

LAMPIRAN A
HASIL UJI MUTU FISIK GRANUL PEMBAWA

SUDUT DIAM

Pengujian	Formula A	Formula B	Formula C	Formula D
Replikasi 1	31,06	30,81	31,06	32,57
Replikasi 2	31,22	32,23	31,65	32,02
Replikasi 3	30,92	32,42	32,62	32,36
Rata-rata ± SD	31,07 ± 0,15	31,82 ± 0,88	31,78 ± 0,79	32,32 ± 0,28

CARR'S INDEX

Pengujian	Formula A	Formula B	Formula C	Formula D
Replikasi 1	18,00	15,00	15,00	15,00
Replikasi 2	16,00	17,00	10,00	15,00
Replikasi 3	15,00	19,00	10,00	10,00
Rata-rata ± SD	16,33 ± 1,53	17,00 ± 2,00	11,67 ± 2,89	16,33 ± 1,53

HAUSNER RATIO

Pengujian	Formula A	Formula B	Formula C	Formula D
Replikasi 1	1,22	1,18	1,18	1,18
Replikasi 2	1,19	1,20	1,11	1,18
Replikasi 3	1,18	1,23	1,11	1,11
Rata-rata ± SD	1,20 ± 0,02	1,21 ± 0,03	1,13 ± 0,04	1,15 ± 0,04

KADAR AIR

Pengujian	Formula A	Formula B	Formula C	Formula D
Replikasi 1	2,76	2,65	3,29	3,30
Replikasi 2	2,11	2,15	2,63	2,64
Replikasi 3	2,85	2,12	2,09	2,11
Rata-rata ± SD	2,91 ± 0,40	2,31 ± 0,30	2,67 ± 0,60	2,68 ± 0,60

UKURAN PARTIKEL

Pengujian	Formula A	Formula B	Formula C	Formula D
Replikasi 1	317,03	207,23	411,71	260,21
Replikasi 2	361,56	238,98	334,41	272,01
Replikasi 3	673,39	195,45	305,18	281,66
Rata-rata ± SD	450,66 ± 194,17	213,89 ± 22,52	350,43 ± 55,04	271,29 ± 10,74

UKURAN PARTIKEL FORMULA A

REPLIKASI 1

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	5,43	10,91	10,91	89,09	1,23	dg 50%	2,42
40	425	16,84	33,84	44,75	55,25	0,13	=	
60	250	8,06	16,20	60,95	39,05	-0,27	317,03	
80	180	5,74	11,54	72,49	27,51	-0,60		
100	150	2,75	5,53	78,01	21,99	-0,78	dg 84%	
120	125	3,82	7,68	85,69	14,31	-1,07	=	2,42
Pan	0	7,12	14,31	100,00	0,00	0,00	767,93	

REPLIKASI 2

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	4,14	8,29	8,29	91,71	1,39	dg _{50%}	1,81
40	425	15,04	30,11	38,40	61,60	0,29	=	
60	250	14,19	28,41	66,81	33,19	-0,43	361,56	
80	180	12,48	24,98	91,79	8,21	-1,39		
100	150	0	0,00	91,79	8,21	-1,39	dg _{84%}	
120	125	2,37	4,74	96,54	3,46	-1,82	=	
Pan	0	1,73	3,46	100,00	0,00	-3,49	655,23	

REPLIKASI 3

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	38,69	45,68	45,68	54,31	0,11		
40	425	15,63	18,45	64,13	35,87	-0,36	dg _{50%} =	
60	250	11,26	13,29	77,43	22,57	-0,75	673,39	
80	180	8,69	10,26	87,69	12,31	-1,16		2,99
100	150	3,31	3,91	91,59	8,41	-1,38	dg _{84%} =	
120	125	3,23	3,81	95,41	4,59	-1,69	2011,52	
Pan	0	3,89	4,59	100,00	0,00	-3,49		

Rata-rata ± SD = 450,66 ± 194,17

UKURAN PARTIKEL FORMULA B

REPLIKASI 1

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	0,20	0,40	0,40	99,60	2,65	dg _{50%} = 207,23	1,77
40	425	8,09	16,61	16,61	83,39	0,97		
60	250	10,01	36,66	36,66	63,34	0,34		
80	180	10,74	58,17	58,17	41,83	-0,21	dg _{84%} = 365,94	
100	150	5,07	68,33	68,33	31,67	-0,48		
120	125	6,59	81,53	81,53	18,47	-0,90		
Pan	0	9,22	100,00	100,00	0,00	-3,49		

REPLIKASI 2

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	0,74	1,48	1,48	98,52	2,17		
40	425	11,28	22,56	24,04	75,96	0,80	dg _{50%} =	
60	250	10,71	21,41	45,46	54,54	0,12	238,98	
80	180	9,90	19,8	65,26	34,74	-0,39		1,82
100	150	4,40	8,80	74,06	25,94	-0,65	dg _{84%} =	
120	125	7,50	15	89,06	10,94	-1,23	435,72	
Pan	0	5,47	10,94	100,00	0,00	-3,49		

REPLIKASI 3

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	0,53	1,06	1,06	98,94	2,30		
40	425	8,70	17,43	18,49	81,51	0,90	dg _{50%} =	
60	250	8,51	17,05	35,54	64,46	0,37	195,45	
80	180	8,79	17,61	53,15	46,85	-0,08		1,97
100	150	4,51	9,04	62,19	37,81	-0,31	dg _{84%} =	
120	125	6,54	13,10	75,29	24,71	-0,68	385,63	
Pan	0	12,33	24,70	100,00	0,00	-3,49		

Rata-rata ± SD = 213,89 ± 22,52

UKURAN PARTIKEL FORMULA C
REPLIKASI 1

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	10,02	20,05	20,05	79,95	0,84	dg _{50%} = 411,71	2,38
40	425	15,43	30,88	50,93	49,07	-0,02		
60	250	9,23	18,47	69,40	30,60	-0,51		
80	180	6,48	12,97	82,37	17,63	-0,93		
100	150	2,39	4,78	87,15	12,85	-1,13	dg _{84%} =	
120	125	2,70	5,40	92,55	7,45	-1,44	981,48	
Pan	0	3,72	7,44	100,00	0,00	-3,49		

REPLIKASI 2

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	5,85	11,69	11,69	88,31	1,25	dg _{50%} =	2,15
40	425	15,10	30,18	41,87	58,13	0,21	334,41	
60	250	10,12	20,22	62,09	37,91	-0,31		
80	180	7,99	15,97	78,06	21,94	-0,78	dg _{84%} =	
100	150	3,22	6,43	84,49	15,51	-1,01	719,05	
120	125	3,37	6,73	91,23	8,77	-1,35		
Pan	0	4,39	8,77	100,00	0,00	-3,49		

REPLIKASI 3

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	2,45	5,36	5,36	94,64	1,61	dg _{50%} = 305,18	2,01
40	425	15,80	34,59	39,95	60,05	0,26		
60	250	10,22	22,37	62,32	37,68	-0,31		
80	180	6,86	15,02	77,34	22,66	-0,75		
100	150	2,70	5,91	83,25	16,75	-0,96	dg _{84%} =	
120	125	2,89	6,33	89,58	10,41	-1,25	612,29	
Pan	0	4,76	10,41	100,00	0,00	-3,49		

