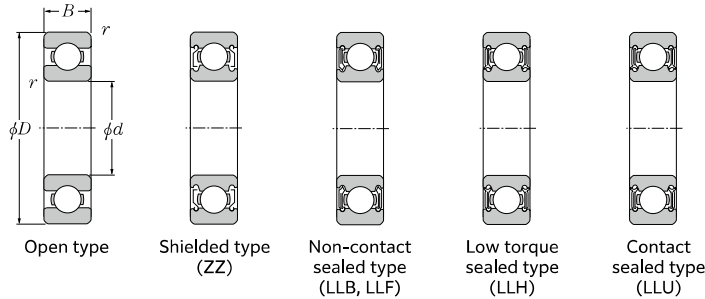


# Deep Groove Ball Bearings

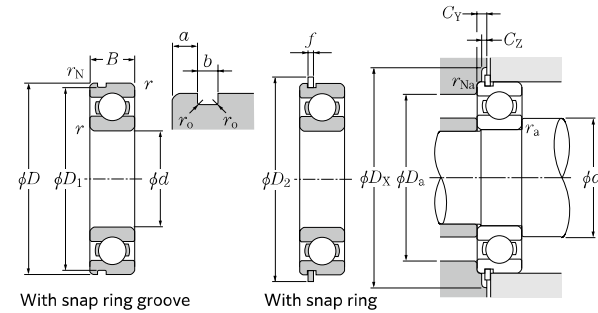


d 20 ~ 35mm

Boundary dimensions	Basic load rating		Fatigue load limit	Factor	Allowable speed				Bearing number								
	mm	dynamic kN			static kN	Grease	Oil	min <sup>-1</sup>		Open type		Shielded or sealed type <sup>2)</sup>					
d	D	B	r <sub>smin</sub> <sup>1)</sup>	r <sub>NS</sub> Min.	C <sub>r</sub>	C <sub>0r</sub>	C <sub>u</sub>	f <sub>0</sub>	ZZ, LLB, LLF	Z, LB, LF	LLH	LLU	Open type	Shielded or sealed type <sup>2)</sup>	(See drawings)		
<b>20</b>	72	19	1.1	—	31.5	13.9	1.09	11.4	12 000	14 000	—	—	<b>6404</b>	<b>ZZ</b>	—	—	
<b>22</b>	44	12	0.6	0.5	10.4	5.05	0.395	13.9	17 000	20 000	13 000	10 000	<b>60/22</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	50	14	1	0.5	14.3	6.80	0.500	13.5	14 000	17 000	12 000	9 700	<b>62/22</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	56	16	1.1	0.5	20.4	9.25	0.725	12.4	13 000	15 000	11 000	9 200	<b>63/22</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
<b>25</b>	32	4	0.2	—	1.21	0.840	0.036	15.8	4 000	4 600	—	—	<b>6705</b>	—	<b>LLF</b>	—	—
	37	7	0.3	0.3	4.75	2.95	0.208	16.1	18 000	21 000	—	10 000	<b>6805JR</b>	<b>ZZ</b>	<b>LLB</b>	—	<b>LLU</b>
	42	9	0.3	0.3	7.80	4.55	0.345	15.4	16 000	19 000	11 700	9 800	<b>6905</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	47	8	0.3	—	9.25	5.10	0.400	15.1	15 000	18 000	—	—	<b>16005</b>	—	—	—	—
	47	12	0.6	0.5	11.2	5.85	0.380	14.5	15 000	18 000	11 000	9 400	<b>6005</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	52	15	1	0.5	15.5	7.85	0.550	13.9	13 000	15 000	11 000	8 900	<b>6205</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	62	17	1.1	0.5	23.5	10.9	0.855	12.6	12 000	14 000	9 700	8 100	<b>6305</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
80	21	1.5	—	38.5	17.5	1.36	11.6	10 000	12 000	—	—	<b>6405</b>	<b>ZZ</b>	—	—	—	
<b>28</b>	52	12	0.6	0.5	13.8	7.40	0.580	14.5	14 000	16 000	10 000	8 400	<b>60/28</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	58	16	1	0.5	19.8	9.75	0.720	13.4	12 000	14 000	9 700	8 100	<b>62/28</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	68	18	1.1	0.5	29.6	14.0	1.10	12.4	11 000	13 000	8 900	7 400	<b>63/28</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
<b>30</b>	37	4	0.2	—	1.27	0.950	0.041	15.7	3 300	3 800	—	—	<b>6706</b>	—	<b>LLF</b>	—	—
