MASTER GARDENER
COLORADO STATE UNIVERSITY
EXTENSION

CMG GardenNotes #266

Converting Inches to Minutes

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Gardeners often wonder, how long should my sprinklers run in order to apply the right amount of water? The difficulty is that water is usually measured in inches while the irrigation controller (timer) works in minutes. The challenge is to convert minutes to inches so that sprinkler run times provide the correct amount of water that is applied to the lawn or garden. It's easy to make the conversion using the following process. First, calculate the precipitation rate for each irrigation zone, then convert inches to minutes using the formulas given in **Tables 1**, **2**, and **3**.

Calculate the Precipitation Rate

The following steps need to be done for each irrigation zone (or each location you placed the sprinkler(s) if you are manually attaching and dragging a hose). To do the calculations you will need six identical straight-sided flat bottom containers, such as soup cans, fruit or vegetable cans, or coffee mugs. (Do not use short cans like tuna cans as they are too shallow, and water may splash out.) You will need a ruler, a watch, and paper/pen to record your findings. Many sod growers and local water providers give out small rain gauges with a ruler on the side for this measurement. You will need six of the same type.

Steps

1. Place six identical rain gauges, or straight-sided, flat-bottomed cans/mugs between sprinkler heads in the zone.
2. Turn on the sprinklers for exactly ten minutes.
3. Pour all the water into one rain gauge or container.
4. With a ruler, measure the depth of the water in the rain gauge or container. This is your precipitation rate in inches per hour.
5. Write down the number near your controller for future reference.
6. Repeat Steps 1 - 5 for each irrigation zone.

Table 1. Conversion of Fractions to Decimals

1/16 = .06	9/16 = .56
1/8 = .13	5/8 = .63
3/16 = .19	11/16 = .69
1/4 = .25	3/4 = .75
5/16 = .31	13/16 = .81
3/8 = .38	7/8 = .88
7/16 = .44	15/16 = .94
1/2 = .50	

Convert Inches to Minutes

Once you know the precipitation rate for each zone, you can look up the run time in the table or calculate it by using the following formula:

$$\text{Run Time (minutes)} = \frac{\text{Water to apply (inches)}}{\text{Precipitation rate (inches/hour)}} \times 60 \text{ minutes/hour}$$

Example: You have done the above steps and calculated that this sprinkler zone has a precipitation rate of 1 ½ inches per hour. You desire to apply ½ inch of water.

$$\text{Run Time} = \frac{0.5 \text{ inches}}{1.5 \text{ inches/hour}} \times 60 \text{ minutes/hour} = 20 \text{ minutes}$$

You need to calculate this for each zone. A common mistake is assuming that all zones have the same water needs or that all zones run the same. In the typical yard, they do not!

Table 2. Sprinkler Run Timetable (in Minutes) by 1/8th Inch

Precipitation Rate (Inches per hour)	**Water to be Applied** (inches)													
	0.2	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**	**1.1**	**1.2**	**1.3**	**1.4**	**1.5**
1/4	48	72	96	120	144	168	192	216	240	264	288	312	336	360
3/8	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1/2	24	36	48	60	72	84	96	108	120	132	144	156	168	180
5/8	19	29	38	48	58	67	77	86	96	106	115	125	134	144
3/4	16	24	32	40	48	56	64	72	80	88	96	104	112	120
7/8	14	21	27	34	41	48	55	62	69	75	82	89	96	103
1	12	18	24	30	36	42	48	54	60	66	72	78	84	90
1 1/8	11	16	21	27	32	37	43	48	53	59	64	69	75	80
1 1/4	10	14	19	24	29	34	38	43	48	53	58	62	67	72
1 3/8	9	13	17	22	26	31	35	39	44	48	52	57	61	65
1 1/2	8	12	16	20	24	28	32	36	40	44	48	52	56	60
1 5/8	7	11	15	18	22	26	30	33	37	41	44	48	52	55
1 3/4	7	10	14	17	21	24	27	31	34	38	41	45	48	51
1 7/8	6	10	13	16	19	22	26	29	32	35	38	42	45	48
2	6	9	12	15	18	21	24	27	30	33	36	39	42	45
2 1/8	6	8	11	14	17	20	23	25	28	31	34	37	40	42
2 1/4	5	8	11	13	16	19	21	24	27	29	32	35	37	40
2 3/8	5	8	10	13	15	18	20	23	25	28	30	33	35	38
2 1/2	5	7	10	12	14	17	19	22	24	26	29	31	34	36
2 5/8	5	7	9	11	14	16	18	21	23	25	27	30	32	34
2 3/4	4	7	9	11	13	15	17	20	22	24	26	28	31	33
2 7/8	4	6	8	10	13	15	17	19	21	23	25	27	29	31
3	4	6	8	10	12	14	16	18	20	22	24	26	28	30

Select the precipitation rate of your sprinkler zone along the left column and move right until you are in the column of the amount of water to be applied. This is the number of minutes to run your sprinkler. Example: Your sprinkler applies water at 1 ½ inches per hour and you want to apply ½ inch, it takes 20 minutes.

Table 3. Sprinkler Run Timetable (in Minutes) by 1/10th Inch

Precipitation Rate (Inches per hour)	Water to Be Applied (inches)													
	0.2	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**	**1.1**	**1.2**	**1.3**	**1.4**	**1.5**
0.20	60	90	120	150	180	210	240	270	300	330	360	390	420	450
0.30	40	60	80	100	120	140	160	180	200	220	240	260	280	300
0.40	30	45	60	75	90	105	120	135	150	165	180	195	210	225
0.50	24	36	48	60	72	84	96	108	120	132	144	156	168	180
0.60	20	30	40	50	60	70	80	90	100	110	120	130	140	150
0.70	17	26	34	43	51	60	69	77	86	94	103	111	120	129
0.80	15	22	30	37	45	52	60	67	75	82	90	97	105	113
0.90	13	20	27	33	40	47	53	60	67	73	80	87	93	100
1.00	12	18	24	30	36	72	48	54	60	66	72	78	81	90
1.10	11	16	22	27	33	38	44	49	55	60	66	71	76	82
1.20	10	15	20	25	30	35	40	45	50	55	60	65	76	75
1.30	9	14	18	23	28	32	37	42	46	51	55	60	65	69
1.40	9	12	17	21	26	30	34	39	43	47	51	56	60	64
1.50	8	12	16	20	24	28	32	36	40	44	48	52	56	60
1.60	8	11	15	19	22	26	30	34	37	41	45	49	52	56
1.70	7	11	14	18	21	25	28	32	35	39	42	46	49	53
1.80	7	10	13	17	20	23	27	30	33	37	40	43	47	50
1.90	7	9	13	16	19	22	25	28	32	35	38	41	44	47
2.00	6	9	12	15	18	21	24	27	30	33	36	39	42	45
2.10	6	9	11	14	17	20	23	26	29	31	34	37	40	43
2.20	6	8	11	14	16	19	22	25	27	30	33	35	38	41
2.30	5	8	10	13	16	18	21	23	26	29	31	34	37	39
2.40	5	7	10	12	15	17	20	22	25	27	30	32	35	37
2.50	5	7	10	12	14	17	19	22	24	26	29	31	34	36

Select the precipitation rate of your sprinkler zone along the left column and move right until you are in the column of the amount of water to be applied. This is the number of minutes to run your sprinkler. Example: Your sprinkler applies water at 1 ½ inches per hour and you want to apply ½ inch, it takes 20 minutes.

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