Rata-rata ± SD = 350,43 ± 55,04

UKURAN PARTIKEL FORMULA D
REPLIKASI 1

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	0,83	1,66	1,66	98,34	2,13	dg _{50%} = 260,21	1,84
40	425	14,58	29,15	30,81	69,19	0,50		
60	250	10,99	21,97	52,78	47,22	-0,07		
80	180	9,40	18,79	71,57	28,43	-0,57	dg _{84%} = 477,86	
100	150	4,01	8,02	79,59	20,41	-0,82		
120	125	4,43	8,86	88,45	11,55	-1,20		
Pan	0	5,78	11,56	100,00	0,00	-3,49		

REPLIKASI 2

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	1,45	2,90	2,90	97,10	1,90	dg _{50%} = 272,01	1,91
40	425	15,07	30,13	33,03	66,97	0,44		
60	250	10,42	20,83	53,86	46,14	-0,11		
80	180	9,19	18,37	72,23	27,77	-0,59	dg _{84%} = 519,02	
100	150	4,08	8,16	80,39	19,61	-0,85		
120	125	4,34	8,68	89,07	10,93	-1,23		
Pan	0	5,47	10,94	100,00	0,00	-3,49		

REPLIKASI 3

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	1,96	3,92	3,92	96,08	1,76	dg _{50%} = 281,66	1,98
40	425	16,31	32,65	36,57	63,43	0,34		
60	250	10,02	20,06	56,62	43,38	-0,17		
80	180	8,14	16,29	72,92	27,08	-0,61	dg _{84%} = 559,07	
100	150	3,46	6,93	79,84	20,16	-0,84		
120	125	4,31	8,63	88,47	11,53	-1,20		
Pan	0	5,76	11,53	100,00	0,00	-3,49		

Rata-rata ± SD = 271,29 ± 10,74

HASIL EVALUASI FORMULA OPTIMUM GRANUL PEMBAWA

SUDUT DIAM

Pengujian	Formula Optimum
Replikasi 1	31,62
Replikasi 2	28,27
Replikasi 3	31,42
Rata-rata $\pm$ SD	30,44 $\pm$ 1,88

HAUSNER RATIO

Pengujian	Formula Optimum
Replikasi 1	1,12
Replikasi 2	1,18
Replikasi 3	1,12
Rata-rata $\pm$ SD	1,14 $\pm$ 0,03

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Pengujian	Formula Optimum
Replikasi 1	11,00
Replikasi 2	15,00
Replikasi 3	11,00
Rata-rata $\pm$ SD	12,33 $\pm$ 2,31

UKURAN PARTIKEL
REPLIKASI 1

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	9,72	22,15	22,15	77,85	0,77	dg _{50%} = 423,37	2,92
40	425	14,64	33,36	55,51	44,49	-0,14		
60	250	8,40	19,14	74,66	25,34	-0,66		
80	180	0,12	0,27	74,93	25,07	-0,67		
100	150	2,69	92,76	81,06	18,94	-0,88	dg _{84%} =	
120	125	2,90	6,61	87,67	12,33	-1,16	1237,44	
Pan	0	5,41	12,33	100,00	0,00	-3,49		

REPLIKASI 2

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	5,15	10,25	10,25	89,75	1,27	dg _{50%} = 303,57	2,45
40	425	16,45	32,74	42,99	57,01	0,18		
60	250	8,28	16,48	59,46	40,54	-0,24		
80	180	5,87	11,68	71,15	28,85	-0,56		
100	150	2,78	5,53	76,68	23,32	-0,73	dg _{84%} =	
120	125	3,38	6,73	83,40	16,60	-0,97	745,20	
Pan	0	8,34	16,60	100,00	0,00	-3,49		

REPLIKASI 3

Nomor ayakan	Diameter (µm)	Berat tertinggal (gram)	% berat	FKA	FKB	Z	dg (µm)	σ _g
20	850	15,64	28,73	28,73	71,27	0,56		
40	425	15,89	29,19	57,92	42,08	-0,20	dg _{50%} =	
60	250	11,90	21,86	79,78	20,22	-0,83	514,81	
80	180	4,75	8,73	88,50	11,50	-1,20		2,41
100	150	1,61	2,96	91,46	8,54	-1,37	dg _{84%} =	
120	125	1,85	3,40	94,86	5,14	-1,63	1241,83	
Pan	0	2,80	5,14	100,00	0,00	-3,49		

Rata-rata ± SD = 413,92 ± 105,94

LAMPIRAN B
HASIL PENETAPAN KADAR DAN DISOLUSI

HASIL PENETAPAN KADAR DAN HOMOGENITAS

1. Campuran Interaktif dengan Granul Pembawa

Replikasi 1

No.	Absorbansi	Kadar Piroksikam (%)
1	0,659	100,57
2	0,653	99,64
3	0,644	98,25
4	0,660	100,72
5	0,658	100,41
6	0,649	99,02
Rata-rata $\pm$ SD		99,77 $\pm$ 0,98
KV		0,97

Replikasi 2

No.	Absorbansi	Kadar Piroksikam (%)
1	0,655	99,46
2	0,653	99,15
3	0,665	100,99
4	0,650	98,69
5	0,659	100,07
6	0,656	99,61
Rata-rata $\pm$ SD		99,66 $\pm$ 0,80
KV		0,64

Replikasi 3

No.	Absorbansi	Kadar Piroksikam (%)
1	0,658	100,91
2	0,660	101,22
3	0,649	99,52
4	0,639	97,96
5	0,657	100,76
6	0,649	99,52
Rata-rata $\pm$ SD		99,98 $\pm$ 1,23
KV		1,50

2. Campuran Interaktif Tanpa Granul Pembawa

Replikasi 1

No.	Absorbansi	Kadar Piroksikam (%)
1	0,625	96,27
2	0,630	97,05
3	0,648	99,86
4	0,623	95,96
5	0,620	95,49
6	0,635	97,83
Rata-rata $\pm$ SD		97,08 $\pm$ 1,60
KV		2,54

Replikasi 2

No.	Absorbansi	Kadar Piroksikam (%)
1	0,619	95,33
2	0,622	95,80
3	0,631	97,21
4	0,636	97,99
5	0,627	96,58
6	0,634	97,67
Rata-rata $\pm$ SD		96,76 $\pm$ 1,05
KV		1,10

Replikasi 3

No.	Absorbansi	Kadar Piroksikam (%)
1	0,626	96,43
2	0,633	97,52
3	0,634	97,67
4	0,620	95,49
5	0,629	96,89
6	0,615	94,71
Rata-rata $\pm$ SD		96,45 $\pm$ 1,16
KV		1,36

3. Kapsul Merk Dagang

Replikasi 1

No.	Absorbansi	Kadar Piroksikam (%)
1	0,664	102,35
2	0,650	100,17
3	0,661	101,89
4	0,655	100,95
5	0,649	100,01
6	0,653	100,64
Rata-rata $\pm$ SD		101,00 $\pm$ 0,94
KV		0,88

Replikasi 2

No.	Absorbansi	Kadar Piroksikam (%)
1	0,659	101,57
2	0,666	102,67
3	0,643	99,08
4	0,657	101,26
5	0,644	99,23
6	0,655	100,95
Rata-rata $\pm$ SD		100,79 $\pm$ 1,40
KV		1,95

