

# 2018 EPCOR IDF CURVES

Intensity Duration Frequency (IDF) curves are a result of a Climate Change study conducted by the University of Alberta and EPCOR encompassing 32 years of records (1984 – 2015) at 11 different monitoring stations across the city of Edmonton.

**Table A7 - IDF Curves - Intensity Table (Part 1 of 3)**  
 Edmonton 11 Rain Gauges Upper Bound - IDF Period: 1984-2015  
 Maximum Years of Record = 32  
IDF Intensity (mm/hr)

Time		Return Frequency						
Minutes	Hours	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
5		66.0	89.0	108.6	138.0	162.2	188.4	217.8
6		61.3	83.2	101.9	129.9	152.9	178.1	206.8
7		57.2	78.3	96.1	122.9	144.7	169.0	197.1
8		53.8	73.9	91.1	116.7	137.5	160.9	188.4
9		50.8	70.1	86.6	111.1	131.1	153.7	180.6
10		48.2	66.7	82.6	106.2	125.3	147.2	173.5
11		45.8	63.7	79.0	101.7	120.1	141.3	167.0
12		43.8	61.0	75.7	97.7	115.4	136.0	161.1
13		41.9	58.6	72.7	93.9	111.1	131.1	155.6
14		40.2	56.3	70.0	90.6	107.1	126.6	150.5
15	0.25	38.7	54.3	67.6	87.4	103.5	122.4	145.9
16		37.2	52.4	65.3	84.6	100.2	118.6	141.5
17		36.0	50.7	63.2	81.9	97.0	115.0	137.5
18		34.8	49.1	61.2	79.4	94.1	111.7	133.7
19		33.7	47.6	59.4	77.1	91.4	108.6	130.1
20		32.6	46.2	57.7	74.9	88.9	105.7	126.8
21		31.7	44.9	56.1	72.9	86.6	102.9	123.6
22		30.8	43.7	54.6	71.0	84.3	100.4	120.7
23		30.0	42.6	53.2	69.2	82.2	97.9	117.9
24		29.2	41.5	51.9	67.5	80.3	95.6	115.2
25		28.5	40.5	50.7	65.9	78.4	93.5	112.7
26		27.8	39.5	49.5	64.4	76.6	91.4	110.3
27		27.1	38.6	48.4	63.0	74.9	89.5	108.0
28		26.5	37.8	47.3	61.6	73.4	87.6	105.9
29		25.9	37.0	46.3	60.3	71.8	85.8	103.8
30	0.5	25.4	36.2	45.3	59.1	70.4	84.2	101.8
31		24.8	35.5	44.4	57.9	69.0	82.5	100.0
32		24.3	34.8	43.6	56.8	67.7	81.0	98.1
33		23.9	34.1	42.7	55.7	66.4	79.5	96.4
34		23.4	33.5	41.9	54.7	65.2	78.1	94.8
35		23.0	32.9	41.2	53.7	64.1	76.8	93.2
36		22.5	32.3	40.4	52.7	63.0	75.5	91.6
37		22.1	31.7	39.7	51.8	61.9	74.2	90.2
38		21.8	31.2	39.1	50.9	60.9	73.0	88.7
39		21.4	30.7	38.4	50.1	59.9	71.9	87.4
40		21.0	30.2	37.8	49.3	58.9	70.8	86.0
41		20.7	29.7	37.2	48.5	58.0	69.7	84.8

**Table A7 - IDF Curves - Intensity Table (Part 2 of 3)**  
 Edmonton 11 Rain Gauges Upper Bound - IDF Period: 1984-2015  
 Maximum Years of Record = 32  
 IDF Intensity (mm/hr)

