

抚顺市城区暴雨强度公式编制 成果报告

辽宁省气候中心
2024年8月

抚顺市城区暴雨强度公式编制成果报告

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抚顺市城区 暴雨强度公式说明及计算图表

辽宁省气候中心编制

二〇二四年八月

1. 本计算图表根据抚顺国家气象站 61 年(1963~2023 年)连续自记雨量记录编制。

2. 暴雨强度总公式:

$$q = \frac{1956.829 \times (1 + 0.997 \lg P)}{(t + 10.378)^{0.776}}$$

3. 重现期 2、3、5、10、20、30、40、50、60、70、80、90、100 (年) 对应的单一重现期暴雨强度公式见表 1。

4. 若采用其它重现期, 设计暴雨强度可用重现期区间参数公式计算:

$$q = \frac{167A}{(t + b)^n}$$

式中: q —设计暴雨强度 (升/秒/公顷)

t —降雨历时 (分钟)

A —雨力参数

b 、 n —常数

(A 、 b 、 n 按重现期区间参数公式计算, 公式见表 2)

应用重现期区间参数公式计算暴雨强度实例: 求 $P=15$ 年, $t=50$ 分钟的暴雨强度 q , 步骤如下:

1) 根据重现期 (15 年) 确定采用区间暴雨强度公式 (表 2) 区间 III 的参数公式, 计算得到参数 n , b , A 。

$$\begin{aligned} n &= 0.770 - 0.007 \ln (P - 7.290) \\ &= 0.7557 \end{aligned}$$

$$b = 9.540 - 0.051 \ln (P - 7.842)$$

$$= 9.44$$

$$A = 15.379 + 2.966 \ln (P - 1.212)$$

$$= 23.161$$

2) 配得 $P=15$ 年的暴雨强度计算公式如下:

$$q = \frac{3867.887}{(t + 9.44)^{0.7557}}$$

可按上式计算 5~180 分钟中任何时段 15 年重现期对应的暴雨强度。

即 $t=50\text{min}$ 时, 求得暴雨强度 q , 结果如下:

$$q = \frac{3867.887}{(50 + 9.44)^{0.7557}} = 176.5 \text{ (升/秒/公顷)}$$

为了应用方便, 本报告以 2、3、5、10、20、30、50、100 (年) 共 8 个常用重现期为例, 给出其对应的 5~180min 设计暴雨强度查算表 (见表 3)。

5. 公式误差

暴雨强度总公式算得的重现期 2~20 年暴雨强度平均绝对均方差为 0.023 (mm/min), 平均相对均方差为 2.64%。暴雨强度区间公式算得的重现期 2~20 年暴雨强度平均绝对均方差为 0.012 (mm/min), 平均相对均方差为 1.18%。精度符合《室外排水设计标准》(GB 50014-2021) 提出的要求。

表1 单一重现期暴雨强度公式

重现期 P (年)	公式
P=2	$2494.980 / (t + 9.662)^{0.788}$
P=3	$2803.429 / (t + 9.607)^{0.781}$
P=5	$3180.682 / (t + 9.549)^{0.773}$
P=10	$3644.775 / (t + 9.501)^{0.763}$
P=20	$4021.193 / (t + 9.413)^{0.752}$
P=30	$4232.615 / (t + 9.382)^{0.748}$
P=40	$4380.243 / (t + 9.363)^{0.746}$
P=50	$4493.803 / (t + 9.349)^{0.744}$
P=60	$4586.154 / (t + 9.338)^{0.742}$
P=70	$4663.976 / (t + 9.329)^{0.741}$
P=80	$4731.277 / (t + 9.322)^{0.740}$
P=90	$4790.395 / (t + 9.315)^{0.739}$
P=100	$4843.334 / (t + 9.309)^{0.738}$

表2 重现期区间暴雨强度公式

P (年)	区间	参数	公 式
2~10	II	n	$0.790 - 0.012 \ln(P - 0.836)$
		b	$9.676 - 0.089 \ln(P - 0.836)$
		A	$12.422 + 4.213 \ln(P - 0.182)$
10~100	III	n	$0.770 - 0.007 \ln(P - 7.290)$
		b	$9.540 - 0.051 \ln(P - 7.842)$
		A	$15.379 + 2.966 \ln(P - 1.212)$