Replikasi 3

No.	Absorbansi	Kadar Piroksikam (%)
1	0,649	100,01
2	0,657	101,26
3	0,667	102,82
4	0,653	100,64
5	0,642	98,92
6	0,664	102,35
Rata-rata $\pm$ SD		101,00 $\pm$ 1,46
KV		2,13

4. Granulasi Basah

Replikasi 1

No.	Absorbansi	Kadar Piroksikam (%)
1	0,584	89,88
2	0,57	87,69
3	0,601	92,53
4	0,595	91,59
5	0,567	87,22
6	0,582	89,56
Rata-rata $\pm$ SD		89,75 $\pm$ 2,09
KV		4,35

Replikasi 2

No.	Absorbansi	Kadar Piroksikam (%)
1	0,569	87,54
2	0,583	89,72
3	0,575	88,47
4	0,59	90,81
5	0,577	88,78
6	0,602	92,68
Rata-rata $\pm$ SD		89,67 $\pm$ 1,85
KV		3,43

Replikasi 3

No.	Absorbansi	Kadar Piroksikam (%)
1	0,605	93,15
2	0,619	95,33
3	0,573	88,16
4	0,594	91,43
5	0,568	87,38
6	0,6	92,37
Rata-rata $\pm$ SD		91,30 $\pm$ 3,04
KV		9,22

HASIL UJI DISOLUSI CAMPURAN INTERAKTIF PIROKSIKAM DENGAN GRANUL PEMBAWA

Replikasi 1

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,63	19,41	17,47	87,26
2	5	0,639	19,69	17,72	88,52
3	10	0,653	20,13	18,11	90,48
4	15	0,665	20,50	18,45	92,17
5	30	0,681	21,00	18,90	94,41
6	45	0,694	21,41	19,27	96,23
7	60	0,651	20,07	18,06	90,20

Replikasi 2

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,627	19,32	17,38	86,88
2	5	0,649	20,00	18,00	89,97
3	10	0,667	20,56	18,51	92,49
4	15	0,686	21,16	19,04	95,16
5	30	0,695	21,44	19,29	96,42
6	45	0,67	20,66	18,59	92,91
7	60	0,648	19,97	17,97	89,83

Replikasi 3

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,64	19,72	17,75	88,75
2	5	0,637	19,63	17,67	88,33
3	10	0,658	20,28	18,26	91,28
4	15	0,683	21,06	18,96	94,79
5	30	0,694	21,41	19,27	96,33
6	45	0,688	21,22	19,10	95,49
7	60	0,645	19,88	17,89	89,45

HASIL UJI DISOLUSI CAMPURAN INTERAKTIF PIROKSIKAM TANPA GRANUL PEMBAWA

REPLIKASI 1

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,617	19,00	17,10	85,52
2	5	0,636	19,60	17,64	88,19
3	10	0,665	20,50	18,45	92,26
4	15	0,66	20,35	18,31	91,56
5	30	0,669	20,63	18,56	92,82
6	45	0,655	20,19	18,17	90,85
7	60	0,634	19,53	17,58	87,91

REPLIKASI 2

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,612	18,85	16,96	84,82
2	5	0,636	19,60	17,64	88,19
3	10	0,668	20,60	18,54	92,68
4	15	0,653	20,13	18,11	90,57
5	30	0,677	20,88	18,79	93,94
6	45	0,685	21,13	19,01	95,07
7	60	0,656	20,22	18,20	91,00

REPLIKASI 3

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,619	19,07	17,16	85,80
2	5	0,64	19,72	17,75	88,75
3	10	0,67	20,66	18,59	92,96
4	15	0,686	21,16	19,04	95,21
5	30	0,668	20,60	18,54	92,68
6	45	0,639	19,69	17,72	88,61
7	60	0,647	19,94	17,95	89,73

HASIL UJI DISOLUSI PIROKSIKAM DARI SERBUK KAPSUL MERK DAGANG

REPLIKASI 1

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,264	7,99	7,19	35,97
2	5	0,362	11,05	9,94	49,72
3	10	0,455	13,95	12,56	62,78
4	15	0,484	14,86	13,37	66,85
5	30	0,52	15,98	14,38	71,90
6	45	0,54	16,60	14,94	74,71
7	60	0,531	16,32	14,69	73,45

REPLIKASI 2

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,271	8,21	7,39	36,95
2	5	0,243	7,34	6,60	33,02
3	10	0,358	10,92	9,83	49,16
4	15	0,429	13,14	11,83	59,13
5	30	0,484	14,86	13,37	66,85
6	45	0,509	15,64	14,07	70,36
7	60	0,513	15,76	14,18	70,92

REPLIKASI 3

No	Waktu (menit)	Abs.	Kons. ($\mu\text{g/mL}$)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,314	9,55	8,60	42,98
2	5	0,354	10,80	9,72	48,60
3	10	0,423	12,95	11,66	58,29
4	15	0,461	14,14	12,72	63,62
5	30	0,506	15,54	13,99	69,94
6	45	0,515	15,82	14,24	71,20
7	60	0,51	15,67	14,10	70,50

HASIL UJI DISOLUSI PIROKSIKAM DARI METODE GRANULASI BASAH

REPLIKASI 1

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,635	19,57	17,61	88,05
2	5	0,647	19,94	17,95	89,73
3	10	0,688	21,22	19,10	95,49
4	15	0,677	20,88	18,79	93,94
5	30	0,665	20,50	18,45	92,26
6	45	0,654	20,16	18,14	90,71
7	60	0,636	19,60	17,64	88,19

REPLIKASI 2

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,617	19,00	17,10	85,52
2	5	0,673	20,75	18,68	93,38
3	10	0,665	20,50	18,45	92,26
4	15	0,68	20,97	18,87	94,36
5	30	0,669	20,63	18,56	92,82
6	45	0,653	20,13	18,11	90,57
7	60	0,646	19,91	17,92	89,59

REPLIKASI 3

No	Waktu (menit)	Abs.	Kons. (µg/mL)	Jumlah obat lepas (mg)	% Obat terlepas
1	2	0,635	19,57	17,61	88,05
2	5	0,659	20,31	18,28	91,42
3	10	0,688	21,22	19,10	95,49
4	15	0,674	20,78	18,70	93,52
5	30	0,68	20,97	18,87	94,36
6	45	0,662	20,41	18,37	91,84
7	60	0,65	20,03	18,03	90,15

LAMPIRAN C

CARA PERHITUNGAN

MUTU FISIK GRANUL PEMBAWA

Misalnya pada formula A replikasi 1.

1. Sudut diam

Luas kertas A4 = $623,7 \text{ cm}^2$, berat kertas A4 = 4,61 gram

Tinggi puncak gundukan granul yang dialirkan lewat corong adalah 4,01 cm; kemudian dibuat lingkaran berdasarkan lingkaran yang terbentuk dari gundukan granul tersebut dan digunting mengikuti bentuk lingkaran tersebut, lalu kertas yang berbentuk lingkaran ditimbang.

Luas lingkaran = (berat kertas lingkaran ; berat kertas A4) X luas kertas A4

$$= (1,04 : 4,61) \times 623,7 = 140,70 \text{ cm}^2$$

Jari-jari lingkaran = $(\text{luas} / \pi)^{1/2} = 6,69 \text{ cm}$

$\tan \alpha = \text{tinggi} : \text{jari-jari} = 4,01 : 6,69 = 0,60$

inv. $\tan \alpha = 30,94^\circ$.