Time		Return Frequency						
Minutes	Hours	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
42	0.75	20.4	29.2	36.6	47.8	57.1	68.7	83.5
43		20.0	28.8	36.1	47.0	56.3	67.7	82.4
44		19.7	28.3	35.5	46.3	55.5	66.7	81.2
45		19.4	27.9	35.0	45.7	54.7	65.8	80.1
46		19.2	27.5	34.5	45.0	53.9	64.8	79.0
47		18.9	27.1	34.0	44.4	53.2	64.0	78.0
48		18.6	26.8	33.5	43.8	52.5	63.1	77.0
49		18.4	26.4	33.1	43.2	51.8	62.3	76.0
50		18.1	26.1	32.6	42.6	51.1	61.5	75.0
51		17.9	25.7	32.2	42.1	50.4	60.7	74.1
52		17.6	25.4	31.8	41.5	49.8	60.0	73.2
53		17.4	25.1	31.4	41.0	49.2	59.3	72.3
54		17.2	24.8	31.0	40.5	48.6	58.5	71.5
55		17.0	24.5	30.6	40.0	48.0	57.9	70.7
56	16.8	24.2	30.3	39.5	47.4	57.2	69.9	
57	16.6	23.9	29.9	39.0	46.9	56.5	69.1	
58	16.4	23.6	29.6	38.6	46.3	55.9	68.3	
59	16.2	23.3	29.2	38.1	45.8	55.3	67.6	
60	1.0	16.0	23.1	28.9	37.7	45.3	54.7	66.8
61		15.8	22.8	28.6	37.3	44.8	54.1	66.1
62		15.7	22.6	28.3	36.9	44.3	53.5	65.5
63		15.5	22.3	27.9	36.5	43.9	53.0	64.8
64		15.3	22.1	27.6	36.1	43.4	52.4	64.1
65		15.2	21.8	27.4	35.7	42.9	51.9	63.5
66		15.0	21.6	27.1	35.3	42.5	51.4	62.9
67		14.8	21.4	26.8	35.0	42.1	50.9	62.3
68		14.7	21.2	26.5	34.6	41.7	50.4	61.7
69		14.5	21.0	26.3	34.3	41.3	49.9	61.1
70		14.4	20.8	26.0	33.9	40.9	49.4	60.5
71		14.3	20.6	25.8	33.6	40.5	49.0	59.9
72		14.1	20.4	25.5	33.3	40.1	48.5	59.4
73		14.0	20.2	25.3	33.0	39.7	48.1	58.9
74	13.9	20.0	25.0	32.7	39.4	47.6	58.3	
75	1.25	13.7	19.8	24.8	32.4	39.0	47.2	57.8
76		13.6	19.6	24.6	32.1	38.6	46.8	57.3
77		13.5	19.5	24.4	31.8	38.3	46.4	56.8
78		13.4	19.3	24.1	31.5	38.0	46.0	56.4

**Table A7 - IDF Curves - Intensity Table (Part 3 of 3)**  
 Edmonton 11 Rain Gauges Upper Bound - IDF Period: 1984-2015  
 Maximum Years of Record = 32  
 IDF Intensity (mm/hr)

Time		Return Frequency						
Minutes	Hours	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
79		13.2	19.1	23.9	31.2	37.6	45.6	55.9
80		13.1	19.0	23.7	31.0	37.3	45.2	55.4
81		13.0	18.8	23.5	30.7	37.0	44.8	55.0
82		12.9	18.6	23.3	30.4	36.7	44.5	54.5
83		12.8	18.5	23.1	30.2	36.4	44.1	54.1
84		12.7	18.3	22.9	29.9	36.1	43.7	53.6
85		12.6	18.2	22.7	29.7	35.8	43.4	53.2
86		12.5	18.0	22.6	29.4	35.5	43.1	52.8
87		12.4	17.9	22.4	29.2	35.2	42.7	52.4
88		12.3	17.8	22.2	29.0	35.0	42.4	52.0
89		12.2	17.6	22.0	28.7	34.7	42.1	51.6
90	1.5	12.1	17.5	21.8	28.5	34.4	41.8	51.2
120	2	9.9	14.3	17.8	23.3	28.2	34.3	42.2
180	3	7.4	10.7	13.3	17.4	21.1	25.8	31.8
240	4	6.0	8.7	10.8	14.1	17.2	21.1	26.0
300	5	5.1	7.4	9.2	11.9	14.6	18.0	22.2
360	6	4.5	6.5	8.0	10.4	12.8	15.8	19.5
420	7	4.0	5.8	7.2	9.3	11.5	14.1	17.4
480	8	3.6	5.3	6.5	8.4	10.4	12.8	15.8
540	9	3.4	4.9	6.0	7.7	9.5	11.8	14.5
600	10	3.1	4.5	5.5	7.1	8.8	10.9	13.5
660	11	2.9	4.2	5.1	6.6	8.2	10.2	12.6
720	12	2.7	3.9	4.8	6.2	7.7	9.6	11.8
780	13	2.6	3.7	4.5	5.8	7.3	9.0	11.1
840	14	2.4	3.5	4.3	5.5	6.9	8.6	10.5
900	15	2.3	3.3	4.1	5.3	6.5	8.1	10.0
960	16	2.2	3.2	3.9	5.0	6.2	7.8	9.6
1020	17	2.1	3.1	3.7	4.8	6.0	7.4	9.2
1080	18	2.0	2.9	3.6	4.6	5.7	7.1	8.8
1140	19	1.9	2.8	3.4	4.4	5.5	6.8	8.4
1200	20	1.9	2.7	3.3	4.2	5.3	6.6	8.1
1260	21	1.8	2.6	3.2	4.1	5.1	6.4	7.8
1320	22	1.7	2.5	3.1	3.9	4.9	6.2	7.6
1380	23	1.7	2.4	3.0	3.8	4.8	6.0	7.3
1440	24	1.6	2.4	2.9	3.7	4.6	5.8	7.1