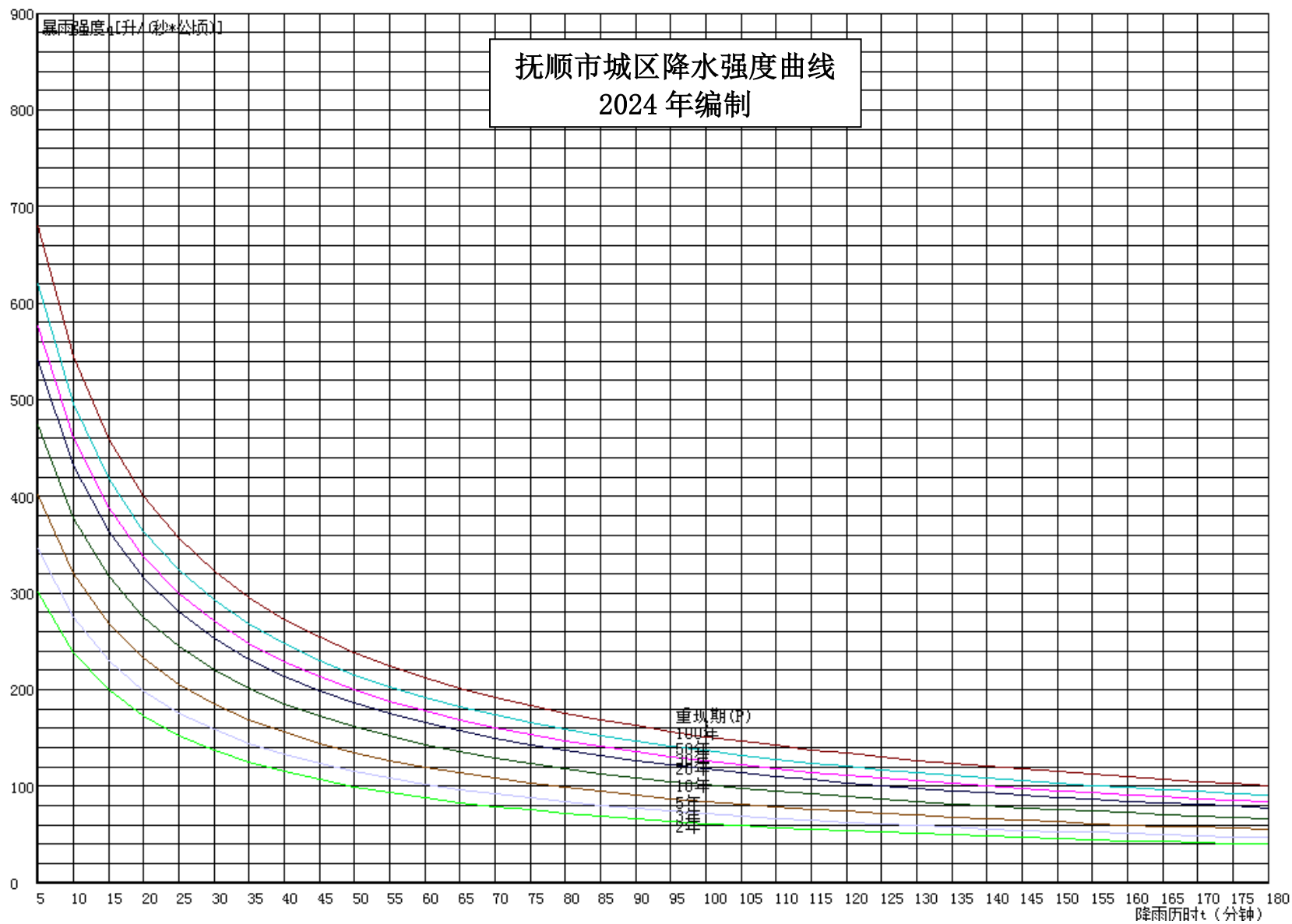


图1 抚顺市城区各重现期降水强度随历时的变化曲线 (单位: $L/(s \cdot hm^2)$)