	42	7	0.3	0.3	5.20	3.65	0.244	16.5	15 000	18 000	10 500	8 800	<b>6806JR</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	47	9	0.3	0.3	8.00	5.00	0.365	15.8	14 000	17 000	10 000	8 400	<b>6906</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	55	9	0.3	—	12.5	7.35	0.570	15.2	13 000	15 000	—	—	<b>16006</b>	—	—	—	—
	55	13	1	0.5	14.7	8.30	0.650	14.8	13 000	15 000	9 200	7 700	<b>6006</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	62	16	1	0.5	21.6	11.3	0.795	13.8	11 000	13 000	8 800	7 300	<b>6206</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	72	19	1.1	0.5	29.5	15.0	1.14	13.3	10 000	12 000	7 900	6 600	<b>6306</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
90	23	1.5	—	48.0	23.9	1.86	12.3	8 800	10 000	—	—	<b>6406</b>	<b>ZZ</b>	—	—	—	
<b>32</b>	58	13	1	0.5	13.1	8.05	0.615	15.4	12 000	15 000	8 700	7 200	<b>60/32</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	65	17	1	0.5	23.0	11.6	0.840	13.6	11 000	12 000	8 400	7 100	<b>62/32</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	75	20	1.1	0.5	33.0	16.9	1.30	13.1	9 500	11 000	7 700	6 500	<b>63/32</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
<b>35</b>	47	7	0.3	0.3	5.45	4.05	0.268	16.4	13 000	16 000	—	7 600	<b>6807JR</b>	<b>ZZ</b>	<b>LLB</b>	—	<b>LLU</b>
	55	10	0.6	0.5	10.6	6.85	0.495	15.8	12 000	15 000	8 500	7 100	<b>6907</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	62	9	0.3	—	12.9	8.20	0.605	15.6	12 000	14 000	—	—	<b>16007</b>	—	—	—	—
	62	14	1	0.5	17.7	10.3	0.805	14.8	12 000	14 000	8 200	6 800	<b>6007</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	72	17	1.1	0.5	28.4	15.3	1.09	13.8	9 800	11 000	7 600	6 300	<b>6207</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
	80	21	1.5	0.5	37.0	19.1	1.47	13.1	8 800	10 000	7 300	6 000	<b>6307</b>	<b>ZZ</b>	<b>LLB</b>	<b>LLH</b>	<b>LLU</b>
100	25	1.5	—	61.0	31.0	2.43	12.3	7 800	9 100	—	—	<b>6407</b>	<b>ZZ</b>	—	—	—	

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available. B-24

# Deep Groove Ball Bearings



Dynamic equivalent radial load

$$P_r = X F_r + Y F_a$$

f <sub>0</sub> ·F <sub>a</sub> C <sub>0r</sub>	e	F <sub>a</sub> /F <sub>r</sub> ≤ e		F <sub>a</sub> /F <sub>r</sub> > e	
		X	Y	X	Y
0.172	0.19	—	—	—	2.30
0.345	0.22	—	—	—	1.99
0.689	0.26	—	—	—	1.71
1.03	0.28	—	—	—	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	—	—	—	1.31
3.45	0.38	—	—	—	1.15
5.17	0.42	—	—	—	1.04
6.89	0.44	—	—	—	1.00

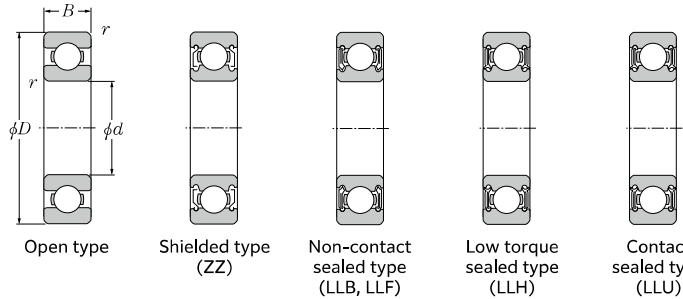
Static equivalent radial load

$$P_{0r} = 0.6 F_r + 0.5 F_a$$

When  $P_{0r} < F_r$  use  $P_{0r} = F_r$ .

