130	225	130	30	224.0	134	21	11
120	140	240	140	31	239.0	144	21	11
130	150	250	140	31	249.0	154	21	11
140	160	270	153	33	269.0	164	3.0	11
150	170	280	153	33	279.0	174	3.0	11
150	180	300	165	37	299.0	184	3.0	20
160	190	320	183	40	319.0	195	4.0	20
170	200	340	192	42	339.0	205	4.0	20
> <b>d</b> —								
17.								

	d* >	0	,		^ *		f* mn	'itmin
15	25	60	45	11	60	27	10	06
20	30	70	52	12	70	32	10	06
25	35	80	59	14	80	37	11	06
30	40	90	65	15	90	42	11	06
35	45	100	72	17	100	47	11	06
40	50	110	78	18	1100	52	1.5	06
45	55	120	87	20	1200	57	1.5	06
50	60	130	93	21	130.0	62	1.5	06
50	65	140	101	23	140.0	68	20	10
55	70	150	107	24	150.0	73	20	10
60	75	160	115	26	160.0	78	20	10
65	80	170	120	27	170.0	83	21	10
65	85	180	128	29	179.5	88	2,1	11
70	90	190	135	30	189.5	93	21	11
80	100	210	150	33	209.5	103	3.0	11
90	110	230	166	37	229.0	113	3.0	11
95	120	250	177	40	249.0	123	4.0	1.5
100	130	270	192	42	269.0	134	4.0	20
110	140	280	196	44	279.0	144	4.0	20
120	150	300	209	46	299.0	154	4.0	20
130	160	320	226	50	319.0	164	5.0	20
135	170	340	236	50	339.0	174	5.0	21
140	180	360	245	52	359.0	184	5.0	3.0
^ > <b>d</b> —								
18.								



6

10.2

$r_s m(n)$

10.3

45

23. 24 25.

104

26.

105

2

23

5

f	r*mtn			% mu		rasmox
0.10	0.05	—	—	0.10	0.2	0.05
0.15	0.08	—	—	0.16	0.3	0.08
0.20	0.10	—	—	0.20	0.4	0.10
0.30	0.15	—	—	0.30	0.6	0.15
0.40	0.20	—	—	0.50	0.8	0.20
0.50	0.30	40	40	0.60	1.0	0.30
0.50	0.30	40	—	0.80	1.0	0.30
1.00	0.60	—	40	1.00	2.0	0.60
1.00	0.60	40	—	1.30	2.0	0.60
1.50	1.00	—	50	1.50	3.0	1.00
1.5	1.0	50	—	1.9	3.0	1.0
2.0	1.1	—	120	2.0	3.5	1.1
2.0	1.1	120	—	2.5	4.0	1.1
2.5	1.5	—	120	2.3	4.0	1.5
2.5	1.5	120	—	3.0	5.0	1.5
3.0	2.0	—	80	3.0	4.5	2.0
3.0	2.0	80	220	3.5	5.0	2.0
3.0	2.0	220	—	3.8	6.0	2.0
3.5	2.1	—	280	4.0	6.5	2.1
3.5	2.1	280	—	4.5	7.0	2.1
—	2.5	—	100	3.8	6.0	2.5
—	2.5	100	280	4.5	6.0	2.5
—	2.5	280	—	5.0	7.0	2.5
4.0	3.0	—	280	5.0	8.0	3.0
4.0	3.0	280	—	5.5	8.0	3.0
5.0	4.0	—	—	6.5	9.0	4.0
6.0	5.0	—	—	8.0	10.0	5.0
6.0	6.0	—	—	10.0	13.0	6.0
10.0	7.5	—	—	12.5	17.0	7.5
12.0	0.5	—	—	15.0	19.0	9.5
15.0	12.0	—	—	18.0	24.0	12.0
18.0	15.0	—	—	21.0	30.0	15.0
22.0	19.0	—	—	25.0	38.0	19.0

10.6

24.

f	» »			»		"
0.5	0.3	—	40	0.7	1.4	0.3
0.5	0.3	40	—	0.9	1.6	0.3
0.8	0.5	—	—	1.2	1.2	0.5
1.0	0.6	—	40	1.1	1.7	0.6
1.0	0.6	46	—	1.3	2.0	0.6

24

·	·	d		RKU		'at
		0	·	0	·	
1,2	0.9			1.7	1.7	0.9
1.5	1.0		50	1.6	2.5	1.0
1.5	1.0	50	—	1.9	3.0	1.0
2.0	1.5		120	2.3	3.0	1.5
2.0	1.5	120	250	2.8	3.5	1.5
2.0	1.5	250		3.5	4.0	1.5
2.5	2.0		120	2.8	4.0	2.0
2.5	2.0	120	250	3.5	4.5	2.0
2.5	2.0	250		4.0	5.0	2.0
3.0	2.5	—	120	3.5	5.0	2.5
3.0	2.5	120	250	4.0	5.5	2.5
3.0	2.5	250		4.5	6.0	2.5
3.5	3.0	—	120	4.0	5.5	3.0
3.5	3.0	120	250	4.5	6.5	3.0
3.5	3.0	250	400	5.0	7.0	3.0
3.5	3.0	400		5.5	7.5	3.0
4.0	4.0		120	5.0	7.0	4.0
4.0	4.0	120	250	5.5	7.5	4.0
4.0	4.0	250	400	6.0	8.0	4.0
4.0	4.0	400	—	6.5	8.5	4.0
5.0	5.0		180	6.5	—	5.0
5.0	5.0	180		7.5	9.0	5.0
6.0	6.0	—	180	7.5	10.0	6.0
6.0	6.0	180	—	9.0	11.0	6.0

10.7

10.8

25.