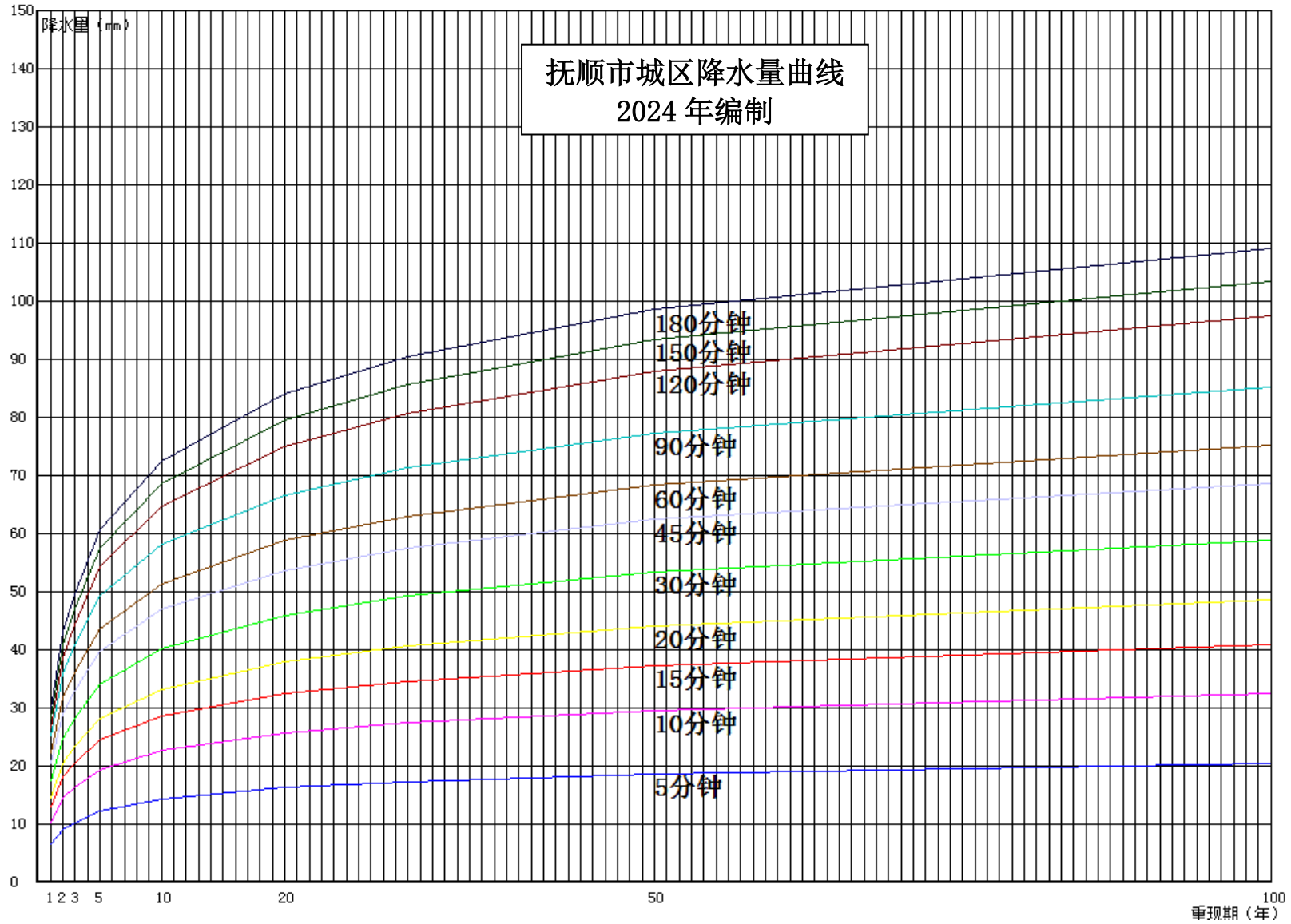


图2 抚顺市城区各重现期各历时降水量变化曲线 (单位: mm)

