واحد مهندسی ، تحقیقات و تکنولوژی

مهندسی ساخت و بومی سازی

شركت فولاد كاوه جنوب كيش



۱ از ۱۰ صفحه::

۱۳۹۸/۰۵/۳۰ تاريخ : دفترچه مشخصات فنی

TECHNICAL SPECIFICATION DOCUMENT

شماره درخواست: Req 970328

ليست قطعات

رديف	کد کالا	شرح قطعه	مشخصه
1	77711722	MECHANICAL SEALφ91xφ70 CPH 150-605 - PU 8205 A/B/C	BURGMANN-ZF

EagleBurgmann_®

M7N



Features

- For plain shafts
- Single seal
- Unbalanced
- Super-Sinus-spring or multiple springs rotating
- Independent of direction of rotation
- Variant with PTFE secondary seals for high chemical resistance (M78N)

Advantages

- Universal application opportunities
- Efficient stock keeping due to easily interchangeable faces
- Extended selection of materials
- Insensitive to low solids contents
- Flexibility in torque transmissions
- Self cleaning effect
- Short installation length possible (G16)
- Pumping screw for media with higher viscosity (M7..F)

Operating range

Shaft diameter:

d1 = 14 ... 100 mm (0.55 " ... 3.94 ")

Pressure:

p1 = 25 bar (363 PSI)

Temperature:

t = -50 °C ... +220 °C

(-58 °F ... +428 °F)

Sliding velocity:

vg = 20 m/s (66 ft/s)

Axial movement:

 $d1 = up to 25 mm: \pm 1.0 mm$

 $d1 = 28 \text{ up to } 63 \text{ mm: } \pm 1.5 \text{ mm}$

d1 = from 65 mm: ±2.0 mm

Materials

Seal face: Special cast CrMo steel (S), Silicon carbide (Q1, Q2), Aluminium oxide (V)
Seat G9: Carbon graphite antimony impregnated (A), Carbon graphite resin impregnated (B), Silicon carbide (Q1*, Q2*)
Seat G4: Silicon carbide (Q1*, Q2*)
Seat G6: Silicon carbide (Q1*, Q2*)
Seat G13: Carbon graphite antimony impregnated (A), Carbon graphite resin impregnated (B)

Secondary seals: EPDM (E), NBR (P), FKM (V),

Springs: CrNiMo steel (G) Metal parts: CrNiMo steel (G), Duplex (G1)

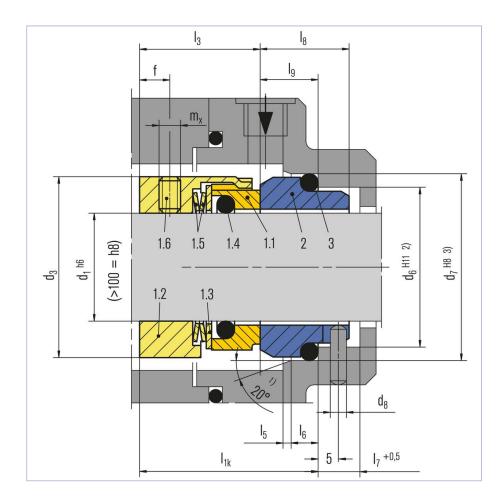
* Cannot be combined with seal face made of S

Standards and approvals

■ EN 12756

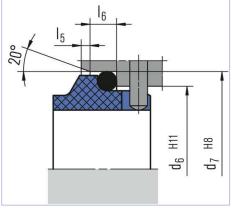
Recommended applications

- Process industry
- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Shipbuilding
- Lube oils
- Low solids content media
- Water / sewage water pumps
- Chemical standard pumps
- Vertical screw pumps
- Gear wheel feed pumps
- Multistage pumps (drive side)
- Circulation of printing colors with viscosity 500 ... 15,000 mm²/s.