Bearing number	Snap ring groove dimensions				Snap ring dimensions		Installation-related dimensions						Mass <sup>5)</sup>		
	mm				mm		mm							kg	
Groove / Snap ring <sup>3)</sup> (See drawings)	D <sub>1</sub> Max.	a Max.	b Min.	r <sub>o</sub> Max.	D <sub>2</sub> Max.	f Max.	Min.	d <sub>a</sub> Max. <sup>4)</sup>	D <sub>a</sub> Max.	D <sub>X</sub> (approx.)	C <sub>Y</sub> Max.	C <sub>Z</sub> Min.	r <sub>as</sub> Max.		r <sub>Nas</sub> Max.
—	—	—	—	—	—	—	26.5	35.5	65.5	—	—	—	1	—	0.4
<b>N NR</b>	41.75	2.06	1.35	0.4	48.3	1.12	26	26.5	40	49	2.9	1.2	0.6	0.5	0.074
<b>N NR</b>	47.6	2.46	1.35	0.4	55.7	1.12	27	29.5	45	56.5	3.3	1.2	1	0.5	0.117
<b>N NR</b>	53.6	2.46	1.35	0.4	61.7	1.12	28.5	31	49.5	62.5	3.3	1.2	1	0.5	0.176
—	—	—	—	—	—	—	26.6	27.3	30.4	—	—	—	—	0.2	0.005
<b>N NR</b>	35.7	1.3	0.95	0.25	39.8	0.85	27	28	35	40.5	1.9	0.9	0.3	0.3	0.022
<b>N NR</b>	40.7	1.7	0.95	0.25	44.8	0.85	27	29	40	45.5	2.3	0.9	0.3	0.3	0.042
—	—	—	—	—	—	—	27	—	45	—	—	—	—	0.3	0.06
<b>N NR</b>	44.6	2.06	1.35	0.4	52.7	1.12	29	30.5	43	53.5	2.9	1.2	0.6	0.5	0.08
<b>N NR</b>	49.73	2.46	1.35	0.4	57.9	1.12	30	32	47	58.5	3.3	1.2	1	0.5	0.128
<b>N NR</b>	59.61	3.28	1.9	0.6	67.7	1.7	31.5	35	55.5	68.5	4.6	1.7	1	0.5	0.232
—	—	—	—	—	—	—	33	41	72	—	—	—	1.5	—	0.53
<b>N NR</b>	49.73	2.06	1.35	0.4	57.9	1.12	32	34	48	58.5	2.9	1.2	0.6	0.5	0.098
<b>N NR</b>	55.6	2.46	1.35	0.4	63.7	1.12	33	35.5	53	64.5	3.3	1.2	1	0.5	0.171
<b>N NR</b>	64.82	3.28	1.9	0.6	74.6	1.7	34.5	38.5	61.5	76	4.6	1.7	1	0.5	0.284
—	—	—	—	—	—	—	31.6	32.3	35.4	—	—	—	—	0.2	0.006
<b>N NR</b>	40.7	1.3	0.95	0.25	44.8	0.85	32	33	40	45.5	1.9	0.9	0.3	0.3	0.026
<b>N NR</b>	45.7	1.7	0.95	0.25	49.8	0.85	32	34	45	50.5	2.3	0.9	0.3	0.3	0.048
—	—	—	—	—	—	—	32	—	53	—	—	—	—	0.3	0.091
<b>N NR</b>	52.6	2.08	1.35	0.4	60.7	1.12	35	37	50	61.5	2.9	1.2	1	0.5	0.116
<b>N NR</b>	59.61	3.28	1.9	0.6	67.7	1.7	35	39	57	68.5	4.6	1.7	1	0.5	0.199
<b>N NR</b>	68.81	3.28	1.9	0.6	78.6	1.7	36.5	43	65.5	80	4.6	1.7	1	0.5	0.36
—	—	—	—	—	—	—	38	49	82	—	—	—	—	1.5	0.735
<b>N NR</b>	55.6	2.08	1.35	0.4	63.7	1.12	37	39	53	64.5	2.9	1.2	1	0.5	0.129
<b>N NR</b>	62.6	3.28	1.9	0.6	70.7	1.7	37	40	60	71.5	4.6	1.7	1	0.5	0.226
<b>N NR</b>	71.83	3.28	1.9	0.6	81.6	1.7	38.5	43.5	68.5	83	4.6	1.7	1	0.5	0.382