**Table A8 - IDF Curves - Intensity Table-Summary**  
 Edmonton 13 Rain Gauges Upper Bound - IDF Period: 1984-2015  
 Maximum Years of Record = 32  
 IDF Intensity (mm/hr)

Time		Return Frequency						
Minutes	Hours	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
5	0.083	66.0	89.0	108.6	138.0	162.2	188.4	217.8
10	0.167	48.2	66.7	82.6	106.2	125.3	147.2	173.5
15	0.250	38.7	54.3	67.6	87.4	103.5	122.4	145.9
20	0.333	32.6	46.2	57.7	74.9	88.9	105.7	126.8
25	0.417	28.5	40.5	50.7	65.9	78.4	93.5	112.7
30	0.500	25.4	36.2	45.3	59.1	70.4	84.2	101.8
35	0.583	23.0	32.9	41.2	53.7	64.1	76.8	93.2
40	0.667	21.0	30.2	37.8	49.3	58.9	70.8	86.0
45	0.750	19.4	27.9	35.0	45.7	54.7	65.8	80.1
50	0.833	18.1	26.1	32.6	42.6	51.1	61.5	75.0
55	0.917	17.0	24.5	30.6	40.0	48.0	57.9	70.7
60	1	16.0	23.1	28.9	37.7	45.3	54.7	66.8
120	2	9.9	14.3	17.8	23.3	28.2	34.3	42.2
180	3	7.4	10.7	13.3	17.4	21.1	25.8	31.8
240	4	6.0	8.7	10.8	14.1	17.2	21.1	26.0
360	6	4.5	6.5	8.0	10.4	12.8	15.8	19.5
720	12	2.7	3.9	4.8	6.2	7.7	9.6	11.8
1440	24	1.6	2.4	2.9	3.7	4.6	5.8	7.1

IDF Parameters

Rate= $a*(t+c)^b$	Return Frequency						
Parameters	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
a (t in min)	337.0	498.1	665.2	909.9	1027.7	1200.5	1498.1
b	-0.732	-0.735	-0.748	-0.757	-0.742	-0.733	-0.735
c (min)	4.3	5.4	6.3	7.1	7.0	7.5	8.8
R <sup>2</sup>	0.994	0.997	0.998	0.998	0.998	0.997	0.994

**Table A9.1 - Chicago Distribution (Modified<sup>1</sup>): 4-Hr Design Storm Data (mm/hr) (Part 1 of 2)**

Edmonton 11 Rain Gauges Upper Bound, IDF-Period: 1984-2015

Maximum Years of Record = 32

Chicago Type Distribution - Design Storm (5-Minute Increment)

