

**Ready reckoners for phosphorus fertilizers** (by Dr. Jagdev Sharma, Senior Scientist (Soil Science) and Dr. A. K. Upadhyay, Senior Scientist (Soil Science))

These ready reckoners have been prepared to help farmers/ users calculate the quantity of commonly used phosphatic fertilizers for P nutrition of the vines. The figures have been rounded to nearest decimal point. The calculations have been made on the basis of minimum nutrient (N, P<sub>2</sub>O<sub>5</sub> or K<sub>2</sub>O as the case may be) contents required to be present in the fertilizer as per the specifications and composition of different fertilizers provided in 'Fertilizers Control Order of India' (Government of India, Ministry of Agriculture and Rural Development (Department of Agriculture and Cooperation). Further information on fertilizer properties can be obtained from the website of the Ministry of Agriculture and Rural Development.

To convert quantity of P to P<sub>2</sub>O<sub>5</sub> multiply P quantity by 2.29.

Example: 10 kg P = 10 x 2.29 = 22.9 kg P<sub>2</sub>O<sub>5</sub>

To convert quantity of P<sub>2</sub>O<sub>5</sub> to P divide P<sub>2</sub>O<sub>5</sub> quantity by 2.29

Example: 22.9 kg P<sub>2</sub>O<sub>5</sub> = 22.9 / 2.29 = 10 kg P

<b>Single super phosphate (SSP) containing 16% P<sub>2</sub>O<sub>5</sub> and 20% calcium and 11% sulphur (S)</b>				
A	B	C	D	E
Quantity of P <sub>2</sub> O <sub>5</sub> needed (Kg)	Quantity of SSP (16% P <sub>2</sub> O <sub>5</sub> ) needed (Kg) for quantity under Column A	Quantity of water soluble P <sub>2</sub> O <sub>5</sub> in SSP under Column B (kg)	Quantity of Ca present in SSP under Column B (kg)	Quantity of S present in SSP quantity under Column B (kg)
10	63	10	13	7
20	125	20	25	14
30	188	30	38	21
40	250	40	50	28
50	313	50	63	34
60	375	60	75	41
70	438	70	88	48
80	500	80	100	55
90	563	90	113	62
100	625	100	125	69

<b>Triple super phosphate (TSP) containing 46% P<sub>2</sub>O<sub>5</sub></b>				
A	B	C	D	
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of TSP needed for quantity under Column A (kg)	Quantity of water soluble P <sub>2</sub> O <sub>5</sub> present in TSP under Column B (kg)	Quantity of citrate soluble P <sub>2</sub> O <sub>5</sub> in TSP under Column B (kg)	Quantity of Ca @15% present in TSP under Column B (kg)
10	21.7	9.1	3.3	3.3
20	43.5	18.3	6.5	6.5
30	65.2	27.4	9.8	9.8
40	87.0	36.5	13.0	13.0
50	108.7	45.7	16.3	16.3
60	130.4	54.8	19.6	19.6
70	152.2	63.9	22.8	22.8
80	173.9	73.0	26.1	26.1
90	195.7	82.2	29.3	29.3
100	217.4	91.3	32.6	32.6

<b>Di-ammonium phosphate (DAP): 18-46-0</b>				
A	B	C	D	E
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of DAP needed for quantity under Column A (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> present in DAP under column B (kg)	Citrate soluble P <sub>2</sub> O <sub>5</sub> present in DAP under column B (kg)	N (kg) present in DAP under column B (kg)
10	21.7	8.9	1.1	3.9
20	43.5	17.8	2.2	7.8
30	65.2	26.7	3.3	11.7
40	87.0	35.7	4.3	15.7
50	108.7	44.6	5.4	19.6
60	130.4	53.5	6.5	23.5
70	152.2	62.4	7.6	27.4
80	173.9	71.3	8.7	31.3
90	195.7	80.2	9.8	35.2
100	217.4	89.1	10.9	39.1

<b>Mono-ammonium phosphate (MAP): 11-52-0</b>				
A	B	C	D	E
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	MAP Quantity needed for P <sub>2</sub> O <sub>5</sub> quantity under column A (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> present in MAP under column B (kg)	Citrate soluble P <sub>2</sub> O <sub>5</sub> present in MAP under column B (kg)	N present in MAP under column B (kg)
10	19	8.1	1.9	2.1
20	38	16.2	3.8	4.2
30	58	24.3	5.7	6.3
40	77	32.5	7.5	8.5
50	96	40.6	9.4	10.6
60	115	48.7	11.3	12.7
70	135	56.8	13.2	14.8
80	154	64.9	15.1	16.9
90	173	73.0	17.0	19.0
100	192	81.2	18.8	21.2

<b>17-44-0 (Urea phosphate):100% water soluble</b>			
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of 17-44-0 needed for quantity under Column A (kg)	Quantity of water soluble P <sub>2</sub> O <sub>5</sub> present in the fertilizer under Column B (kg)	Quantity of N (kg) present in the fertilizer under Column B (kg)
10	22.7	10	3.9
20	45.5	20	7.7
30	68.2	30	11.6
40	90.9	40	15.5
50	113.6	50	19.3
60	136.4	60	23.2
70	159.1	70	27.0
80	181.8	80	30.9
90	204.5	90	34.8
100	227.3	100	38.6