表3 8个重现期下5~180min暴雨强度查算表（区间公式）

抚顺 P=2年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	146.038	53	95.726	79	72.820	105	59.463	131	50.618	157	44.285
		28	142.973	54	94.539	80	72.179	106	59.057	132	50.336	158	44.077
		29	140.051	55	93.385	81	71.551	107	58.658	133	50.058	159	43.871
		30	137.261	56	92.262	82	70.935	108	58.265	134	49.783	160	43.667
5	300.682	31	134.594	57	91.170	83	70.331	109	57.877	135	49.512	161	43.465
6	285.448	32	132.042	58	90.106	84	69.739	110	57.496	136	49.244	162	43.266
7	271.860	33	129.597	59	89.071	85	69.158	111	57.120	137	48.979	163	43.068
8	259.657	34	127.252	60	88.062	86	68.587	112	56.750	138	48.717	164	42.873
9	248.629	35	125.002	61	87.078	87	68.028	113	56.385	139	48.459	165	42.679
10	238.610	36	122.839	62	86.119	88	67.478	114	56.025	140	48.204	166	42.487
11	229.462	37	120.760	63	85.184	89	66.939	115	55.671	141	47.951	167	42.298
12	221.073	38	118.759	64	84.271	90	66.409	116	55.322	142	47.702	168	42.110
13	213.350	39	116.832	65	83.381	91	65.888	117	54.977	143	47.456	169	41.924
14	206.212	40	114.974	66	82.511	92	65.377	118	54.637	144	47.212	170	41.740
15	199.595	41	113.182	67	81.662	93	64.875	119	54.303	145	46.971	171	41.558
16	193.440	42	111.452	68	80.832	94	64.381	120	53.972	146	46.733	172	41.378
17	187.700	43	109.781	69	80.021	95	63.896	121	53.647	147	46.498	173	41.199
18	182.332	44	108.166	70	79.228	96	63.419	122	53.325	148	46.266	174	41.022
19	177.300	45	106.603	71	78.453	97	62.950	123	53.008	149	46.036	175	40.847
20	172.573	46	105.091	72	77.695	98	62.489	124	52.695	150	45.808	176	40.674
21	168.123	47	103.627	73	76.954	99	62.035	125	52.387	151	45.583	177	40.502
22	163.924	48	102.208	74	76.228	100	61.589	126	52.082	152	45.361	178	40.332
23	159.956	49	100.833	75	75.518	101	61.150	127	51.782	153	45.141	179	40.163
24	156.200	50	99.499	76	74.822	102	60.718	128	51.485	154	44.924	180	39.996
25	152.638	51	98.204	77	74.141	103	60.293	129	51.192	155	44.709		
26	149.255	52	96.947	78	73.474	104	59.875	130	50.903	156	44.496		

抚顺 P=3年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

		27	168.479	53	110.797	79	84.473	105	69.095	131	58.897	157	51.588
		28	164.970	54	109.434	80	83.736	106	68.628	132	58.572	158	51.347
		29	161.623	55	108.109	81	83.013	107	68.168	133	58.251	159	51.109
		30	158.427	56	106.820	82	82.304	108	67.714	134	57.934	160	50.874
5	345.277	31	155.372	57	105.565	83	81.610	109	67.268	135	57.621	161	50.641
6	327.874	32	152.448	58	104.344	84	80.928	110	66.828	136	57.312	162	50.410
7	312.350	33	149.646	59	103.154	85	80.259	111	66.395	137	57.006	163	50.182
8	298.407	34	146.959	60	101.995	86	79.603	112	65.969	138	56.704	164	49.956
9	285.807	35	144.380	61	100.865	87	78.958	113	65.548	139	56.406	165	49.732
10	274.357	36	141.901	62	99.763	88	78.326	114	65.133	140	56.112	166	49.511
11	263.903	37	139.518	63	98.688	89	77.705	115	64.725	141	55.820	167	49.292
12	254.315	38	137.224	64	97.640	90	77.095	116	64.322	142	55.533	168	49.075
13	245.485	39	135.014	65	96.616	91	76.496	117	63.925	143	55.248	169	48.860
14	237.326	40	132.883	66	95.616	92	75.907	118	63.533	144	54.967	170	48.648
15	229.759	41	130.828	67	94.640	93	75.329	119	63.147	145	54.689	171	48.437
16	222.721	42	128.844	68	93.686	94	74.760	120	62.766	146	54.415	172	48.229
17	216.156	43	126.927	69	92.754	95	74.201	121	62.391	147	54.143	173	48.022
18	210.017	44	125.074	70	91.843	96	73.652	122	62.020	148	53.874	174	47.818
19	204.261	45	123.282	71	90.952	97	73.112	123	61.655	149	53.609	175	47.616
20	198.852	46	121.547	72	90.080	98	72.581	124	61.294	150	53.347	176	47.415
21	193.760	47	119.867	73	89.228	99	72.058	125	60.938	151	53.087	177	47.217
22	188.955	48	118.238	74	88.393	100	71.544	126	60.587	152	52.830	178	47.020
23	184.414	49	116.660	75	87.576	101	71.039	127	60.240	153	52.576	179	46.825
24	180.114	50	115.128	76	86.776	102	70.541	128	59.898	154	52.325	180	46.632
25	176.036	51	113.642	77	85.993	103	70.051	129	59.560	155	52.077		
26	172.163	52	112.199	78	85.225	104	69.569	130	59.227	156	51.831		