Pada pengujian sudut diam dilakukan sebanyak 3 replikasi dengan hasil replikasi 1 = $30,94^\circ$; $30,88^\circ$; dan $31,37^\circ$. Rata-rata dari ketiga data tersebut adalah $31,06^\circ$.

2. *Carr's Index*

Berat gelas ukur 100 mL kosong = 112,75 gram

Berat gelas ukur 100 mL + granul pembawa = 158,09 gram

Berat granul pembawa = 45,34 gram

Setelah di *tapped* diperoleh hasil pemampatan granul pembawa pada 82 mL.

$$\rho_{bulk} = 45,34 : 100 = 0,45 \text{ g/mL}$$

$$\rho_{tapped} = 45,34 : 82 = 0,55 \text{ g/mL}$$

$$\begin{aligned} \text{Carr's index} &= (\rho_{tapped} - \rho_{bulk}) : \rho_{tapped} \times 100\% \\ &= (0,55 - 0,45) : 0,55 \times 100\% = 18\% \end{aligned}$$

3. Hausner Ratio

$$\text{Hausner ratio} = \rho_{tapped} : \rho_{bulk} = 0,55 : 0,45 = 1,22$$

4. Ukuran Partikel

Ditimbang berat granul yang tertinggal di masing-masing pengayak, lalu dijumlahkan beratnya. Dihitung % berat, contoh $(5,43 : 49,76) \times 100\% = 10,91\%$.

FKA dihitung dengan cara % berat dikumulatifkan, contoh 10,91; $10,91 + 33,84 = 44,75$; $44,75 + 16,20 = 60,95$; dan seterusnya.

FKB dihitung dengan cara 100 kurang masing-masing nilai dari FKA.

Nilai FKB masing-masing kemudian dibagi 100, dan dilihat di tabel Z. Contoh: $89,09 : 100 = 0,8909$; angka ini dilihat pada tabel Z dengan nilai yang sama atau mendekati angka tersebut. Carilah angka 0,8909 pada deretan angka. Apabila tidak menemukan angka yang persis sebesar 0,8909, maka carilah angka yang paling mendekati angka 0,8909. Angka yang paling mendekati adalah 0,8907. Dari angka 0,8907, tariklah garis ke kiri terlebih dahulu hingga mencapai deretan angka pada kolom paling kiri dan catatlah angkanya. Dalam kasus ini adalah 1,20. Kemudian kembali ke posisi angka 0,8907, tariklah garis ke atas hingga mencapai deretan ujung kolom bagian atas dan catatlah angkanya, dalam hal ini adalah 0,03.

Nilai Z yang dicari adalah $1,20 + 0,03 = 1,23$.

Diregresikan antara $\ln$ diameter dan nilai Z, dengan diameter sebagai sumbu x dan nilai z sebagai sumbu y, lalu akan diperoleh persamaan garis $y = a + bx$.

$dg_{50\%}$ diperoleh dari : angka 0 dimasukkan ke dalam persamaan $y = a + bx$.

$dg_{84\%}$ diperoleh dari : angka 1 dimasukkan ke dalam persamaan $y = a + bx$.

σ_g diperoleh dari $dg_{84\%}$ dibagi $dg_{50\%}$.

PERHITUNGAN HASIL OPTIMUM BERDASARKAN HASIL DESIGN EXPERT

Confirmation Report									
Two-sided		Confidence = 95%		n = 1					
Factor	Name	Level	Low Level	High Level	Std. Dev.	Coding			
A	SSG	-0.93	-1.00	1.00	0.000	Actual			
B	Laktosa	-0.40	-1.00	1.00	0.000	Actual			
Response	Predicted		Observed	Std Dev	n	SE Pred	95% PI low	Data Mean	95% PI high
	Mean	Median							
Sudut diam	31.3042	31.3042	-	0.611167	1	0.66	29.77		32.84
Hausner ratio	1.15555	1.15555	-	0.0365148	1	0.040	1.06		1.25
Carr's index	14.9655	14.9655	-	2.39792	1	2.60	8.96		20.97
Ukuran partikel	413.893	413.893	-	101.682	1	110.46	159.17		668.61
¹ For transformed responses the predicted mean and median may differ on the original scale. See help for details.									

1. Perhitungan Jumlah Laktosa yang Optimum

$$X' = \frac{X - \text{rata-rata 2 level}}{\frac{1}{2} \times \text{perbedaan level}}$$

$$-0,40 = \frac{X - \{(150 \text{ gram} + 200 \text{ gram})/2\}}{\frac{1}{2} \times (200-150)}$$

$$-0,40 = \frac{X - 175}{\frac{1}{2} \times 50}$$

$$X = -10 + 175$$

$$X = 165 \text{ gram}$$

Jadi, jumlah optimum dari Laktosa adalah 165 gram.

2. Perhitungan Jumlah SSG yang Optimum

$$X' = \frac{X - \text{rata-rata 2 level}}{\frac{1}{2} \times \text{perbedaan level}}$$

$$-0,93 = \frac{X - \{(3 \text{ gram} + 7,5 \text{ gram})/2\}}{\frac{1}{2} \times (7,5-3)}$$

$$-0,93 = \frac{X - 5,25}{\frac{1}{2} \times 4,5}$$

$$X = -2,0925 + 5,25$$

$$X = 3,1575 \text{ gram}$$

Jadi, jumlah optimum dari Laktosa adalah 3,1575 gram.

CARA PERHITUNGAN F_{HITUNG}

Baku	No	Kons. (µg/mL)	Abs.	X ²	XY	Y ²	n	Residual SS	Residual DF
I	1	4,05	0,163	16,40	0,66	0,03	5	4,03 X 10 ⁻³	3
	2	12,14	0,422	147,38	5,12	0,18			
	3	20,24	0,685	409,66	13,86	0,47			
	4	28,34	0,902	803,16	25,56	0,81			
	5	36,43	1,145	1327,14	41,71	1,31			
	Total			2703,74	86,92	2,80			
II	1	4,03	0,155	16,24	0,62	0,02	5	5,68 X 10 ⁻³	3
	2	12,09	0,438	146,17	5,30	0,19			
	3	20,16	0,689	406,43	13,89	0,47			
	4	28,22	0,875	796,37	24,69	0,77			
	5	36,29	1,165	1316,96	42,28	1,36			
	Total			2682,17	86,78	2,81			
III	1	4,1	0,141	16,81	0,58	0,02	5	2,31 X 10 ⁻⁴	3
	2	12,1	0,398	146,41	4,82	0,16			
	3	20,2	0,645	408,04	13,03	0,42			
	4	28,1	0,915	789,61	25,71	0,84			
	5	36,2	1,168	1310,44	42,28	1,36			
	Total			2671,31	86,42	2,80			
Pooled Regression								9,94 X 10 ⁻³	9
Common Regression								1,23 X 10 ⁻²	11

$$SS = \sum Y^2 - (\sum XY^2 / \sum X^2)$$

$$\text{Pooled Regression} = SS_1 + SS_2 + SS_3$$

$$\text{Common Regression} = \text{total } \sum Y^2 - (\text{total } (\sum XY)^2 / \text{total } \sum X^2)$$

$$F_{\text{hitung}} = \{(\text{Common Regression} - \text{Pooled Regression}) / 3-1\} : (\text{Pooled Regression} / 9)$$

$$= \{(1,23 \times 10^{-2} - 9,94 \times 10^{-3}) / 2\} : (9,94 \times 10^{-3} / 9)$$

$$= 1,07 < F_{\text{tabel}}(0,05 (2;9)) = 4,26.$$

CARA PERHITUNGAN AKURASI PRESISI

Dari hasil pembacaan absorbansi terhadap larutan sampel akurasi presisi kemudian di ekstrapolasikan ke dalam persamaan kurva baku sehingga diperoleh konsentrasi obat. Untuk mendapatkan % perolehan kembali maka konsentrasi obat ang diperoleh di bagi dengan knsentrasi teoritis dari penimbangan bahan aktif.