25 —

·	% mn	* < * )	«
0.10	0.05	0.10	0.05
0.15	0.08	0.16	0.08
0.20	0.10	0.20	0.10
0.30	0.15	0.30	0.15
0.40	0.20	0.50	0.20
0.50	0.30	0.80	0.30
1.00	0.60	1.50	0.60
1.50	1.00	2.20	1.00
2.00	1.10	2.70	1.10
2.50	1.50	3.50	1.50

>		% **	' »
3.00	2.00	4.00	2.00
3.50	2.10	4.50	2.10
4.00	3.00	5.50	3.00
5.00	4.00	6.50	4.00
6.00	5.00	8.00	5.00
8.00	6.00	10.00	6.00
10.00	7.50	12.50	7.50
12.00	9.50	15.00	9.50
15.00	12.00	18.00	12.00
18.00	15.00	21.00	15.00
22.00	19.00	25.00	19.00
*	.	.	.

	«	* *	«
0.2	0.1	0.4	0.1
0.3	0.2	0.5	0.2
0.4	0.2	0.7	0.2
0.5	0.3	0.8	0.3
0.8	0.5	1.2	0.5
1.0	0.7	1.5	0.6
1.2	0.9	1.7	0.8
1.5	1.1	2.1	1.0
2.0	1.3	2.7	1.0
2.5	1.8	3.3	1.5
3.0	2.3	4.0	2.0
3.5	2.5	4.5	2.0
4.0	3.0	5.2	2.5
5.0	3.7	6.3	3.0
6.0	4.7	7.5	4.0
8.0	6.0	10.0	5.0
10.0	7.5	12.5	6.0
12.0	9.5	15.0	8.0
15.0	12.0	19.0	10.0
18.0	14.0	23.0	12.0

( )

.1 .1— .4 ( )  
 104:2002 [3]. 15:2011 (1). 355:1977 [2]  
 355:2007 — 355:1977 [4].  
 355:1977

355:2007.

.1 —

3478		15:2011		3478		15:2011	
1		1		7		0	
3		3		1		1	
7		0		2		2	
1		1		3		3	
2		2		4		4	
3	8	3	8				
4		4		0		0	
5		5		1		1	
6		6		0	5	2	
7		0		3		3	
1		1		4		4	
2		2		8		8	
3	9	3	9	0		0	
4		4		1		1	
5		5		0	6	2	
6		6		3	3	3	
7		0		0		0	
0		1		2		2	
2		2					
3	1	3	0				
4		4					
5		5					
6		6					

.2 —

5478		365 1977		3478		35S:1977	
2	9	2	9	0	2	0	2
3		3		0	5	2	
2	1	2	V	3	2	3	3
3		3		0	6	0	
3	7	3	1	1		1	
				0	6	2	

. —

3478		104.2002		3478		104:2002	
7	9	7	0	7	3	7	3
9		9		9		9	
1		1		0		1	
7	1	7	1	7	4	7	4
9		9		9		9	
0		1		0		1	
7	2	7	2	9	5	9	5
9		9					
0		1					

.4 —

3478		104:2002	
0	2	2	2
0	3	2	3
0	4	2	4

( )

.1

.2  
R40 8032.**d.**  
**D**

$$D = d^2 I_0 d \circ -9.$$

( .1)

**d**

.1— fg

<sup>^</sup>							
0		9	1	7	2 5	3	4
0.34	0.45	0.62	0.84	1.12	1.48	1.92	2.56

.2.

.2 —

**D**

3	0.5
3 80	1
* 80 230 »	5
» 230	10

.4

$$B = Q \cdot 5 f_e (D - d),$$

( .2)

**f\$****fg**

( )							
0	<b>X</b>	2	3	4	6		7
0.64	0.88	1.15	1.5	2	2.7	3.6	

8032

R80

.4.

3	0.1
» 4 »	0.5
» 4 » 500 »	1
» 500	5

.5

 $r_f - \min$ 

23

: 7 %

8 7 %

 $\{ - d)/2.$

( )

1

.2

R40 8032.

**D****D-d\*I<sub>0</sub>d<sup>0B</sup>.**

( .1)

**d**

.1.

.1 —

/0

9	1	2	3	4	S
0.36	0.72	1.2	1.84	2.68	3.8

.2.

.2 —

3	0.5
3 » 80 »	1
» 80 » 230 »	5
» 230	10

.4

**D-d**

( .2)

8

**fj**

1

fj		
7	9	1
0.9	1.2	1.6

R80

**8032**

.4.

.4—

0	
3	0 1
. 3 » 4 »	0.5
» 4 * 500 »	1
» 500	5

.5

%

25

: 7 %

7 %

***(D — d)f2.***

- [1] 15:2011  
(ISO 15:2011 Rolling bearings — Radial bearings — Boundary dimensions. general plan)
- [2] 355:1977  
(ISO 355:1977 Rolling bearings; Metric tapered roller bearings: Boundary dimensions and series designations)
- [3] 104:2002  
(ISO104:2002 Rolling bearings — Thrust bearings — Boundary dimensions. general plan)
- [4] 355:2007  
(ISO 355:2007 Rotbng bearings — Tapered roller bearings — Boundary & dimensions and series designations)

3478—2012

**621.822.6:006.354**      **21.100.20**      **46 0000**      **NEQ**

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£.£.

04.06.2014.      17.09.2014      60 \*64 Vg.  
6.12.      4.60      260      3747.

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