抚顺 P=5 年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	196.978	53	130.030	79	99.391	105	81.455	131	69.542	157	60.991
		28	192.910	54	128.445	80	98.532	106	80.910	132	69.162	158	60.710
		29	189.031	55	126.904	81	97.690	107	80.373	133	68.787	159	60.431
		30	185.325	56	125.405	82	96.864	108	79.844	134	68.416	160	60.155
5	401.467	31	181.782	57	123.946	83	96.054	109	79.323	135	68.050	161	59.883
6	381.359	32	178.391	58	122.525	84	95.259	110	78.809	136	67.688	162	59.613
7	363.421	33	175.141	59	121.141	85	94.479	111	78.303	137	67.331	163	59.345
8	347.307	34	172.024	60	119.792	86	93.714	112	77.805	138	66.978	164	59.081
9	332.743	35	169.032	61	118.478	87	92.963	113	77.314	139	66.629	165	58.819
10	319.507	36	166.156	62	117.196	88	92.225	114	76.830	140	66.285	166	58.560
11	307.421	37	163.390	63	115.945	89	91.501	115	76.352	141	65.944	167	58.303
12	296.334	38	160.727	64	114.725	90	90.790	116	75.882	142	65.607	168	58.049
13	286.123	39	158.162	65	113.533	91	90.091	117	75.418	143	65.275	169	57.798
14	276.685	40	155.689	66	112.370	92	89.405	118	74.960	144	64.946	170	57.549
15	267.932	41	153.303	67	111.233	93	88.730	119	74.509	145	64.621	171	57.302
16	259.789	42	150.999	68	110.123	94	88.067	120	74.064	146	64.299	172	57.058
17	252.192	43	148.773	69	109.038	95	87.415	121	73.625	147	63.982	173	56.816
18	245.086	44	146.621	70	107.977	96	86.774	122	73.192	148	63.668	174	56.577
19	238.423	45	144.539	71	106.939	97	86.144	123	72.765	149	63.357	175	56.340
20	232.162	46	142.523	72	105.924	98	85.524	124	72.344	150	63.050	176	56.105
21	226.265	47	140.571	73	104.931	99	84.914	125	71.928	151	62.746	177	55.872
22	220.701	48	138.679	74	103.958	100	84.315	126	71.517	152	62.445	178	55.642
23	215.441	49	136.845	75	103.007	101	83.724	127	71.112	153	62.148	179	55.414
24	210.460	50	135.065	76	102.075	102	83.144	128	70.712	154	61.854	180	55.188
25	205.736	51	133.337	77	101.162	103	82.572	129	70.317	155	61.564	181	54.964
26	201.248	52	131.660	78	100.267	104	82.009	130	69.927	156	61.276	182	54.742