Contoh : akurasi presisi pada penetapan kadar (Tabel 4.8)

Rep.	Kons.	Penimbangan bahan aktif (mg)	Abs	Kons. (µg/mL)	Teoritis (µg/mL)	Perolehan kembali (%)	Rata- rata	SD	KV (%)
I	80%	16,2	0,530	16,29	16,20	100,56			
II	80%	16,3	0,532	16,35	16,30	100,32	100,70	0,47	0,22
III	80%	16,0	0,527	16,20	16,00	100,23			

$$Y = 0,032056 X + 0,00798$$

$$0,530 = 0,032056 X + 0,00789$$

$$X = 16,29 \mu\text{g/mL}.$$

$$\text{Konsentrasi teoritis} = 16,20 \mu\text{g/mL}.$$

$$\% \text{ perolehan kembali} = (16,29 / 16,20) \times 100\% = 100,56 \%.$$

Masing-masing replikasi dihiitung % perolehan kembali, kemudian cari rata-rata, standar deviasi, dan koefisien variasi (KV).

CARA PERHITUNGAN PERSEN EFISIENSI DISOLUSI (% ED)

$$\% \text{ED} = \{ \text{AUC}_{\text{total}} / (\text{waktu} \times \text{dosis}) \} \times 100\%$$

dimana $\text{AUC}_{\text{total}}$ adalah total jumlah obat yang terlepas (Wt).

Contoh pada uji disolusi campuran interaktif dengan granul pembawa replikasi 1 :

$$\% \text{ED} = \{ 1097,592 / (60 \times 20) \} \times 100\% = 91,47 \%.$$

LAMPIRAN D

HASIL UJI STATISTIK

UJI STATISTIK DENGAN ONEWAY ANOVA

1. Hasil *Oneway* ANOVA untuk sudut diam.

Descriptives

Sudut diam

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	3	31.0667	.15011	.08667	30.6938	31.4396	30.92	31.22
2.00	3	31.8200	.87983	.50797	29.6344	34.0056	30.81	32.42
3.00	3	31.7767	.78768	.45476	29.8200	33.7334	31.06	32.62
4.00	3	32.3167	.27755	.16024	31.6272	33.0061	32.02	32.57
Total	12	31.7450	.69863	.20168	31.3011	32.1889	30.81	32.62

Test of Homogeneity of Variances

Sudut diam

Levene Statistic	df1	df2	Sig.
3.458	3	8	.071

ANOVA

Sudut diam

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.381	3	.794	2.125	.175
Within Groups	2.988	8	.374		
Total	5.369	11			

2. Hasil Oneway ANOVA untuk *Carr's Index*

Descriptives

Carrs_index								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	3	16.3333	1.52753	.88192	12.5388	20.1279	15.00	18.00
2.00	3	17.0000	2.00000	1.15470	12.0317	21.9683	15.00	19.00
3.00	3	11.6667	2.88675	1.66667	4.4956	18.8378	10.00	15.00
4.00	3	13.3333	2.88675	1.66667	6.1622	20.5044	10.00	15.00
Total	12	14.5833	3.05877	.88299	12.6399	16.5268	10.00	19.00

Test of Homogeneity of Variances

Carrs_index			
Levene Statistic	df1	df2	Sig.
1.118	3	8	.398

ANOVA

Carrs_index					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	56.917	3	18.972	3.300	.079
Within Groups	46.000	8	5.750		
Total	102.917	11			

3. Hasil Oneway ANOVA untuk *Hausner Ratio*

Descriptives

Hausner_ratio								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	3	1.1967	.02082	.01202	1.1450	1.2484	1.18	1.22
2.00	3	1.2033	.02517	.01453	1.1408	1.2658	1.18	1.23
3.00	3	1.1333	.04041	.02333	1.0329	1.2337	1.11	1.18
4.00	3	1.1567	.04041	.02333	1.0563	1.2571	1.11	1.18
Total	12	1.1725	.04115	.01188	1.1464	1.1986	1.11	1.23

Test of Homogeneity of Variances

Hausner_ratio			
Levene Statistic	df1	df2	Sig.
1.425	3	8	.305

ANOVA

Hausner_ratio					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.010	3	.003	3.064	.091
Within Groups	.009	8	.001		
Total	.019	11			

4. Hasil *Oneway* ANOVA untuk ukuran partikel

Descriptives

Ukuran partikel

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	3	450.6600	194.17059	112.10445	-31.6865	933.0065	317.03	673.39
2.00	3	213.8867	22.51552	12.99934	157.9550	269.8183	195.45	238.98
3.00	3	350.4333	55.04290	31.77903	213.6992	487.1675	305.18	411.71
4.00	3	271.2933	10.74294	6.20244	244.6064	297.9803	260.21	281.66
Total	12	321.5683	127.05435	36.67743	240.8418	402.2948	195.45	673.39

Test of Homogeneity of Variances

Ukuran partikel

Levene Statistic	df1	df2	Sig.
9.597	3	8	.005

ANOVA

Ukuran partikel

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	94862.291	3	31620.764	3.059	.092
Within Groups	82708.600	8	10338.575		
Total	177570.891	11			

UJI STATISTIK ONE-SAMPLE T TEST

1. Hasil *one-sample t test* sudut diam

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Sudut diam	3	30.4367	1.87905	1.08487

One-Sample Test

	Test Value = 30.44					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Sudut diam	-.003	2	.998	-.00333	-4.6712	4.6645

2. Hasil *one-sample t test Carr's Index*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Carr's index	3	12.3333	2.30940	1.33333

One-Sample Test

	Test Value = 12.33					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Carr's index	.003	2	.998	.00333	-5.7335	5.7402

3. Hasil *one-sample t test Hausner Ratio*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Hausner ratio	3	1.1400	.03464	.02000

One-Sample Test

	Test Value = 1.14					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hausner ratio	.000	2	1.000	.00000	-.0861	.0861

4. Hasil *one-sample t test* ukuran partikel

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Ukuran partikel	3	413.9167	105.93681	61.16265

One-Sample Test

	Test Value = 413.92					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ukuran partikel	.000	2	1.000	-.00333	-263.1650	263.1583

UJI ANOVA GRANUL PEMBAWA FORMULA OPTIMUM

1. Sudut Diam

Response	1	Sudut diam			
ANOVA for selected factorial model					
Analysis of variance table [Partial sum of squares - Type III]					
	Sum of		Mean	F	p-value
Source	Squares	df	Square	Value	Prob > F
Model	2.38	3	0.79	2.12	0.1753 not significant
A-SSG	1.25	1	1.25	3.36	0.1042
B-Laktosa	1.09	1	1.09	2.92	0.1257
AB	0.034	1	0.034	0.091	0.7701
Pure Error	2.99	8	0.37		
Cor Total	5.37	11			