Time (min)	Return Frequency						
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.73	2.52	3.01	3.82	4.92	6.25	7.76
10	1.82	2.65	3.18	4.04	5.19	6.58	8.18
15	1.93	2.80	3.36	4.28	5.49	6.97	8.67
20	2.05	2.98	3.58	4.56	5.84	7.41	9.22
25	2.18	3.18	3.83	4.89	6.25	7.92	9.87
30	2.34	3.42	4.13	5.27	6.73	8.52	10.63
35	2.53	3.70	4.48	5.74	7.31	9.24	11.54
40	2.76	4.04	4.91	6.31	8.01	10.12	12.65
45	3.05	4.47	5.45	7.02	8.89	11.22	14.04
50	3.42	5.03	6.15	7.95	10.03	12.63	15.85
55	3.91	5.77	7.10	9.20	11.57	14.54	18.28
60	4.61	6.83	8.45	11.00	13.76	17.26	21.74
65	5.69	8.47	10.55	13.82	17.18	21.48	27.11
70	7.61	11.37	14.32	18.89	23.26	28.94	36.59
75	12.07	18.13	23.11	30.69	37.26	45.90	57.82
80	47.05	65.15	80.55	103.56	122.26	143.62	169.27
85	47.05	65.15	80.55	103.56	122.26	143.62	169.27
90	21.85	32.56	41.62	55.17	66.01	80.00	99.06
95	13.85	20.82	26.60	35.36	42.79	52.54	66.05
100	10.28	15.44	19.62	26.01	31.74	39.26	49.58
105	8.26	12.37	15.62	20.63	25.34	31.48	39.81
110	6.95	10.38	13.03	17.15	21.18	26.40	33.37
115	6.03	8.98	11.22	14.72	18.26	22.81	28.81
120	5.35	7.95	9.89	12.93	16.10	20.14	25.42
125	4.83	7.15	8.86	11.55	14.43	18.08	22.79
130	4.40	6.51	8.04	10.46	13.10	16.44	20.70
135	4.06	5.99	7.37	9.57	12.02	15.10	18.99
140	3.77	5.55	6.82	8.83	11.12	13.98	17.57
145	3.53	5.19	6.35	8.21	10.36	13.04	16.36
150	3.31	4.87	5.95	7.68	9.71	12.23	15.33
155	3.13	4.60	5.60	7.22	9.14	11.52	14.44
160	2.97	4.35	5.30	6.82	8.65	10.91	13.65
165	2.83	4.14	5.03	6.46	8.21	10.36	12.96
170	2.70	3.95	4.79	6.15	7.82	9.87	12.34
175	2.58	3.78	4.58	5.87	7.47	9.44	11.79
180	2.48	3.62	4.38	5.61	7.15	9.04	11.29

<sup>1</sup> Instantaneous Peak Averaged out

**Table A9.1 - Chicago Distribution (Modified): 4-Hr Design Storm Data (mm/hr) (Part 2 of 2)**  
 Edmonton 11 Rain Gauges Upper Bound, IDF-Period: 1984-2015  
 Maximum Years of Record = 32  
 Chicago Type Distribution - Design Storm (5-Minute Increment)

Time (min)	Return Frequency						
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
<b>185</b>	2.38	3.48	4.21	5.38	6.86	8.68	10.83
<b>190</b>	2.30	3.35	4.04	5.17	6.60	8.36	10.42
<b>195</b>	2.22	3.23	3.90	4.98	6.36	8.06	10.04
<b>200</b>	2.14	3.12	3.76	4.80	6.14	7.78	9.69
<b>205</b>	2.08	3.02	3.64	4.64	5.94	7.53	9.37
<b>210</b>	2.01	2.93	3.52	4.49	5.75	7.29	9.07
<b>215</b>	1.95	2.84	3.41	4.35	5.57	7.07	8.80
<b>220</b>	1.90	2.76	3.31	4.21	5.41	6.86	8.54
<b>225</b>	1.85	2.69	3.22	4.09	5.26	6.67	8.30
<b>230</b>	1.80	2.62	3.13	3.98	5.12	6.49	8.07
<b>235</b>	1.75	2.55	3.05	3.87	4.98	6.33	7.86
<b>240</b>	1.71	2.49	2.97	3.77	4.86	6.17	7.66