抚顺 P=10年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	234.224	53	155.385	79	119.165	105	97.904	131	83.751	157	73.575
		28	229.444	54	153.514	80	118.148	106	97.256	132	83.299	158	73.240
		29	224.882	55	151.695	81	117.151	107	96.619	133	82.853	159	72.908
		30	220.525	56	149.925	82	116.172	108	95.991	134	82.412	160	72.579
5	473.723	31	216.359	57	148.202	83	115.213	109	95.372	135	81.976	161	72.254
6	450.222	32	212.369	58	146.523	84	114.271	110	94.762	136	81.546	162	71.933
7	429.250	33	208.546	59	144.889	85	113.348	111	94.162	137	81.121	163	71.614
8	410.406	34	204.878	60	143.295	86	112.441	112	93.570	138	80.701	164	71.299
9	393.370	35	201.356	61	141.742	87	111.551	113	92.987	139	80.286	165	70.987
10	377.883	36	197.971	62	140.227	88	110.677	114	92.412	140	79.876	166	70.678
11	363.736	37	194.714	63	138.748	89	109.819	115	91.845	141	79.471	167	70.372
12	350.756	38	191.578	64	137.306	90	108.975	116	91.286	142	79.070	168	70.070
13	338.798	39	188.557	65	135.897	91	108.147	117	90.735	143	78.674	169	69.770
14	327.742	40	185.644	66	134.522	92	107.333	118	90.191	144	78.283	170	69.473
15	317.485	41	182.832	67	133.178	93	106.533	119	89.655	145	77.896	171	69.179
16	307.941	42	180.117	68	131.865	94	105.747	120	89.126	146	77.514	172	68.888
17	299.035	43	177.494	69	130.581	95	104.974	121	88.605	147	77.135	173	68.600
18	290.702	44	174.957	70	129.326	96	104.214	122	88.090	148	76.762	174	68.315
19	282.887	45	172.502	71	128.099	97	103.467	123	87.583	149	76.392	175	68.032
20	275.540	46	170.125	72	126.898	98	102.731	124	87.082	150	76.026	176	67.752
21	268.620	47	167.823	73	125.722	99	102.008	125	86.587	151	75.664	177	67.475
22	262.089	48	165.592	74	124.572	100	101.297	126	86.099	152	75.307	178	67.200
23	255.914	49	163.427	75	123.445	101	100.596	127	85.617	153	74.953	179	66.928
24	250.064	50	161.328	76	122.342	102	99.907	128	85.142	154	74.603	180	66.658
25	244.515	51	159.289	77	121.262	103	99.229	129	84.672	155	74.256		
26	239.242	52	157.309	78	120.203	104	98.561	130	84.209	156	73.914		

抚顺 P=20年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	269.333	53	179.601	79	138.221	105	113.863	131	97.612	157	85.906
		28	263.902	54	177.467	80	137.057	106	113.120	132	97.093	158	85.520
		29	258.718	55	175.391	81	135.916	107	112.388	133	96.580	159	85.137
		30	253.766	56	173.371	82	134.796	108	111.668	134	96.073	160	84.759
5	540.719	31	249.030	57	171.404	83	133.698	109	110.958	135	95.572	161	84.385
6	514.119	32	244.494	58	169.488	84	132.620	110	110.259	136	95.077	162	84.014
7	490.381	33	240.146	59	167.622	85	131.562	111	109.569	137	94.589	163	83.648
8	469.049	34	235.974	60	165.803	86	130.524	112	108.890	138	94.106	164	83.285
9	449.760	35	231.968	61	164.029	87	129.505	113	108.220	139	93.628	165	82.925
10	432.224	36	228.116	62	162.298	88	128.504	114	107.560	140	93.157	166	82.570
11	416.203	37	224.410	63	160.610	89	127.520	115	106.909	141	92.691	167	82.217
12	401.500	38	220.841	64	158.962	90	126.555	116	106.268	142	92.230	168	81.869
13	387.953	39	217.402	65	157.353	91	125.606	117	105.635	143	91.775	169	81.523
14	375.425	40	214.085	66	155.781	92	124.673	118	105.011	144	91.324	170	81.181
15	363.801	41	210.884	67	154.246	93	123.756	119	104.395	145	90.879	171	80.843
16	352.982	42	207.792	68	152.745	94	122.855	120	103.788	146	90.439	172	80.507
17	342.885	43	204.803	69	151.278	95	121.970	121	103.189	147	90.004	173	80.175
18	333.435	44	201.913	70	149.843	96	121.098	122	102.598	148	89.574	174	79.846
19	324.571	45	199.116	71	148.440	97	120.242	123	102.015	149	89.148	175	79.521
20	316.237	46	196.408	72	147.066	98	119.399	124	101.439	150	88.727	176	79.198
21	308.386	47	193.784	73	145.722	99	118.570	125	100.871	151	88.311	177	78.878
22	300.974	48	191.240	74	144.407	100	117.754	126	100.310	152	87.899	178	78.561
23	293.964	49	188.773	75	143.118	101	116.951	127	99.757	153	87.492	179	78.248
24	287.323	50	186.379	76	141.856	102	116.161	128	99.211	154	87.089	180	77.937
25	281.022	51	184.054	77	140.620	103	115.383	129	98.671	155	86.690		
26	275.033	52	181.796	78	139.409	104	114.617	130	98.138	156	86.296		