# Deep Groove Ball Bearings

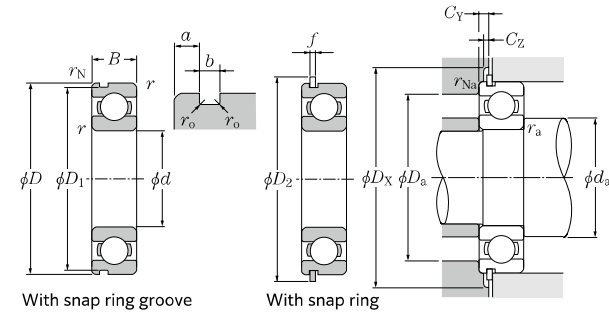


d 10 ~ 20mm

	Boundary dimensions				Basic load rating		Fatigue load limit $C_{10}$	Factor $f_0$	Allowable speed $\text{min}^{-1}$			Bearing number					
	mm				dynamic	static			Grease	Oil			Open type	Shielded or sealed type <sup>2)</sup>			
	d	D	B	$r_{s\text{min}}^{1)}$	$C_r$	$C_{0r}$	$C_u$		Open type, ZZ, LLB, LLF, Z, LB, LF	Open type, Z, LB, LF	LLH	LLU		(See drawings)			
10	15	3	0.1	—	0.950	0.435	0.018	15.7	10 000	12 000	—	—	6700	—	—	—	
	19	5	0.3	—	2.03	0.925	0.072	14.8	32 000	38 000	—	24 000	6800	ZZ	LLB	LLU	
	22	6	0.3	0.3	2.99	1.27	0.099	14.0	30 000	36 000	25 000	21 000	6900	ZZ	LLB	LLH	LLU
	26	8	0.3	—	5.05	1.96	0.138	12.4	29 000	34 000	25 000	21 000	6000	ZZ	LLB	LLH	LLU
	30	9	0.6	0.5	5.65	2.39	0.182	13.2	25 000	30 000	21 000	18 000	6200	ZZ	LLB	LLH	LLU
35	11	0.6	0.5	9.10	3.50	0.273	11.4	23 000	27 000	20 000	16 000	6300	ZZ	LLB	LLH	LLU	
12	18	4	0.2	—	1.03	0.530	0.021	16.2	8 300	9 500	—	—	6701	—	LLF	—	
	21	5	0.3	—	2.12	1.04	0.080	15.3	29 000	35 000	—	20 000	6801	ZZ	LLB	LLU	
	24	6	0.3	0.3	3.20	1.46	0.115	14.5	27 000	32 000	22 000	19 000	6901	ZZ	LLB	LLH	LLU
	28	7	0.3	—	5.65	2.39	0.187	13.2	26 000	30 000	—	—	16001JRX	—	—	—	
	28	8	0.3	—	5.65	2.39	0.182	13.2	26 000	30 000	21 000	18 000	6001JRX	ZZ	LLB	LLH	LLU
	32	10	0.6	0.5	6.75	2.75	0.214	12.7	22 000	26 000	20 000	16 000	6201	ZZ	LLB	LLH	LLU
37	12	1	0.5	10.8	4.20	0.325	11.1	20 000	24 000	19 000	15 000	6301	ZZ	LLB	LLH	LLU	
15	21	4	0.2	—	1.04	0.585	0.024	16.5	6 600	7 600	—	—	6702	—	LLF	—	
	24	5	0.3	—	2.30	1.26	0.091	15.8	26 000	31 000	—	17 000	6802	ZZ	LLB	LLU	
	28	7	0.3	0.3	4.05	2.00	0.157	14.8	24 000	28 000	—	16 000	6902	ZZ	LLB	LLU	
	32	8	0.3	—	6.20	2.84	0.222	13.9	22 000	26 000	—	—	16002	—	—	—	
	32	9	0.3	0.3	6.20	2.84	0.199	13.9	22 000	26 000	18 000	15 000	6002	ZZ	LLB	LLH	LLU
	35	11	0.6	0.5	8.60	3.60	0.279	12.7	19 000	23 000	18 000	15 000	6202	ZZ	LLB	LLH	LLU