The Model F-value of 2.12 implies the model is not significant relative to the noise. There is a 17.53 % chance that a F-value this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case there are no significant model terms.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	0.61	R-Squared	0.4434
Mean	31.75	Adj R-Squared	0.2347
C.V. %	1.93	Pred R-Square	-0.2523
PRESS	6.72	Adeq Precisor	3.543

2. Hausner Ratio

Response 2 Hausner ratio

ANOVA for selected factorial model

Analysis of variance table [Partial sum of squares - Type III]

	Sum of		Mean	F	p-value	
Source	Squares	df	Square	Value	Prob > F	
Model	7.625E-003	3	2.542E-003	1.91	0.2071	not significant
A-SSG	3.008E-003	1	3.008E-003	2.26	0.1715	
B-Laktosa	4.408E-003	1	4.408E-003	3.31	0.1065	
AB	2.083E-004	1	2.083E-004	0.16	0.7030	
Pure Error	0.011	8	1.333E-003			
Cor Total	0.018	11				

The Model F-value of 1.91 implies the model is not significant relative to the noise. There is a 20.71 % chance that a F-value this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case there are no significant model terms.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	0.037	R-Squared	0.4169
Mean	1.16	Adj R-Squared	0.1982
C.V. %	3.14	Pred R-Square	-0.3121
PRESS	0.024	Adeq Precisor	3.320

3. Carr's Index

Response	3	Carr's index			
ANOVA for selected factorial model					
Analysis of variance table [Partial sum of squares - Type III]					
	Sum of		Mean	F	p-value
Source	Squares	df	Square	Value	Prob > F
Model	56.92	3	18.97	3.30	0.0786 not significant
A-SSG	4.08	1	4.08	0.71	0.4239
B-Laktosa	52.08	1	52.08	9.06	0.0168
AB	0.75	1	0.75	0.13	0.7273
Pure Error	46.00	8	5.75		
Cor Total	102.92	11			

The Model F-value of 3.30 implies there is a 7.86% chance that an F-value this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case B is a significant model term.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	2.40	R-Squared	0.5530
Mean	14.58	Adj R-Squared	0.3854
C.V. %	16.44	Pred R-Square	-0.0057
PRESS	103.50	Adeq Precisor	3.852

4. Ukuran Partikel

Response 4

Ukuran partikel

ANOVA for selected factorial model

Analysis of variance table [Partial sum of squares - Type III]

	Sum of		Mean	F	p-value
Source	Squares	df	Square	Value	Prob > F
Model	94883.42	3	31627.81	3.06	0.0916 not significant
A-SSG	74884.10	1	74884.10	7.24	0.0274
B-Laktosa	1379.66	1	1379.66	0.13	0.7244
AB	18619.65	1	18619.65	1.80	0.2164
Pure Error	82713.28	8	10339.16		
Cor Total	1.776E+005	11			

The Model F-value of 3.06 implies there is a 9.16% chance that an F-value this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case A is a significant model term.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	101.68	R-Squared	0.5343
Mean	321.55	Adj R-Squared	0.3596
C.V. %	31.62	Pred R-Square	-0.0479
PRESS	1.861E+005	Adeq Precisor	4.033

LAMPIRAN E

GAMBAR DAN TABEL

南通精华制药股份有限公司检验报告

NANTONG JINGHUA PHARMACEUTICAL CO. LTD.

CERTIFICATE OF ANALYSIS

APIs, ADD: 43 Yaogang Road, Nantong Jiangsu China

Tel: 86-513-85609405/85609406

吡罗昔康

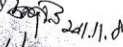
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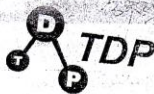
Batch No.	PRX2011045M	Manufacture Date	2011.11.7
Total Quantity	200.0KG	Report Date	2011.11.8
Commercial Quantity	200.0KG	Re-test Date	2014.11.6
Inspection No.	110300298		

TEST	SPECIFICATIONS (USP)	RESULTS
Characteristics	off-white to light tan or light yellow odorless powder	Complies
Identification	A. IR B. UV C. TLC	Complies
Water	≤0.5%	0.27%
Residue on ignition	≤0.3%	0.13%
Heavy metals	≤0.005%	<0.005%
Particle size	D(0.98) ≤13um	11.1 um
Assay	97.0~103.0%	99.62%

Conclusion The product meets the requirements of USP 34 and the additional items defined by customer

Analyst  2011.11.8 Supervisor  2011.11.8 Chief of Laboratory  2011.11.8

QA Release Date  2011.11.8





Nama Bahan : Lactose
No Batch : J 0825/13 (GX010017)
Ex : DMV Fontera
ED : 01/2018
Grade : Fama

Jenis Pemeriksaan	Persyaratan FI IV	Hasil
Pemerian	Serbuk, putih atau putih krem, tidak berbau, rasa agak manis	Sesuai
Kelarutan	Larut dalam 6 bagian air, 1 bagian air mendidih, sukar larut dalam etanol, praktis tidak larut dalam kloroform dan dalam eter	Sesuai
Kejernihan dan warna larutan	3 g dalam 10 ml air mendidih; terbentuk larutan jernih, tidak berwarna	Sesuai
Susut Pengeringan	Tidak lebih dari 5,5%	0,6 %
pH (10% b/v)	4,0 – 6,5	5,0

HEAD OFFICE	Jl. Cikidang Barat No. 70, Jakarta Pusat 10170, Telp. (021) 3622709, Faksimil (021) 3627704, E-mail: info@brn.com
BRANCH OFFICE	* JAKARTA Jl. Mangrove Street "M" 5, Jakarta 11810 Telp. (021) 6260613, Faksimil (021) 6260630, E-mail: info@brn.com Jl. Bukitduri Raya Blok TR2 No. 5, Jakarta 12420 Telp. (021) 4544600, Faksimil (021) 4543061 * KALIDENGER Jl. Kalidenger No. 12, Bandung 20132, Telp. (021) 5077125, 5000325, Fax (021) 5010175 * BANDUNG Jl. Gombak No. 770, Bandung 40132, Telp. (021) 4710127, 2135660-300, Fax (021) 7216131 * SEMARANG Jl. Rengas Iwernan No. 10, Tembung 50134, Telp. (021) 4416000, Fax (021) 4416000 YOGYAKARTA Jl. Beringharjo No. 41, Yogyakarta 55132, Telp. (021) 542434, Faksimil (021) 542434 SURABAYA Jl. Tidar No. 89, Surabaya 60131, Telp. (031) 522087, 5225020, Fax (031) 531403 MEDAN Jl. Alindia Made no. 40, Medan Telp. (061) 4148292, 4122180 Fax. (061) 4125068

TAKETUNG, BOGOR, DRASWAG, CIREBON, TASIKMALAJA, SOLO, PURKORWERTO, TEGAL, MALANG, EDJOGJA, DENPASAR, PLEMBANG, MAKASSAR.

The National Chemicals and Ingredients Distributor



永日化學工業股份有限公司

YUNG ZIP CHEMICAL IND. CO., LTD.

43767 台中市大甲區幼雅工業區幼雅路59號

ADD: 59 You Shin Road, Youth Industrial District, Taichung, Taiwan 43767, R.O.C.