抚顺 P=30年

t 单位: 分钟 (min); q 单位: 升/秒/公顷 (L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	287.634	53	192.153	79	148.064	105	122.085	131	104.740	157	92.237
		28	281.858	54	189.880	80	146.823	106	121.292	132	104.185	158	91.824
		29	276.346	55	187.669	81	145.606	107	120.512	133	103.637	159	91.416
		30	271.079	56	185.518	82	144.412	108	119.743	134	103.096	160	91.012
5	575.959	31	266.041	57	183.423	83	143.241	109	118.985	135	102.561	161	90.612
6	547.710	32	261.217	58	181.382	84	142.092	110	118.239	136	102.033	162	90.216
7	522.499	33	256.592	59	179.394	85	140.964	111	117.503	137	101.511	163	89.824
8	499.843	34	252.154	60	177.456	86	139.857	112	116.778	138	100.995	164	89.436
9	479.357	35	247.891	61	175.567	87	138.770	113	116.064	139	100.486	165	89.052
10	460.731	36	243.793	62	173.723	88	137.702	114	115.359	140	99.982	166	88.672
11	443.713	37	239.850	63	171.925	89	136.654	115	114.665	141	99.484	167	88.296
12	428.095	38	236.052	64	170.169	90	135.624	116	113.980	142	98.992	168	87.923
13	413.703	39	232.393	65	168.454	91	134.612	117	113.304	143	98.506	169	87.554
14	400.394	40	228.863	66	166.780	92	133.617	118	112.638	144	98.025	170	87.189
15	388.043	41	225.456	67	165.143	93	132.640	119	111.981	145	97.550	171	86.827
16	376.548	42	222.165	68	163.544	94	131.679	120	111.333	146	97.079	172	86.468
17	365.818	43	218.984	69	161.981	95	130.734	121	110.694	147	96.615	173	86.113
18	355.776	44	215.908	70	160.452	96	129.804	122	110.063	148	96.155	174	85.762
19	346.356	45	212.931	71	158.956	97	128.890	123	109.440	149	95.700	175	85.414
20	337.498	46	210.048	72	157.492	98	127.991	124	108.826	150	95.251	176	85.069
21	329.153	47	207.254	73	156.060	99	127.107	125	108.219	151	94.806	177	84.727
22	321.274	48	204.546	74	154.657	100	126.236	126	107.621	152	94.366	178	84.388
23	313.822	49	201.919	75	153.284	101	125.380	127	107.030	153	93.931	179	84.053
24	306.762	50	199.370	76	151.939	102	124.537	128	106.446	154	93.501	180	83.721
25	300.062	51	196.895	77	150.621	103	123.707	129	105.870	155	93.075		
26	293.695	52	194.490	78	149.330	104	122.890	130	105.302	156	92.654		

抚顺 P=50年

t 单位: 分钟 (min); q 单位: 升/秒/公顷 (L/(s·hm²))