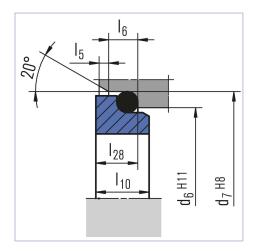


Item	Part no. to DIN 24250	Description
1.1	472	Seal face
1.2	485	Drive collar
1.3	474	Thrust ring
1.4	412.1	O-Ring
1.5	477	Spring
1.6	904	Set screw
2	475	Seat (G9)
3	412.2	O-Ring
2) d1	> 100 mm: 30° > 100 mm: +0.1 > 100 mm: H7	

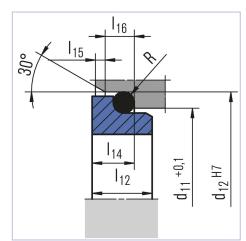
Seat alternatives



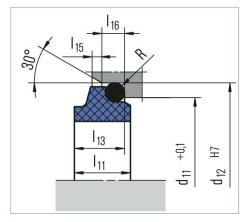
G9 (EN 12756)



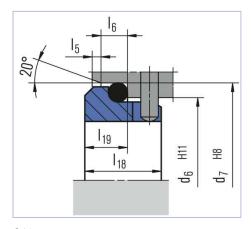
G6 (EN 12756)



G4

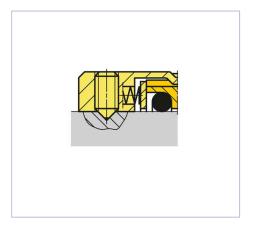


G13

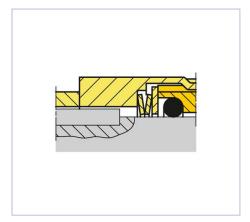


 $\begin{tabular}{ll} \textbf{G16} \\ (EN 12756, but I_{1k} is shorter than specified) \\ \end{tabular}$

Torque transmissions

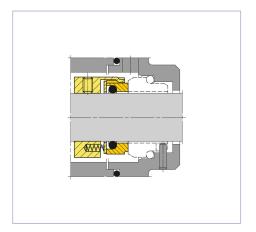


d1 > 100 mm (3.94")
Torque transmission by 4 set screws with cone points. Offset: 90°



Drive key (M7S2 / M74S2)

Product variants



M74

Dimensions, items and descriptions as for M7N, but with multiple springs (Item no. 1.5). Preferably for d1 >100 mm (3.94").

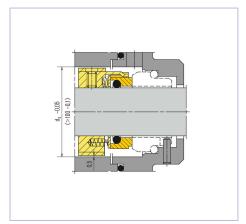
M74F

Shaft diameter:

d1 = 14 ... 200 mm (0.55" ... 7.87")

Dimensions, items and descriptions as for type M7N, but with multiple springs and pumping screw, dependent on direction of rotation.

(Viscosity ≤ ISO VG10).



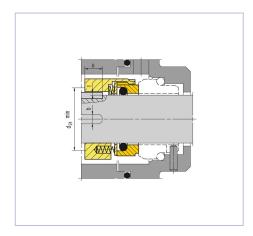
M7F

Shaft diameter d1 = max. 100 mm (3.94") Dimensions, items and descriptions as for type M7N, but with pumping screw, dependent on direction of rotation. (Viscosity ≤ ISO VG10).

M74S2

Shaft diameter: d1 = 28 ... 200 mm (1.10" ... 7,87")

Dimensions, items and descriptions as for type M7N, but with multiple springs and drive key. (without item no. 1.6)



M7S2

Shaft diameter: d1 = max. 100 mm (3.94"). Dimensions, items and descriptions as for type M7N, but with drive key. (without item no. 1.6)

M78N

Shaft diameter:

d1 = 18 ... 100 mm (0.71" ... 3.94") Temperature: t = max. 180 °C (356 °F)

Dimensions, items and description as for M7N.