**Table A9.2 - Huff Distribution: Design Storm for Lake Drawdown Analysis Only (Part 1 of 3)**

Edmonton 11 Rain Gauges Upper Bound, IDF-Period: 1984-2015

Maximum Years of Record = 32

Storm Duration = 24 hours

Huff Distribution (First-Quartile 50% Probability), mm/hr

Time		Return Frequency						
Mins.	Hrs.	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
0	0	0	0	0	0	0	0	0
15		0.29	0.42	0.52	0.66	0.83	1.03	1.28
30		0.59	0.85	1.03	1.32	1.66	2.07	2.55
45		0.88	1.27	1.55	1.98	2.49	3.10	3.83
60	1	1.18	1.70	2.06	2.64	3.32	4.14	5.10
75		1.57	2.26	2.75	3.52	4.42	5.51	6.80
90		2.35	3.39	4.12	5.27	6.62	8.26	10.18
105		3.12	4.52	5.49	7.03	8.82	11.00	13.56
120	2	3.90	5.64	6.85	8.78	11.02	13.74	16.94
135		4.68	6.77	8.22	10.53	13.22	16.48	20.33
150		5.21	7.53	9.14	11.71	14.70	18.33	22.60
165		5.35	7.74	9.39	12.03	15.11	18.84	23.23
180	3	5.49	7.94	9.65	12.36	15.51	19.34	23.85
195		5.64	8.15	9.90	12.68	15.92	19.85	24.47
210		5.78	8.36	10.15	13.00	16.32	20.35	25.10
225		5.69	8.23	9.99	12.80	16.07	20.04	24.70
240	4	5.45	7.87	9.56	12.25	15.37	19.17	23.64
255		5.20	7.52	9.13	11.69	14.68	18.30	22.57
270		4.95	7.16	8.70	11.14	13.98	17.44	21.50
285		4.71	6.81	8.26	10.59	13.29	16.57	20.43
300	5	4.47	6.46	7.84	10.05	12.61	15.72	19.39
315		4.23	6.11	7.42	9.51	11.93	14.88	18.35
330		3.99	5.77	7.00	8.97	11.26	14.04	17.31
345		3.75	5.42	6.58	8.43	10.58	13.20	16.27
360	6	3.51	5.07	6.16	7.89	9.91	12.36	15.24
375		3.29	4.76	5.78	7.40	9.29	11.59	14.29
390		3.07	4.44	5.39	6.91	8.67	10.82	13.34
405		2.85	4.13	5.01	6.42	8.06	10.05	12.39
420	7	2.64	3.81	4.63	5.93	7.44	9.28	11.44
435		2.43	3.51	4.27	5.47	6.86	8.56	10.55
450		2.28	3.30	4.00	5.13	6.44	8.03	9.90
465		2.13	3.08	3.74	4.79	6.01	7.50	9.24
480	8	1.98	2.86	3.47	4.45	5.59	6.97	8.59
495		1.83	2.64	3.21	4.11	5.16	6.44	7.94