42	13	1	0.5	12.7	5.45	0.425	12.3	17 000	21 000	15 000	12 000	6302	ZZ	LLB	LLH	LLU	
17	23	4	0.2	—	1.11	0.660	0.027	16.3	5 000	6 700	—	—	6703	—	LLF	—	
	26	5	0.3	—	2.47	1.46	0.102	16.1	24 000	28 000	—	15 000	6803	ZZ	LLB	LLU	
	30	7	0.3	0.3	5.15	2.58	0.202	14.7	22 000	26 000	—	14 000	6903JRX	ZZ	LLB	LLU	
	35	8	0.3	—	7.55	3.35	0.263	13.6	20 000	24 000	—	—	16003	—	—	—	
	35	10	0.3	0.3	7.55	3.35	0.243	13.6	20 000	24 000	16 000	14 000	6003	ZZ	LLB	LLH	LLU
	40	12	0.6	0.5	10.6	4.60	0.355	12.8	18 000	21 000	15 000	12 000	6203	ZZ	LLB	LLH	LLU
	47	14	1	0.5	15.0	6.55	0.510	12.2	16 000	19 000	14 000	11 000	6303	ZZ	LLB	LLH	LLU
62	17	1.1	—	25.2	10.8	0.840	11.1	14 000	16 000	—	—	6403	ZZ	—	—	—	
20	27	4	0.2	—	1.15	0.730	0.031	16.1	5 000	5 700	—	—	6704	—	LLF	—	
	32	7	0.3	0.3	4.45	2.47	0.185	15.5	21 000	25 000	—	13 000	6804JR	ZZ	LLB	LLU	
	37	9	0.3	0.3	7.05	3.70	0.288	14.7	19 000	23 000	—	12 000	6904	ZZ	LLB	LLU	
	42	8	0.3	—	8.75	4.50	0.350	14.5	18 000	21 000	—	—	16004	—	—	—	
	42	12	0.6	0.5	10.4	5.05	0.355	13.9	18 000	21 000	13 000	11 000	6004	ZZ	LLB	LLH	LLU
	47	14	1	0.5	14.2	6.65	0.505	13.2	16 000	18 000	12 000	10 000	6204	ZZ	LLB	LLH	LLU
	52	15	1.1	0.5	17.6	7.90	0.615	12.4	14 000	17 000	12 000	10 000	6304	ZZ	LLB	LLH	LLU

1) Smallest allowable dimension for chamfer dimension  $r_s$ . 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available. B-22

# Deep Groove Ball Bearings



With snap ring groove

With snap ring

Dynamic equivalent radial load

$$P_r = X F_r + Y F_a$$

$f_0 \cdot F_a$ $C_{0r}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19				2.30
0.345	0.22				1.99
0.689	0.26				1.71
1.03	0.28				1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34				1.31
3.45	0.38				1.15
5.17	0.42				1.04
6.89	0.44				1.00

Static equivalent radial load

$$P_{0r} = 0.6 F_r + 0.5 F_a$$

When  $P_{0r} < F_r$  use  $P_{0r} = F_r$ .