Design of the seal face especially for secondary sealing element made of PTFE (T).

Seal face: Carbon graphite antimony impregnated (A), Carbon graphite resin impregnated (B), Silicon carbide (Q1)*

Seat G9: Special cast CrMo steel (S)*, Silicon carbide (Q1)

* Cannot be combined with seal face made of silicon carbide (Q1)

Dimensions

d ₁	d ₃	d ₆	d ₇	dg	d ₁₁	d ₁₂	d ₂₄	ds	I _{1k}	l ₃	l ₅	l ₆	I ₇	l ₈	lg	I ₁₀	l ₁₁	l ₁₂	l ₁₃	l ₁₄	l ₁₅	I ₁₆	l ₂₈	b	f	m _x	u _{max.}	t	R
14*	25	21.0	25.0	3	20.5	24.6	16		35.0					17.5			10.0	6.5	7.6		1.2		6.6	4		M5		1.5	1.2
16*	27	23.0	27.0	3	22.0	28.0	18	36	35.0	25.0	1.5	4	8.5	17.5	10.0	7.5	11.5	8.5	9.0	7.5	1.2	3.8	6.6	4	6	M5	10	1.5	1.5
18*	33	27.0	33.0	3	24.0	30.0	20	38	37.5	26.0	2.0	5	9.0	19.5	11.5	8.5	12.5	9.0	10.0	8.0	1.5	5.0	7.5	5	7	M5	12	1.1	1.5
20*	35	29.0	35.0	3	29.5	35.0	22	40	37.5	26.0	2.0	5	9.0	19.5	11.5	8.5	12.5	8.5	9.5	7.5	1.5	5.0	7.5	5	7	M5	12	1.1	1.5
22*	37	31.0	37.0	3	29.5	35.0	24	42	37.5	26.0	2.0	5	9.0	19.5	11.5	8.5	12.5	8.5	9.5	7.5	1.5	5.0	7.5	6	7	M5	12	1.5	1.5
24*	39	33.0	39.0	3	32.0	38.0	26	44	40.0	28.5	2.0	5	9.0	19.5	11.5	8.5	12.5	8.5	9.5	7.5	1.5	5.0	7.5	6	8	M5	12	1.5	1.5
25*	40	34.0	40.0	3	32.0	38.0	27	45	40.0	28.5	2.0	5	9.0	19.5	11.5	8.5	12.5	8.5	9.5	7.5	1.5	5.0	7.5	6	8	M5	12	1.5	1.5
28*	43	37.0	43.0	3	36.0	42.0	30	47	42.5	31.0	2.0	5	9.0	19.5	11.5	8.5	14.0	10.0	11.0	9.0	1.5	5.0	7.5	6	8	M6	13	1.5	1.5
30*	45	39.0	45.0	3	39.2	45.0	32	49	42.5	31.0	2.0	5	9.0	19.5	11.5	8.5	14.0	11.5	11.0	10.5	1.5	5.0	7.5	6	8	M6	13	1.5	1.5
32*	47	42.0	48.0	3	42.2	48.0	34	51	42.5	31.0	2.0	5	9.0	19.5	11.5	8.5	14.0	11.5	11.0	10.5	1.5	5.0	7.5	6	8	M6	13	1.5	1.5
33*	48	42.0	48.0	3	44.2	50.0	35	51	42.5	31.0	2.0	5	9.0	19.5	11.5	8.5	14.5	12.0	11.5	10.5	1.5	5.0	7.5	6	8	M6	13	1.5	1.5
35*	50	44.0	50.0	3	46.2	52.0	37	54	42.5	31.0	2.0	5	9.0	19.5	11.5	8.5	14.5	12.0	11.5	11.0	1.5	5.0	7.5	6	8	M6	13	1.5	1.5
38*	55	49.0	56.0	4	49.2	55.0	40	59	45.0	31.0	2.0	6	9.0	22.0	14.0	10.0	14.5	11.3	11.5	10.3	1.5	5.0	9.0	6	8	M6	13	1.5	1.5
40*	57	51.0	58.0	4	52.2	58.0	42	61	45.0	31.0	2.0	6	9.0	22.0	14.0	10.0	14.5	11.8	11.5	10.8	1.5	5.0	9.0	6	8	M6	13	1.5	1.5
43*	60	54.0	61.0	4	53.3	62.0	45	65	45.0	31.0	2.0	6	9.0	22.0	14.0	10.0	17.0	13.2	14.3	12.0	2.0	6.0	9.0	6	8	M6	13	1.5	2.5
45*	62	56.0	63.0	4	55.3	64.0	47	66	45.0	31.0	2.0	6	9.0	22.0	14.0	10.0	17.0	12.8	14.3	11.6	2.0	6.0	9.0	6	8	M6	13	1.5	2.5
48*	65	59.0	66.0	4	59.7	68.4	50	69	45.0	31.0	2.0	6	9.0	22.0	14.0	10.0	17.0	12.8	14.3	11.6	2.0	6.0	9.0	6	8	M6	13	1.5	2.5
50*	67	62.0	70.0	4	60.8	69.3	52	71	47.5	32.5	2.5	6	9.0	23.0	15.0	10.5	17.0	12.8	14.3	11.6	2.0	6.0	9.5	6	8	M6	13	1.5	2.5
53*	70	65.0	73.0	4	63.8	72.3	55	75	47.5	32.5	2.5	6	9.0	23.0	15.0	12.0	17.0	13.5	14.3	12.3	2.0	6.0	11.0	6	8	M6	13	1.5	2.5
55*	72	67.0	75.0	4	66.5	75.4	57	76	47.5	32.5	2.5	6	9.0	23.0	15.0	12.0	18.0	14.5	15.3	13.3	2.0	6.0	11.0	6	8	M6	13	1.5	2.5
58*	79	70.0	78.0	4	69.5	78.4	60	83	52.5	37.5	2.5	6	9.0	23.0	15.0	12.0	18.0	14.5	15.3	13.3	2.0	6.0	11.0	8	9	M8	13	1.9	2.5