TEL: +886-4-26521344 FAX: +886-4-26521007

CERTIFICATE OF ANALYSIS

Sodium Starch Glycolate (DST)

Batch no.: SSG0012324

Manufacturing date: December 27, 2012

Retest date: December 26, 2015

Monographs following: USP 35-NF 30/BP 2011/EP 7.0

Test Item	Specification	Result
Appearance	A white or almost white, fine, free-flowing powder, very hygroscopic.	A white free-flowing powder
Examined under microscope	Conformed to the test.	Conformed to the test.
Solubility	Practically insoluble in methylene chloride. A translucent suspension in water.	Practically insoluble in methylene chloride. A translucent suspension in water.
Identification		
EP-A. pH	Between 5.5 and 7.5	5.9
EP-B. Suspension test	Suspension forms settles after standing.	Suspension forms settles.
EP-C. Iodine test	The solution becomes blue to violet.	Becomes blue to violet.
EP-D. Sodium test	Dense white precipitate formed.	Dense white precipitate formed.
USP-Infrared absorption	Conformed to Working Standard.	Conformed to WS
USP-Potassium pyroantimonate test	A white crystalline precipitate is formed.	A white crystalline precipitate.
USP-Flame test	An intense yellow color to nonluminous flame.	An intense yellow color to nonluminous flame.
Appearance of solution S1		
Clear	The opalescence is not more pronounced than reference suspension I.	Not more pronounced than reference suspension I.
Colorless	Not more intensely colored than reference solution B ₂ .	Not more intensely colored than reference solution B ₂ .
Sodium chloride	≤ 7.0 %	4.8 %
Sodium glycolate	≤ 2.0 %	1.9 %
Iron	≤ 20 ppm	< 20 ppm
Heavy metals	≤ 20 ppm	< 20 ppm
Loss on drying	≤ 10.0 %	3.2 %
Microbial contamination	Absence of <i>Salmonella</i> species and <i>Escherichia coli</i> .	Absence of <i>Salmonella</i> and <i>E. coli</i> .
Assay	2.8 % - 4.2 % of sodium.	3.1 %
Foreign matter	100 to 200 μm: ≤ 70 Particles 200 to 400 μm: ≤ 2 Particles ≥ 400 μm: None	40 Particles None None

We certify herewith the above mentioned product is in conformity with the specifications.

Approved by

J. L. Y. MAD 11.2013



Please note that the certificates of analysis are also conveniently available online and around the clock at www.worldaccount.basf.com

Fax No 0062000218452306

PT MEGASETIA AGUNG KIMIA

2011-10-13

SUNTER AGUNG PODOMORO TANJUNG PRIOK

BASF CORPORATION

14350 JAKARTA UTARA

Certificate No 2025

Indonesia

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Certificate of Analysis according to DIN 5350-18-4.2.2

Povidone K30 USP.

Material

50660727

45KG Fibre drum

Order

1327638834 000010

Purchase Order/Customer Product#

Delivery

8027251182 000001

318/08/2011

Lot

G120785S0

50660727

Lot/Cty

4410.000 KG

Total

9000.000 KG

THIS CERTIFICATE OF ANALYSIS HAS BEEN PRODUCED ELECTRONICALLY
AND IS VALID WITHOUT A SIGNATURE.

The aforementioned data shall constitute the agreed contractual quality of the product at the time of passing of risk. The data are controlled at regular intervals as part of our quality assurance program. Neither these data nor the properties of product specimens shall imply any liability (including guarantee of origin) for a specific purpose. No liability of ours can be derived therefrom.

Please note that the certificates of analysis are also conveniently available online and around the clock at www.worldaccount.basf.com

Fax No 006200216452306

PT MEGASETIA AGUNG KIMIA

2011-10-13

SUNTER AGUNG PODOBORO TANJUNG PRIOK

BASF CORPORATION

14350 JAKARTA UTARA

Certificate No 2025

Indonesia

Page 3 of 4

Certificate of Analysis according to DIN 55350-18-4.2.2

Povidone K30 USP.

Material

50660727

45KG Fibre drum

Order

1327638834 000010

Purchase Order/Customer Product#

Delivery

8027251182 000001

316/08/2011

Lot

G12076SS0

50660727

Lot/Qty

4410.000 KG

Total

9000.000 KG

Characteristic/Method	UOM	Result	Specification
Acetaldehydes	ppm	188	<=560
Hydrazine	ppm	< 1	<=1
K -value	%	30.1	27.6-32.4
Lead	ppm	< 10	<=10
Microbiology Status		Conforms	
Nitrogen	Weight %	12.3	11.5-12.8
pH (5% in water)		3.5	3.0-7.0
Identification - Dichromate Test		ID DICHRONATE TEST COMPLIES	
Identification - Iodine Test		ID IODINE TEST COMPLIES	
PVP ID - Thiocyanate		ID THIOCYANATE TEST COMPLIES	
FORMIC ACID	Weight %	0.2	<=0.5
Sulfated Ash / Residue on Ignition	Weight %	< 0.1	<=0.1
N-vinylpyrrolidone (NVP)	ppm	< 1	<=10
Water	Weight %	3.4	<=5.8

Manufacturing Date: 26.07.2011

Povidone® K30 USP meets the requirements of the current monograph for Povidone in USP.

Manufacturer: BASF Corporation
8487 River Road
Geismar, LA 70734

Product Re-test Date is 24 months from Date of Manufacture

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Fax No 00620247627001

PT. BAHTERA ADI JAYA
JL. BETENG NO.108, KRANGGAN
50137 SEMARANG
SEMARANG TENGAH - JAWA TENGAH
Indonesia

2012-11-02
Quality Control
A. Muklis
0218711096
Certificate No 1191
Page 2 of 2

Certificate of Analysis according to DIN 55350-18-4.2.2

Texapon® OC-P / *Sod. Lauryl Sulphate*

20KG Paper Bags
Purchase Order/Customer Product#
P685/BAJ/SPY/XI/2012

Material 50210676
Order 6000547404 000030
Delivery 6200491467 000030
Lot 0008901774
Lot/Qty 140.000 KG
Total 200.000 KG
Transport N 9546 UG

PARAMETER	RESULTS	STANDARD
Appearance; -	Pass	white to slightly yellow
Anionic Surfactant (MM 299); % DIN ISO 2271 mod	95.4	Min. 95.0
pH-Value (1%); - ISO 4316	9.3	7.0 - 10.5
Water Content; % ISO 4317	1.0	Max. 1.2
Sodium Sulphate; % Method 949822-01	2.1	Max. 2.5
Sodium Chloride; % Method 936186-01	0.05	Max. 0.2
Bulk Density; g/L Method 920837-01	502	350 - 600
Color APHA (5%); - ASTM D 1209	10	Max. 25
Alkalinity; - GCI A-13	0.10	Max. 0.5
Unsulphated Substance; % HPLC	1.4	Max. 1.5
Manufacturing Date : 13.10.2012		
Expiry Date : 12.10.2013		

The aforementioned data shall constitute the agreed contractual quality of the product at the time of passing of risk. The data are controlled at regular intervals as part of our quality assurance program. Neither these data nor the properties of product specimens shall imply any legally binding guarantee of certain properties or of fitness for a specific purpose. No liability of cure can be derived therefrom.

This is a computer-generated document. No signature is required.