		27	310.176	53	207.616	79	160.192	105	132.218	131	113.525	157	100.040
		28	303.975	54	205.173	80	158.856	106	131.364	132	112.927	158	99.595
		29	298.058	55	202.796	81	157.546	107	130.523	133	112.336	159	99.155
		30	292.404	56	200.482	82	156.261	108	129.694	134	111.752	160	98.719
5	619.354	31	286.995	57	198.230	83	155.000	109	128.878	135	111.176	161	98.287
6	589.075	32	281.815	58	196.036	84	153.763	110	128.074	136	110.606	162	97.860
7	562.052	33	276.849	59	193.898	85	152.549	111	127.281	137	110.043	163	97.437
8	537.767	34	272.083	60	191.814	86	151.357	112	126.500	138	109.487	164	97.019
9	515.806	35	267.505	61	189.782	87	150.187	113	125.730	139	108.938	165	96.605
10	495.838	36	263.104	62	187.799	88	149.037	114	124.971	140	108.395	166	96.194
11	477.593	37	258.869	63	185.864	89	147.909	115	124.222	141	107.858	167	95.788
12	460.847	38	254.790	64	183.976	90	146.799	116	123.484	142	107.327	168	95.386
13	445.416	39	250.859	65	182.132	91	145.710	117	122.757	143	106.802	169	94.988
14	431.144	40	247.067	66	180.330	92	144.639	118	122.039	144	106.284	170	94.594
15	417.900	41	243.407	67	178.570	93	143.586	119	121.331	145	105.771	171	94.203
16	405.571	42	239.871	68	176.849	94	142.551	120	120.632	146	105.264	172	93.816
17	394.063	43	236.454	69	175.167	95	141.533	121	119.943	147	104.763	173	93.433
18	383.292	44	233.148	70	173.522	96	140.533	122	119.263	148	104.267	174	93.054
19	373.187	45	229.949	71	171.913	97	139.548	123	118.592	149	103.777	175	92.678
20	363.684	46	226.851	72	170.338	98	138.580	124	117.929	150	103.292	176	92.306
21	354.731	47	223.849	73	168.797	99	137.627	125	117.276	151	102.812	177	91.937
22	346.277	48	220.938	74	167.288	100	136.690	126	116.630	152	102.338	178	91.572
23	338.281	49	218.115	75	165.810	101	135.767	127	115.993	153	101.868	179	91.210
24	330.705	50	215.375	76	164.362	102	134.859	128	115.364	154	101.404	180	90.851
25	323.515	51	212.714	77	162.944	103	133.965	129	114.743	155	100.945		
26	316.681	52	210.129	78	161.554	104	133.084	130	114.130	156	100.490		

抚顺 P=100年

t 单位: 分钟(min); q 单位: 升/秒/公顷(L/(s·hm²))

t	q	t	q	t	q	t	q	t	q	t	q	t	q
		27	341.864	53	229.491	79	177.416	105	146.650	131	126.065	157	111.201
		28	335.078	54	226.810	80	175.948	106	145.710	132	125.406	158	110.710
		29	328.601	55	224.202	81	174.508	107	144.784	133	124.755	159	110.224
		30	322.411	56	221.664	82	173.095	108	143.873	134	124.112	160	109.743
5	679.680	31	316.488	57	219.192	83	171.709	109	142.974	135	123.477	161	109.268
6	646.627	32	310.816	58	216.784	84	170.349	110	142.089	136	122.849	162	108.796
7	617.125	33	305.378	59	214.437	85	169.015	111	141.216	137	122.229	163	108.330
8	590.609	34	300.158	60	212.149	86	167.704	112	140.356	138	121.616	164	107.868
9	566.628	35	295.144	61	209.918	87	166.417	113	139.508	139	121.010	165	107.411
10	544.821	36	290.322	62	207.742	88	165.153	114	138.672	140	120.412	166	106.959
11	524.892	37	285.682	63	205.618	89	163.912	115	137.848	141	119.820	167	106.511
12	506.600	38	281.213	64	203.544	90	162.692	116	137.036	142	119.235	168	106.067
13	489.741	39	276.906	65	201.519	91	161.494	117	136.234	143	118.657	169	105.628
14	474.146	40	272.750	66	199.541	92	160.316	118	135.444	144	118.085	170	105.193
15	459.672	41	268.739	67	197.608	93	159.158	119	134.664	145	117.520	171	104.762
16	446.198	42	264.863	68	195.718	94	158.019	120	133.894	146	116.961	172	104.335
17	433.618	43	261.117	69	193.870	95	156.900	121	133.135	147	116.408	173	103.913
18	421.843	44	257.493	70	192.063	96	155.799	122	132.386	148	115.862	174	103.494
19	410.794	45	253.986	71	190.295	97	154.716	123	131.647	149	115.321	175	103.079
20	400.403	46	250.588	72	188.565	98	153.651	124	130.918	150	114.787	176	102.668
21	390.611	47	247.297	73	186.872	99	152.603	125	130.198	151	114.258	177	102.261
22	381.365	48	244.105	74	185.214	100	151.571	126	129.487	152	113.735	178	101.858
23	372.618	49	241.008	75	183.590	101	150.556	127	128.785	153	113.217	179	101.459
24	364.329	50	238.002	76	182.000	102	149.556	128	128.092	154	112.705	180	101.063
25	356.462	51	235.084	77	180.441	103	148.573	129	127.408	155	112.198		
26	348.984	52	232.248	78	178.913	104	147.604	130	126.732	156	111.697		