60*	81	72.0	80.0	4	71.5	80.4	62	85	52.5	37.5	2.5	6	9.0	23.0	15.0	12 0	18.0	14.5	15.3	13.3	2.0	6.0	11.0	8	9	M8	13	1.9	2.5
									02.0	00				_0.0		12.0	10.0							•	-				
63*	84	75.0	83.0	4	74.5	83.4	65		52.5			6					18.0		15.3	13.3		6.0		8		M8	13	1.9	2.5
63* 65*	84 86	75.0 77.0	83.0 85.0	4	74.5 76.5	83.4 85.4	65 67	88		37.5	2.5	6	9.0	23.0	15.0	12.0		14.2			2.0		11.0		9	M8 M8		1.9 1.9	
						85.4 91.5		88 95 93	52.5 52.5 52.5	37.5 37.5 34.5	2.5 2.5 2.5	6 6 7	9.0 9.0 9.0	23.0 23.0 26.0	15.0 15.0 18.0	12.0 12.0 12.5	18.0 18.0 19.0	14.2 14.2 14.9	15.3 16.0	13.0 13.7	2.0 2.0 2.0	6.0	11.0 11.0 11.3	8	9		13 13	1.9 1.9	2.5 2.5
65* 68* 70*	86 89 91	77.0 81.0 83.0	85.0 90.0 92.0	4 4	76.5 82.7 83.0	85.4 91.5 92.0	67 70 72	88 95 93 95	52.5 52.5 52.5 60.0	37.5 37.5 34.5 42.0	2.5 2.5 2.5 2.5	6 6 7 7	9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0	15.0 15.0 18.0 18.0	12.0 12.0 12.5 12.5	18.0 18.0 19.0 18.0	14.2 14.2 14.9 14.2	15.3 16.0 15.3	13.0 13.7 13.0	2.0 2.0 2.0 2.0	6.0 6.0 6.0	11.0 11.0 11.3 11.3	8 8 8	9 9 9	M8 M8	13 13 16	1.9 1.9 1.9	2.5 2.5 2.5
65* 68* 70* 75*	86 89 91 99	77.0 81.0 83.0 88.0	85.0 90.0 92.0 97.0	4 4 4 4	76.5 82.7 83.0 90.2	85.4 91.5 92.0 99.0	67 70 72 77	88 95 93 95 105	52.5 52.5 52.5 60.0 60.0	37.5 37.5 34.5 42.0 42.0	2.5 2.5 2.5 2.5 2.5	6 6 7 7 7	9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.0	15.0 15.0 18.0 18.0 18.0	12.0 12.0 12.5 12.5 12.5	18.0 18.0 19.0 18.0 18.0	14.2 14.2 14.9 14.2 15.2	15.3 16.0 15.3 15.3	13.0 13.7 13.0 14.0	2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0	11.0 11.0 11.3 11.3 11.3	8 8 8 8	9 9 9 9	M8 M8 M8 M8	13 13 16 16	1.9 1.9 1.9 1.9	2.5 2.5 2.5 2.5
65* 68* 70* 75* 80*	86 89 91 99	77.0 81.0 83.0 88.0 95.0	85.0 90.0 92.0 97.0 105.0	4 4 4 4	76.5 82.7 83.0 90.2 95.2	85.4 91.5 92.0 99.0 104.0	67 70 72 77 82	88 95 93 95 105 109	52.5 52.5 52.5 60.0 60.0	37.5 37.5 34.5 42.0 42.0 41.8	2.5 2.5 2.5 2.5 2.5 3.0	6 6 7 7 7 7	9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.0 26.2	15.0 15.0 18.0 18.0 18.0 18.2	12.0 12.0 12.5 12.5 12.5 13.0	18.0 18.0 19.0 18.0 18.0	14.2 14.9 14.2 15.2 16.2	15.3 16.0 15.3 15.3 16.3	13.0 13.7 13.0 14.0 15.0	2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0	11.0 11.0 11.3 11.3 11.3	8 8 8 8 8	9 9 9 9 10	M8 M8 M8 M8 M8	13 13 16 16 16	1.9 1.9 1.9 1.9	2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85*	86 89 91 99 104 109	77.0 81.0 83.0 88.0 95.0	85.0 90.0 92.0 97.0 105.0 110.0	4 4 4 4 4	76.5 82.7 83.0 90.2 95.2 100.2	85.4 91.5 92.0 99.0 104.0 109.0	67 70 72 77 82 87	88 95 93 95 105 109	52.5 52.5 52.5 60.0 60.0 60.0	37.5 37.5 34.5 42.0 42.0 41.8 41.8	2.5 2.5 2.5 2.5 2.5 3.0 3.0	6 6 7 7 7 7 7	9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.0 26.2 26.2	15.0 15.0 18.0 18.0 18.0 18.2 18.2	12.0 12.0 12.5 12.5 12.5 13.0 15.0	18.0 18.0 19.0 18.0 18.0 19.0	14.2 14.9 14.2 15.2 16.2 16.0	15.3 16.0 15.3 15.3 16.3	13.0 13.7 13.0 14.0 15.0 14.