**Table A9.2 - Huff Distribution: Design Storm for Lake Drawdown Analysis Only (Part 2 of 3)**

Edmonton 11 Rain Gauges Upper Bound, IDF-Period: 1984-2015

Maximum Years of Record = 32

Storm Duration = 24 hours

Huff Distribution (First-Quartile 50% Probability), mm/hr

Time		Return Frequency						
Mins.	Hrs.	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
510		1.71	2.48	3.01	3.85	4.84	6.03	7.44
525		1.65	2.39	2.90	3.72	4.67	5.82	7.17
540	9	1.59	2.30	2.79	3.58	4.49	5.60	6.91
555		1.53	2.21	2.69	3.44	4.32	5.38	6.64
570		1.47	2.12	2.58	3.30	4.14	5.17	6.37
585		1.41	2.03	2.47	3.16	3.97	4.95	6.10
600	10	1.34	1.94	2.36	3.02	3.80	4.73	5.84
615		1.28	1.86	2.25	2.89	3.62	4.52	5.57
630		1.22	1.77	2.15	2.75	3.45	4.30	5.30
645		1.16	1.68	2.04	2.61	3.28	4.09	5.04
660	11	1.10	1.60	1.94	2.48	3.12	3.89	4.79
675		1.05	1.52	1.84	2.36	2.96	3.70	4.56
690		1.00	1.44	1.75	2.24	2.81	3.50	4.32
705		0.94	1.36	1.65	2.11	2.65	3.31	4.08
720	12	0.89	1.28	1.56	1.99	2.50	3.12	3.84
735		0.86	1.24	1.51	1.93	2.42	3.02	3.73
750		0.83	1.20	1.46	1.87	2.35	2.93	3.61
765		0.80	1.16	1.41	1.81	2.27	2.83	3.49
780	13	0.78	1.12	1.36	1.75	2.19	2.73	3.37
795		0.75	1.08	1.31	1.68	2.11	2.63	3.25
810		0.71	1.03	1.25	1.60	2.01	2.51	3.10
825		0.68	0.98	1.19	1.53	1.92	2.39	2.95
840	14	0.65	0.93	1.13	1.45	1.82	2.27	2.80
855		0.61	0.88	1.07	1.37	1.72	2.15	2.65
870		0.59	0.85	1.03	1.32	1.66	2.07	2.55
885		0.58	0.84	1.02	1.31	1.64	2.04	2.52
900	15	0.57	0.83	1.01	1.29	1.62	2.02	2.49
915		0.57	0.82	1.00	1.28	1.60	2.00	2.46
930		0.56	0.81	0.98	1.26	1.58	1.97	2.43
945		0.55	0.80	0.97	1.24	1.56	1.95	2.40
960	16	0.55	0.79	0.96	1.23	1.54	1.92	2.37
975		0.54	0.78	0.95	1.21	1.52	1.90	2.34
990		0.53	0.77	0.94	1.20	1.50	1.88	2.31
1005		0.53	0.76	0.92	1.18	1.49	1.85	2.28

**Table A9.2 - Huff Distribution: Design Storm for Lake Drawdown Analysis Only (Part 3 of 3)**

Edmonton 11 Rain Gauges Upper Bound, IDF-Period: 1984-2015

Maximum Years of Record = 32

Storm Duration = 24 hours

Huff Distribution (First-Quartile 50% Probability), mm/hr

Time		Return Frequency						
Mins.	Hrs.	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr
1020	17	0.52	0.75	0.91	1.17	1.47	1.83	2.25
1035		0.51	0.74	0.90	1.15	1.45	1.80	2.22
1050		0.51	0.73	0.89	1.14	1.43	1.78	2.20
1065		0.50	0.72	0.88	1.12	1.41	1.76	2.17
1080	18	0.49	0.71	0.86	1.11	1.39	1.73	2.14
1095		0.49	0.70	0.85	1.09	1.37	1.71	2.11
1110		0.48	0.69	0.84	1.08	1.35	1.68	2.08
1125		0.47	0.68	0.83	1.06	1.33	1.66	2.05
1140	19	0.46	0.67	0.82	1.05	1.31	1.64	2.02
1155		0.46	0.66	0.80	1.03	1.29	1.61	1.98
1170		0.44	0.64	0.78	1.00	1.25	1.56	1.92
1185		0.43	0.62	0.75	0.97	1.21	1.51	1.86
1200	20	0.42	0.60	0.73	0.93	1.17	1.46	1.80
1215		0.40	0.58	0.71	0.90	1.13	1.41	1.74
1230		0.39	0.56	0.68	0.87	1.10	1.37	1.68
1245		0.37	0.54	0.66	0.84	1.06	1.32	1.63
1260	21	0.36	0.52	0.63	0.81	1.02	1.27	1.57
1275		0.35	0.50	0.61	0.78	0.98	1.22	1.51
1290		0.33	0.48	0.59	0.75	0.94	1.17	1.45
1305		0.32	0.46	0.56	0.72	0.90	1.13	1.39
1320	22	0.31	0.44	0.54	0.69	0.86	1.08	1.33
1335		0.29	0.42	0.51	0.66	0.83	1.03	1.27
1350		0.28	0.40	0.49	0.63	0.79	0.98	1.21
1365		0.27	0.38	0.47	0.60	0.75	0.93	1.15
1380	23	0.25	0.36	0.44	0.57	0.71	0.89	1.09
1395		0.24	0.34	0.42	0.53	0.67	0.84	1.03
1410		0.22	0.32	0.39	0.50	0.63	0.79	0.97
1425		0.21	0.30	0.37	0.47	0.59	0.74	0.91
1440	24	0.20	0.28	0.35	0.44	0.56	0.69	0.85