Bearing number	Snap ring groove dimensions				Snap ring dimensions		Installation-related dimensions						Mass <sup>5)</sup> kg			
	mm				mm		mm									
	$D_1$ Max.	a Max.	b Min.	$r_o$ Max.	$D_2$ Max.	f Max.	Min.	$d_a$ Max. <sup>4)</sup>	$D_a$ Max.	$D_X$ (approx)	$C_Y$ Max.	$C_Z$ Min.		$r_{as}$ Max.	$r_{Nas}$ Max.	(approx)
—	—	—	—	—	—	—	10.8	—	14.2	—	—	—	0.1	—	0.0015	
—	—	—	—	—	—	—	12	12.5	17	—	—	—	0.3	—	0.005	
N	NR	20.8	1.05	0.8	0.2	24.8	0.7	12	13	20	25.5	1.5	0.7	0.3	0.009	
—	—	—	—	—	—	—	—	12	13.5	24	—	—	0.3	—	0.019	
N	NR	28.17	2.06	1.35	0.4	34.7	1.12	14	16	26	35.5	2.9	1.2	0.6	0.5	0.032
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	14	17	31	40.5	2.9	1.2	0.6	0.5	0.053
—	—	—	—	—	—	—	—	13.6	13.8	16.4	—	—	—	0.2	—	0.002
—	—	—	—	—	—	—	—	14	14.5	19	—	—	—	0.3	—	0.006
N	NR	22.8	1.05	0.8	0.2	26.8	0.7	14	15	22	27.5	1.5	0.7	0.3	0.3	0.011
—	—	—	—	—	—	—	—	14	—	26	—	—	—	0.3	—	0.019
NX2	NX2RX3	26.44	2.20	0.90	0.3	32.7	0.85	14	16	26	33.4	2.8	0.9	0.3	0.3	0.021
N	NR	30.15	2.06	1.35	0.4	36.7	1.12	16	17	28	37.5	2.9	1.2	0.6	0.5	0.037
N	NR	34.77	2.06	1.35	0.4	41.3	1.12	17	18.5	32	42	2.9	1.2	1	0.5	0.06
—	—	—	—	—	—	—	—	16.6	16.8	19.4	—	—	—	0.2	—	0.0025
—	—	—	—	—	—	—	—	17	17.5	22	—	—	—	0.3	—	0.007
N	NR	26.7	1.3	0.95	0.25	30.8	0.85	17	17.5	26	31.5	1.9	0.9	0.3	0.3	0.016
—	—	—	—	—	—	—	—	17	—	30	—	—	—	0.3	—	0.025
N	NR	30.15	2.06	1.35	0.4	36.7	1.12	17	19	30	37.5	2.9	1.2	0.3	0.3	0.03
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	19	20	31	40.5	2.9	1.2	0.6	0.5	0.045
N	NR	39.75	2.06	1.35	0.4	46.3	1.12	20	23	37	47	2.9	1.2	1	0.5	0.082
—	—	—	—	—	—	—	—	18.6	18.8	21.4	—	—	—	0.2	—	0.0025
—	—	—	—	—	—	—	—	19	19.5	24	—	—	—	0.3	—	0.008
N	NR	28.7	1.3	0.95	0.25	32.8	0.85	19	20	28	33.5	1.9	0.9	0.3	0.3	0.018
—	—	—	—	—	—	—	—	19	—	33	—	—	—	0.3	—	0.032
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	19	21	33	40.5	2.9	1.2	0.3	0.3	0.039
N	NR	38.1	2.06	1.35	0.4	44.6	1.12	21	23	36	45.5	2.9	1.2	0.6	0.5	0.066
N	NR	44.6	2.46	1.35	0.4	52.7	1.12	22	25	42	53.5	3.3	1.2	1	0.5	0.115
—	—	—	—	—	—	—	—	23.5	30	55.5	—	—	—	1	—	0.27
—	—	—														