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0	11.0 11.0 11.3 11.3 11.3 12.0 14.0	8 8 8 8 8 8	9 9 9 10 10	M8 M8 M8 M8 M8	13 13 16 16 16 16	1.9 1.9 1.9 1.9 1.9	2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90*	86 89 91 99 104 109 114	77.0 81.0 83.0 88.0 95.0 100.0	85.0 90.0 92.0 97.0 105.0 110.0	4 4 4 4 4 4	76.5 82.7 83.0 90.2 95.2 100.2 105.2	85.4 91.5 92.0 99.0 104.0 109.0 114.0	67 70 72 77 82 87 92	88 95 93 95 105 109 114 119	52.5 52.5 52.5 60.0 60.0 60.0 60.0 65.0	37.5 37.5 34.5 42.0 42.0 41.8 41.8	2.5 2.5 2.5 2.5 2.5 3.0 3.0 3.0	6 6 7 7 7 7 7	9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.0 26.2 26.2 26.2	15.0 15.0 18.0 18.0 18.0 18.2 18.2	12.0 12.0 12.5 12.5 12.5 13.0 15.0	18.0 18.0 19.0 18.0 18.0 19.0 19.0	14.2 14.9 14.2 15.2 16.2 16.0	15.3 16.0 15.3 15.3 16.3 16.3	13.0 13.7 13.0 14.0 15.0 14.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.0 11.3 11.3 11.3 12.0 14.0	8 8 8 8 8 8 8	9 9 9 10 10 10	M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20	1.9 1.9 1.9 1.9 1.9 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90*	86 89 91 99 104 109 114 119	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0	85.0 90.0 92.0 97.0 105.0 110.0 120.0	4 4 4 4 4 4 4	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3	67 70 72 77 82 87 92	88 95 93 95 105 109 114 119	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0	37.5 37.5 42.0 42.0 41.8 41.8 46.8 47.8	2.5 2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0	6 6 7 7 7 7 7 7	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 26.2 25.2	15.0 15.0 18.0 18.0 18.2 18.2 18.2 17.2	12.0 12.5 12.5 12.5 13.0 15.0 15.0	18.0 18.0 19.0 18.0 19.0 19.0 19.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 16.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0	8 8 8 8 8 8 8 10	9 9 9 10 10 10 10	M8 M8 M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90* 95*	86 89 91 99 104 109 114 119 124	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0	4 4 4 4 4 4 4	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3	67 70 72 77 82 87 92 97	88 95 93 95 105 109 114 119 124 129	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 65.0	37.5 37.5 34.5 42.0 41.8 41.8 46.8 47.8	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 3.0	6 6 7 7 7 7 7 7 7	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 25.2	15.0 15.0 18.0 18.0 18.2 18.2 17.2 17.2	12.0 12.5 12.5 12.5 13.0 15.0 15.0 15.0	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0	8 8 8 8 8 8 8 10 10	9 9 9 10 10 10 10 10	M8 M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90* 95* 100*	86 89 91 99 104 109 114 119 124 138	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0 115.0	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3	4 4 4 4 4 4 4 5	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3	67 70 72 77 82 87 92 97 102	88 95 93 95 105 109 114 119 124 129 143	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 46.8 47.8 47.8	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 3.0 2.0	6 6 7 7 7 7 7 7 7 7	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 25.2 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 17.2 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 15.0	18.0 18.0 19.0 18.0 19.0 19.0 19.