<b>12-61-0 (Mono-ammonium phosphate): 100% water soluble</b>			
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Quantity of P <sub>2</sub> O <sub>5</sub> needed(kg)	Quantity of 12-61-0 fertilizer needed for quantity under Column A (kg)	Quantity of water soluble P <sub>2</sub> O <sub>5</sub> in the fertilizer under Column B (kg)	Quantity of N in the fertilizer under Column B (kg)
10	16.4	10	2.0
20	32.8	20	3.9
30	49.2	30	5.9
40	65.6	40	7.9
50	82.0	50	9.8
60	98.4	60	11.8
70	114.8	70	13.8
80	131.1	80	15.7
90	147.5	90	17.7
100	163.9	100	19.7

<b>Superphosphoric acid (70% P<sub>2</sub>O<sub>5</sub> / kg): Liquid water soluble</b>			
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Quantity of P <sub>2</sub> O <sub>5</sub> needed	Quantity of fertilizer (17-44-0) needed (kg)	Polyphosphate (P <sub>2</sub> O <sub>5</sub> ) present in the fertilizer under column B (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> present in the fertilizer under column B
10	14.3	2.7	10
20	28.6	5.4	20
30	42.9	8.1	30
40	57.1	10.8	40
50	71.4	13.5	50
60	85.7	16.2	60
70	100.0	18.9	70
80	114.3	21.6	80
90	128.6	24.3	90
100	142.9	27	100

<b>Ammonium polyphosphate (10-34-0) : Liquid water soluble</b>				
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of 10-34-0 fertilizer needed (kg)	Polyphosphate (P <sub>2</sub> O <sub>5</sub> ) present in the fertilizer under column B (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> in the fertilizer under column B	Ammonium- N present in the fertilizer under column B
10	29.4	6.47	10	2.9
20	58.8	12.94	20	5.9
30	88.2	19.41	30	8.8
40	117.6	25.88	40	11.8
50	147.1	32.35	50	14.7
60	176.5	38.82	60	17.6
70	205.9	45.29	70	20.6
80	235.3	51.76	80	23.5
90	264.7	58.24	90	26.5
100	294.1	64.71	100	29.4

<b>N-P-K : 10-26-26</b>					
A	B	C	D	E	F
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Fertilizer (10-26-26 needed for quantity under column A (kg))	Water soluble P <sub>2</sub> O <sub>5</sub> present in fertilizer under column B (kg)	Citrate soluble P <sub>2</sub> O <sub>5</sub> present in fertilizer under column B (kg)	K <sub>2</sub> O present in fertilizer under column B (kg)	K <sub>2</sub> O present in fertilizer under column B (kg)
10	38.5	8.5	1.5	3.85	10.0
20	76.9	17.0	3.0	7.69	20.0
30	115.4	25.5	4.5	11.54	30.0
40	153.8	34.0	6.0	15.38	40.0
50	192.3	42.5	7.5	19.23	50.0
60	230.8	51.0	9.0	23.08	60.0
70	269.2	59.5	10.5	26.92	70.0
80	307.7	68.0	12.0	30.77	80.0
90	346.2	76.5	13.5	34.62	90.0
100	384.6	85.0	15.0	38.46	100.0

<b>Urea Ammonium Phosphate : 24-24-0</b>					
A	B	C	D	E	F
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of fertilizer (24-24-0) needed for quantity under column A (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> present in fertilizer under column B (kg)	Citrate soluble P <sub>2</sub> O <sub>5</sub> present in fertilizer under column B (kg)	N present in fertilizer under column B (kg)	K <sub>2</sub> O present in fertilizer under column B (kg)
10	41.7	8.5	1.5	10.0	-
20	83.3	17.0	3.0	20.0	-
30	125.0	25.5	4.5	30.0	-
40	166.7	34.0	6.0	40.0	-
50	208.3	42.5	7.5	50.0	-
60	250.0	51.0	9.0	60.0	-
70	291.7	59.5	10.5	70.0	-
80	333.3	68.0	12.0	80.0	-
90	375.0	76.5	13.5	90.0	-
100	416.7	85.0	15.0	100.0	-

Steamed bone meal (22% P <sub>2</sub> O <sub>5</sub> )				
A	B	C	D	E
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Steamed bone meal needed for P <sub>2</sub> O <sub>5</sub> quantity under column A (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> in fertilizer under column B (kg)	2 % citric acid soluble P <sub>2</sub> O <sub>5</sub> in fertilizer under column B (kg)	N%
10	45.5	-	7.3	-
20	125.0	-	20.0	-
30	187.5	-	30.0	-
40	250.0	-	40.0	-
50	312.5	-	50.0	-
60	375.0	-	60.0	-
70	437.5	-	70.0	-
80	500.0	-	80.0	-
90	562.5	-	90.0	-
100	625.0	-	100.0	-

Raw bone meal (20% P <sub>2</sub> O <sub>5</sub> )				
A	B	C	D	E
Quantity of P <sub>2</sub> O <sub>5</sub> needed (kg)	Quantity of raw bone meal needed for P <sub>2</sub> O <sub>5</sub> under column A (kg)	Water soluble P <sub>2</sub> O <sub>5</sub> in fertilizer under column B (kg)	2 % citric acid soluble P <sub>2</sub> O <sub>5</sub> in fertilizer under column B (kg)	N @3% in the bone meal under column B (kg)
10	50	-	6	1.5
20	100	-	16	3.0
30	150	-	24	4.5
40	200	-	32	6.0
50	250	-	40	7.5
60	300	-	48	9.0
70	350	-	56	10.5
80	400	-	64	12.0
90	450	-	72	13.5
100	500	-	80	15.0