Critical Values of t

n	2-tailed testing			1-tailed testing		
	$\alpha = .1$	$\alpha = .05$	$\alpha = .01$	$\alpha = .1$	$\alpha = .05$	$\alpha = .01$
5	0.805	0.878	0.959	0.687	0.805	0.934
6	0.729	0.811	0.917	0.608	0.729	0.882
7	0.669	0.754	0.875	0.551	0.669	0.833
8	0.621	0.707	0.834	0.507	0.621	0.789
9	0.582	0.666	0.798	0.472	0.582	0.750
10	0.549	0.632	0.765	0.443	0.549	0.715
11	0.521	0.602	0.735	0.419	0.521	0.685
12	0.497	0.576	0.708	0.398	0.497	0.658
13	0.476	0.553	0.684	0.380	0.476	0.634
14	0.458	0.532	0.661	0.365	0.458	0.612
15	0.441	0.514	0.641	0.351	0.441	0.592
16	0.426	0.497	0.623	0.338	0.426	0.574
17	0.412	0.482	0.606	0.327	0.412	0.558
18	0.400	0.468	0.590	0.317	0.400	0.543
19	0.389	0.456	0.575	0.308	0.389	0.529
20	0.378	0.444	0.561	0.299	0.378	0.516
21	0.369	0.433	0.549	0.291	0.369	0.503
22	0.360	0.423	0.537	0.284	0.360	0.492
23	0.352	0.413	0.526	0.277	0.352	0.482
24	0.344	0.404	0.515	0.271	0.344	0.472
25	0.337	0.396	0.505	0.265	0.337	0.462
26	0.330	0.388	0.496	0.260	0.330	0.453
27	0.323	0.381	0.487	0.255	0.323	0.445
28	0.317	0.374	0.479	0.250	0.317	0.437
29	0.311	0.367	0.471	0.245	0.311	0.430
30	0.306	0.361	0.463	0.241	0.306	0.423
40	0.264	0.312	0.403	0.207	0.264	0.367
50	0.235	0.279	0.361	0.184	0.235	0.328
60	0.214	0.254	0.330	0.168	0.214	0.300
80	0.185	0.220	0.286	0.145	0.185	0.260
100	0.165	0.197	0.256	0.129	0.165	0.232
120	0.151	0.179	0.234	0.118	0.151	0.212
140	0.140	0.166	0.217	0.109	0.140	0.196
160	0.130	0.155	0.203	0.102	0.130	0.184
180	0.123	0.146	0.192	0.096	0.123	0.173
200	0.117	0.139	0.182	0.091	0.117	0.164
300	0.095	0.113	0.149	0.074	0.095	0.134
400	0.082	0.098	0.129	0.064	0.082	0.116
500	0.074	0.088	0.115	0.057	0.074	0.104

Standard Normal Probabilities

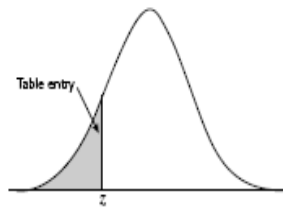


Table entry for z is the area under the standard normal curve to the left of z .

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
-0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
-0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

Standard Normal Probabilities

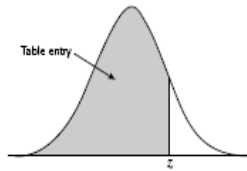


Table entry for z is the area under the standard normal curve to the left of z .

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

Tabel Titik Kritis Distribusi t

Titik Persentase Distribusi t (df = 1 – 40)

Pr	0.25	0.10	0.05	0.025	0.01	0.005	0.001
df	0.50	0.20	0.10	0.050	0.02	0.010	0.002
1	1.00000	3.07768	6.31375	12.70620	31.82052	63.65674	318.30884
2	0.81650	1.88562	2.91999	4.30265	6.96456	9.92484	22.32712
3	0.76489	1.63774	2.35336	3.18245	4.54070	5.84091	10.21453
4	0.74070	1.53321	2.13185	2.77645	3.74695	4.60409	7.17318
5	0.72669	1.47588	2.01505	2.57058	3.36493	4.03214	5.89343
6	0.71756	1.43976	1.94318	2.44691	3.14267	3.70743	5.20763
7	0.71114	1.41492	1.89458	2.36462	2.99795	3.49948	4.78529
8	0.70639	1.39683	1.85955	2.30600	2.89646	3.35539	4.50079
9	0.70272	1.38303	1.83311	2.26216	2.82144	3.24984	4.29681
10	0.69981	1.37218	1.81246	2.22814	2.76377	3.16927	4.14370
11	0.69745	1.36343	1.79588	2.20099	2.71808	3.10581	4.02470
12	0.69548	1.35622	1.78229	2.17881	2.68100	3.05454	3.92963
13	0.69383	1.35017	1.77093	2.16037	2.65031	3.01228	3.85198
14	0.69242	1.34503	1.76131	2.14479	2.62449	2.97684	3.78739
15	0.69120	1.34081	1.75305	2.13145	2.60248	2.94671	3.73283
16	0.69013	1.33676	1.74588	2.11991	2.58349	2.92078	3.68615
17	0.68920	1.33338	1.73961	2.10982	2.56693	2.89823	3.64577
18	0.68836	1.33039	1.73406	2.10092	2.55238	2.87844	3.61048
19	0.68762	1.32773	1.72913	2.09302	2.53948	2.86093	3.57940
20	0.68695	1.32534	1.72472	2.08596	2.52798	2.84534	3.55181
21	0.68635	1.32319	1.72074	2.07961	2.51765	2.83136	3.52715
22	0.68581	1.32124	1.71714	2.07387	2.50832	2.81876	3.50499
23	0.68531	1.31946	1.71387	2.06866	2.49987	2.80734	3.48496
24	0.68485	1.31784	1.71088	2.06390	2.49216	2.79694	3.46678
25	0.68443	1.31635	1.70814	2.05954	2.48511	2.78744	3.45019
26	0.68404	1.31497	1.70562	2.05553	2.47863	2.77871	3.43500
27	0.68368	1.31370	1.70329	2.05183	2.47266	2.77068	3.42103
28	0.68335	1.31253	1.70113	2.04841	2.46714	2.76326	3.40816
29	0.68304	1.31143	1.69913	2.04523	2.46202	2.75639	3.39624
30	0.68276	1.31042	1.69726	2.04227	2.45726	2.75000	3.38518
31	0.68249	1.30946	1.69552	2.03951	2.45282	2.74404	3.37490
32	0.68223	1.30857	1.69389	2.03693	2.44868	2.73848	3.36531
33	0.68200	1.30774	1.69236	2.03452	2.44479	2.73328	3.35634
34	0.68177	1.30695	1.69092	2.03224	2.44115	2.72839	3.34793
35	0.68156	1.30621	1.68957	2.03011	2.43772	2.72381	3.34005
36	0.68137	1.30551	1.68830	2.02809	2.43449	2.71948	3.33262
37	0.68118	1.30485	1.68709	2.02619	2.43145	2.71541	3.32563
38	0.68100	1.30423	1.68595	2.02439	2.42857	2.71156	3.31903
39	0.68083	1.30364	1.68488	2.02269	2.42584	2.70791	3.31279
40	0.68067	1.30308	1.68385	2.02108	2.42326	2.70446	3.30688

F Values for $\alpha = 0.05$

d_2	d_1								
	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.51	19.00	19.16	19.25	19.3	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96
inf	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88