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.0 11.3 11.3 12.0 14.0 14.0 14.0	8 8 8 8 8 8 8 10 10 10	9 9 9 10 10 10 10 10 10	M8 M8 M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90* 95* 100* 110	86 89 91 99 104 109 114 119 124 138	77.0 81.0 83.0 88.0 95.0 100.0 105.0 115.0 122.2 128.2	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3 140.3	4 4 4 4 4 4 4 5 5	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3	67 70 72 77 82 87 92 97 102 108 113	88 95 93 95 105 109 114 119 124 129 143 148	52.5 52.5 60.0 60.0 60.0 65.0 65.0 65.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 46.8 47.8 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 3.0 2.0	6 6 7 7 7 7 7 7 7 7 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 25.2 30.0 30.0	15.0 15.0 18.0 18.0 18.0 18.2 18.2 17.2 17.2 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 15.0	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0	8 8 8 8 8 8 8 10 10 10 10 10	9 9 9 10 10 10 10 10 10	M8 M8 M8 M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20 20 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 100* 115	86 89 91 99 104 109 114 119 124 138 143	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0 115.0 122.2 128.2 136.2	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3 140.3	4 4 4 4 4 4 4 5 5	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3	67 70 72 77 82 87 92 97 102 108 113 118	88 95 93 95 105 109 114 119 124 129 143 148 153	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 2.0 2.0	6 6 7 7 7 7 7 7 7 7 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 12.0 12.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 25.2 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0	8 8 8 8 8 8 8 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10	M8 M8 M8 M8 M8 M8 M8 M8 M8 M8	13 13 16 16 16 16 20 20 20 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120	86 89 91 99 104 109 114 119 124 138 143 143	77.0 81.0 83.0 88.0 95.0 100.0 105.0 115.0 122.2 128.2 136.2	85.0 90.0 92.0 97.0 105.0 110.0 125.0 125.0 134.3 140.3 150.3	4 4 4 4 4 4 4 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3	67 70 72 77 82 87 92 97 102 108 113 118 123	88 95 93 95 105 109 114 119 124 129 143 148 153 158	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 42.0 41.8 41.8 47.8 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 12.0 12.0 12.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0	8 8 8 8 8 8 8 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10	M8	13 13 16 16 16 16 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 100* 115 120 125	86 89 91 99 104 109 114 119 124 138 143 148 153 158	77.0 81.0 83.0 88.0 95.0 100.0 105.0 115.0 122.2 128.2 136.2 138.2 142.2	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3 140.3 148.3 150.3	4 4 4 4 4 4 4 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 105.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3 - - -	67 70 72 77 82 87 92 97 102 108 113 118 123	88 95 93 95 105 109 114 119 124 129 143 148 153 158 163	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 3.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 25.2 25.2 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 - - -	8 8 8 8 8 8 8 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120 125 130	86 89 91 104 109 114 119 124 138 143 153 158 163	77.0 81.0 83.0 88.0 95.0 100.0 105.0 115.0 122.2 128.2 136.2 142.2 146.2	85.0 90.0 92.0 97.0 105.0 110.0 125.0 125.0 134.3 140.3 150.3 154.3	4 4 4 4 4 4 4 5 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3 - - - -	67 70 72 77 82 87 92 97 102 108 113 118 123 128 133	88 95 93 95 105 109 114 119 124 129 143 153 158 163 168	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 7 10 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 26.2 25.2 30.0 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0 -	8 8 8 8 8 8 8 10 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120 125 130 135	86 89 91 104 109 114 119 124 138 143 143 158 163 168	77.0 81.0 83.0 95.0 100.0 105.0 115.0 122.2 128.2 136.2 138.2 142.2 146.2	85.0 90.0 92.0 97.0 105.0 110.0 125.0 125.0 134.3 140.3 154.3 154.3 164.3	4 4 4 4 4 4 4 5 5 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5 - - - -	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3 - - - - -	67 70 72 77 82 87 92 97 102 108 113 118 123 128 133	88 95 93 95 105 109 114 119 124 129 143 153 158 163 163 173	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 10 10 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 25.2 25.2 30.0 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0 20.0 20.0 20.0	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 - - - - -	8 8 8 8 8 8 8 10 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120 125 130 135 140	86 89 91 104 109 114 119 124 138 143 148 153 158 163 168 173	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0 122.2 128.2 136.2 138.2 142.2 146.2 156.2	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3 148.3 150.3 154.3 158.3 168.3	4 4 4 4 4 4 4 5 5 5 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5 - - - -	85.4 91.5 92.0 99.0 104.0 109.0 114.0 120.3 123.3 - - - - -	67 70 72 77 82 87 92 97 102 108 113 118 123 128 133 138 143	88 95 93 95 105 109 114 119 124 129 143 153 158 163 163 173	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 10 10 10 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 12.0 12.0 12.0 12.0 12.0 12.0	23.0 23.0 26.0 26.0 26.2 26.2 25.2 30.0 30.0 30.0 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0 20.0 20.0 20.0 2	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0 - - - -	8 8 8 8 8 8 8 10 10 10 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120 125 130 135 140 145	86 89 91 104 109 114 119 124 138 143 143 158 163 168 173 178	77.0 81.0 83.0 95.0 100.0 105.0 115.0 122.2 128.2 136.2 142.2 146.2 152.2 161.2	85.0 90.0 92.0 97.0 105.0 110.0 125.0 124.3 140.3 148.3 154.3 154.3 164.3 168.3 173.3	4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5 - - - - -	85.4 91.5 92.0 99.0 104.0 114.0 120.3 123.3 - - - - - - -	67 70 72 77 82 87 92 97 102 108 113 123 128 133 143 148	88 95 93 95 105 109 114 119 124 129 143 153 158 163 163 173 178 183	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0 47.0 47.0 47.0 47.0	2.5 2.5 2.5 2.5 3.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6 6 7 7 7 7 7 7 7 10 10 10 10 10 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	23.0 23.0 26.0 26.0 26.2 26.2 25.2 25.2 30.0 30.0 30.0 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0 20.0 20.0 20.0 2	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 - - - - - -	8 8 8 8 8 8 8 8 10 10 10 10 10 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -
65* 68* 70* 75* 80* 85* 90* 95* 100* 115 120 125 130 135 140 145 150	86 89 91 104 109 114 119 124 138 143 148 153 158 163 163 173 178 183	77.0 81.0 83.0 88.0 95.0 100.0 105.0 110.0 122.2 128.2 136.2 138.2 142.2 146.2 156.2	85.0 90.0 92.0 97.0 105.0 110.0 120.0 125.0 134.3 140.3 154.3 154.3 168.3 168.3 173.3 180.3	4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5	76.5 82.7 83.0 90.2 95.2 100.2 111.6 114.5 - - - -	85.4 91.5 92.0 99.0 104.0 114.0 120.3 123.3 	67 70 72 77 82 87 92 97 102 108 113 128 133 138 143 143 148 153	88 95 93 95 105 109 114 129 143 153 158 163 173 178 183 188	52.5 52.5 52.5 60.0 60.0 60.0 65.0 65.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0 67.0	37.5 37.5 34.5 42.0 41.8 41.8 47.8 47.0 47.0 47.0 47.0 47.0 47.0 47.0 47.0	2.5 2.5 2.5 3.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2	6 6 7 7 7 7 7 7 7 10 10 10 10 10 10 10 10 10	9.0 9.0 9.0 9.0 9.0 9.0 9.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0	23.0 23.0 26.0 26.0 26.2 26.2 25.2 30.0 30.0 30.0 30.0 30.0 30.0 30.0	15.0 15.0 18.0 18.0 18.2 18.2 17.2 20.0 20.0 20.0 20.0 20.0 20.0 20.0 2	12.0 12.0 12.5 12.5 12.5 13.0 15.0 15.0 - - - -	18.0 18.0 19.0 18.0 19.0 19.0 20.0 20.0	14.2 14.9 14.2 15.2 16.2 16.0 17.0 17.0	15.3 16.0 15.3 15.3 16.3 16.3 17.3	13.0 13.7 13.0 14.0 15.0 14.8 14.8 15.8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	6.0 6.0 6.0 6.0 6.0 6.0 6.0	11.0 11.3 11.3 11.3 12.0 14.0 14.0 14.0 - - - - -	8 8 8 8 8 8 8 10 10 10 10 10 10 10 10 10 10 10	9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10	M8 M	13 13 16 16 16 16 20 20 20 20 20 20 20 20 20 20 20 20 20	1.9 1.9 1.9 1.9 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 -